October 23, 2015

Ms. Norma Bennett
District Manager, NSE
30 Damascus Road, Suite 115
Bedford Commons, Bedford NS
B4A 0C1

RE: Vertical Expansion Contingency Plan Permit Application

Ms. Bennett,

On August 4, 2015 a contingency plan was approved by Halifax Council to manage Halifax's solid waste at the Otter Lake Site for a minimum of one year if there happens to be a delay in the vertical expansion approval for the entire site. On this date Halifax Council directed staff to initiate the by-law process to prohibit Industrial, Commercial and Institutional waste from being received at the Otter Lake Facility effective January 1, 2016 (unless the 140,000 tonne expansion of landfill Cell 6 is approved by the Province prior to January 1, 2016, in which case the change to the by-law will not be effective until April 1, 2016; or unless vertical expansion of the entire Otter Lake Facility is approved by the Province prior to April 1, 2016, in which case the change to the by-law will not be made effective at all).

As the Administrator responsible for the Otter Lake Site, Approval No. 2008-065580-A01, I am applying for a 140,000 tonne capacity increase to Cell 6. I have included within this Halifax permit application submission for the 140,000 tonne capacity increase to landfill Cell 6 all requirements as outlined within your June 24, 2015 letter including:

- A completed application for amendment of approval to operations to include the vertical expansion of Cell 6 including all attachments and supporting documents;
- Dillon letter dated September 30, 2015 entitled "Otter Lake Contingency Plan" which includes the structure and specifics of the Design for the Vertical Expansion, related drawings and a Geotechnical Assessment report prepared by Conquest Engineering;
- Changes in the Manual or Plan for your authorization – i.e. an updated Operations Plan for the Residuals Disposal Facility dated September 2015 (to incorporate the 140,000 tonne vertical expansion in Cell 6);
- A copy of all correspondence with the Otter Lake Community Liaison Committee (Community Monitoring Committee) since 2012 both sent by and received by HRM regarding the proposed contingency plan and/or vertical expansion of any of the cells at this facility;
- Confirmation from a certified professional engineer that the proposed addition of 140,000 tonnes of residual waste will not impact the performance of leachate collection system surrounding and/or beneath Cell 6, as required under the terms and conditions of the existing operating approval.

Throughout the entire solid waste strategy review Halifax has actively engaged and communicated with the CMC as well as the local and broader community. To illustrate the depth and breadth of this engagement the application submission contains community consultation reports; presentations given by both staff and the CMC to Halifax Council and the public; questions and feedback from the engagement process; Council reports with direction to staff regarding vertical expansion, public consultation and the engagement process; Halifax's Community Engagement Strategy Policy; and finally a summary of the

three year consultation and engagement process Halifax has led to ensure community input was provided and incorporated into the decision making process.

On October 6, 2015 Halifax Council directed staff to commence contract negotiations with Mirror NS on an extension to the 1997 HRM – Mirror NS "Agreement for the Design, Construction and Operation of Components of Halifax Regional Municipality's Solid Waste Facilities" (the "Extension Agreement") subject to the parameters as outlined within this report and return to Halifax Regional Council for ratification of the Agreement by December 31, 2015.

If Halifax staff and Mirror NS are able to successfully negotiate and ratify a new agreement by December 8, 2015 (Halifax Council's last scheduled meeting for 2015), Halifax may seek to have this contingency plan permit application rescinded for consideration.

I will ensure Solid Waste staff, GHD, Dillon Consulting and Mirror NS are available upon request to address any issues with this application. Please do not hesitate to call.

Regards,

[redacted]

Matt Kelliher

Manager
Solid Waste Resources
Halifax Regional Municipality
Tel 902.490.6606
Cell 902.225.2677
Email kelihem@halifax.ca

cc. Jillanna Brown, P. Eng., NS Environment

NOVA SCOTIA
Environment

APPLICATION FOR APPROVAL

OFFICE USE ONLY		Application #
Date Rec'd (yyyy/mm/dd)	Ext. Ref. #	NSE File #
Total Fees Due	Fees Paid	Paid in Full Yes ☐ No ☐
Receipt #	Water Auth. # (Div. 1 only)	

The non-refundable application fee is for processing the application. Receipt of the fee will not imply an approval or guarantee an approval will be given.

Nova Scotia Environment will only collect, use, and disclose personal information in keeping with the privacy provisions of the *Nova Scotia Freedom of Information & Protection of Privacy Act (FOIPOP).*

PLEASE PRINT OR TYPE. Complete Sections 1, 2, 3, 4 and 7 for ALL Applications. Complete areas of Sections 5 and 6 that are applicable to the specific activities of this application only.

Type of Application

New Application ☐ Renewal ☐ Amendment ☑ Transfer ☐

If applicable, provide the previous Approval # 2011-076545, 2008-065580-A01

SECTION 1 - OWNER

If there is more than one owner, please indicate who will be the primary applicant for this project and attach a complete list of owners.

Company/Organization/Municipality Halifax Regional Municipality			
Business Number (BN) *if applicable* Contact #1			
Mr ☑ Ms ☐ Mrs ☐ Other		Professional Designation MBA, MPS (CED), CHRP, CPA,	
First Name Matthew	Middle Initial	Family Name Keliher	
Phone Home (902)	Business (902) 490-6606 Ext	Other (902) 225-2677 Ext	
Fax (902) 490-6690	E-mail kelihem@halifax.ca		
Civic/Street Address 40 Alderney Dr., Suite 102			
Mailing Address (if different than Civic) P. O. Box 1749			
County	City/Town Halifax		
Province Nova Scotia	Postal Code B3J 3A5	Country Canada	

SECTION 2 - APPLICATION CONTACT

Is the Application Contact the same as Section 1 - Owner? Yes ☐ No ☐ **If yes, please skip to Section 3.**

Company/Organization/Municipality Halifax Regional Municipality			
Business Number (BN) *if applicable* Contact #2			
Mr ☑ Ms ☐ Mrs ☐ Other		Professional Designation P. Eng.	
First Name Robert	Middle Initial T	Family Name Orr	
Phone Home (902)	Business (902) 490-6698 Ext	Other (902) 476-6754 Ext	
Fax (902) 490-6690	E-mail orrr@halifax.ca		
Civic/Street Address Same As Above			
Mailing Address (if different than Civic)			
County	City/Town		
Province Nova Scotia	Postal Code	Country Canada	

SECTION 3 - SITE/LOCATION OF PROPOSED ACTIVITIES

Property Identification numbers (PID) are available at Service Nova Scotia and Municipal Relations.
1:50,000 Topo Maps (identifying Easting and Northing) are available at Nova Scotia Environment.

Site Name Otter Lake Residuals Disposal Facility (Landfill Cell 6 Vertical Expansion of 140,000 tonnes)	
Civic/Street Address 600 Otter Lake Dr., Exit 3, Off Highway 103	
County Halifax	Community
Property Identification # (PID) 00624973 & Others	1:50,000 Topo Map #
Grid Reference Easting (6)	Northing (7)

SECTION 4 - ACTIVITY

Proposed Activity - Please check (✓) all that apply.

Activity	Complete Sections	Activity	Complete Sections
Septage Works:			
Treatment and Disposal	☐ 4, 5A, 5B, 6A, 7		
Sewage Works:			
Collection & Pumping Application	☐ 4, 5A, 5C, 6A, 7	Storage	☐ 4, 5A, 5C, 6A, 7
Collection & Pumping Notification	☐ 4, 5A, 5C, 6A, 7	Treatment	☐ 4, 5A, 5C, 6A, 7
Outfalls	☐ 4, 5A, 5C, 6A, 7		
Solid Waste:			
Composting Facility	☐ 4, 5A, 5D, 6A, 6B, 7	Municipal Solid Waste Ashfill	☐ 4, 5A, 5D, 6A, 6B, 7
Construction & Demolition Debris Disposal Site	☐ 4, 5A, 5D, 6A, 6B, 7	Municipal Solid Waste Landfill	☑ 4, 5A, 5D, 6A, 6B, 7
Energy from Waste Facility	☐ 4, 5A, 5D, 6A, 6B, 7	Waste Storage Facility	☐ 4, 5A, 5D, 6A, 6B, 7
Front End Mixed Waste Processing Facility	☐ 4, 5A, 5D, 6A, 6B, 7	Waste Transfer Station	☐ 4, 5A, 5D, 6A, 6B, 7
Household Hazardous Waste Depot	☐ 4, 5A, 5D, 6A, 6B, 7		
Manufacturing Facility	☐ 4, 5A, 5D, 6A, 6B, 7		
Mixed Waste Material Recovery Facility	☐ 4, 5A, 5D, 6A, 6B, 7		
Storm Drainage Works:			
Collection & Pumping Application	☐ 4, 5A, 5E, 6A, 7	Storage	☐ 4, 5A, 5E, 6A, 7
Collection & Pumping Notification	☐ 4, 5A, 5E, 6A, 7	Treatment	☐ 4, 5A, 5E, 6A, 7
Outfalls	☐ 4, 5A, 5E, 6A, 7		
Water Works:			
Water Distribution Application	☐ 4, 5A, 5F, 6A, 7	Water Supply	☐ 4, 5A, 5F, 6A, 7
Water Distribution Notification	☐ 4, 5A, 5F, 6A, 7	Water Treatment	☐ 4, 5A, 5F, 6A, 7

Will this Activity employ a new technology? Yes ☐ No ☑

If yes, please specify This project is a vertical expansion of Landfill Cell 6 in an amount of an additional 140,000 tonnes.

Proposed Project Dates, if applicable (yyyy/mm/dd)

Start Construction Date | Start Operations Approx. Oct /16 | End/Closure Date Approx. Nov./17

SECTION 5 - ACTIVITY DETAILS

Complete Section 5 to the best of your knowledge. Please provide all information requested in metric units indicated.

5A - Complete for *ALL Applications*

Communities or Locations Served Halifax Regional Municipality

Number of Persons Served after Project Completion Approx. 400,000

This is a New Facility ☐ *OR* Modification to an existing Facility ☑

5B - Complete only for *Septage Works*

Type of Treatment Facility Lagoon ☐ *AND/OR* Land Application ☐ *AND/OR* Other ☐

If Other, please specify

Depth to Maximum Groundwater Level (metres)	Depth to Bedrock (metres)
Distance to nearest Public Well (within 500 metres)	Distance to nearest Dwellings (within 500 metres)

5C - Complete only for *Sewage Works*

Type of Treatment Facility: Lagoon ☐ RBC ☐ Oxidation Ditch ☐ SBR ☐ Intermittent Sand Filtration ☐ Engineered Wetland ☐ Other ☐

If Other, please specify

Has a Pre-design Study or a Pollution Control Study been completed? Yes ☐ No ☐

If this is a sewage treatment plant, please provide the following:

Distance to the nearest well (metres) Distance to the nearest dwelling (metres)

If there is an outfall, what is the receiving watercourse?

Type of Disinfection: Chlorination ☐ UV ☐ Other ☐

If Other, please specify If chlorination will be used, will de-chlorination be provided? Yes ☐ No ☐

5D - Complete only for *Solid Waste*

Type of Solid Waste Processing: Composting ☐ Landfill ☑ Construction & Demolition Debris ☐ Municipal Solid Waste ☐ Other ☐

If Other, please specify: Vertical Expansion of Landfill Cell 6 in an amount of 140,000 tonnes

What is the distance between the active area and the nearest

Residential/Institutional Building (metres)	> 1000 m	Public Water Supply (metres)	
Commercial/Industrial Building (metres)		Off-site Well (metres)	Ap. 3000 m
Highway or Common Road (metres)	2.6 km	Watercourse (metres)	See Dwgs.

5E - Complete only for *Storm Drainage Works*

What is the receiving watercourse?

5F - Complete only for *Water Works*

Water Authorization #

Source of Water: Groundwater ☐ *OR* Surface Water ☐

If surface water, please specify.

SECTION 6 - SUPPORTING DOCUMENTATION TO ATTACH

All supporting documentation is to be submitted in accordance with the "Approvals Procedures Regulations." If applicable, the following documents must be submitted with this Application; however, additional information may be requested.

Note - A legend must be supplied for all mapping describing symbols used, scale and north orientation.

6A - Attach for *All* Applications

☐	Copy of the property deed, lease or letter proving the applicant's legal right to conduct the activity on the site
☐	If applicable, certified copy of the article of the incorporation of the company
☐	Copies of all existing Approvals relating to the activity that have been issued by any agencies (including Municipal Approval)
☐	Site Plan (scaled drawing, minimum scale 1:2,000) including (but not limited to): - Property boundaries, contours of the site and adjacent properties - Location of all relevant industrial, commercial and residential structures - Location of nearby watercourses, wetlands, dwellings, wells, water supplies, public roads & highways
☐	Site Assessment evaluating potential impacts on wells, watercourses, roads, residences or other environmental or ecological features
☐	Predesign Study or Pollution Control Study

☑	Scaled engineering drawings, plans, and specifications that are stamped by a qualified N. S. Licensed professional engineer including (but not limited to) - Plans & drawings for structures & equipment used to obtain satisfactory treatment of wastes. - Sufficient data to demonstrate the feasibility of a process to supply satisfactory treatment - Reports on the proposed treatment facilities indicating design capacities, flows, & concentrations of wastes expected to be emitted to the environment - Calculations, factors, & parameters used in the design See Sep. 30, 2015 Dillon report attached.
☑	Geotechnical Report See Conquest Engineering Geotechnical Assessment Sep. 30/15.
☐	Hydrogeological Report
☑	Description of the waste reduction, recycling, and environmental controls from the facility See Sep. 30 Dillon report.
☑	Operations Procedure & Maintenance Manual, including (but not limited to) - Inspection & monitoring procedures (Upload) See Sep. 30 Dillon report.
☐	Contingency plan, including (but not limited to) - Scope of the plan (purpose, geographic area, and persons, groups, etc., that have responsibility) - Notification procedures (what is to be reported, when, to whom, internal & external reporting procedures and a 24 hour telephone response number - Notification list including names & telephone numbers for all key internal response team personnel, telephone number for reporting environmental emergencies in N. S., relevant municipal/local telephone numbers (fire, police, ambulance, medical/hospital, clean-up contractors, etc) And government assistance services such as CANUTEC - Identification of a response team leader and the role of the response team leader respecting decision making, focal point, report preparation and submission, etc. - Proposed containment and clean-up procedures - Proposed transportation procedures - Site restorations plan (in case of an accidental discharge) that will ensure that the area is rehabilitated to its pre-spill condition - Proposed disposal procedures - Available resources including manpower, contractors, treatment materials, expertise, communications, countermeasure equipment, etc - Public relations including the identification of an individual who can speak on behalf of the approval holder - Incident reporting procedures and investigative follow-up procedures
6B - Attach for *Solid Waste* only	
☐	Preliminary development of an abandonment or rehabilitation plan including a report outlining the requirements as per current Environment guidelines

If information submitted is incomplete, or if supporting documentation is of poor quality (plans, maps, etc.), the application may be delayed, returned or rejected.

SECTION 7 - DECLARATION

Correspondence is to be returned to: Owner ☑ OR Application Contact ☐

Owner's Signature [redacted] Date (yyyy/mm/dd) 2015/10/01

Name (Please print or type) Robert Orr (for Halifax Regional Municipality)

OWNER'S AUTHORIZATION (If Correspondence is to Be Returned to Application Contact)

If you are acting on behalf of the owner, you must:

1. Have the ***Owner*** sign above **or**
   Attach a letter of authorization from the ***Owner*** identified on Page 1, Section 1, of this application.
2. Identify yourself as the ***Application Contact*** on Page 1, Section 2, of this application.
3. Sign the declaration below.

I certify that I am [redacted]nt.

Signature [redacted] Date (yyyy/mm/dd) 2015/10/01

Name (Please print or type) Robert T. Orr (Emplyee)

NOVA SCOTIA
Environment
Compliance Division

30 Damascus Road, Suite 115
Bedford, Nova Scotia
Canada B4A 0C1

(902) 424-7773 T.
(902) 424-0597 F.
www.gov.ns.ca/nse

File # 94400-30BED-2008-065580-A01

Matthew Keliher
Manager, Solid Waste Resources
Halifax Regional Municipality
PO Box 1749
Halifax, NS B3J 3A5

June 24, 2015

Dear Mr. Keliher,

Further to your correspondence of April 15, 2015 regarding the proposed vertical expansion contingency plan at the Otter Lake municipal landfill facility, the proposed contingency plan proposes changes to Cell 6. The current operating approval, **2008-065580-A01**, contains the following reference document:

k) Halifax Regional Municipality - Application for amendment of approval to operation to include Cell 6, dated August 24, 2012, including all attachments

The reference document speaks to the current structure of Cell 6 and does not include the specifics of this proposed vertical expansion for the contingency plan. The proposed contingency plan will require amendments to these reference materials to including a maximum additional 140,000 tonnes of residual waste. This proposed contingency plan will also likely require a revision to your Operations Plan, which forms part of your approval, as per Term and Condition 2

d) Any changes in the Manual or Plan must be authorized, in writing, by the Department.

An application for consideration of amendment to this operating approval must be submitted to the Department with these revised documents. In addition, the following items must be submitted as part of your application process:

- A copy of all correspondence with the Otter Lake Community Liaison Committee since 2012, both sent by and received by HRM, regarding the proposed contingency plan and/or vertical expansion of any of the cells at this facility;
- Confirmation from a certified professional engineer that the proposed addition of 140,000 tonnes of residual waste will not impact the performance of leachate collection system surrounding and/or beneath Cell 6, as required under the terms and conditions of the existing operating approval.

Should you or other HRM staff have specific questions regarding this file, then please contact Jillanna Brown, P.Eng. at 902-424-2290.

Yours truly,

[redacted]

Norma Bennett
District Manager

CMC's Topics for Review and Assessment

On December 3, 2014 the CMC outlined their requirements to support vertical expansion.

Conditions were that Halifax would assess:

1. Landfill Cell Development Scope and Sequencing
2. Landfill Stability
3. Area View Planes
4. Odour Management
5. Landfill Gas Management
6. Leachate Management
7. Surface Water Management
8. Litter Management

In addition to the above, another condition was there would also be ongoing participation by the CMC in the process. The CMC agreed that they would review documents once completed.

On October 1, 2015 CMC was provided detailed operational plans and amendments for the 140,000 capacity increase in Cell 6. An invitation was given to the CMC to review any and all documents with the Halifax staff, GHD, Dillon Consulting and Mirror NS. CMC did not accept.

October 13, 2015 the CMC was provided another letter to inform them of staff's desire to review the documents with them in order to address any concerns. CMC did not accept.

October 16, 2015 the CMC wrote the Mayor expressing that "Although the application for vertical height expansion includes some engineering design work, it does not satisfy the requirements of the study as agreed to by HRM". (As outlined above).

On October 19, 2015 Halifax was provided a letter from GHD outlining that all CMC requirements (1-8 above) have been satisfied within the amended operating and design documents. Staff had planned to address any and all issues or concerns with the CMC during a review meeting. As outlined above the CMC declined to be engaged. Therefore Halifax requested this letter be prepared.

October 19, 2015 Reference No.088605-10

Mr. Matthew Keliher MBA, MPS, CHRP, CMA
Manager
Solid Waste Resources
Transportation & Public Works
Halifax Regional Municipality

Via Email: kelihem@halifax.ca

Dear Mr. Keliher:

Re: Cell 6 Contingency Plan
Otter Lake Facility
600 Otter Lake Drive, Halifax, Nova Scotia

Halifax Regional Municipality (Halifax) has retained GHD Limited (GHD) to peer review the Cell 6 Contingency Plan for the Otter Lake Facility prepared by Dillon Consulting (Dillon) (dated September 30, 2015) on behalf of Mirror Nova Scotia (Mirror NS). Overall, the plan adequately addresses adding 140,000 tonnes of material to Cell 6, resulting in an increase in the final height of Cell 6 by 6 m as compared to original design grades. Landfill design aspects addressed by Dillon include cell design, slope stability, landfill gas management, and surface water management. In addition, Mirror NS has adequately updated the Residual Disposal Facility (RDF) Operations Plan, which required minimal change to accommodate the additional 6 m waste lift on Cell 6.

Specific concerns that had been previously raised by the Halifax Waste Resources Society with regards to the full vertical expansion of the entire Residual Disposal Facility (RDF) have been addressed, as applicable, for the Cell 6 Contingency Plan as summarized below.

1. Landfill Cell Development Scope and Sequencing: The basis for the proposed contingency plan was to add an additional year of capacity in Cell 6. As noted in Section 1.0, the design shows that by vertically expanding Cell 6 by 6 m will accommodate approximately 140,000 tonnes of waste or approximately 1 to 1.5 years of capacity depending on incoming waste volumes.
2. Landfill Stability: As noted in Appendix B, it was determined that there were no slope stability concerns with the proposed 6 m vertical expansion. There is an existing steep slope (2.5:1) on the south side of Cell 6 that has been recommended to be filled to a flatter slope (4:1) to provide better long-term stability.
3. Area View Plane: Based on the previous balloon study completed (SNC Lavalin, 2013), there are no area view plan concerns.

GHD Limited
45 Akerley Boulevard Dartmouth Nova Scotia B3B 1J7 Canada
T 902 468 1248 F 902 468 2207 W www.ghd.com

4. Odour Management: As noted in Appendix C (Operations Plan, Section 5.2) Mirror NS will continue to manage odours by:
   - Applying daily cover (i.e., 0.150 m of shredded construction and demolition debris matrix)
   - Applying interim cover (i.e., 0.300 m of soil cover) to waste loads that are particularly odorous in addition to areas that will become dormant for more than six months
   - Use of waste acceptance and rejection procedures

   As noted in Section 3.0, one operational change is that Mirror NS will use horizontal landfill gas (LFG) collection trenches as part of the implementation of the contingency plan. The trenches will underlay the proposed 6 m lift and will allow for the immediate collection of LFG. The utilization of both horizontal trenches and existing vertical LFG collection wells will improve the overall capture of LFG and associated odours.

5. Landfill Gas Management: Please see response to #4. Existing LFG collection and flaring infrastructure is adequate to accommodate the 6 m vertical expansion.

6. Leachate Management: The existing leachate collection infrastructure in Cell 6 is adequate to accommodate the 6 m vertical expansion. Mirror NS has reported no challenges with leachate mounding or breakout in Cell 6.

7. Surface Water Management: As noted in Section 4.0, as part of the 6 m vertical expansion, there will be minor changes as to how surface water runoff drains to the south sedimentation pond. The existing surface water conveyance infrastructure is generally adequate (e.g., ditches, culverts, and ponds). Once the vertically expanded Cell 6 is capped, minor modifications to the surface water conveyance infrastructure may be required.

8. Litter Management: As noted in Appendix C (Operations Plan, Section 5.1), wind-blown litter will continue to be managed by maintaining control of the active face of the landfill by utilizing fixed and portable litter fencing, and by utilizing personnel to pick litter.

Sincerely,

GHD

[redacted]

Andrew Philopoulos, P.Eng., M.Sc.

AP/bar/9

Halifax Waste-Resource Society
P.O. Box 213
Lakeside, NS
B3T 1M6

December 3, 2014

John Traves, Q.C.
Director
Legal, Insurance And Risk Management Services
Halifax Regional Municipality
PO Box 1749
Halifax, NS
B3J 3A5

Dear Mr. Traves:

Re: Solid Waste/Resource Strategy Review

Please find attached the Halifax Waste-Resource Society's position paper on the January 14, 2014 staff recommendations #7, 8 and 9 with respect to the Otter Lake landfill.

Yours sincerely,

[redacted]

Jack Mitchell,
Chair, HWRS

Cc: Ken Meech, Executive Director, HWRS

Update on Discussions with HRM on Otter Lake Recommendations

BACKGROUND AT COMMENCEMENT OF DISCUSSIONS

At the outset of these discussions, there were certain understandings and expectations held by the community, and some held by HRM.

COMMUNITY UNDERSTANDINGS/EXPECTATIONS:

A. Otter Lake Landfill Facility would close by December 31, 2023;

B. There was a predetermined outcome for the community engagement program;

C. The existing agreement between HRM and the HWRS is based on verifiable trust (confidence in commitments);

Verifiable Trust

Trust [trust] noun
1.reliance on the integrity, strength, ability, surety, etc., of a person or thing; confidence.

D. There is a need for more time to monitor (c) before any willingness to support extending life of landfill; and,

E. HRM will honor the commitment by Council that the environmental and community protection standards remain the same or better.

HRM UNDERSTANDINGS/EXPECTATIONS:

A. Based on the solid waste review, there is an opportunity to reduce operational/capital costs; and,

B. There is an ability to extend the operational life of the landfill and eliminate the need to locate a new replacement facility at considerable cost ($100 million).

POSITION OF HALIFAX WASTE RESOURCE SOCIETY(HWRS)/COMMUNITY MONITORING COMMITTEE(CMC) FOR INPUT TO HRM COUNCIL

Four joint sessions were held to review and discuss recommendations 7, 8, & 9 in the STAFF REPORT dated JANUARY 14, 2014:

A. With respect to ITEM #7 regarding export the HWRS/CMC has no objection. On behalf of the interests of the wider community we suggest due process as it represents changing a principle of the Community Stakeholder Strategy, and export was not included in the waste management public consultation. Accordingly we recommend an additional public hearing to solicit and hear the views from the wider public.

B. In accordance with the CMC agreement we expect that the FEP/WSF facilities will remain in operation.

C. No detail was presented for our review on the proposed integrated waste management campus. It is not recommended that a campus be created in the absence of an opportunity for the HWRS/CMC to view detail of what may be proposed.

D. We recommend the further exploration of alternative technologies.

Based on this starting point the focus of the meetings has been to explore the implications of **vertical expansion to existing cells at the**

Residual Waste Disposal Facility (RDF).

HRM retained Conestoga-Rovers & Associates to complete a high level technical review of the proposed vertical expansion of the RDF at Otter Lake.

The report has concluded that a vertical cell expansion is **technically possible while still maintaining or enhancing environmental protection and control measures** and that it should begin with cells 1 & 2 and continue through to all existing cells.

In the view of the Society an expansion of the landfill by opening closed cells and building higher upon them presents increased environmental risks, including:

- Increased litter;
- Impacts to the Nine Mile River;
- Increased leachate generation; and,
- Potential for significant odour and noise issues.

The report concludes that **design and operational changes** will be **required** to mitigate the risks and meet the objective of vertical cell expansion. As a minimum the report determined the following should be considered in the vertical expansion design:

- Design and Sequencing
- Slope stability
- Leachate and surface water management
- Landfill system components
- Landfill Gas (LFG) management
- Visual impact

The design changes will necessitate the need to develop a **revised operational plan** covering each of these aforementioned elements.

While the report concludes that a vertical extension is technically feasible it confirms that **operational changes** may be necessary to meet environmental objectives and obligations to the community. This represents a risk that is best mitigated by ensuring that the existing operator and its consultant, who are most familiar with the landfill facility, design any required operational modifications subject to review by HRM and CMC.

As design studies and operational changes are completed, HRM should provide opportunities for the local community to view them and understand them.

One of the key issues for the Society remains the **odour standards/outcomes**. It is expected that the operational plan to be developed will address this specific issue consistent with CRA advice that the vertical extension can be implemented while maintaining or enhancing all environmental and community protection.

The society expects that vertical extension will only proceed in small incremental steps thereby providing the operator, CMC, and HRM the opportunity to bring a halt to the process if unsuccessful. Environmental outcomes will be monitored to ensure compliance.

The society has reviewed the recommendations from staff and has no objection to the proposal subject to our comments, conditions and ongoing participation by CMC in the process.

Appendix

TECHNICAL REQUIREMENTS AS DETAILED BY HWRS AT COMMENCEMENT OF DISCUSSIONS.

Otter Lake - Residuals Disposal Facility – Vertical Expansion

With regard to the proposed vertical expansion and the site's current Provincial Approval to Operate, the following two clauses are highlighted:

> *3.p) Pursuant to Section 60 of the Act, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.*
>
> *3.t) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the active area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change.*

The Approval to Operate regulates a number of practices and emissions including the following, all of which will need to be dealt with by any change in the RDF cells;

- Air Emissions
- Sound Levels
- Liquid Effluent (Leachate)
- Vector / Litter Control
- Spills or Releases
- Erosion and Sediment Control
- Surface Water Discharge
- Groundwater

Topics Needing Review and Assessment Prior to Detailed Design

1) Landfill Cell Development Scope & Sequencing

- What is the most satisfactory height increase and based on what rationale (e.g., is it 15 m versus 10 m, 20 m or some other value?).
- Based on the selected height increase, confirmation of the required fill/long term construction sequence that best deals with vehicle access for waste placement, the original cover and gas collection system, and final cap installation. This evaluation must include selection of a preferred start point (ex., Cell 1 or Cell 6) of the vertical expansion effort.
- [illegible] closing date and overall fill capacity for the RDF.

2) Landfill Stability

- Confirmation that establishing new disposal areas on top of previously completed portions of the landfill will not create issues related to potential sinking of the present ground level of the closed cells and/or side slope failure.

3) Area View Planes

- With reference to Dillon's September 2012 conclusion that the top of Cell 5 was visible to area residents, completion of a view plane study to determine the visibility of the RDF during/following vertical expansion including consideration of ongoing/planned area developments.

4) Odour Management

- Confirmation of potential odour impacts and approaches for lessoning the potential impact of; a) the removal of the cap system from previously completed cells, and b) excavation/inspection and potential upgrade of the original leachate collection system.
- Identification of a preferred daily/interim cover material to enhance to the control of landfill gas and odours.
- The evaluation of potential odour impacts associated with vertical expansion must acknowledge stipulations included in Section 10 (Air Emissions) of site's Approval to Operate.

5) Landfill Gas Management

- Evaluation of landfill gas management needs for the new vertical expansion areas, including connection existing site systems and the potential requirement for new collection and flaring infrastructure.
- Evaluation of potential impacts to surface/sub-surface gas system infrastructure in the closed cells, including buried collection piping.

6) Leachate Management

- Confirmation that leachate from the new vertical expansion areas will move down through the closed disposal cells and to the original collection system without flow barriers (including soil cover in Cell 1); blockages; or exceedance of the 300 mm head limit on the RDF liner system.
- Inspection of original cell leachate collection sumps to assess their capability to manage increased quantities of leachate from the new vertical expansion areas. Due to bio-fouling (i.e., material deposits) and design improvements carried out over the years, it is anticipated that some sumps and pumping systems will require excavation and replacement.
- Inspection and possible upgrading of the leachate transmission piping outside of the cells to assess the capability to manage increased quantities of leachate.

7) Surface Water Management

- Determining drainage features (including terracing) necessary to accommodate runoff volumes and velocities down extended landfill side slopes.
- Confirmation of upgrade requirements to surface water management infrastructure (e.g., ditching, culverts and ponds) to manage runoff from new vertical expansion areas.

8) Litter Management

- Assessment of the adequacy of existing litter management procedures due to the increased elevation/exposure of the working disposal face.

Otter Lake Community Monitoring

October 16, 2015

Mayor Savage
1841 Argyle Street
PO Box 1749
Halifax, NS B3J 3A5

Dear Mayor Savage,

I am writing in response to Mr. Keliher's letter dated October 1, 2015 and to provide feedback on HRM's contingency plan of vertical expansion for the Otter Lake landfill.

We recognize that HRM has provided CMC with the opportunity to review the contingency plan of vertical height expansion as per the requirements of the Agreement between HRM and the Halifax Waste-Resource Society.

We understand that there is currently no application from HRM before Nova Scotia Environment ("NSE") for the contingency plan and that HRM will allow CMC the opportunity to review the application prior to its submittal.

We further understand that HRM is currently studying possible vertical expansion for all of the current approved cells, referred to as cells 1 to 9, as preparation of an application for approval to NSE.

CMC is awaiting the opportunity to review the study on vertical expansion in order to consult with the community and provide HRM with an adequate response and feedback.

At this time, CMC would like to provide the following comments:

On September 23, 2015 HRM staff ("Staff") members met with the CMC, as directed by Council, and brought along representatives from Mirror Nova Scotia ("Mirror"). The purpose of the meeting was to brief CMC on the proposal from Mirror for an extension of their contract, and to secure feedback.

During the meeting we were told by Staff that vertical height expansion did not have to be addressed for 2 or 3 years. The following week we were asked to review the contingency proposal for vertical height expansion.

We understood from the presentation from Staff and Mirror that the contingency plan was not necessary as construction of cell 7 was to commence as soon as Council approved negotiations with Mirror. In fact, the CAO and the City Solicitor stated several times in the meeting that a benefit of the proposed approach with Mirror is that vertical expansion would not have to be considered for 2 or 3 years. As a result, it was surprising to us to receive, only 6 business days later, the package from Staff that is to form the basis of an application to Nova Scotia Environment for a vertical expansion of cell 6.

We were further surprised that Council passed a resolution last week requiring vertical expansion to be a part of the contract negotiations with Mirror.

On December 9th, 2014 we were promised a study on the risks of vertical expansion to the environment and community, and the necessary mitigation measures, and we still have not received it. We are unable to adequately respond to HRM's proposed vertical expansion contingency plan until we have reviewed the results of such a study.

As you are aware, last year Council directed Staff to meet with the CMC to discuss deferred recommendations 7, 8 and 9 regarding proposed changes to the Otter Lake landfill. During those discussions, CMC and Staff agreed that a detailed study would be undertaken to assess the risks and mitigation efforts required as they relate to vertical expansion. Staff agreed to accept a list developed by the CMC of areas of concern to be incorporated into the study.

Although the CMC has requested the Terms of Reference for the study several times, it has not been provided to us. Without it we have not been able to assure ourselves, and the local affected community, that the study indeed addresses the issues we raised, and Staff agreed to include. In fact the refusal of HRM to provide the Terms of Reference, even in the face of a FOIPOP application, leads us to be sceptical that our concerns are being addressed as promised.

Although the application for vertical height expansion includes some engineering design work, it does not satisfy the requirements of the study as agreed to by HRM.

Refer to Appendix in Dec 3, 2014 CMC letter to John Travers.

Fifteen days does not allow us the time, nor do we have the resources, to conduct a full review of the engineering work that is included in the application documents. However we do note that the work does not address all of the issues that HRM agreed to study as per the Staff report of December 9, 2014. Most notably, there is no mention of nuisance factors such as odour and litter, which are priorities for the community. This omission is

both surprising and concerning, and we trust that a review by Nova Scotia Environment will find this as a significant shortcoming in the proposal.

The contingency plan constitutes a request for approval of vertical expansion, in case there is no approval for vertical expansion.

The purpose of the vertical expansion contingency plan is to ensure that there is capacity at the landfill for HRM's residential waste in case an application for vertical expansion of the landfill is not obtained by December 31, 2015.

The contingency plan has two elements:

1. To ban IC&I waste from the landfill, as necessary, to reserve landfill capacity in cell 6 for residential waste; and,
2. To increase the height of cell 6.

The contingency plan is to secure a vertical expansion of cell 6 in case there is not a timely approval of a vertical expansion of the entire landfill. The CMC fails to see the logic in this approach.

Vertical expansion of the landfill requires consultation with the local community.

It is our belief that the notion of increased height to existing cells requires public consultation with the local community. In fact, the Stantec Report *Waste Resource Strategy Update* of January 2013 recommended that any vertical expansion consideration be "subject to input from the immediate neighbours of the landfill." HRM has not satisfied this requirement and we do not believe that vertical expansion should be approved without it.

For clarity, the International Association for Public Participation, recognized internationally as an authority on public consultation/participation, lists 7 core values for public participation which we believe should be present in this instance to satisfy the requirement for public consultation and participation:

Core Values for the Practice of Public Participation

1. Public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.

2. Public participation includes the promise that the public's contribution will influence the decision.
3. Public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers.
4. Public participation seeks out and facilitates the involvement of those potentially affected by or interested in a decision.
5. Public participation seeks input from participants in designing how they participate.
6. Public participation provides participants with the information they need to participate in a meaningful way.
7. Public participation communicates to participants how their input affected the decision.

Giving 15 days for CMC to review a proposal for substantial changes to the Otter Lake landfill does not constitute community consultation.

To be clear, the notification to CMC under the agreement between HRM and the Halifax Waste-Resource Society certainly does not meet the definition of community consultation. There is a requirement in the agreement with the Halifax Waste-Resource Society to notify the CMC and allow the CMC to provide input, but nowhere does it suggest that doing so fulfills the requirements of community consultation.

Working together requires cooperation on both sides.

We certainly want to work cooperatively with HRM but that requires timely access to relevant information. Our requests for information remain unsatisfied. We ask again that the following information be provided to CMC immediately:

- The scope of work for the engineering study on risks and mitigation for height expansion
- The report from the August 4th in camera meeting on the contingency plan.

We are not requesting a meeting with Council at this time.

Because we still do not have adequate information to assess vertical height expansion, there is no point in meeting with Council at this time. We reserve the right to meet with Council at a later date when HRM provides all of the information required to assess vertical expansion and its potential impacts on the community, including the study that is not yet complete.

Otter Lake Community Monitoring

Yours truly,

[redacted]

Jack Mitchell

Chair, Community Monitoring Committee

cc: Members of Community Monitoring Committee
Members of HRM Council
Municipal Clerk
Matt Keliher
Honourable Andrew Younger, Minister of the Environment

October 13, 2015

Jack Mitchell
Chair
Community Monitoring Committee
PO Box 213
Lakeside, NS B3T 1M6

Dear Mr. Mitchell

As indicated in my October 1, 2015 letter, in order for Halifax to avoid restricting the ICI sector effective January 1, 2016 the 140,000 tonne capacity expansion must be approved by Nova Scotia Environment (NSE) no later than December 31, 2015. NSE has a 60 day legislative timeframe to review and render a decision on the application. Therefore an application must be submitted to NSE no later than October 30, 2015.

Halifax has yet to receive a request from the CMC to review documents related to the contingency vertical expansion nor has Halifax received a request to address Halifax Regional Council.

With the approaching deadlines Halifax is again reaching out to the CMC to determine if the CMC requires any further information regarding this proposal, and/or if the CMC would like to establish a time to review, in detail, the study and associated documents.

I would like to reiterate that Halifax is committed to continued consultation and information sharing with the CMC and will make, upon request, Halifax Solid Waste staff, GHD (formerly Conestoga-Rovers), Mirror NS and Dillon Consulting available to review any and all aspects of the proposed specifications. If after these consultations the CMC wishes to address Halifax Regional Council, time will be made available, upon request of the Chair, at the October 20, 2015 session of Halifax Regional Council.

Regards,

[redacted]

Matt Ketiher
Manager, Solid Waste

HALIFAX

Halifax Regional Municipality
PO Box 1749, Halifax, Nova Scotia
Canada B3J 3A5

halifax.ca

October 1, 2015

Jack Mitchell
Chair
Community Monitoring Committee
PO Box 213
Lakeside, NS B3T 1M6

Dear Mr. Mitchell

As you are aware on August 4, 2015 Regional Council directed staff to apply for an amendment to the operating permit for the Otter Lake Facility providing for approximately 140,000 tonnes of additional landfill capacity in Cell 6. Council also directed staff to initiate the by-law process to prohibit Industrial, Commercial and Institutional waste from being received at the Otter Lake Facility effective January 1, 2016 (unless the 140,000 tonne expansion of Cell 6 is approved by the Province prior to January 1, 2016, in which case the change to the by-law will not be effective until April 1, 2016; or unless vertical expansion of the entire Otter Lake Facility is approved by the Province prior to April 1, 2016, in which case the change to the by-law will not be made effective at all).

In order for us to avoid restricting the ICI sector effective January 1, 2016 the 140,000 tonne capacity expansion must be approved by Nova Scotia Environment (NSE) no later than December 31, 2015. NSE has a 60 day legislative timeframe to review and render a decision on the application. Therefore an application must be submitted to NSE no later than October 30, 2015.

Pursuant to section 6.05 of the Agreement for Community Monitoring of Solid Waste Facilities dated February 16, 1999, Halifax is providing the CMC the "proposed specifications" for the additional 140,000 tonne capacity which are to be included within the application to NSE.

Halifax is committed to continued consultation and information sharing with the CMC and will make, upon request, Halifax Solid Waste staff, GHD (formerly Conestoga-Rovers), Mirror NS and Dillon Consulting available to review any and all aspects of the proposed specifications. If after these consultations the CMC wishes to address Halifax

Regional Council, time will be made available, upon request of the Chair, at the October 20, 2015 session of Halifax Regional Council.

If you require any further information or details regarding this proposal, or would like to establish a time to review the proposal with the CMC and staff please feel free to call or email.

Regards,

[redacted]

Matt Keliher
Manager, Solid Waste

October 19, 2015 Reference No.088605-10

Mr. Matthew Keliher MBA, MPS, CHRP, CMA
Manager
Solid Waste Resources
Transportation & Public Works
Halifax Regional Municipality

Via Email: kelihem@halifax.ca

Dear Mr. Keliher:

Re: Cell 6 Contingency Plan
Otter Lake Facility
600 Otter Lake Drive, Halifax, Nova Scotia

Halifax Regional Municipality (Halifax) has retained GHD Limited (GHD) to peer review the Cell 6 Contingency Plan for the Otter Lake Facility prepared by Dillon Consulting (Dillon) (dated September 30, 2015) on behalf of Mirror Nova Scotia (Mirror NS). Overall, the plan adequately addresses adding 140,000 tonnes of material to Cell 6, resulting in an increase in the final height of Cell 6 by 6 m as compared to original design grades. Landfill design aspects addressed by Dillon include cell design, slope stability, landfill gas management, and surface water management. In addition, Mirror NS has adequately updated the Residual Disposal Facility (RDF) Operations Plan, which required minimal change to accommodate the additional 6 m waste lift on Cell 6.

Specific concerns that had been previously raised by the Halifax Waste Resources Society with regards to the full vertical expansion of the entire Residual Disposal Facility (RDF) have been addressed, as applicable, for the Cell 6 Contingency Plan as summarized below.

1. Landfill Cell Development Scope and Sequencing: The basis for the proposed contingency plan was to add an additional year of capacity in Cell 6. As noted in Section 1.0, the design shows that by vertically expanding Cell 6 by 6 m will accommodate approximately 140,000 tonnes of waste or approximately 1 to 1.5 years of capacity depending on incoming waste volumes.
2. Landfill Stability: As noted in Appendix B, it was determined that there were no slope stability concerns with the proposed 6 m vertical expansion. There is an existing steep slope (2.5:1) on the south side of Cell 6 that has been recommended to be filled to a flatter slope (4:1) to provide better long-term stability.
3. Area View Plane: Based on the previous balloon study completed (SNC Lavalin, 2013), there are no area view plan concerns.

GHD Limited
45 Akerley Boulevard Dartmouth Nova Scotia B3B 1J7 Canada
T 902 468 1248 F 902 468 2207 W www.ghd.com

4. Odour Management: As noted in Appendix C (Operations Plan, Section 5.2) Mirror NS will continue to manage odours by:
   - Applying daily cover (i.e., 0.150 m of shredded construction and demolition debris matrix)
   - Applying interim cover (i.e., 0.300 m of soil cover) to waste loads that are particularly odorous in addition to areas that will become dormant for more than six months
   - Use of waste acceptance and rejection procedures

   As noted in Section 3.0, one operational change is that Mirror NS will use horizontal landfill gas (LFG) collection trenches as part of the implementation of the contingency plan. The trenches will underlay the proposed 6 m lift and will allow for the immediate collection of LFG. The utilization of both horizontal trenches and existing vertical LFG collection wells will improve the overall capture of LFG and associated odours.

5. Landfill Gas Management: Please see response to #4. Existing LFG collection and flaring infrastructure is adequate to accommodate the 6 m vertical expansion.

6. Leachate Management: The existing leachate collection infrastructure in Cell 6 is adequate to accommodate the 6 m vertical expansion. Mirror NS has reported no challenges with leachate mounding or breakout in Cell 6.

7. Surface Water Management: As noted in Section 4.0, as part of the 6 m vertical expansion, there will be minor changes as to how surface water runoff drains to the south sedimentation pond. The existing surface water conveyance infrastructure is generally adequate (e.g., ditches, culverts, and ponds). Once the vertically expanded Cell 6 is capped, minor modifications to the surface water conveyance infrastructure may be required.

8. Litter Management: As noted in Appendix C (Operations Plan, Section 5.1), wind-blown litter will continue to be managed by maintaining control of the active face of the landfill by utilizing fixed and portable litter fencing, and by utilizing personnel to pick litter.

Sincerely,

GHD

[redacted]

Andrew Philopoulos, P.Eng., M.Sc.

AP/bar/9

October 1, 2015

Reference No.088605-10

Mr. Matthew Keliher MBA, MPS, CHRP, CMA
Manager
Solid Waste Resources
Transportation & Public Works
Halifax Regional Municipality

Via Email: kelihem@halifax.ca

Dear Mr. Keliher:

Re: Cell 6 Contingency Plan
Otter Lake Facility

Halifax Regional Municipality (Halifax) has retained GHD to peer review the Cell 6 Contingency Plan for the Otter Lake Facility prepared by Dillon Consulting (Dillon) on behalf of Mirror Nova Scotia (Mirror NS). Overall, the plan adequately addresses adding 140,000 tonnes of material to Cell 6, resulting in an increase in the final height of Cell 6 by 6 m as compared to original design grades. Landfill design aspects addressed by Dillon include cell design, slope stability, landfill gas management, and surface water management. In addition, Mirror NS has adequately updated the Residual Disposal Facility (RDF) Operations Plan, which required minimal change to accommodate the additional 6 m waste lift on Cell 6.

GHD has no issues with the Cell 6 Contingency Plan as proposed and believes that the same level of environmental protection can be expected as compared to current site operations. If you have any questions or comments, please do not hesitate to contact the undersigned.

Sincerely,

GHD

[redacted]

Andrew Philopoulos, P.Eng., M.Sc.

AP/tj/7

GHD Limited
45 Akerley Boulevard Dartmouth Nova Scotia B3B 1J7 Canada
T 902 468 1248 **F** 902 468 2207 **W** www.ghd.com

September 30, 2015

DILLON CONSULTING

137
Chain Lake Drive
Suite 100
Halifax
Nova Scotia
Canada
B3S 1B3
Telephone
(902) 450-4000
Fax
(902) 450-2008

MIRROR NS
P. O. Box 209
Lakeside, Nova Scotia
B3T 1M6

ATTENTION: Bev Connell

Otter Lake Contingency Plan

Our proposal letter of August 7, 2015 presented a methodology to develop a contingency plan to accommodate an additional 140,000 tonnes of residual material placed in Cell 6 on top of its currently-defined final design elevations.

1.0 Definition of Placement Geometry and Logistics

The geometry of Cell 6 was investigated to determine if the height of the surcharged waste in the cell could be increased to accommodate an additional 140,000 tonnes of residual material. Key assumptions used in the evaluation of the placement geometry and landfilling logistics for the additional waste were as follows:

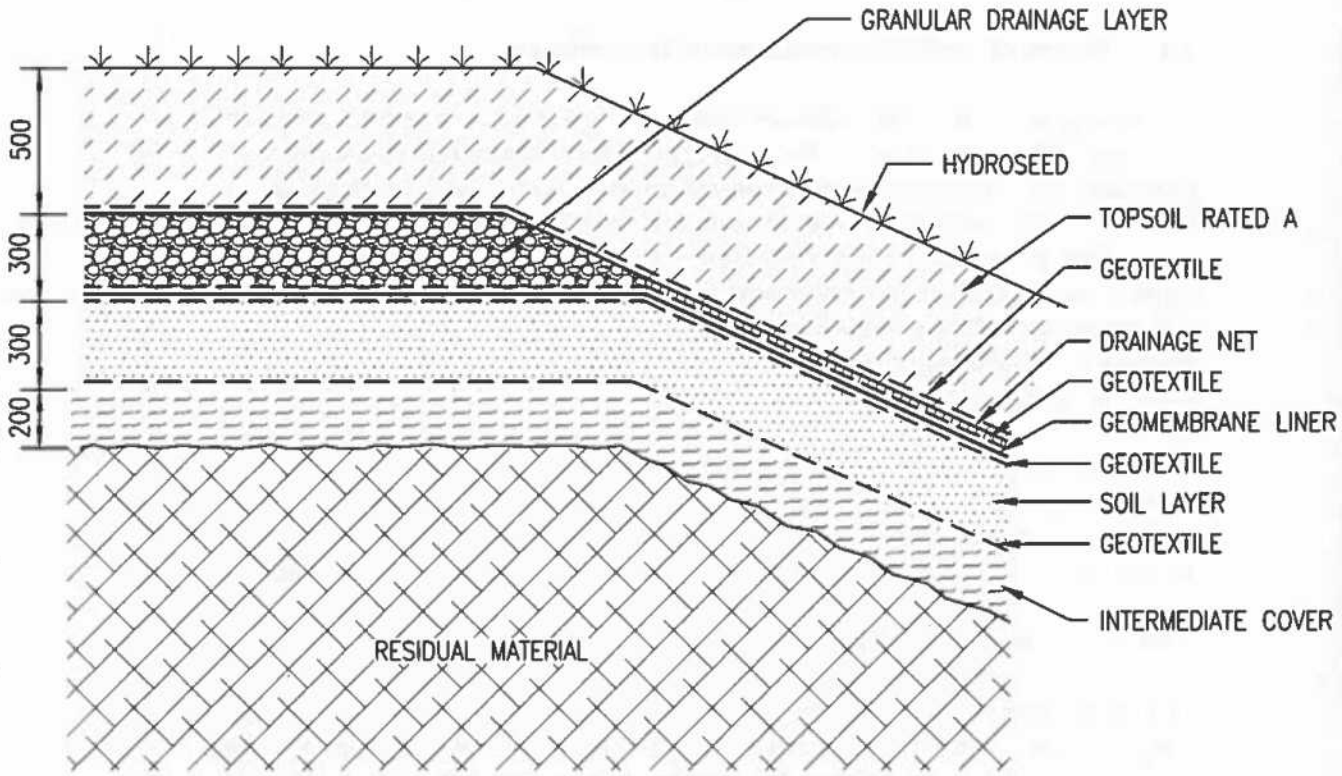
- Definition of the top of Cell 6 based on the surcharge elevations provided to MIRROR NS in November 2012.
- An existing 2.5:1 side slope along the western side (Cell 7 side) of Cell 6.
- A 3:1 slope toward Cell 5 (acknowledging the requirement for a future connection to the VE lift).
- NSE approved cap system for the RDF.
- Placement of the additional tonnage within the limits of Cell 6 with the existing Cell 5 cap remaining intact;
- Providing a minimum top width of approximately 50 m to allow for hauling vehicles and mobile equipment to access the top of the proposed contingency fill area.
- The requirement to accommodate the contingency fill area into the future Vertical Expansion development.
- The average placed/compacted material density at the RDF will be 850 kg/m^3 as presented in Task 2 - Daily Cover Material Options Analysis.

The investigation indicated that the additional material can be accommodated based on the above assumptions, resulting in the height of the cell increasing (on average) by 6 m (plus an additional 1.1 m for the cap). The total available volume available for the placement of residual materials is approximately 176,000 m^3. The supporting drawings, plan and cross sections, are presented in **Appendix A.**

Placement of residual material would begin in the western side of Cell 6, adjacent to the South Sedimentation Pond and progress toward the eastern end of the cell. The existing Cell 6 cap soil layer (average thickness of 300 mm) would be removed and stockpiled off of the cell with the geotextile removed, cut to reduce its size and returned to the cell. The area of the removed soil layer and geotextile would be based on sufficient area to provide a feasible working face with a minimum size of 500 m^2. The residual material and daily cover would be placed in two 3.0 m lifts. Once the final elevation of the residual material was reached, intermediate cover would be placed with the Cell 6 Cap geotextile and soil layer placed periodically based on weather conditions and season. With the 140,000 tonnes placed or a manageable portion having reached final grades, a decision as to when, and if, the permanent cap can be placed would be reviewed based on the time of year, regulatory approval requirements and construction schedule.

The airspace used by the 140,000 tonne contingency would be part of the subsequent vertical expansion of the RDF. However, based on 100,000 tonnes of waste material arriving at the Otter Lake site per year (96,900 tonnes delivered to the RDF as presented in Task 2 - Daily Cover Material Options Analysis), it would be approximately 12 years from when the contingency residual material was placed to when the VE lift (which will commence at Cell 1) will reach Cell 6. Acknowledging this extended "dormancy" period, the existing 2.5:1 west side slope and past experience with NSE on cover placement requirements, it is recommended that the west side slope be redefined, by placing common borrow, to a 4:1 slope and moving the toe-of-slope toward Cell 7 as presented in the **Appendix A** drawings.

To our knowledge, NSE has only approved caps that meet the requirements of Figure 2 "Typical Final Cover System Cross-Section" as presented in the *Municipal Solid Waste Landfill Guidelines" October 1997* . Therefore, we recommend that the NSE RDF approved cap presented as **Figure No. 1** be placed on the top and side slopes of Cell 6.



SCALE: NTS

DILLON CONSULTING	PROJECT OTTER LAKE RESIDUAL DISPOSAL CELL 6 CONTINGENCY	PROJECT NO. 15-2142
DATE SEPTEMBER 2015	TITLE TYPICAL COVER SYSTEM SCHEMATIC	FIGURE NO. 1

fileName:c:\projectwise\working directory\active\50dbcd0016258511521 42-fig 1.dwg

2.0 Geotechnical Assessment

Please refer **Appendix B** for the letter report from Conquest Engineering.

3.0 Review of Landfill Gas Management Requirements

The existing landfill gas (LFG) collection system in Cell 6 consists of vertical collection wells that will be connected into the existing perimeter head system by a series of subheader pipes. The proposed (LFG collection system for the Cell 6 contingency vertical expansion includes a series of horizontal collectors installed along the top plateau final grades, as currently permitted. These horizontal collectors would connect to the existing perimeter header system through a 150 mm - 200 mm subheader pipe to be installed along the Cell 6 contingency vertical expansion southwest corner adjacent to Cell 7. Each collector would be aligned from north to south, along the short plan dimension of Cell 6.

Twelve horizontal collectors are included, with a horizontal spacing of approximately 34 m. Each collector would be activated as residual material is placed over the collector to a minimum depth of 3 m. As residual material is placed moving from west to east, the horizontal collector arrangement would allow application of vacuum to new residual material soon after it is placed, while minimizing atmospheric infiltration to the LFG collection system.

Each horizontal collector would consist of a trench excavated approximately 1 m into existing residual material, sloped at approximately three percent from south to north for condensate/leachate drainage. The trench would be lined with a geotextile, and backfilled with clear stone around a 150 mm perforated HDPE pipe. The northern and southern ends of this trench would be set back from the north and south edges of the contingency expansion by approximately 23 m, and the west-most and east-most trenches being similarly inset from the west and east edges. A 2 m x 2 m x 2 m granular drainage pit would be included at the low point on the south side of each trench for drainage of leachate and condensate.

Diagrams presenting the proposed layout of the horizontal collectors in the Cell 6 contingency vertical expansion are attached as **Figures No. 2** and **3**.

On the west end of each horizontal collector, approximately 25 m of solid HDPE lateral pipe is included, terminating outside the residual material at a wellhead, which connects the lateral to the subheader. A bentonite plug would be placed at the transition from perforated piping to solid lateral piping, to minimize atmospheric

intrusion into the horizontal collector along the length of the lateral. As residual material is placed, a decision whether to cap or extend the existing vertical wells with solid wall piping would be made. This decision would be based on operational field conditions, LFG generation, odour control factors and ability to place residual material.

When an area in the contingency expansion reaches final grade, a decision to install new vertical wells will be required, including an evaluation to either augment or replace the horizontal wells. New vertical wells will be connected to the subheader.

The installation cost for the horizontal collection system is estimated to be approximately $225,000:

- Horizontal collectors @ $180/m = $157,000; and
- 425 m of lateral piping @ $160/m = $68,000.

Noting uncertainties on the specific future requirements for the abandonment and replacement new vertical wells, a budget estimate has not been prepared.

4.0 Review of Stormwater Management Requirements

A review of stormwater management considerations for the proposed contingency waste placement has been undertaken as part of this study. In general, no significant challenges are expected with respect to stormwater management should the addition of approximately 6 m of residual material (see Section 1.0) proceed. Erosion protection of the cell cover and cap, most notably at the interface between Cells 5 and 6, will likely form the most important consideration. Other considerations include conveyance capacity along the existing perimeter ditch and conveyance structures flowing into the South Sedimentation Pond.

A pre-design of overland flow velocities has been undertaken along the 4:1 perimeter side-slopes, as well as the 3:1 northeast side slope adjacent to Cell 5. The assessment considered the estimated maximum velocity (assumed to occur at the toe of each slope) during the passing of a 25-year design storm. The critical duration of the storm has been adjusted for the time of concentration for the slope (approximately 15 minutes). The overland flow velocities estimated for the elevated Cell 6 side slopes were determined to be within the acceptable range for a vegetated cover to resist erosion.

Surface drainage patterns on top and along the perimeter of Cells 5 and 6 will need to be modified to accommodate the vertical expansion of Cell 6 and the periodic removal of the cap Soil layer and geotextile, and then the installation of new

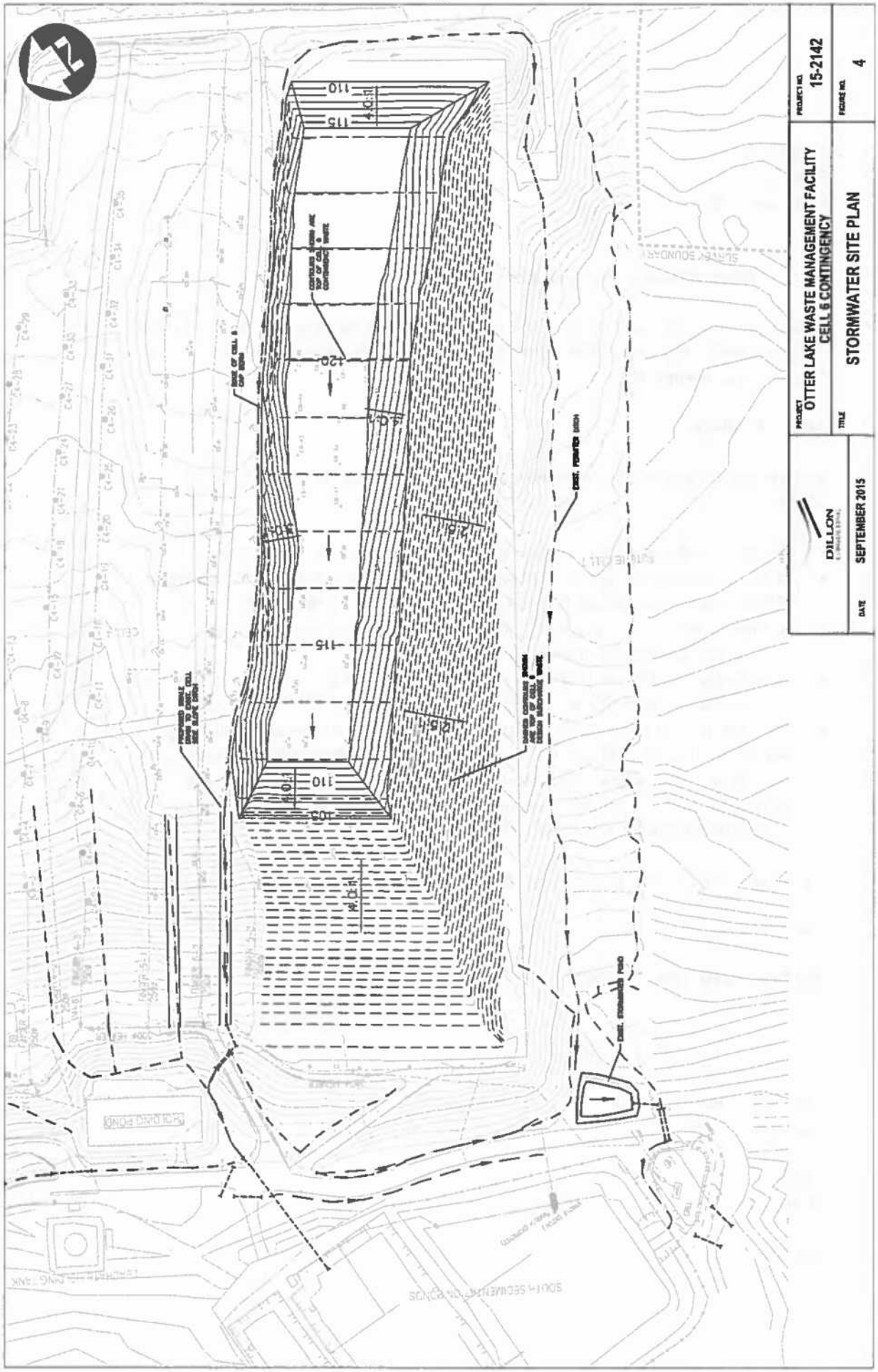
geotextile and the soil layer once final grades are achieved. The most significant addition will be a ditch along the intersection of Cells 5 and 6 (along the Cell 5 cap) to collect runoff from the expanded Cell 6 northeast side slope. It is anticipated that this ditch would flow in a southerly direction around the back of Cell 6 into the existing perimeter ditch at the Cell 6/7 toe of slope and northwest direction, discharging into the existing conveyance channel (geomembrane chute) flowing down the northwest side slope of Cell 5, ultimately entering the South Sedimentation Pond. **Figure No. 4** depicts the proposed stormwater modifications.

Some maintenance and potential upgrades of the perimeter ditch along the southern boundary of Cell 6 may be required to accommodate the increased runoff once the expanded Cell 6 has been capped. These upgrades could potentially include minor widening of the ditch and general maintenance, significant changes to the existing ditch alignment are not anticipated. A detailed review of the perimeter ditch capacity will be undertaken as part of the stormwater management component (Task 7) of the 2015 Revised Engineering Services for the Proposed Vertical Expansion of Cells 1 to 6.

The pre-design assessment of the existing twin 1500 mm culverts conveying runoff to the South Sedimentation Pond suggests that sufficient excess capacity is available to accommodate the runoff generated by a 25-year, 24 hour rainfall event under the Cell 6 contingency scenario.

Operation of the South Sedimentation Pond is not expected to be significantly impacted by the vertical expansion of Cell 6. While the capacity assessment of the South Pond to accommodate low-frequency rainfall events (25-year, 24 hour) is currently in progress, the incremental increase of runoff volume contributed to the pond as a result of the Cell 6 expansion is expected to be minimal. Preliminary modelling results indicate that contributions to the South Pond from the perimeter ditch collecting Cell 6 runoff (and other adjacent areas) represents approximately 20% of the total runoff volume currently entering the South Pond during the 25-year, 24 hour storm event. The incremental increase to this portion of the runoff volume is not expected to be detrimental to the operation of the pond.

It is recommended that the design considerations discussed in this section be revisited should the Cell 6 contingency plan be selected as the preferred option. It is acknowledged that the detailed design of the stormwater facilities described in this section will be required prior to the addition of residual material on Cell 6 as part of the Contingency Plan.


DILLON
PROJECT
OTTER LAKE WASTE MANAGEMENT FACILITY
CELL 6 CONTINGENCY
TITLE
STORMWATER SITE PLAN
DATE
SEPTEMBER 2015
PROJECT NO.
15-2142
FIGURE NO.
4

5.0 Updated Design and Operations Plan

Updated portions of the 2012 Operations Plan that acknowledge the requirements of the Contingency Plan described in this letter are provided under separate cover and can be found in **Appendix C**.

6.0 Findings

With reference to previous sections of this letter report the following items are noted:

- The increased tonnage can be accommodated within the limits of Cell 6.
- To accommodate the additional 140,000 tonnes of residual material, the height of Cell 6 would increase by 6 m (on average) plus the cap thickness.
- Placement of the NSE approved final cap will be required when the final contingency grades of Cell 6 are reached.
- An evaluation of the existing vertical LFG wells in Cell 6 is required to determine if they should be extended or abandoned in place.
- The addition of a ditch along the intersection of Cells 5 and 6 (along the Cell 5 cap) is required to collect runoff from the expanded Cell 6 northeast side slope.
- As a component of Task 7 (Stormwater Management and Erosion and Sediment Control Plan) of the current VE evaluation, a detailed review of the perimeter ditch capacity should be undertaken.

If you have any questions, please contact the undersigned.

Yours sincerely,

DILLON CONSULTING LIMITED

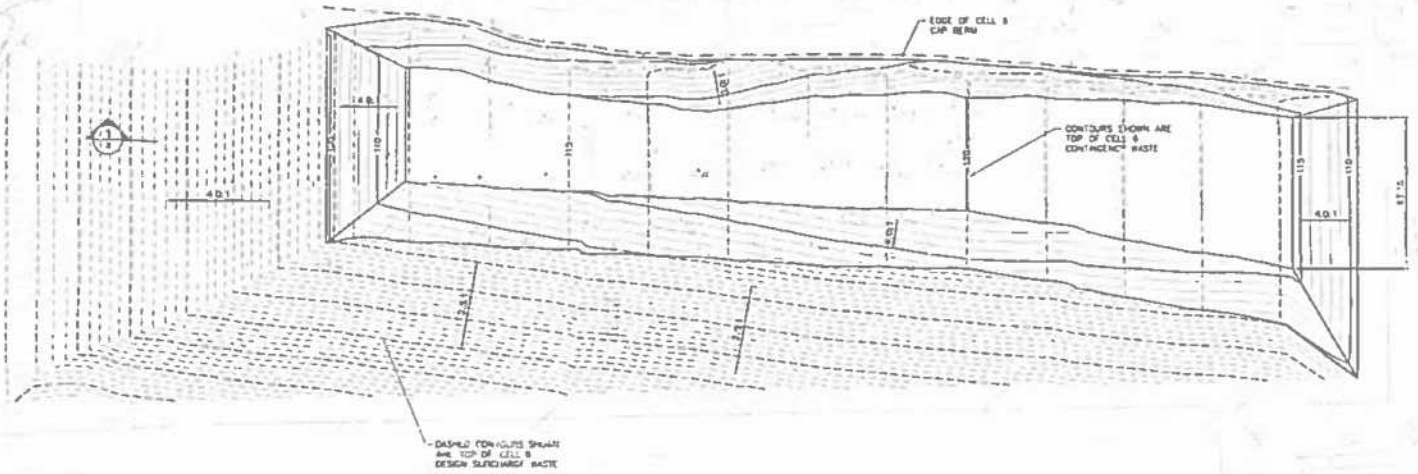
[redacted]

Christopher Shortall, P.Eng.
Project Manager

CRS:jes
Attachments

Our File: 15-2142-1000

APPENDIX A
PLAN DRAWING AND CROSS SECTIONS



Conditions of Use

MIRROR NS

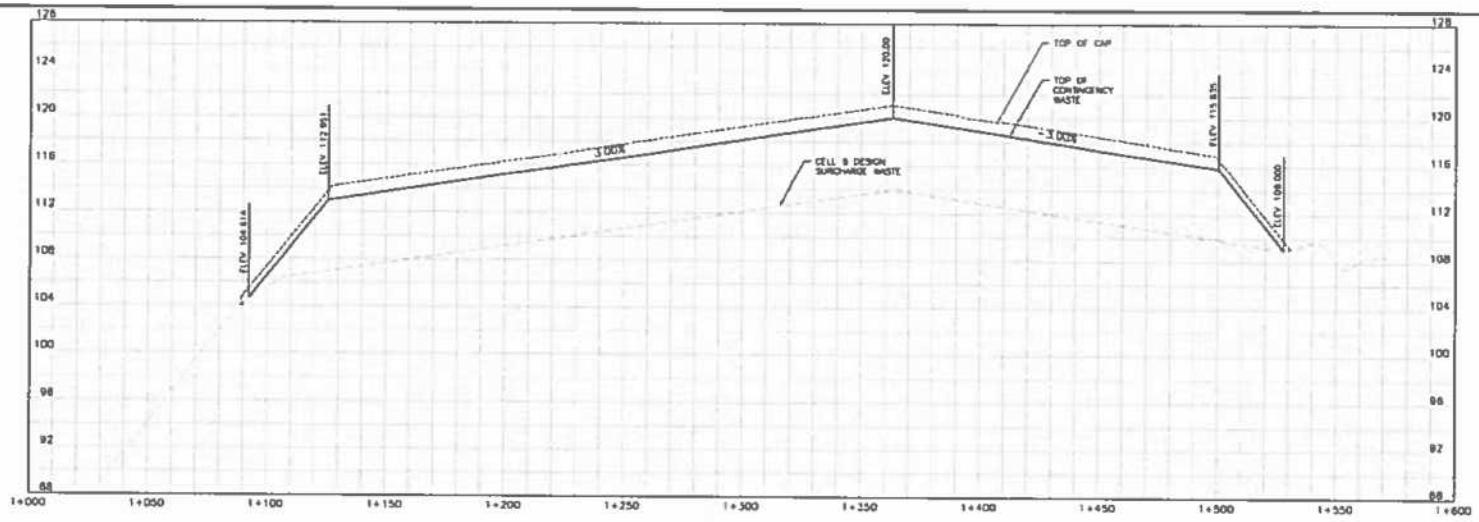
DILLON CONSULTING

OTTER LAKE WASTE MANAGEMENT FACILITY
RDF VERTICAL EXPANSION

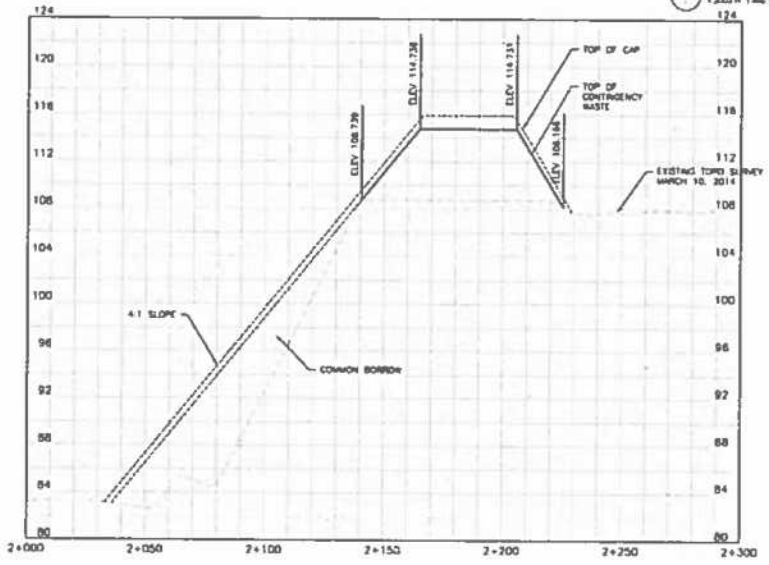
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CELL 6 CONTINGENCY
SITE PLAN

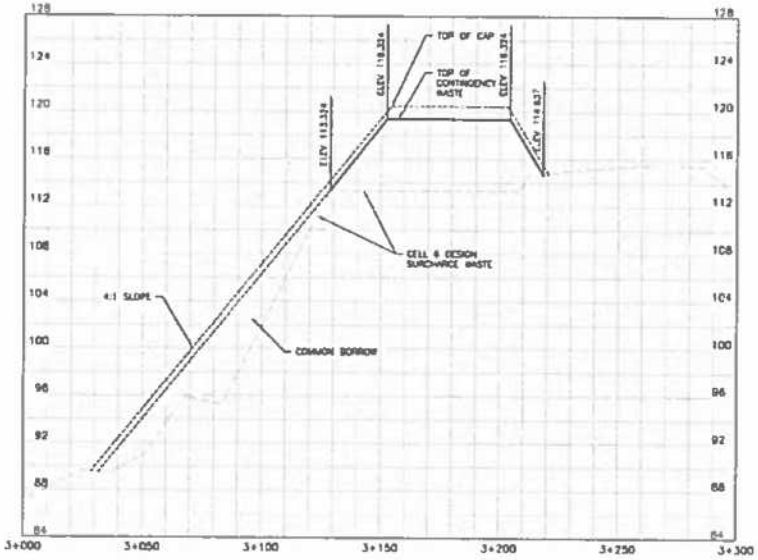
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1 SECTION



2 SECTION



3 SECTION

Conditions of Use

Do not scale drawing

MIRROR NS

DILLON CONSULTING

OTTER LAKE WASTE MANAGEMENT FACILITY
RDF VERTICAL EXPANSION

15-2142

CELL 6 CONTINGENCY
SECTIONS 1 TO 3

2

APPENDIX B
GEOTECHNICAL ASSESSMENT

CONQUEST ENGINEERING LTD.

Geotechnical and Materials Engineers
Concrete Technology, Blasting Consultants
Construction Quality Assurance / Quality Control

348 Bluewater Road, Bedford, NS B4B 1J6 • Phone (902)835-7313 • Fax (902)835-1260

September 30, 2015

Mr. Chris Shortall, P.Eng.
Dillon Consulting
137 Chain Lake Drive
Halifax, NS B3S 1B3

Dear Mr. Shortall,

Re: Geotechnical Assessment – Otter Lake RDF Cell 6 Contingency Expansion
Otter Lake Landfill, Halifax, NS

We have reviewed the proposed Cell 6 Contingency Expansion at the Residual Disposal Facility (RDF) in Otter Lake, Halifax, Nova Scotia. We understand that with the proposed contingency there may be a significant amount of time between filling Cell 6 and the construction of Cell 7. We would consider the side slope of Cell 6 to be long term rather than temporary.

As indicated by the borehole investigation, the residual waste material was relatively homogenous and consisted of sorted waste, and wood fibers, plastic, and metal. The residual material was in generally compact, but variable due to the nature of the material with occasional refusal encountered during drilling.

Currently the geotextile and soil layer of the Cell 6 cap is installed. We understand that the geotextile and soil layer will be removed before additional residual material is placed, and that when final grades are reached a new geotextile and soil layer will be placed. This cover material would not have a significant impact on the stability or consolidation analysis.

We recommend a minimum acceptable factor of safety of 1.5, given the anticipated time to construction of Cell 7, the natural variability in the residual material, and an anticipated increase in moisture content along the surface of the slope. Consistent with standard landfill design practice in Nova Scotia, a 4H:1V side slope provides a factor of safety greater than 2.0.

The main findings and recommendations from our assessment are as follows:

- Slope stability analysis for the vertical expansion shows a factor of safety of 1.7 along the side bank using a slope angle of 2.5H:1V. However, given variability in the residual material we would recommend that a cover material be placed over the existing slope to minimize the slope angle along the side bank, and protect from rainfall infiltration, especially at the slope base.

- We have completed an analysis for the expected long term settlement with the addition of the contingency expansion. For an estimated height of 29 m of placed residual material we calculate long term settlement of up to 2.6 m.

The slope stability analysis was performed using the information provided by the previous borehole investigation, and material properties testing.

Please contact us if you have any questions.

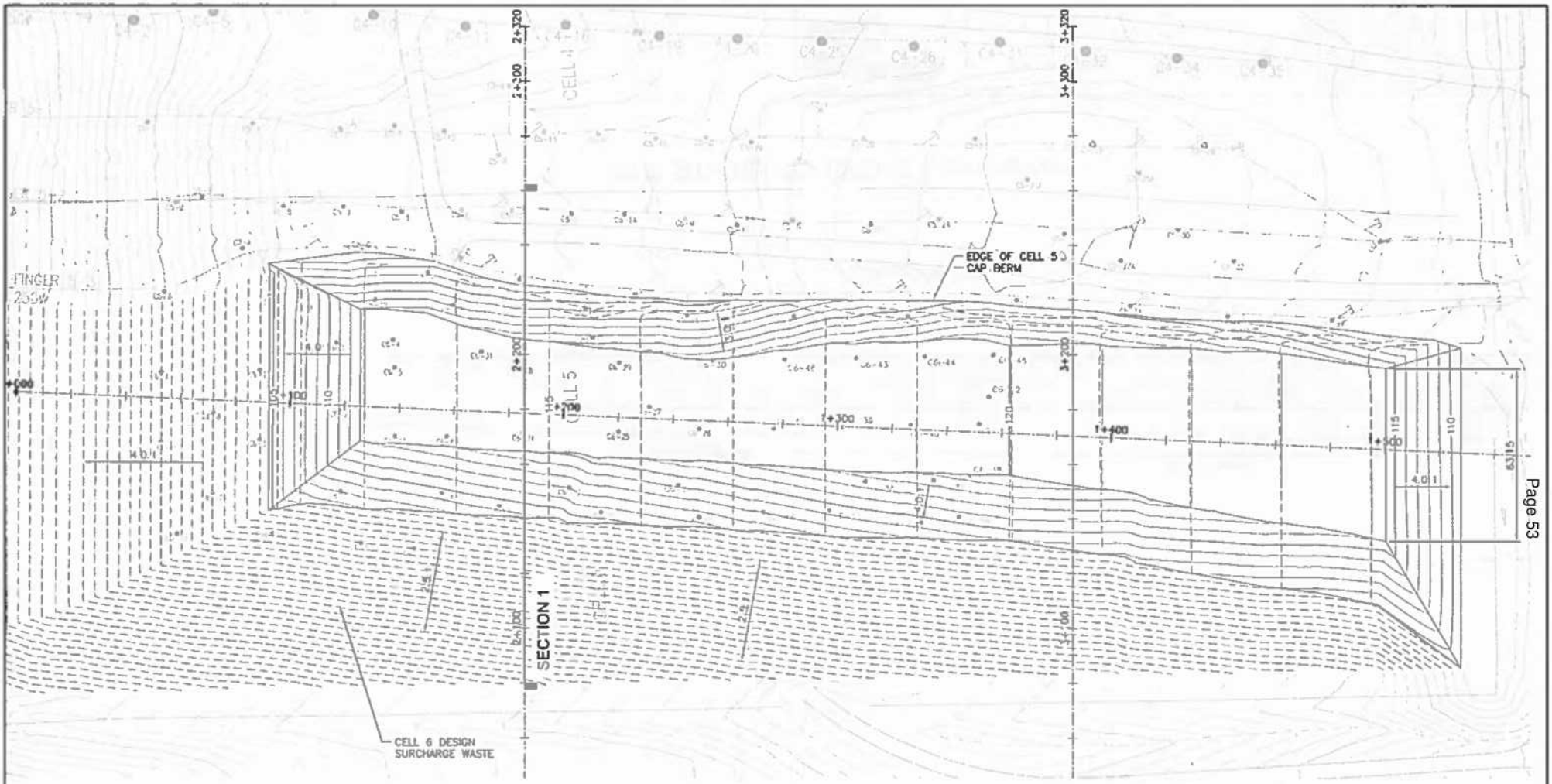
Thank you,

[redacted]

Glenn Graham, P.Eng.
Geotechnical Engineer
ggraham@conquest-eng.com

[redacted]

R. Bruce MacNeil, P.Eng.
Senior Geotechnical Engineer
bmacneil@conquest-eng.com



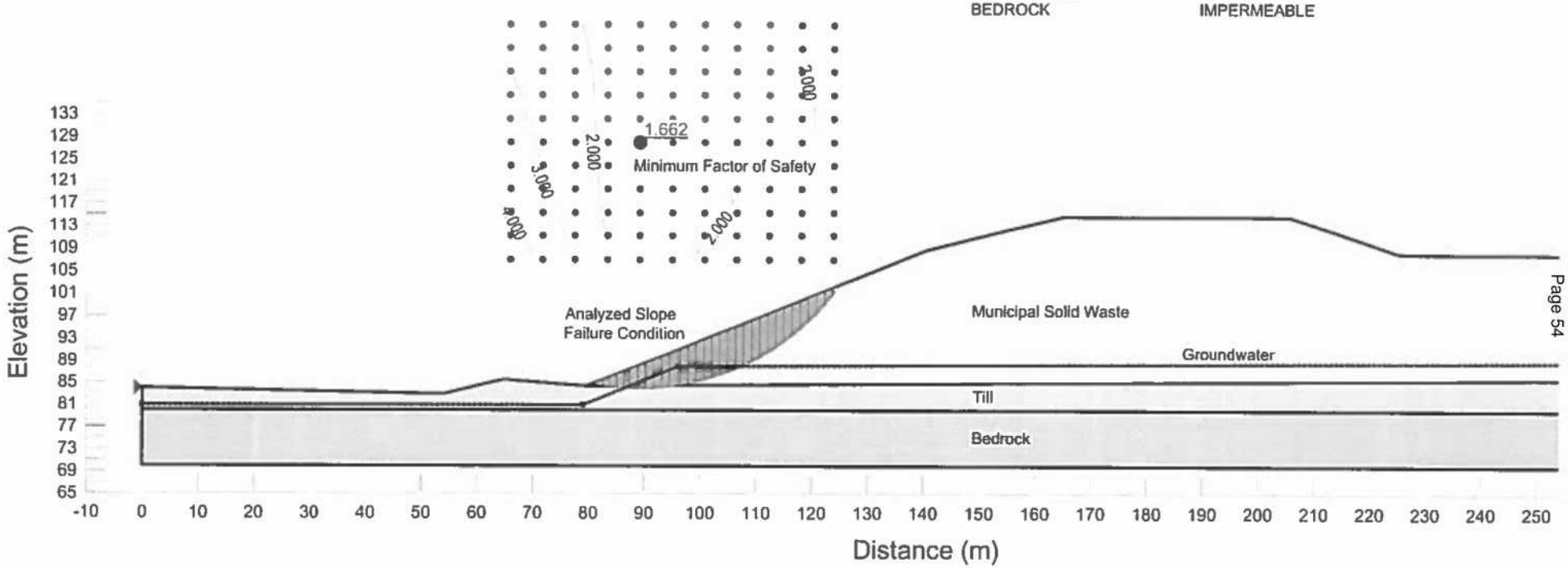
SLOPE STABILITY - CELL 6 (Contingency)

CONQUEST ENGINEERING LTD.	CELL 6 SIDE PLAN VIEW OTTER LAKE RFD VERTICAL EXPANSION	075-070 NTS 2-SEP-2015 GG	1 0

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PARAMETERS

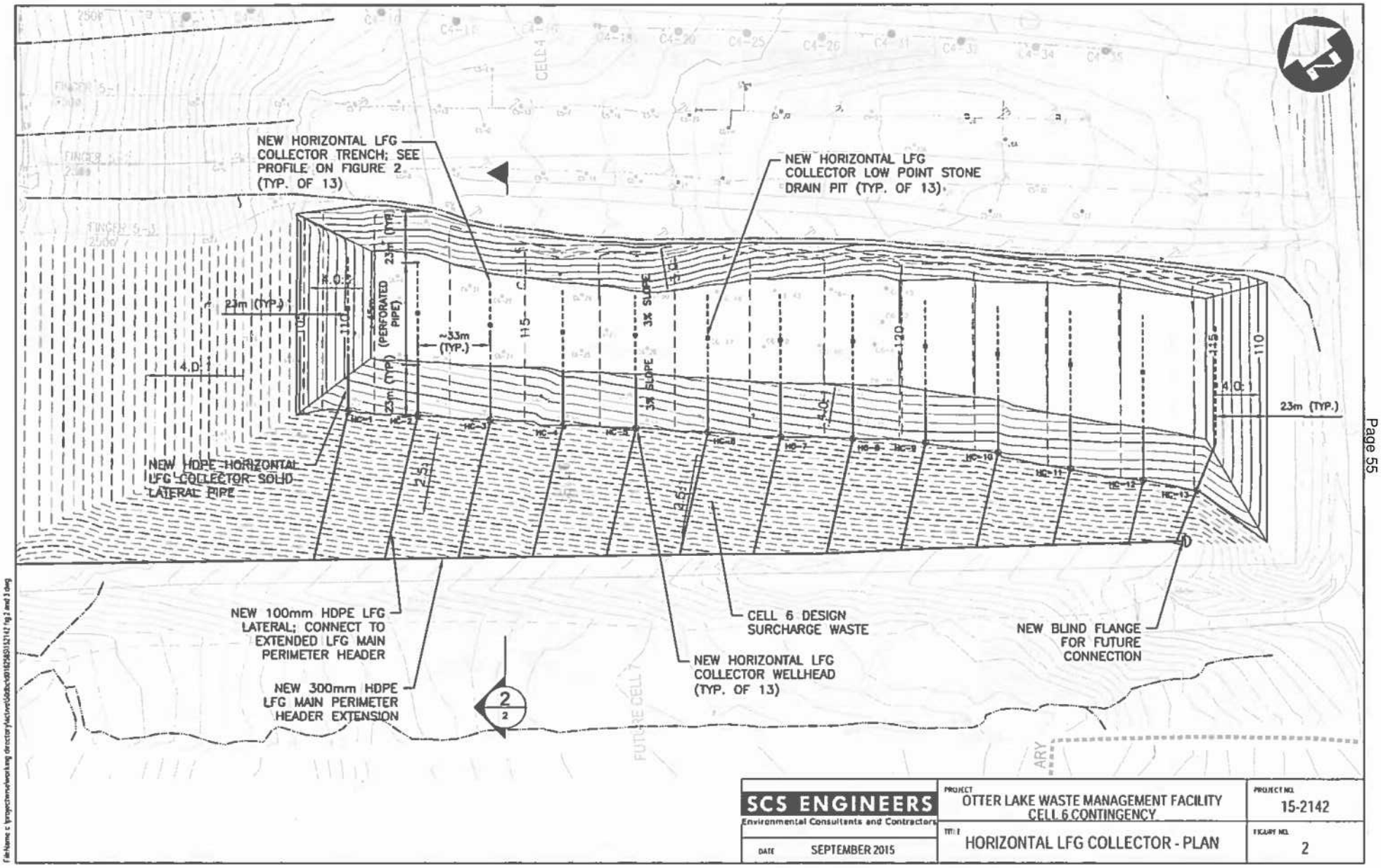
	UNIT WT (γ)	FRICTION ANGLE (Φ)	COHESION (c)
MUNICIPAL SOLID WASTE	12 Kn/m^3	34°	-
LINER	18 Kn/m^3	10°	-
GLACIAL TILL	18 Kn/m^3	34°	-
BEDROCK	IMPERMEABLE		



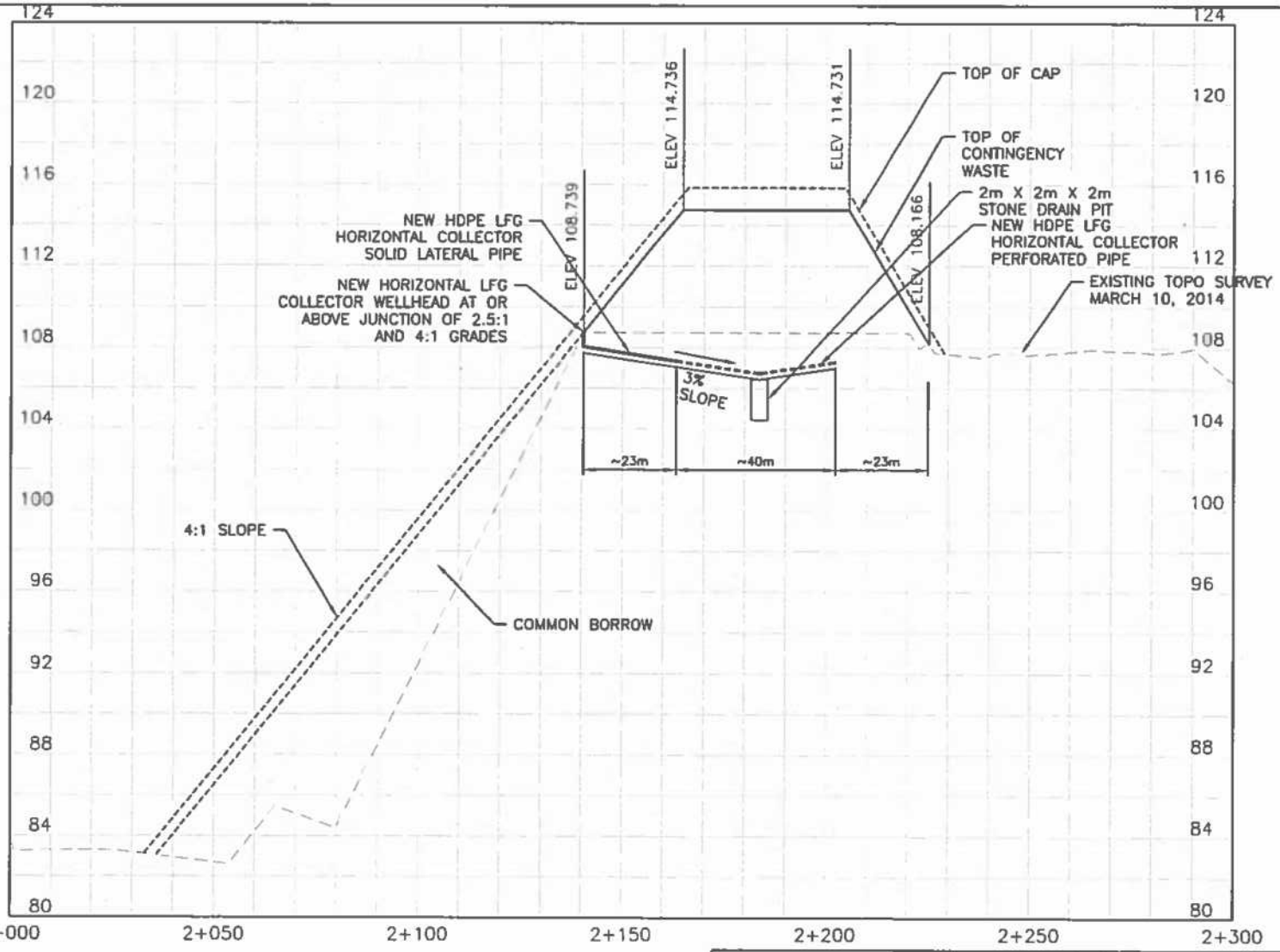
SLOPE STABILITY - CELL 6 (Contingency)

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SCS ENGINEERS Environmental Consultants and Contractors	PROJECT OTTER LAKE WASTE MANAGEMENT FACILITY CELL 6 CONTINGENCY	PROJECT NO. 15-2142
DATE SEPTEMBER 2015	TITLE HORIZONTAL LFG COLLECTOR - PLAN	FIGURE NO. 2



2/1 SECTION
1:2000 H. 1:400 V.

SCS ENGINEERS
Environmental Consultants and Contractors

DATE SEPTEMBER 2015

PROJECT: OTTER LAKE WASTE MANAGEMENT FACILITY CELL 6 CONTINGENCY

PROJECT NO. 15-2142

TITLE: HORIZONTAL LFG COLLECTOR - SECTION

FIGURE NO. 3

APPENDIX C
UPDATED DESIGN AND OPERATIONS PLAN

HALIFAX WASTE PROCESSING AND RESIDUALS DISPOSAL FACILITY

HALIFAX REGIONAL MUNICIPALITY

OPERATIONS PLAN

FOR

RESIDUALS DISPOSAL FACILITY

September 2015

Prepared by:

MIRROR Nova Scotia

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APPENDIX D Leachate Disposal Study, Porter Dillon Project # 98-5697-01-01; December 1998

APPENDIX E Environmental Monitoring Program

1.0 Introduction

1.1 Purpose of RDF Operations Plan

The purpose of the RDF Operations Plan is to provide an addendum to and to be read in conjunction with the Operations Plan submitted to NSDOE and approved under Approval No. 2008-065580-A01 for the operation of the Front End Processing Facility (FEP) and the Waste Stabilization Facility (WSF) which are parts of the Halifax Waste Processing and Residuals Disposal Facility (the Facility).

The Operator provides this document as supporting documentation to its application for an amendment to Approval No. 2008-065580-A01 to permit operation of both the FEP/WSF and the RDF and its associated components under this Approval.

1.2 General and Facility Description

The Halifax Waste Processing and Residuals Disposal Facility (the Facility) is located at 600 Otter Lake Drive, Halifax, Nova Scotia. Access to the Facility is from Highway 103 at Exit 3.

The Facility was constructed during 1997 and 1998. The Facility property slopes generally from the east to the west with a topographic high in the area of the FEP and WSF. Most of the property consists of shallow granite bedrock overlain by relatively thin overburden. One significant deposit of clayey silt till exists to the west of the RDF which serves as the borrow area for landfill liner materials and cover soils. Stormwater drains from the property, including all areas of the RDF, into sedimentation ponds to the west of the RDF, except:

- Immediately west of the FEP which drains to the northwest through open ditches. Areas contributing to this drainage path are primarily paved or have been restored with vegetation since construction of the facility, and
- In the area of the water treatment plant for the Facility which drains into Otter Lake

Storm water that drains into the sedimentation ponds is treated prior to release to ensure compliance with the Nova Scotia sediment discharge standards. All storm water, except that entering Otter Lake, eventually reaches the Nine Mile River.

Otter Lake serves as the source of water for fire protection, process water and domestic water needs of the Facility. Water used for domestic purposes is treated to drinking water standards at an on-site treatment plant prior to distribution.

1.3 Facility Operations Review

The Facility will receive mixed waste materials generated in the Halifax Regional Municipality, which have not been sent to a number of diversion facilities within the Municipality. Materials delivered to the Facility will be weighed on entry to the site where their source and contents will be recorded. Commercial and residential vehicles will be directed to the FEP for unloading. Small loads and private cars will be directed to a public drop-off area adjacent to the scale house for unloading into containers. These containers will be delivered to the FEP when full. Material deposited on the floor will be spread and inspected prior to loading into conveyors leading to the sorting stations and equipment in the FEP. This material will then be processed by a series of mechanical and manual sorting methods. Inert materials from the public drop off area and sorted on the tipping floor are transported to the RDF.

Rotating trommel screens have been included in the FEP to remove the predominantly organic fraction of the incoming wastes for delivery to the WSF for processing. Material that is not removed by the trommel screens continues to additional sorting locations for removal of recoverable material, if any.

The residues from the FEP and the WSF will be transported to the RDF by transfer trailers. This material will be spread and compacted in place and covered with daily cover.

1.4 RDF Capacity Characteristics

The design of the RDF is included in the supporting documentation to the application to NSDOEL used in obtaining Approval No. 97-ATCC-003 issued for the construction of Cell No.1, Approval No. 99-ATCC-021, Amendment # 1 issued for the construction of Cell # 2 and Approval No. 2001-020041-A01 issued for the construction of Cell # 3 at the RDF and associated infrastructure, Approval No. 2005-044732-A02 issued for the construction of Cell #4, Approval No. 2008-061630-A01 for the construction of Cell 5 and Approval No. 2011-076545 for the construction of Cell 6 of the RDF.

The RDF has been designed to accommodate the residual materials from the FEP and WSF. Contingencies have been built into the design of the RDF to accommodate in excess of the design residual output of the FEP and WSF. The original design capacity of the RDF has been set at 120,000 tonnes per year of material over a design life of 25 years, for an overall capacity of 3,000,000 tonnes. This capacity will allow contingency disposal of inert materials from other HRM sources in addition to the residues from the FEP and the WSF and will accommodate the additional residues from the expanded FEP operations.

The RDF has been designed with the following features and assumptions:

- RDF development will occur in cells. Each cell, with the exception of Cell Nos. 1 and 2, will be equipped with dedicated leachate collection systems including leachate removal systems stations and leak detection sumps. Cell No. 2 is an extension of Cell No.1 and as such, leachate collection pipes installed in Cell No.1 have been extended into Cell No.2 (at the time of Cell No.2 construction) and both cells utilize common leachate collection and leak detection sumps. Future cells will have dedicated leachate collection and leak detection systems
- RDF volume consumed is based on the following parameters:
    - In-place compacted density of 700 kg/m^3.
    - Daily cover volume consumed at approximately 18% of residual volumes or a ratio of 1 : 5
- Intermediate cover applied to areas of the cell that will remain unused for periods of six (6) months or longer before additional residue is added.
- Top slope of final cover surface sloping from east to west at typically 5 percent.
- Final landfill height ranging from only a few metres at the eastern limit to about 25 metres at the western limit.

2.0 RDF Operating Hours, Access and Personnel

2.1 Hours of Operation

The RDF will be open Monday through Friday. The Facility may be open on Saturdays and Sundays to accommodate unusual circumstances. The RDF will receive residual material during the core hours of 6:00 am to 9.00 p.m. Processing of waste will occur outside the core operating hours of the RDF. In the event that residual volumes are such that extended RDF operating hours are required, these will occur. The operating hours are, however, independent of the posted receiving hours for wastes at the scalehouse.

Site operations will commence prior to and extend beyond the posted receiving hours to allow for preparation of the daily activities at the RDF and to allow for completion of daily cover activities at the day's end. In addition, other RDF activities that are not connected with residual disposal, such as borrow area activities, leachate management and the like will occur independently of the core RDF operating hours.

Except where conditions warrant, the RDF will be closed on the following Statutory Holidays:

- New Year's Day
- February Holiday
- Good Friday
- Victoria Day
- Canada Day
- Natal Day
- Labour Day
- Thanksgiving
- Remembrance Day
- Christmas Day

Operations on these statutory holidays may occur on occasion.

2.2 Traffic Routing

Vehicles delivering residual materials to the disposal cell will typically originate in both the FEP and the WSF. Potentially, vehicles carrying inert residuals from sources outside the Facility could also deliver material for disposal to the RDF. Vehicles from the FEP/WSF will be weighed after loading and then will travel to the active cell. Travel of all vehicles will take place on the RDF perimeter road and into the active cell via access ramps.

2.3 Site Security

Unauthorized entry to the RDF will not be allowed. Access to this area is restricted to vehicles carrying residuals and those persons engaged in management, regulating or working at the facility. Public access to this area from the Facility entrance will be limited to supervised informational tours only. In order to limit access to the RDF, entry is controlled from other areas of the property by the use of natural barriers and fences. In addition, for added security, the RDF perimeter access road and the RDF buildings are well lit.

2.4 Personnel

2.4.1 RDF Management

A General Manager has been appointed to provide overall direction and management of the Facility. The RDF will be managed by the RDF Manager who will be responsible for the day-to-day operations. The RDF Manager will also be the Environmental, Health and Safety Manager (MESH) and the Emergency Response Co-ordinator (ERC) for the Facility. The Manager will be assisted on an as needed basis by maintenance and other professionals engaged at the Facility.

2.4.2 RDF Staff

The following table outlines the typical number of personnel and their categories that will be employed in relation to the RDF. This number may increase or decrease over time as operational conditions warrant.

POSITION	No. of PERSONNEL
RDF Manager	1
Equipment Operators	5
Labourers	4
Administrative	1

All employees working at the RDF will be properly trained for the jobs that they will be expected to perform at the landfill. An outline of the minimum duties and responsibilities of each position follows. The outline is not intended to be comprehensive or to limit the employee's opportunity to expand their capabilities beyond this scope or to limit the employer's right to assign other duties.

2.4.2.1 RDF (Landfill) Manager

The RDF Manager is responsible for the operation of the RDF. The Manager oversees and co-ordinates day-to-day operations at the site. The Manager's duties may include:

- Providing overall direction of activities, including use of equipment and personnel;
- Ensuring that only acceptable wastes are received for disposal;
- Ensuring operations at the RDF are in accordance with the Design Report and Operations Manual, the Facility Engineering Drawings and the Operating Approvals issued by NSDOEL;
- Ensuring that the site is always maintained and operated in a clean and safe manner, including regular pick up of litter and maintaining the site in a litter-free condition;
- Maintaining the leachate management system and monitoring the sedimentation control program;
- Assessing the need for and implementing as required control measures for birds, rodents and/or odour;
- Preparing regularly scheduled reports on progress and planning at the site;
- Preparing and filing reports to NSDOEL on the site operations, including monitoring results;
- Dealing directly with the public, responding to disposal requests;
- Maintaining the environmental monitoring program;
- Co-ordinating the environmental sampling programs,;
- Ensuring that RDF staff receive the required training courses;
- Maintaining records of residual waste tonnage disposed of in the RDF; and
- Surveying and logging use of cover materials, compaction and site works.

2.4.2.2 Mobile Equipment Operators

Under the direction of the RDF Manager, the Equipment Operators are responsible for operating and maintaining mobile equipment used for waste handling and disposal operations. The Equipment Operators duties may include:

- Ensure that only acceptable wastes as indicated in Section 4.1 are received for disposal at the site in consultation with the Operations Superintendent;
- Be responsible for the operation and routine maintenance of the site machinery;
- Make recommendations to the Operations Superintendent for major and minor repair work required for site equipment; and,
- Ensure that the site is always maintained and operated in a clean and safe manner.

2.4.2.3 Labourers and Administrative Personnel

Labour and administrative personnel will be employed at the RDF to conduct work as directed by the RDF Manager.

2.4.3 Training

Every RDF employee will be trained to perform his or her job in a safe and efficient manner. Employees must be current with changes in regulations and technology through ongoing, comprehensive training courses in such areas as regulations and the technical aspects of landfill operation, surface water, ground water, and leachate management; leak detection; spill prevention; special wastes; and safety.

Continuing on-the-job training will be provided for all employees. The training will emphasize the safe and environmentally sound operation of the landfill. A review of this Operations Plan will be a prerequisite for any employee before being declared eligible for work at the landfill. All employees will be given safety training covering all equipment and systems, with which they will be expected to interact on a daily basis. The limitations associated with protective equipment, methane gas and leachate handling, and the handling and precautions associated with special wastes, will also be included in the safety training. Documentation of the employee's participation in the safety training will be maintained in the employee's personnel file.

Training programs for the more specific tasks, e.g., equipment operation, will be tailored to that position and will be documented with written records of meetings and types of instruction. This instruction will include identification of special wastes and unacceptable wastes; emergency procedures in case of fire, spill or injury; confined space entry; respirator use and fit testing; and other issues that will arise from time to time. Documentation will also be kept on file at the main personnel office and reviewed annually for any necessary updates. A general outline of some of the training that employees will be given is found in Table 2-1. It is not intended to be a comprehensive list or to limit additional staff training, should legislation change, or limit the employer's or employee's right to require additional training.

TABLE 2-1

STAFF TRAINING REQUIREMENTS

Program	Position			
	RDF Manager	Equipment Operators	Labourers	Administrative
WHMIS	❄	❄	❄	❄
Emergency First Aid	❄	❄	❄	❄
Confined Space Entry (1)	❄	❄	❄	
General Safety Training	❄	❄	❄	❄

1) One equipment operator and one labourer will be trained in these procedures for a complement of three (3) including the RDF Manager.

3.0 Site Equipment

Equipment selection is based on evaluation of the functions to be performed. Basic functions to be performed are waste grading and compaction; daily and intermediate cover placement, final cover construction and providing support functions such as access road maintenance. Equipment to be used to manage waste at the RDF portion of the Facility typically will include the following types or their equivalents:

- Dozer (Cat D6 or equivalent)
- Landfill Compactor (Cat 826 or equivalent)

Support functions will be performed with on-site equipment and will include: daily cover placement, maintaining access roads, snow removal, and dust control. Site equipment will be used as much as possible to perform these tasks. In addition, back-up equipment is available from local rentals and contractors, should anomalous situations dictate need for additional equipment. Routine maintenance and cleaning will be performed as necessary to keep equipment in good operating order.

An equipment maintenance program exists for all on-site equipment. The program includes scheduled maintenance activities to be performed in accordance with equipment manufacturer's guidelines. Daily activities include checking of vital engine fluids, cleaning of tracks, blades, wheels, and overall visual observation of major equipment components (i.e., tires, blades, tracks, hydraulic systems, etc.).

4.0 Waste Receiving, Placement, and Covering

Residual material produced during the processing of waste at the FEP and the WSF will be disposed of in the RDF. As well, other inert residuals may be sent directly to the RDF. As well, other inert residuals may be sent directly to the RDF.

4.1 Acceptable Materials for Disposal in RDF

Acceptable materials for disposal in the RDF are defined as:

- Inert Materials, which means solid waste which is not Unacceptable Waste as defined below and does not contain elements that are recognizable as readily putrescible;
- Stable Materials, which means items of solid waste that are substantially free of readily putrescible elements after having undergone bio-stabilization in the WSF excluding Unacceptable Waste as defined below;
- Residual Materials, which means sorted and processed mixed waste materials which may contain minor quantities of any material or substance the disposal of which at a solid waste landfill is banned or prohibited by law and which, notwithstanding the reasonable and diligent efforts of the Facility operator to identify and remove such materials, remain in the waste that is disposed of in the RDF.

4.2 Unacceptable materials at the RDF

The RDF site operators will not knowingly dispose of unacceptable Wastes.

Unacceptable Waste means any material or substance, the disposal of which at a solid waste landfill is banned by Applicable Law (other than Residual Material as defined above) and which is not capable of being rendered into Stable materials (as defined above) through bio-stabilization in the WSF.

Unacceptable Wastes are defined in Section 2.2.3 of the FEP/WSF Operations Plan. The Facility will not accept hazardous wastes and untreated infectious medical wastes. Procedures in place to prevent the acceptance of these materials are also detailed in the FEP/WSF Operations Plan.

4.3 Inspection for Unacceptable Materials

Prior to delivery to the RDF for disposal, all materials will have been inspected at the scalehouse or in the FEP and WSF for unacceptable materials. As a result, unacceptable materials will have been removed to as great an extent as possible. Nonetheless, residual material and other inert wastes delivered to the RDF for disposal will be visually examined by the equipment operators prior to final disposal. All RDF employees will be given training in the identification and management of unacceptable materials.

4.4 Initial Lift Placement

The first lift of residual material to be placed in each cell will be placed directly on top of the protective layer above the leachate collection stone with care to protect the underlying liner from damage. The initial material to be placed will be inspected at the working face to remove any larger bulky or long items that could harm the liner system. Initial waste placement activities will begin at the edge of the composite liner system by carefully pushing waste out over the liner already protected by leachate collection stone and the protective layer. In order to preserve the integrity of the composite liner system, the operation of disposal vehicles or site equipment on the protective layer will be limited as much as possible during the placement of this lift. It is not possible to prevent the use of this layer as a travel zone at all times, but the use will be minimized as much as possible.

As part of initial waste placement activities, residual materials will be spread about 4 m high and compacted only on the top of the lift. Landfill personnel will monitor the placement, compaction, and covering of the first layer of waste, as well as maintain grade control and inspect filling techniques. Inadvertent damage to the liner will be reported to the RDF Manager and will be restored prior to filling in the damaged area in accordance with liner construction requirements.

4.5 Working Face

The working face is to be kept as small as possible to ensure the maximum compaction, reduce cover material requirements and to limit the amount of exposed waste. The maximum working face is not expected to exceed 30 m in width. Filling will be by the area method with the working face progressing in an orderly manner across each area. As each lift is completed, the working face will be relocated to the next higher lift.

4.6 Waste Compaction and Lift Height

Residual materials will be deposited in lifts and compacted by multiple passes of the landfill compactor before additional material is spread in order to achieve the maximum practical density. Each lift will not exceed about 4 m in height and the working face will be inclined no steeper than the practical working limits of the spreading and compacting equipment, about 1.5 (horizontal) to 1 (vertical).

4.7 Daily Cover

The purpose of daily cover is to prevent the generation of problems associated primarily with vectors (insects, animals and birds) and wind.

Covering of residual materials:

- Is an effective deterrent to vectors from scavenging for food in the materials. In the case of the material being disposed at the RDF, the opportunity for attracting vectors is significantly reduced after processing of the incoming wastes, particularly the biostabilization of the organic fraction.
- Reduces the effect of wind on smaller plastic and paper components and

At the end of each day, the compacted residuals will be covered with daily cover. Daily cover is defined as:

- About 150 mm of soil,
- Other natural material required for on-residue travel roadways
- Plastic tarping or other sheet material used at the working face which is removed at the commencement of the next day's operations
- Construction and demolition debris mix as approved by NSDOEL.
- Other materials as approved by NSDOEL

Daily cover will be placed over the compacted material during and at the end of each working day. Depressions and low spots in the surface will be filled and the soil surface graded to encourage positive drainage, thus reducing leachate generation. Prior to subsequent filling, as much daily cover soil as possible will be removed and stockpiled for future use as daily cover.

Daily cover soil will be obtained from the site borrow areas on the property or from other sources. In times of inclement weather, this material will be stockpiled close to the working face as required in appropriate quantities for at least one (1) day's requirement.

Plastic tarping and other sheet materials such as geotextiles and geomembranes are also effective in providing a cover material for the sloping edge of the working face. These materials are removed prior to placement of any additional residue the following day. Soil cover however is usually required on the flatter fill surfaces, particularly those areas used as travel ways.

4.8 Intermediate Cover

Intermediate cover is required to protect residual material already placed and compacted in areas of the RDF which will remain dormant for a period of six (6) months or more. Intermediate cover consists of providing an additional layer of soil above daily cover to create a thickness of about 300 mm. Additional cover will be applied where necessary to any areas where the cover is cracked, eroded, or uneven. The intermediate cover is applied to facilitate the movement of equipment and prevent erosion.

Prior to commencement of filling, as much intermediate cover as possible will be scraped back and stockpiled for reuse when filling is to resume over the same area. Removing previously placed intermediate cover soil before placing additional waste minimizes leachate mounding in the fill which is the most common cause of leachate outbreaks on the exposed side slopes of landfills.

4.9 Final Cover

At the completion of filling operations, final cover must be applied to the completed areas. Details of the closure design and construction including the cross-section through the final cover are not included in this document as these are subject to an application to NSDOE with approval required prior to commencement of the work.

A final cover cross-section is included with the drawings comprising part of the approved documents under Approval No. 97-ATCC-003, issued by NSDOE. This cross-section is illustrative only and is subject to change as a result of detailed design of the final cover and closure system.

After the final cover has been applied, a vegetative cover must be established on top of the cover. Nutrient addition will occur as necessary to ensure that the vegetative cover is well established and will remain effective in preventing erosion.

In subsequent years after the final cover has been placed, regular inspections of the cover are conducted to identify any areas where remedial action is required. Examples of remedial action are:

- Placement of additional soil in areas where differential settlement has occurred
- Reseeding where barren areas are discovered
- Addition of protective materials to areas where preferential drainage courses have naturally occurred or to existing engineered drainage pathways

4.10 Salvaging or Scavenging

Salvaging or scavenging of material will not be permitted at the landfill working face.

4.11 Inclement Weather

The RDF has been designed to permit operations in inclement weather without significant disruption to material delivery to the working face. The access roads will be kept passable at all practical times. In wet conditions, additional road base will be added to stabilize soft areas in the RDF internal roads. During cold weather, road sand will be applied to icy spots on access roads to ensure good traction. A snow plow or road grader will clear on-site access roads and other travelled areas of snow.

Road salt will not be used at the RDF.

4.12 Surveying and Horizontal / Vertical Control

The limits of the landfill property and the fill limits will be clearly defined in the field. To aid in the construction of the landfill, permanent benchmarks have been established for horizontal and vertical control. It will be the RDF Manager's responsibility to ensure that all necessary construction staking is accomplished and to appraise the equipment operators of their presence. As filling progresses, the RDF Manager will utilize a GPS (CAES) system to ensure that the construction is in accordance with the approved plans.

5.0 Nuisance Control

5.1 Litter Control

Maintaining proper litter control is essential to the controlled operation of a landfill. Litter control procedures at the RDF are described in more detail in the following sections.

5.1.1 Working Face

Tight control over operations at the working face will be the main line of defence against the generation of litter. Fixed fences will be installed as needed on exterior berms. Portable fences will be installed at or near the working face to catch windblown materials. The fencing will be cleaned as necessary, typically on a daily basis. Additionally, higher fencing will be installed beyond the portable fencing as necessary to catch further wind blown material.

5.1.2 On-Site Litter

Some litter will likely occur even with proper litter controls. Personnel will collect litter that is blown from the active face and the litter fences on a daily basis. When working in areas below natural grade, litter is less likely to escape than when working above natural grade. Inspection of the site, access roads to the site, and neighbouring land will also be conducted on a daily basis when the site is in operation. Litter encountered will be collected daily and deposited at the working face. The following cleanup procedures will be followed on a routine basis:

- Litter will be removed from and along litter fences
- Litter will be removed from and along on-site roads
- Litter at the site entrance and road leading to the entrance will be cleaned
- Litter in other areas will be collected as necessary

5.2 Odour Control

Odours should be minimised at the RDF as a result of the prior processing of the organic materials within the WSF. Notwithstanding this condition, odour control at the RDF will be implemented using the following daily measures:

- Application of daily cover in a timely manner
- Apply immediate cover to waste loads that are particularly odorous.
- Use of waste acceptance and rejection procedures as outlined in the FEP/WSF Operations plan and herein

Odour control is also achieved by routine site inspections to identify and eliminate localized surface water ponding and/or surface water drainage problems. Should odours become a problem, an on-site evaluation will be performed and appropriate remedial actions taken based on results of the evaluation.

5.3 Mud Tracking and Dust Control

5.3.1 Mud Tracking Control

The perimeter access road around the RDF is granular. The road circulating the FEP/WSF compound is paved. Minimization of mud build-up on the circular road will be accomplished by implementing the following practices:

- The route from the working face to the public road will be long enough to facilitate removal of occasional mud from vehicle tires.
- Length of travel along the granular access road will help jar mud loose from vehicle tires and bodies before leaving the facility.
- Site ditches will be maintained to ensure adequate drainage.
- Access roads will be maintained with a good crown on the road to quickly shed rainfall.
- Sweeping of the paved road as necessary to remove mud and dust
- Additional stone as needed

5.3.2 Dust Control

Dust control will be implemented during operation of the landfill by application of water sprays from a water tank truck. Frequency of application of water for dust control will depend on site conditions and specific operations being performed. Internal gravel haul roads will be maintained in good condition, well graded, and intermittently treated with water to control dust. Traffic movement and speed will be controlled on-site to minimize the routes traversed, and therefore, to minimize dust generation.

All areas of the landfill, which are completed to final grade, will be properly covered and immediately revegetated (with native grasses or agronomic species) to minimize vulnerability to wind erosion and dust dispersion.

Chemical dust suppressants will not be used.

5.4 Vector and Bird Control

It is anticipated that the residual material being disposed will be significantly less attractive to vectors than at solid waste landfills where organic wastes are accepted in an unprocessed form.

Nonetheless limiting access to vectors is the key to their control. Control of vectors will be accomplished through proper compaction of the waste as soon as possible after arrival and by the application of the required cover material at the working face.

5.5 Noise Control

All equipment powered by internal combustion engines will have mufflers installed and will be maintained in accordance with manufacturer's recommendations. In addition, buffers of natural vegetation surround the facility, which aid in minimizing noise impacts beyond the facility boundary.

5.6 Open Burning

Open burning will not be permitted.

6.0 Surface Water Management

6.1 General Description

Surface water on the site is classified in three categories:

- Stormwater from developed areas - any surface water from non-active portions of the landfill cells, outside slope of berms, access roads, and capped areas and other areas as shown on the drawings. This water is collected in ditches and directed to stormwater sedimentation ponds.
- Stormwater from non-developed areas - surface water from grassed areas, right-of-way, field areas and other areas as shown on the drawings. This water is discharged directly off-site.
- Leachate-contaminated stormwater - any water in contact with waste or the active area of a landfill cell. The water is contained and directed to the separate leachate collection system. Leachate-contaminated stormwater is considered to be leachate and is discussed in Section 8.

6.2 Perimeter Ditching and Berming (Run-on Protection)

Permanent ditches are located along the perimeter road and at other areas of the RDF site to direct stormwater runoff to the RDF sedimentation pond control system. Drainage systems around the paved access road, maintenance, and employee parking areas will be directed towards an existing internal drainage ditch, which discharges through ditches to the north of the FEP/WSF compound.

Temporary or "interim" ditches will be constructed as necessary to direct runoff to the stormwater sedimentation pond. Interim ditches will be filled or otherwise eliminated as site development progresses and drainage can be redirected to either permanent ditches or alternative interim ditches.

6.3 Sedimentation Ponds

The RDF sedimentation ponds are designed to receive stormwater runoff collected by the internal site ditch system. The ponds will be maintained with water elevations as low as possible. The ponds are also designed to remove solids held in colloidal suspension through a Sediment Control Building. The Sediment Control Building is designed to facilitate the removal of soil particles held in colloidal suspension. The building includes a surface water pump, flocculant injection system and a mixing return channel designed to inject approved chemical flocculant and mix the resulting solution. Gravity settling of the resulting soil particle flocs will occur in the ponds.

Off-site discharge will be controlled at the pond outlet structure. Should a storm event greater than the design event be encountered, the water level will continue to rise and eventually overflow the pond's riprap weir structure (100 year return period).

Pond maintenance activities will be performed as necessary to ensure the system is operating at design capacity. Routine maintenance activities will include repair of scoured areas, removal of debris and excess sediment build-up, and maintenance of vegetated areas. The ponds will be inspected monthly for any debris and cleaned of sediment build-up on an as-needed basis.

Stormwater retained within the pond will be used, as required, for dust suppression, irrigation, and emergency fire protection supply.

6.4 Erosion Protection

Erosion control will be maintained as described herein. Perimeter areas beyond the limits of the cells will be vegetated to minimize erosion following construction disturbance. Diversion berms will be constructed on sideslopes to collect surface water and control erosion. Intermediate cover will be placed on all exposed faces, in which adjacent cells will be filled in the future. Following landfill capping, seeding and mulching will be undertaken. As vegetation develops on the cover, soil erosion will be minimized.

Inspections will be undertaken by the RDF Manager to identify areas of erosion. Areas observed to have excessive erosion will be assessed to identify the cause of the erosion. Remedial measures such as regrading, reseeding, and/or placement of more effective erosion control methods such as erosion blankets or riprap, will be implemented if necessary. Routine operational practices will include temporary placement of straw bales and/or silt fences as necessary to prevent excessive erosion in areas where construction activities are being undertaken. Upon completion of construction activities, these areas will be regraded and revegetated to reduce soil erosion.

7.0 Landfill Gas Management

The landfill design reduces potential for and controls off-site movement of subsurface landfill gas (LFG) through various control features and detection systems. The systems employed will include barriers, vent systems, and monitoring probes. Design characteristics or structures in the landfill to deter the build-up and migration of gases include the clay liner, the synthetic liner, and passive gas venting. Active wells will be installed as cells of the landfill are capped.

Landfill gas wells will be installed horizontally while waste is being placed as well as through the final cover vertically. Both will be designed as part of the operations and closure program.

Subsurface landfill gas migration can be harmful to property and occupants if undetected. Currently, the buildings around the landfill cell are equipped with methane monitoring equipment. In addition, however, the detection will be facilitated through the installation of monitoring stations outside the limit of the landfill cell. A total of two (2) permanent LFG stations will be installed to monitor for landfill gas migration as follows:

- One station is installed between cell No.2 and the biofilter/WSF area. This well was part of the construction of Cell No. 2.
- One probe will be installed at the west end of the RDF between Cell No. 3 and the leachate storage tank compound. The station was installed as part of the construction of Cell No. 3.

The LFG stations will monitor for methane concentrations in unsaturated soil (i.e., above the water table). The monitoring will be conducted quarterly and will include:

- Combustible gas concentrations.
- Olfactory inspection for identifiable odours, recording of location, and visually checking the quality of the cover soils in the immediate area.
- Temperature of the gas at the probe collar.
- Pressures at the probe collar.

8.0 Leachate Management

8.1 General Description

Leachate is considered to be any liquid having contacted the disposed waste material or any liquids generated within the disposed waste material. This liquid is contained by the RDF liner system and is collected by the leachate collection system. Collected leachate is then transferred to the RDF leachate storage tank by force main, where it is stored until it is removed from site for treatment.

The primary source of leachate is infiltration of rain and surface water through the landfill cover into the underlying refuse. The quantity and quality of leachate generated varies between landfills and between areas within a landfill. In general, leachate is produced once the water content of the landfilled material exceeds its "field saturation capacity," and may be generated soon after placement of waste material. During design, the HELP model was used to estimate leachate generation from the landfill under varying conditions including capping.

The landfill is designed with a leachate collection and removal system (LCRS) on top of the composite liner. The LCRS consists of granular drainage layers, perforated pipes within the granular layers, collection sumps, and sidewall risers. An independent leak detection monitoring sump has been installed below the leachate-collection sump.

To minimize the generation of leachate the first cell incorporates a geomembrane barrier located approximately half-way down the cell. This barrier intercepts stormwater that has not contacted waste and diverts it away from the leachate collection system to reduce leachate volumes.

8.2 Collection

Leachate levels within the leachate collection sump will be monitored automatically by pressure sensor. The pressure sensor records the depth of leachate within the collection sump as a digital display on a panel outside the leachate pumphouse. The on-off liquid head levels for activation and stopping the leachate pumps are 450mm and 300mm respectively above the base of the sump. Leachate levels that exceed 800 mm above the base of the sump activate a warning light. This level is coincident with the top of the sump and equates to the lowest elevation of the liner across the cell. The maximum design head of leachate is 300 mm above the liner and this occurs when the leachate levels within the sump indicate a height of 1100 mm above the base of the sump. The leachate pumps, which are installed in each sump, pump the leachate out of the sump and into a forcemain which delivers the leachate to the RDF leachate storage tank. Using the above control heads, the depth of leachate across the liner should be insignificant except under exceptional circumstances which are discussed below.

Under heavy precipitation conditions, where removal of leachate from the leachate storage tank for off-site treatment cannot be accomplished at a rate faster than the rate of leachate generation, temporary control of leachate will occur by holding leachate within the landfill cell until such time as the pumping rate exceeds the generation rate. Pumping to the storage tank will continue until normal operating conditions return.

The volume of leachate removed will be recorded as it is transferred into transportation tankers by either volume indicators or by weight measurement.

8.3 Leachate Quantity Minimization

A system has been incorporated into the RDF design to allow diversion of uncontaminated stormwater away from the leachate collection system until the cell or part thereof receives residues for disposal. A series of geomembrane barriers have been installed at the surface of the cell that allow separation of the active part of a cell from areas that have yet to receive material for disposal. In the areas where the barriers cross leachate collection pipe lines, the leachate collection pipes have been fitted with removable blind flanges that prevent water on the upstream side of the barrier from entering the collection system. Uncontaminated storm water contained behind these barriers will be pumped out of the cell into the Facility storm drainage system.

As landfilling progresses, it will be necessary to remove the stormwater barrier and the blind flanges to create a connection in the line to allow leachate to flow to the collection sumps.

8.4 Storage and Transportation

Leachate storage is accomplished using an approximately 250,000 gallon above ground storage tank. The tank is constructed of glass-coated, bolted, steel plate. The tank is equipped with a level alarm system, which will automatically close electronically operated valves to prevent overfilling of the tank. The controls used to operate the filling and emptying system are protected from winter freezing by heat tracing. In addition, the tank is equipped with mixing apparatus to prevent leachate from freezing within the tank.

Controlled, pumped unloading of the tank will occur in trucked tanker batches of up to about 9,000 gallons each. Actual batch sizes will vary according to tanker availability and highway weight allowances.

The volume stored within the tank will be kept at a minimum by co-ordinating transport truck pickups to empty the tank as quickly as possible. Leachate will be transported from the storage tank to the disposal point as identified by the receiving facility using a licensed liquid waste hauler.

8.5 Treatment

Leachate will be treated off-site at a wastewater treatment facility designated by and owned and operated by HRM, unless HRM designates otherwise. In all cases, treatment will occur at locations approved by NSDOE.

Appendix "D" includes the results of a treatment capacity study conducted on HRM's wastewater treatment facilities located within the Municipality. The objective of the study was to confirm that sufficient capacity exists within the overall system to accommodate leachate generated at the Facility in addition to other commitments already existing or planned for the future. Appendix "D" indicates that sufficient capacity does in fact exist for this purpose.

9.0 Inspection and Maintenance

An inspection plan will be implemented to ensure that all of the major aspects of the RDF are maintained in compliance with the current regulations and this Operations Plan. The major areas requiring inspection are the leachate collection system, stormwater conveyance system, erosion and sedimentation controls, roads, RDF structures, and site equipment.

9.1 RDF Site

The RDF Manager is responsible for inspection of active areas at the RDF on a daily basis and inactive areas on a monthly basis. Any significant operational or maintenance problems, along with the corrective measures taken, will be recorded in an Inspection Log. The Inspection Log will be kept on file for at least two years and will be available to NSDOE for inspection upon request.

The list of inspection items below summarize the operations and maintenance inspection required for the site as shown on the Inspection Log.

- ***Access and on-site traffic control:*** inspection of fencing and lockable gates, and monitoring of traffic congestion and queuing. A key log will be maintained at the site to control access to locks.
- ***Material control:*** inspection of incoming residue waste at the working face.
- ***Litter control:*** inspection of litter fences, on-site areas (e.g., buffer zones), off-site roads and adjacent property boundaries.
- ***Odour control:*** inspection of daily covering, cracks or fissures in the soil cover, odour at the property boundary, leachate tank.
- ***Dust control:*** inspection of on-site roads, tracking of mud, vegetation on the final cover, buffer zones, and stockpiles.
- ***Erosion and sediment control:*** inspection of vegetation and siltation of ditches, conditions of culverts, berms, or pond.
- ***Leachate control:*** inspection of leachate seeps or discharges of potentially contaminated runoff to surface water, condition of leachate collection pipes and manholes, the leachate storage tanks, and leachate collection pipe cleanout.
- ***Landfill gas control:*** combustible-gas alarms, inspection of vegetation health, condition of gas wells, and the gas management system operation.
- ***Noise control:*** inspection of landfill equipment.
- ***Fuel storage:*** inspection of fuel and waste oil tank integrity, leakage, and containment system. Also, any mobile fuelling equipment will be inspected on a daily basis.
- ***Equipment:*** inspection for visible signs of deterioration or malfunction, routine maintenance and fluid level checks as per equipment manufacturer specifications.
- ***Buildings:*** inspection of exterior condition, interior condition, winter preparedness, and general appearances.

- ***Landscape:*** inspection of vegetation, weed infestation, erosion, and general appearance.
- ***Closed areas:*** inspection of vegetation, erosion, slumping, and cracking of cover.

9.2 Stormwater Management System

The stormwater management system consists of stormwater sedimentation ponds, treatment building, control structures, ditches, and culverts. Monthly inspections will be undertaken to ensure that pipes and ditches are free of obstructions and that there is no visible damage to the system. The ends of the culverts will be checked to ensure they are open. If the culvert has been crushed, it will be repaired or replaced. The on-site access road ditches will be periodically regraded, if necessary, to prevent standing water and ensure adequate capacity. If sediment has accumulated it will be cleaned in an appropriate manner. The sedimentation ponds will be cleaned out when sediment has accumulated requiring clean out and the sediment will be placed in the landfill as part of the daily cover.

After each storm event, the erosion and sedimentation control devices will be inspected. If any of the devices are found to be damaged, they will be repaired or replaced as soon as possible.

9.3 Leachate Collection and Storage System

The leachate collection system consists of many different parts. These include the piping, side slope risers, leachate sumps, manholes, and a storage tank. All of the portions of the leachate collection system that are to remain under the solid waste will be checked before any solid waste is placed in a cell to be sure that the sumps are operating properly and that there is no blockage of the piping. After the initial start-up, inspections will be performed as necessary and will include weekly visual inspections of leachate pumping systems and associated hoses and the like. All pumps will be pulled yearly and inspected. All the manufacturer's recommended periodic maintenance will be performed at this time. Leachate collection pipes will be cleaned periodically. The access to these pipes will be gained through the leachate collection pipe cleanouts. The storage tank will be inspected on a regular basis to check for tank leakage, malfunction of vent ports, improperly functioning discharge pumps, or other potential defects.

Special care will be taken when inspecting any of the leachate collection system, as methane can be trapped in sumps, piping or other places and could cause explosions. Confined space entry procedures will be used in all spaces defined as such.

9.4 Gas Management System

Operational activities for the active gas management system will typically include periodic maintenance. Gas wells are scheduled to be installed as part of the closure program. During the

operating phases of the site, weekly visual inspections of all gas wells will be performed to check for gas generation, excessive settlement around each well that could cause distress to the final cover.

10.0 Monitoring and Reporting

10.1 Development and Operations Monitoring

10.1.1 Development Monitoring

Landfill development will be monitored and recorded to assess the progress of site development and compare with disposal capacity, soil excavation, and leachate and gas generation calculations performed during landfill design. The type of records that will be maintained by the RDF Manager will include the following:

- Volumes of any clean fill or alternate cover brought to the site from off-site sources.
- Estimates of quantities of combined daily, intermediate, and final cover used.
- Leachate volumes pumped for treatment.
- Levels of leachate in the leachate collection systems.
- Cell elevations and area consumed
- Tonnage of residual waste landfilled.

Cover material records will be used to assess the current cover needs and forecast future requirements.

10.1.2 Landform Monitoring

In addition to monitoring of development, annual monitoring of the RDF will focus on the adequacy of:

- Revegetation/seeding programs.
- Grading to preclude or control unplanned surface runoff or erosion.
- Weed control measures taken to control infestation by undesirable weed species.
- Measures to control inadvertent impairment of surface water quality by solids suspended in runoff.
- Appropriateness of use of sediment-control structures (e.g., porous sediment-retaining geosynthetics)

This information will be included in annual monitoring reports, and submitted to NSDOE.

10.2 Environmental Quality Monitoring

10.2.1 General

This section of the Operations Plan details the environmental monitoring program to be conducted during the operation of the Facility. The program covers areas of the FEP/WSF and the RDF and will be carried out as a whole for all locations on the site.

Prior to construction of the FEP/WSF and the RDF, boreholes were advanced, monitoring wells installed and surface water sampling locations established to determine baseline conditions at the Facility. The baseline conditions were reported in the supporting documentation provided to NSDOE as part of the Approval 97-ATCC-003 issued for construction of the first cell of the RDF.

Monitoring of approximately 50 monitoring wells and 12 surface water sampling locations has occurred monthly during RDF construction in 1997 and 1998 and on a quarterly basis since construction commenced. The purpose of these monitoring events was to:

- Determine if construction activities created any significant impact to the environment
- Develop a baseline of data with which results of monitoring during operations of the facility could be compared.

The final round of monitoring took place before the end of the year 1998 and the results of these analyses were reported to NSDOE after operations commenced.

This document sets out the monitoring program for use during operations in 1999. Programs for subsequent years will be confirmed upon completion of a review of the data collected to date. Assessment will include but may not necessarily be limited to the following:

- Groundwater quality compared to baseline conditions, and any changes
- Surface water quality compared to baseline conditions, and any changes
- Leachate quality from an environmental impact perspective at the Facility

Monitoring for leachate constituents as required by HRM wastewater treatment facilities is not part of the terms of reference of the Operations Plan and is not part of the environmental monitoring program.

10.2.2 Groundwater

A review of the locations of the existing monitoring wells has been conducted to determine the spatial importance (both horizontally and vertically) of these wells in providing data with which determination of environmental quality can be achieved and any changes that might arise from operations can be assessed. Of the approximately 50 existing wells, 28 of these wells are deemed to be close enough to operations at either the FEP/WSF or the RDF, or both, that continued monitoring is considered necessary. The remaining wells are somewhat removed from operational impact at this stage of Facility development such that annual monitoring is considered sufficient. As the Facility develops, some of the wells, considered as annual wells in this program, will change to quarterly as the operations become closer to their location, and conversely, some current quarterly sampled wells will become annual as the operations move away from their location or as parts of the RDF are closed. Further, it is anticipated that, in the future, additional wells will be required at various locations on the property.

Hydraulic head levels will be measured in coincidence with each monitoring event. Wells will be purged to remove, at a minimum, three to five casing volumes of water prior to sampling.

All samples will be analyzed for general inorganic chemistry and trace metals, including uranium during each sampling event. Specific wells, as indicated on Table E-1 (Appendix E) will also be sampled for volatile organic compounds (VOC's), polyaromatic hydrocarbons (PAH's), petroleum hydrocarbon components (TPH / BTEX), insecticides and polychlorinated biphenyls (PCB's) on one occasion during 1999. Samples for general inorganic chemistry and metals will be field filtered and metal aliquot acidified. Parameters included in each of the analytical packages are included for reference in Table E-4, Appendix E.

10.2.3 Surface Water

The surface water monitoring program consists of sampling of 11 of the original 12 monitoring locations. SW12 is located on the east side of Otter Lake and has provided background data during previous events. Continued monitoring of this location is not warranted. It is, however, noted that the program will incorporate sample collection from the sedimentation ponds. These location will be referred to as SW13, SW14 and SW15.

All samples will be analyzed for general inorganic chemistry, trace metals and Total Suspended Solids (TSS). Two surface water stations, SW2 and SW4, representative of discharge from the sedimentation ponds will be additionally analyzed for Chemical Oxygen Demand (COD) and for 5-day Biological Oxygen Demand (BOD).

10.2.4 Leachate Quality Monitoring

Samples of leachate will be collected from the leachate storage tank and analyzed as outlined in Table E-3, Appendix E.

10.2.5 Analyses and Reporting

Analyses of samples collected under the monitoring program will be conducted at accredited laboratories that are certified to analyse the specific contaminant. The sampling and analytical program will be subject to the normal rigours of quality control including chain–of-custody, trip, field and laboratory blanks.

The analytical results of the monitoring events will be submitted to NSDOE after internal review to identify any anomalous data. If anomalous data is noted, interpretation of this data will accompany the results when submitted to NSDOE. If the data suggests analytical error, re-sampling will be conducted if warranted and after discussion with NSDOE.

Full interpretation of the data collected will be conducted annually and will be included in the facility annual report noted at the end of this Section.

10.3 Leachate Quantity Monitoring

Leachate monitoring takes two forms; monitoring of leachate flows and monitoring of leachate quality, or the concentrations of specified constituents. Leachate quality monitoring is included in Section 10.2.4. This section includes the methods used to monitor leachate quantities generated at the RDF.

10.3.1 Leachate Collection Sump Monitoring

Leachate levels within the leachate collection sumps are monitored and maintained automatically by pressure sensor. The pressure sensor records the depth of leachate within the sump as a digital display on a panel located outside the leachate pumphouse. As noted earlier, the on-off liquid head levels for activation and stopping the leachate pumps are 450mm and 300mm respectively above the base of the sump. Leachate levels that exceed 800 mm above the base of the sump activate a warning light. This level is coincident with the top of the sump and equates to the lowest elevation of the liner across the cell. The maximum design head of leachate is 300 mm above the liner and this occurs when the leachate levels within the sump indicate a height of 1100 mm above the base of the sump. The status of the warning light and the functions of the leachate pumps are visually checked on a daily basis and are included as part of the monthly inspection of the site. Increased monitoring frequency will occur as leachate volumes increase, or as required by the receiving facility.

The leachate from the sumps will be consolidated using submersible pumps and transported to the leachate storage tank. The volume of leachate generated in a particular area of any landfill is a function of many variables. The most significant of these are:

- Volume of leachate produced in a cell is a function of the area of the cell.
- Volume of leachate produced is a function of precipitation infiltrating into the cell.
- The rate of infiltration into the cell is as a function of the state of covering in that particular area. For example, an area with only daily cover will generate more leachate than an area with intermediate cover.
- Leachate generation rate is a function of the absorptive capacity of the waste or residue through which the leachate travels. As landfills are not homogeneous masses and because preferential travel pathways will develop through the mass of the cell, generation rates vary from time to time and from area to area.

Consequently, short-term flow measurement of leachate quantities provides data of a significantly varying degree to make any interpretation meaningful. Measurement of leachate generated from a particular cell is normally determined through analysis of annual volumes calculated on the basis of volume treated on-site or trucked from the landfill for off-site treatment.

As a result, reporting of leachate volumes generated will be based on average annual data at the RDF. The data will be interpreted giving recognition to the state of the cell during the reporting period. For example, estimates will be made of the percentage of the cells being reported that only received daily cover during the reporting period, the percentage that received final cover, and whether significant run-off was directed off the cell cover surface. Historically, data such as this is scant from Nova Scotia landfills. However, some data has been collected for in excess of one year at a similar facility in Nova Scotia to assist in this interpretative analysis and data is also available from other areas of North America with similar climatic conditions.

Based on these data sets, the following typical leachate generation rates, which are less than the values generated by the H.E.L.P. model used in the RDF design, can be expected or anticipated at this site:

- Flat cells with minimal daily cover - in excess of 10,000 L/Ha/Day
- Graded cells with daily cover - approximately 7,500 – 10,000 L/Ha/Day
- Steeper sloped well covered cells - approximately 2,500 – 5,000 L/Ha/Day
- Closed cells with synthetic caps - approximately 100 – 1000 L/Ha/Day

As more data becomes available, and a history is developed at the RDF, these values will be refined to reflect the larger data set.

Total annual leachate volumes for the portion of the RDF filled, partially filled or closed will be calculated based on measured trucked leachate volume or converted weight as applicable. The estimate of generation from particular areas will be computed by apportioning the total volume collected amongst the various areas according to their development state over the period being assessed.

10.3.2 Leak Detection Monitoring Sump

Monitoring of any leakage from the LCRS will be undertaken to ensure that the liner system is working as designed. Additionally, ground water monitoring wells on-site will be an integral part of the comprehensive leakage detection system.

A leak detection monitoring sump is located in each cell. Access to this sump is through 500 mm sidewall riser. Liquid will collect in these sumps as time progresses. Periodically, the water from these sumps is removed by pumping. Unlike the leachate collection sump, this process is not automated. A submersible pump will be used to remove this water and to record the volume pumped on each occasion.

The origin of this water can be from one or more of the following sources:

- Post-construction drainage – if the construction season has been wet, significant water is often located in the annular space within the drainage geonet above the leak detection layer liner.
- Release of pore water from overlying clay liner materials. As the weight of disposed material increases above the clay liner, the vertical stress on the liner increases and the liner consolidates. Consolidation of clay causes an increase in pore pressure resulting in release of water within the pores into the drainage layer. Historical measurement of similar designs as the RDF indicate that this phenomenon can continue for years.
- Leakage through the clay liner from the primary liner above.

Monitoring of the quantity of water removed from the sumps is accomplished by recording the volume pumped during each pumping event. Monitoring of the chemical change, if any, of this water is used to identify the origin of water found within the leak detection cell. Monitoring of the chemistry of this water is included in Table E-3, Appendix E.

10.4 Odour

Air monitoring for odour will consist of an active on-site monitoring program. Active on-site odour monitoring will be performed daily as part of the Operations Superintendent's responsibilities (Section 5). In the event of malodours, the following actions will be taken:

- Record location of identified malodour.
- Inspect the area, to determine potential source of the odour.
- Undertake appropriate remedial measures. These may include:
    - repair to intermediate or final cover;
    - proper placement of daily cover; and
    - removal of standing water

If problem odours still persist, upon implementation of remedial measures, additional expertise will be retained to evaluate the situation.

Passive off-site monitoring will consist of logging and responding to any complaints received. The complaint response procedure will be followed as identified in Section 11. In addition, maintenance of daily, intermediate, and final cover areas will be inspected and remediated, as required.

11.0 Complaint Response Procedures

During the operation of the landfill, complaints regarding litter, dust, traffic, odour, noise, and vectors (birds, rodents, flies) may occur. Complaints will be received at the Administration Building and those that may relate to the RDF will be directed to the RDF Manager for resolution. The telephone number for complaints will be made available for the public and will be posted on a sign at the site entrance.

The complaint will be recorded on the Complaint Log as presented in Appendix "A" of the FEP/WSF Operations Plan. A response will be made to the complainant on the same day confirming the receipt and nature of the complaint, and to give results of any follow-up. If a complaint cannot be resolved within a reasonable time period, the complainant will be notified of what action will be taken and when it will be taken. Any complaints received after hours will be recorded using an answering machine or answering service.

Complaint forms will be completed when a complaint is received. This will be done for all complaints, whether received verbally or by correspondence. This form will be kept on file, along with copies of any correspondence or records of discussions with the complainant. The form will indicate the following information:

- Date and time of day that the complaint was received.
- Date and time of day the complaint incident occurred.
- Complainant's name, address, telephone number, and location of incident.
- Nature of complaint (noise, dust, odour, etc.).
- Method of receipt of complaint (phone, letter, site visit, personal communication).
- Operational data at the time of the incident.
- Nature and result of any investigation or follow-up.
- Weather conditions and meteorological measurements at the time of the complaint.

Weather conditions at the time of a complaint will be carefully and thoroughly noted. As in most cases, this information could be used to validate the complaint.

12.0 Annual Reports

To assist in the tracking of site progress and performance, a site development and operations report and an environmental monitoring report will be prepared annually and submitted on or before March 1 of each year commencing in March 2000 to the Department of the Environment and HRM. The reports will cover the calendar year preceding each anniversary of the site opening.

The annual site development and operations report will include the following:

- An operational overview of the past year and a brief description of the operations to be conducted in the next 12 months.
- A site contour map of the site area showing areas where waste was deposited during the year, and areas of excavation.
- A summary of the volume, weight and types of all residues and wastes managed at the RDF.
- A summary of rejected loads with reasons for rejection
- An estimation of the amount of cover material used in the operations.
- An estimation of the remaining capacity of the RDF.
- A review of contingency plans and measures and a recommendation for changes.
- A description of major scheduled and unscheduled works undertaken in the past year.
- A summary of complaints received during the past year.
- A description of significant environmental and operational problems encountered during the past year, if any, and mitigative actions taken.
- The quantity and quality of leachate removed for off-site treatment.
- A statement as to the compliance of the RDF with all conditions of the approval to operate.

13.0 Additional Contingency Measures to Complement Contingency Plan Approved as Part of the FEP/WSF Operations Plan.

13.1 General

The FEP/WSF Operations Plan approved under NSDOE Approval No. 98-ATCC-025 includes a Contingency Plan in Section 7 of that document. This section of the RDF Operation Plan includes:

- Those additional contingency measures and plan narrative that are applicable to the RDF only.
- References to the particular section of the Contingency Plan included in the FEP/WSF Operations Plan where the conditions of that Contingency Plan are applicable to the RDF as well as to the FEP/WSF.

13.2 Scope and Plan Purpose

13.2.1 Purpose

Refer to Section 7.2.1 of the Contingency Plan included in the FEP/WSF Operations Plan approved by NSDOE under Approval No. 98-ATCC-025.

13.2.2 Location

In addition to the location noted in Section 7.2.2 of the Contingency Plan included in the FEP/WSF Operations Plan, the additional geographic area applicable covers the areas of the RDF that are used in the daily operation of the Facility. These are:

- The active and inactive landfill cell areas
- The sedimentation ponds and the leachate storage tank.
- The daily cover borrow area
- The area in the vicinity of the maintenance building
- On-site roads.

13.2.3 Organizations and Groups with Responsibility under this Plan

Refer to Section 7.2.3 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.3 Emergency Response Coordinator

Refer to Section 7.3. of the Contingency Plan included in the FEP/WSF Operations Plan, amended as follows:

Primary ERC:	Steve Copp, RDF Manager	Office: 453-3490 Home: 876-5157 Cell: 478-4671
Secondary ERC:	Dave Ernst, Operations Manager	Office: 453-3490 Home: Cell: 222-7958
Corporate 24-Hour Telephone:		876-3418

13.4 Personnel Training

Refer to Section 7.4 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.5 Spills

Refer to Section 7.5 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.6 Fire

13.6.1 Landfill and Residual Material Fires

13.6.1.1. Surface Landfill Fires

Surface landfill fires are usually the result of undetected hot loads that are landfilled. Management of detected hot loads is included in Section 13.6.1.2. As the origin of the majority of the residual material to be disposed of at the RDF is from the FEP/WSF, the opportunity for hot loads to be received at the working face is remote. Nonetheless, the procedures included herein are designed to manage the unlikely event of one or more loads of residue or inert material being delivered for disposal that might cause a fire.

Fires will, therefore, generally start within 24 hours of disposal and are at or near the current working face. The following procedures will be followed upon identification of a fire. The employee who initially spots the fire will immediately inform the ERC. The ERC will assess the extent of the fire and notify the appropriate authorities. The ERC will:

- Determine the number, location, extent, and possible cause of landfill fire.
- Notify all on-site landfill staff.
- Notify emergency responders and request assistance, if required.
- Determine the priorities, if multiple fires.
- Assign specific tasks to landfill staff at the highest priority fire.

Once the above actions have been taken, the ERC will instruct fire responders to:

- Prepare an area away from the working face and southwest of the landfill cell to be clear of vegetation and waste (preferably virgin ground).
- Excavate soil nearby for use in smothering the fire if insufficient cover material is at hand.
- Assemble portable pumps and hoses.
- Fill the water truck.
- Get safety equipment (breathing apparatus and filters) from equipment storage building.

After preparations have been made, the ERC will direct the responders to contain the fire, by:

- Constructing a firebreak as close to the burning area as possible to limit surface spreading of fire.
- Suppressing flames with water.
- Pushing smouldering material to the clear area while continuing to spray with water.
- Smothering the fire by adding soil and compacting.
- Continuing to monitor the fire site and smothered material following the apparent extinguishing of the fire. In this light, burnt material will be isolated and left exposed for two days after extinguishing to ensure no subsequent outbreak of fire.

13.6.1.2 Hot Loads

Refer to Section 7.5 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.6.1.3 Sub-Surface Landfill Fires

Subsurface landfill fires can result from the spontaneous combustion of the wastes or from unattended shallow fires that spread. Because of the complex conditions required for spontaneous combustion and the likelihood that surface fires will be properly extinguished, subsurface fires are relatively rare. The following procedures should be followed if a subsurface fire is suspected.

The employee who initially spots the fire will immediately inform the ERC. The ERC will assess the extent of the fire and notify the appropriate authorities. The ERC will:

- Inspect the suspected fire area for signs of smoke or vapour (best seen in the early morning) being emitted from the landfill surface.
- Inspect the landfill surface in the suspected fire area for signs of accelerated subsidence.
- Inspect the landfill surface for cracks, erosion, or other areas where air may be readily entering the landfill.
- Visually assess the surface soil temperatures to determine the spatial distribution of any elevated temperatures.

Once the above actions have been taken, the ERC will instruct site personnel to:

- Eliminate all potential sources of air intrusion.
- Fill in any surface subsidence and restore landfill cover.

13.6.1.4 General Personnel and Equipment Safety Precautions

Refer to Section 7.7.2 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.6.2 Equipment Fires

Refer to Section 7.7.3 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.6.3 Building, Fuel Island, Other Fires

Refer to Section 7.7.4 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.7 Medical Emergencies

Refer to Section 7.8 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.8 Accumulation of Hazardous Gases

Refer to Section 7.9 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.9 Lightning

Refer to Section 7.10 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.10 Power Outages

Refer to Section 7.11 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.11 Resources

Refer to Section 7.13 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.12 Evacuation Plan

In addition Section 7.14 of the Contingency Plan included in the FEP/WSF Operations Plan., evacuation of the following areas may be necessary as part of an emergency response action:

- Maintenance Building
- South Sedimentation Building
- North Sedimentation Building
- Leachate Storage Tank Pumping Stations

The evacuation procedure will be as detailed in Section 7.14 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.13 Public Relations

Refer to Section 7.15 of the Contingency Plan included FEP/WSF Operations Plan.

13.14 Post-Event Assessment

Refer to Section 7.16 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.15 Reporting

Refer to Section 7.17 of the Contingency Plan included in the FEP/WSF Operations Plan.

13.16 Updating

Refer to Section 7.18 of the Contingency Plan included in the FEP/WSF Operations Plan.

Appendix D

Leachate Disposal Capacity Study

MIRROR NOVA SCOTIA

LEACHATE DISPOSAL STUDY
DRAFT REPORT

NOVEMBER 1998

PORTER DILLON LIMITED
Halifax, Nova Scotia

November 4, 1998

DILLON CONSULTING

Porter Dillon Limited
2701 Dutch Village Road, Suite 700, Halifax, Nova Scotia, Canada B3L 4G6
Telephone (902) 453-1115
Fax (902) 454-6886

MIRROR Nova Scotia
P. O. Box 209
Lakeside, Nova Scotia
B3T 1M6

ATTENTION: Mr. Kurt Jacobs
General Manager

Leachate Disposal Capacity Study Draft Report

We are pleased to enclose two copies of our leachate disposal capacity study draft report resulting from the investigations of the various sources of leachates and the capacity of four treatment facilities within the Halifax Regional Municipality (HRM) to treat these leachates. The unbound copy is intended to be used for inclusion in Mirror NS's application to NSDOE.

Four copies of this draft report are being submitted simultaneously to Mr. Robert Orr, P.Eng. of HRM.

If any questions arise on this matter, please contact the undersigned or our Mr. Gerry Isenor, P.Eng.

Yours truly,

PORTER DILLON LIMITED

[redacted]

A. Bourque, P.Eng.
Project Manager

AHB:jep
enclosure
Our File: 98-5697-01-01

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1.0 INTRODUCTION

The objective of this study is to assess the suitability of four candidate treatment facilities in the Halifax Regional Municipality (HRM) to accept leachates from the Otter Lake Facility; the Cumberland Central Landfill (BFI portion only); and, the Ragged Lake Composting Facility. The findings of the study will lead to the development of a long term leachate management strategy. HRM currently has an interim approval from the Nova Scotia Department of the Environment (NSDOE) to treat leachate generated at the Otter Lake Facility at the Mill Cove Sewage Treatment Plant until December 31, 1998. Further approval is contingent upon HRM completing a long-term management strategy. The operations that are currently producing leachate, or that will soon be producing leachate, are: the waste stabilization facility (WSF), front end processing unit (FEP), and biofilter at Otter Lake; the Ragged Lake Composting Facility; and, the Cumberland Central Landfill. In the interim, leachates produced as a result of these operations are being transported to the Mill Cove Sewage Treatment Plant. Operation of the residuals disposal facility (RDF) and the Ragged Lake Composting Facility are due to begin shortly.

The treatment facility assessment will utilize the characterization of the leachates and review the capacities of the candidate sewage and leachate treatment facilities over the next decade. The leachate characterization and capacity review focused on: rates of flow; biochemical oxygen demand (BOD); and, ammonia concentration. Total suspended solids (TSS) concentrations for landfill leachates is typically very low compared with BOD concentrations. As the landfill leachates comprise the majority of the flow, TSS will not be a limiting factor in evaluating the candidate treatment facilities, and therefore, it was eliminated from the assessment. The four candidate treatment facilities are:

- Mill Cove Sewage Treatment Plant;
- Lakeside-Timberlea Sewage Treatment Plant;
- Aerotech Sewage Treatment Plant; and,
- Highway 101 Leachate Treatment System.

The assessment of the treatment plants as suitable candidates for treatment of the leachates will be based upon current and projected loadings at the plants. The estimated leachate characterization information will be combined with the projected loadings at the treatment plants due to municipal sewage and compared with the design capacities of the plants to determine the suitability of each treatment plant in both the short and long term.

Sources of data and information for both the characterization of the leachates and the assessment of the candidate treatment plants consisted of: previous studies and design reports, including, *Residual Disposal Facility Final Design Report* (Porter Dillon, June 1997), *Cumberland Central Landfill Design Report* (Porter Dillon, July 1996), *Leachate Treatment Study* (CBCL, April 1997); operating data from the treatment facilities, such as the four HRM treatment facilities, Central Cumberland Landfill, the Otter Lake facility, and the Colchester composting facility; and, communication with various organizations, including HRM, MIRROR and NSDOE. Population projections were based on HRM's Priority and Policy Group *Forecasting the Future of Halifax Regional Municipality Report #1 Population Projections 1996-2021* dated September 1998.

2.0 LEACHATE CHARACTERIZATION

2.1 Otter Lake Facility

The Otter Lake Facility consists of the RDF and the FEP/WSF. The bulk of the leachate produced at this facility is due to the RDF and it will be studied separately from the leachate produced as a result of the activities associated with the FEP/WSF. Characterization of both streams of leachate will be presented in the following sections.

2.1.1 Residual Disposal Facility

The Otter Lake RDF is designed to accept stabilized material produced by the FEP/WSF, after source separation, recycling, stabilization and diversion, from HRM over a period of 25 years. The total tonnage is expected to be approximately 3.12 million tonnes of stabilized material (Porter Dillon Site A Report of June 1997). The RDF contains a liner system and a leachate collection and transmission system. Leachate collected from the RDF is stored in an above ground tank to be periodically trucked to an HRM facility for treatment.

The quantity and quality of leachate produced at the RDF was estimated by Porter Dillon (June 1997).

As the RDF will only receive wastes that are source separated and then screened and biostabilized in the FEP and WSF, it is expected that the leachate will have a significantly weaker organic content than the leachate produced in a typical municipal landfill. As suggested in Porter Dillon's report (June 1997) and shown in Figure 1, a predicted BOD concentration of 2000 mg/L is expected from the RDF. The BOD loading depicted in Figure 4 incorporates the concepts discussed in the Porter Dillon report (June 1997) which were based on the landfilling plan, typical leachate trends over time, and the recorded BOD loadings at the Highway 101 Landfill.

Fig. 1 - Leachate BOD Concentration Projections

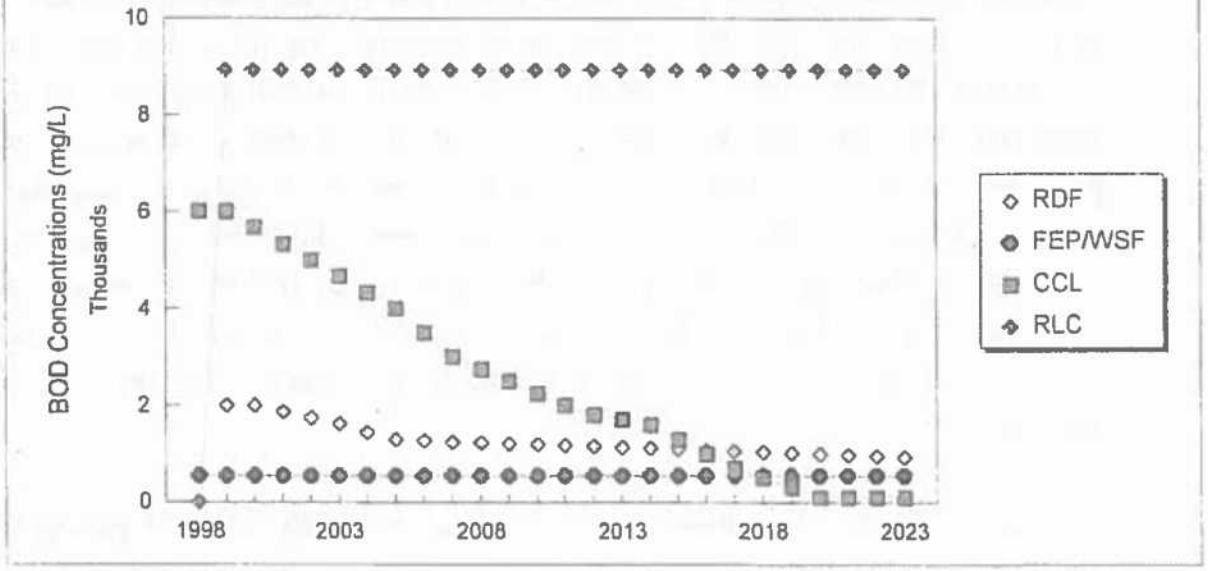
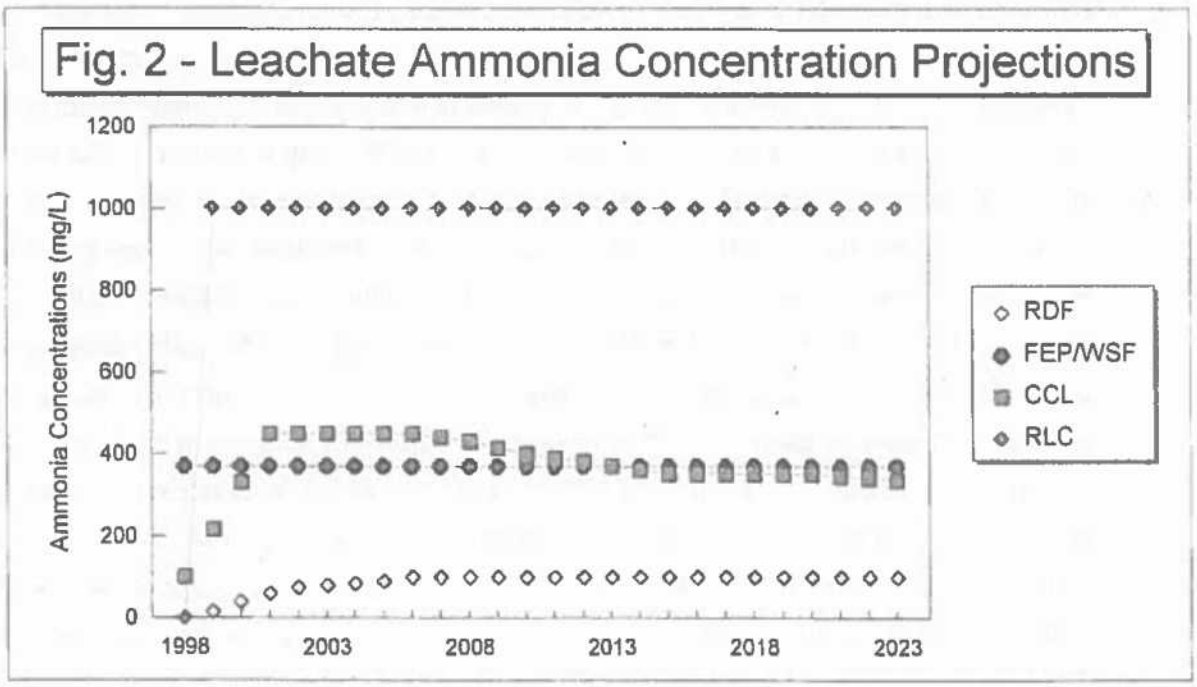


Fig. 2 - Leachate Ammonia Concentration Projections



RDF - Residual Disposal Facility
FEP/WSF - Front End Processing/Waste Stabilization Facility
CCL - Cumberland Central Landfill
RLC - Ragged Lake Composting

The initial ammonia concentration in leachate from a conventional landfill is typically in the range of 10-20 mg/L after which it peaks, to approximately 450 mg/L, and remains at this level as the anaerobic biodegradation of the organic material progresses. As the municipal solid waste (MSW) is source separated and any remaining organics are previously stabilized, the anaerobic biodegradation occurring in the Otter Lake RDF should be minimal. As stated in the Porter Dillon report (June 1997), the ammonia concentrations should peak at 100 mg/L which is approximately 20% of that value which is expected at the Highway 101 Landfill Phases A&B. The predicted ammonia concentrations and loadings from the RDF leachate are shown in Figures 2 and 5, respectively.

The quantity of leachate was estimated by Porter Dillon (June 1997) using the Hydrological Evaluation of Landfill Performance (HELP, V3.04) computer modelling software. The HELP model was used to estimate runoff, evapotranspiration, leachate generation and percolation in five different cases. The five different cases represent stages of landfill development which include increasing increments of waste depth with daily cover and a closed landfill cell with a low density polyethylene (LDPE) cap system over the closed area. The results of these five cases were combined based on the landfilling plan to determine the estimated yearly leachate generation rates. Previous work done by Porter Dillon on estimating the volumes of leachate to be produced from Phases A&B of the Highway 101 Landfill (i.e., the landfill extension constructed for 1995-1996) allowed for calibration of the model using actual measured flow rates. The calibration factor was utilized in the determination of the estimated annual volume of leachate to be delivered to HRM, which is depicted in Figure 3. The average annual leachate generation over the active life of the landfill is estimated to be approximately 25 000 m^3/yr while the peak value is approximately 36 000 m^3/yr. The decrease in leachate generation predicted to start in the year 2006 is due to the proposed operation of the RDF and was described in Porter Dillon's Site A Report (June 1997).

2.1.2 Front End Processing/Waste Stabilization Facility

The FEP provides a facility to allow for receiving the source separated MSW and other non-putrescible material and process residue from HRM facilities. It also facilitates the screening of the MSW which allows the larger inert materials to be placed directly in the landfill. The remaining waste material is biostabilized in the WSF through a series of agitated channels which have aeration and humidification systems to control the composting process of the residual organics in the waste. Following the initial stages of the composting, the waste is placed in a curing area to complete the biostabilization process. The exhaust air from the FEP/WSF is forced through a biofilter which consists of bark and wood chips. The microbes living in the biofilter will break down the odorous compounds contained in the FEP/WSF exhaust air.

The wastewater created as a result of activities associated with the FEP/WSF consist of: liquids leaching from the waste received at the FEP; floor wash water at the FEP; leachate from the agitated bin composting process; and, leachate from the biofilter. In the interim, the wastewaters produced have approval to be transported and treated at the Mill Cove Sewage Treatment Plant. The leachate produced as a result of the biofilter consists of the most significant volume of wastewater associated with the FEP/WSF. The biofilter leachate forms as a result of precipitation or excess applied moisture which infiltrates through the biofilter media and does not get absorbed into the media nor evaporated into the air stream. It is expected that there should be minimal leachate generated from the agitated bed composting system based on review of similar composting systems in Lunenburg, Nova Scotia and Guelph, Ontario. Based on discussions with operations staff at the Otter Lake Facility and a review of their estimated leachate production to date, an annual leachate production of 850 m^3/yr has been estimated. This average annual production rate is expected to remain relatively consistent with time, although the biofilter leachate produced is highly variable as it is dependant upon precipitation.

Analytical results based on one sample each of WSF and biofilter leachate and the results of leachate samples taken upon delivery to the Mill Cove Sewage Treatment Plant were compared to leachate composition from the MSW composting facility in Guelph, Ontario.

Based on analysis of these numbers, concentrations of BOD, as 560 mg/L, and ammonia, as 370 mg/L, were estimated. It is expected that these concentrations will remain relatively constant over time, although changes can occur which would be a function of the operation, precipitation and incoming waste to the FEP/WSF. BOD and ammonia concentrations are plotted on Figures 1 and 2 while the resulting loading rates are depicted on Figures 4 and 5.

2.2 Cumberland Central Landfill

Following closure of the Highway 101 Landfill in 1997, MSW from HRM was transported and disposed in the Cumberland Central Landfill (CCL). Disposal of HRM waste in CCL is an interim solution until the Otter Lake Facility is constructed and begins accepting wastes. Therefore, capping of the two cells, Cell 1 and Cell 2a, which contain mostly HRM waste, is expected to occur shortly after December of 1998. After capping, it is expected that both the hydraulic and organic loading will decrease with time. As part of the arrangement to dispose of HRM wastes in CCL, all the leachate produced in these two cells will be transported to an HRM facility for treatment. In the interim, leachate produced at CCL is being transported and disposed in the Mill Cove Sewage Treatment Plant.

The measured annual volumes of leachate produced at CCL in Cell 1 and Cell 2a have agreed with modelling predictions made in the Porter Dillon Report (July 1996). As the HELP model has been found to be somewhat inaccurate in predicting infiltration through the geomembrane cap, BFI's database of closed landfills with similar cap designs and similar annual precipitation rates was used to predict long term annual leachate generation at CCL in Cell 1 and Cell 2a. The estimated annual volumes of leachate to be produced over time at CCL in Cell 1 and Cell 2a is depicted in Figure 1. Current leachate production is approximately 12 435 m^3/year, however, by 2003, it is expected that leachate production will have declined to a steady state value of approximately 276 m^3/year.

Fig. 3 - Leachate Production Projections

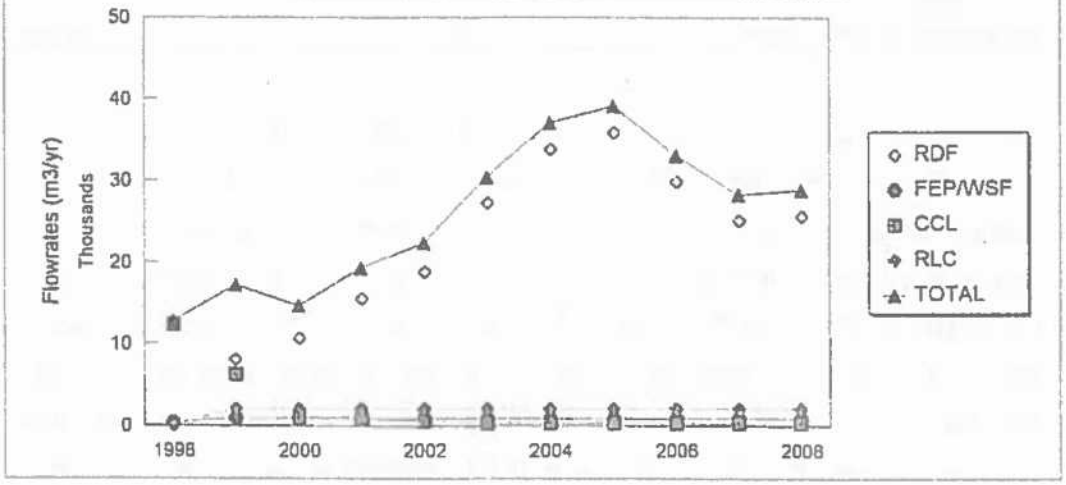


Fig. 4 - Leachate BOD Loading Projections

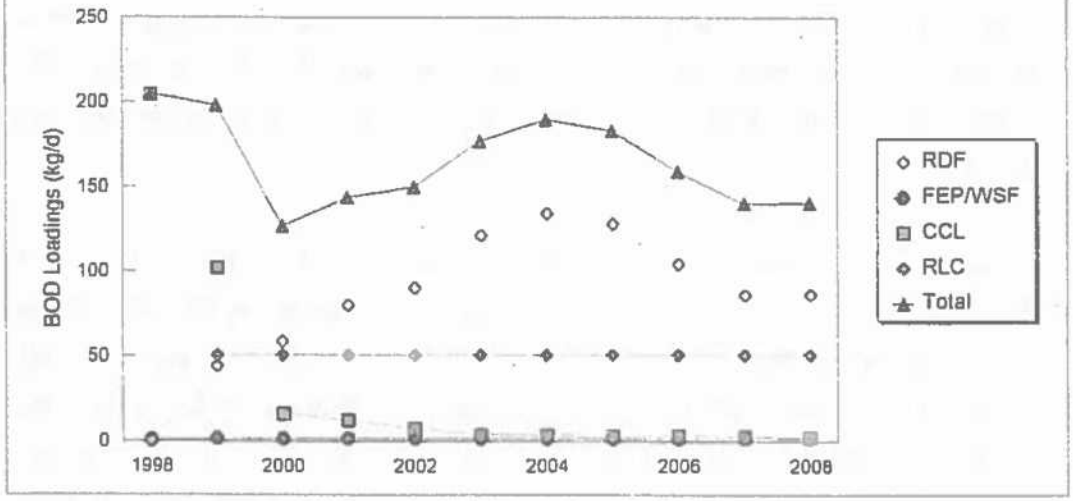
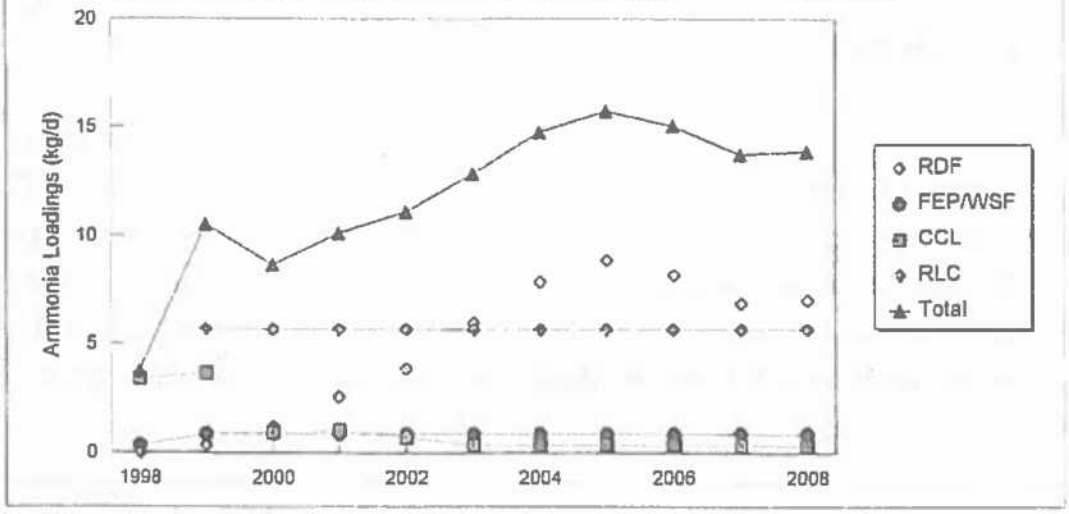


Fig. 5 - Leachate Ammonia Loading Projections



The characterization of the leachate from CCL's Cell 1 and Cell 2a is based on analysis of sampling results of the leachate from May 1997 to present and the results of leachate samples analyzed upon delivery to the Mill Cove Sewage Treatment Plant. The expected change in leachate composition after capping is based on trends measured and predicted for Highway 101 Landfill Phases A&B, as discussed in Porter Dillon's Report (June 1997). The initial BOD concentration of CCL leachate utilized in this study is 6000 mg/L. This value is taken from the upper end of the wide range of BOD concentrations in the analyzed leachate samples. The decline in BOD concentration with time was inferred based on the expected decline from Highway 101 Landfill Phases A&B. Although the BOD concentration of CCL leachate is approximately half of measured BOD concentrations at Highway 101 Phases A&B, it is expected that over time the concentration for CCL leachate will be similar to that expected of Highway 101 Phases A&B. Production projections as well as BOD concentration and loadings curves are shown on Figures 1, 3 and 4.

Initial ammonia concentrations are based on analytical results of CCL leachate samples. It is expected that this initial value of 100 mg/L will increase as the landfill ages and the anaerobic biodegradation of the organic material progresses. It is also expected that the peak and subsequent slow decline of ammonia concentrations in the leachate will follow the trend predicted for Highway 101 Phases A and B as described in Porter Dillon's Report (June 1997). Ammonia concentration and loading projections are shown on Figure 2 and 5.

2.3 Ragged Lake Composting Facility

Two composting facilities are planned within HRM to accept source separated organic material from the residential and Industrial-Commercial-Institutional sector of HRM. One composting facility is planned for Burnside Industrial Park and the other in Ragged Lake. The latter of the two requires treatment of its leachate at an HRM facility while the other has provisions for treatment on site and has permission to discharge to the local municipal storm sewer provided there is adequate pre-treatment of the leachate. Therefore, only

discussion of leachate expected to be produced from the Ragged Lake Composting Facility is included in this study.

The system being utilized for the Ragged Lake Composting Facility is an in-vessel system manufactured by the same company, Stinnes Enerco, as the Colchester composting system. The active composting phase takes place in a module, which has leachate drains and leachate reinjection. The air forced through the material in the modules is passed through a series of covered biofilters which treat the exhaust from the composting system. The curing stage takes place in covered windrows on a concrete pad. Based on the process described above and through discussions with Stinnes Enerco staff, no excess leachate is expected to be produced. All leachate collected will be circulated back into the process. Discussions with staff at the Colchester facility revealed that they are currently producing no excess leachate due to reinjection. At the start up of the processes at Colchester, some excess leachate was produced as the initial modules did not have reinjection capabilities. However, should excess leachate be produced at the Ragged Lake Composting Facility, HRM has NSDOE approval to transport and treat this leachate to the Mill Cove Sewage Treatment Plant. An annual volume of leachate of 2070 m^3/yr was estimated in the correspondence from NSDOE discussing approval to treat the leachate at the Mill Cove Sewage Treatment Plant. This annual volume has been utilized in this study as a conservative estimate, although it is expected that very little excess leachate will be produced. Although it is expected that the volume of organics processed at the facility will increase over time, no increase in leachate production has been incorporated into the analysis, as shown on Figure 3 since the production rate used in this study is felt to be very conservative.

The expected quality of leachate produced the Ragged Lake composting facility is based on a summary report of the analysis preformed on leachate produced at the Colchester composting facility completed by Stinnes Enerco staff (June 1998) and subsequent discussions with staff. The weighted average of all wastewater expected from the composting facility, including leachate from the active composting process and condensate from the air handling unit was used to determine concentrations and loadings shown on Figures 1, 2, 4 and 5. These loading estimates are based on BOD and ammonia

concentrations of 8910 mg/L and 1000 mg/L, respectively. It is assumed that these concentrations will not change significantly over time.

3.0 CAPACITIES OF THE TREATMENT FACILITIES

3.1 Sewage Treatment Plants

Summaries of the three candidate HRM sewage treatment plants are shown in Table 1. The treatment process description identifies the various components in the treatment process train for each plant. The treatment facility capacities for each plant is identified for hydraulic, ammonia and organic (BOD) loadings. The effluent criteria for each plant is also noted in the summary table.

3.2 Highway 101 Landfill Leachate Treatment Plant

The Highway 101 Landfill served as the Metro Halifax area sanitary landfill from November 1977 to December 1996. The majority of the landfill (45 of 54 ha) is capped with a moderately permeable cover. The 9 ha landfill life extension constructed for 1996-1997, known as Phases A&B, is capped with a LDPE membrane.

Leachate generated at the landfill is directed to a pumping station which feeds the anaerobic leachate treatment system at a relatively constant flow rate. Excess leachate (i.e., in excess of pumping capacity) overflows directly to the aerobic system, along with the treated leachate discharged from the anaerobic system.

The anaerobic treatment system comprises: an equalization tank; physical/chemical pre-treatment; two anaerobic reactors; and, a sludge thickener. The system was designed for a hydraulic loading of 33 000 m^3/yr (90 000 L/d).

The aerobic system, which treats both the overflow from the raw leachate pumping station and the effluent from the anaerobic system, includes: two aeration basins operated in series; a secondary clarifier; and, sludge recirculation. The two basins, therefore, operate as an activated sludge process.

Table 1 - Summary of Candidate Sewage Treatment Plants

	Mill Cove STP	Lakeside-Timberlea STP	Aerotech STP
TREATMENT PROCESS DESCRIPTION			
Pre-treatment	Screening & Grit Removal	Screening & Grit Removal	Screening & Grit Removal
Primary Clarifiers	Yes	Yes	Yes
Biological Treatment	Pure oxygen activated sludge	RBCs	RBCs
Secondary Clarifiers	Yes	Yes	Yes
Disinfection	Ultraviolet	Chlorine	Chlorine
Sludge Digestion	Anaerobic	Anaerobic	Aerobic
Chemical Nutrient Reduction	No	Yes	No
Post-secondary Aeration	No	Yes	No
TREATMENT FACILITY CAPACITY (DESIGN LOADINGS)			
Hydraulic	28 ML/d (6.3 migd) (1)	4.5 ML/d (1.0 migd) (4)	1.4 ML/d (0.3 migd) (3)
Organic (BOD)	5040 kg BOD/d (1)	775 kg BOD/d (4)	275 kg BOD/d (3)
Ammonia	560 kg/d (2)	91 kg/d (4)	27 kg/d (4)
DISCHARGE CRITERIA			
BOD	30 mg/L	15 mg/L (4)	10 mg/L (3)
SS	30 mg/L	20 mg/L (4)	10 mg/L (3)

Sources:

(1) Porter Dillon Ltd. - 2nd Expansion - Phase 1 Preliminary Design Brief Report (April 1992)
(2) Based on assumed average design influent ammonia concentration of 20 mg/L
(3) Porter Dillon Ltd. - Aerotech Business Park Sewage Treatment Plant Design Brief (July 1985)
(4) CBCL - Leachate Treatment Study (April 1997)

Effluent from the two aeration basins flows through: four settling ponds, which also serve as sedimentation ponds for the site runoff; a wetland head pond; and, a marsh meadow before final discharge to the Sackville River.

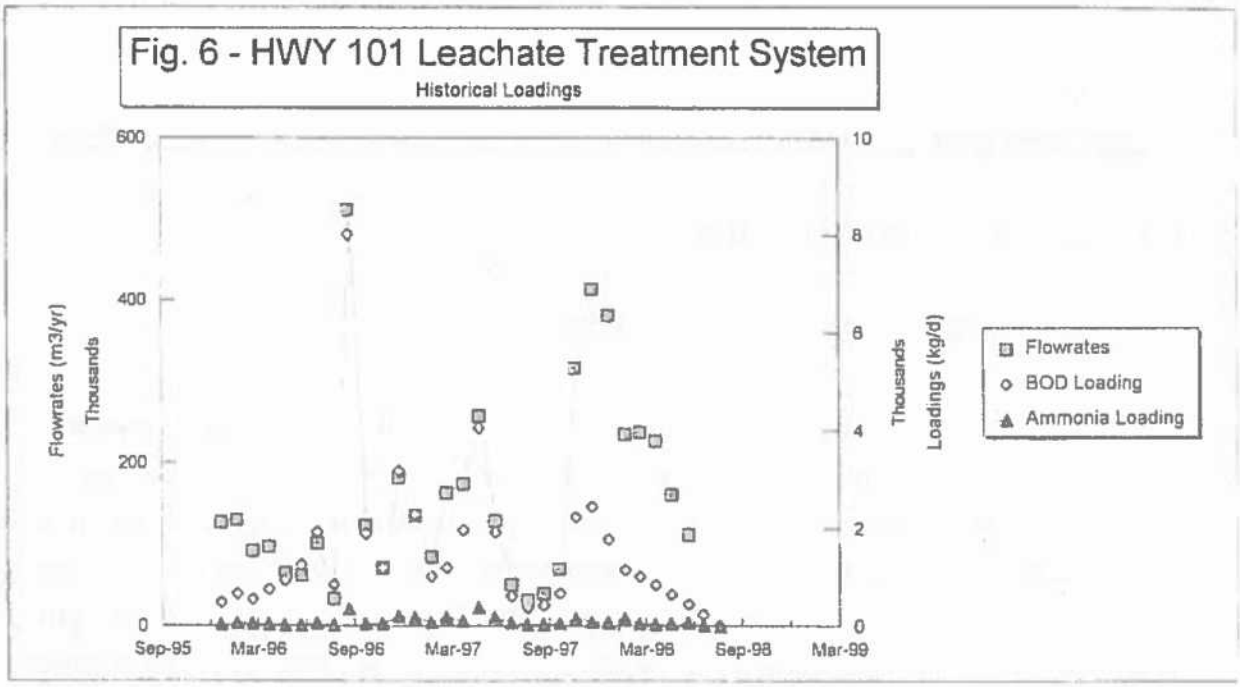
The treated leachate quality requirements are based on a maximum ammonia concentration measured in the Sackville River of 2.5 mg/L. A highly conservative assessment of the anticipated dilution provided in the River at the 70-year low flow condition, a mixing efficiency of 75% and only 50% of the River channel, presented in Porter *Dillon's Leachate Treatment for Ammonia Removal Summary Report* (August 1991), determined that the maximum end-of-pipe ammonia concentration is 23 mg/L. That is, a discharged effluent ammonia concentration of 23 mg/L will result in a diluted concentration of 2.5 mg/L in the River. It should be noted that the dilution assumption presented in CBCL's *Leachate Treatment Study* (April 1997) was based on an average mean low month flow of 416 L/s (compared with the 70-year low flow of 28 L/s) resulting in significantly less conservative end-of-pipe ammonia concentration requirements. The rationale for this approach was that leachate production and River flow tend to increase proportionately. Therefore, it is highly unlikely that the average or maximum leachate production will occur at the same time as the lowest flow in the River.

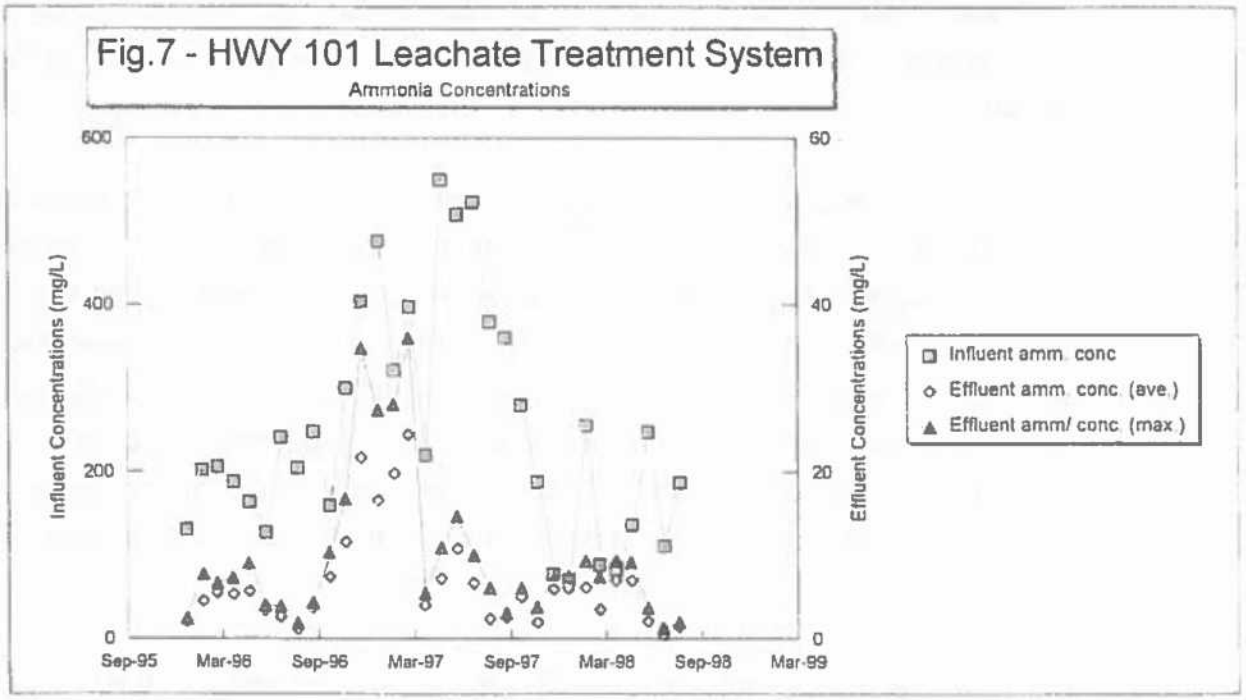
Assessment of the Leachate Treatment System's capacity is complicated by a number of variables. Therefore, the capacity of the system has been established empirically on the basis of past performance, that is, by reviewing previous records and determining the loadings at which acceptable effluent quality is maintained. For example, during the high loading rates observed shortly following capping of Phases A&B (i.e., 2440 kg BOD/d and 165 kg NH_3/d), the ammonia concentrations in the final effluent to the Sackville River were in the order of 6.0 mg/L which was significantly below the target end-of-pipe concentration of 23 mg/L. These removal efficiencies were observed during the winter period which is significant since reaction kinetics tend to be lower for colder temperatures resulting in decreased removal efficiencies. Prior to capping of Phases A&B, in May 1997, BOD and ammonia loadings were 4050 kg/d and 388 kg/d, respectively. During this period, ammonia concentrations in the effluent to the River were less than 11.0 mg/L.

These two significant loading periods assist in empirically establishing, based on measured performance, the capacity of the treatment system.

Figure 6 presents the average monthly leachate flows along with BOD and ammonia loadings to the treatment system for the period from January 1996 to June 1998 while Figure 7 shows the monthly average ammonia concentrations in the raw influent leachate as well as the monthly averages and maximums for the marsh meadow effluent at the discharge to the Sackville River for the same period.

As shown on Figure 7, during the period of December 1996 to March 1997, effluent ammonia concentrations exceeded the target value of 23 mg/L even though the loadings to the system were lower than those experienced in May 1997. This is explained by the fact that one of the two anaerobic reactors at eth leachate treatment plant was out of service during those months.


Fig. 6 - HWY 101 Leachate Treatment System
Historical Loadings
Flowrates (m3/yr)
Thousands
Loadings (kg/d)
Thousands
600
400
200
0
10
8
6
4
2
0
Sep-95
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Flowrates
BOD Loading
Ammonia Loading


Fig.7 - HWY 101 Leachate Treatment System
Ammonia Concentrations
Influent Concentrations (mg/L)
Effluent Concentrations (mg/L)
600
400
200
0
60
40
20
0
Sep-95
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Influent amm. conc
Effluent amm. conc. (ave.)
Effluent amm/ conc. (max.)

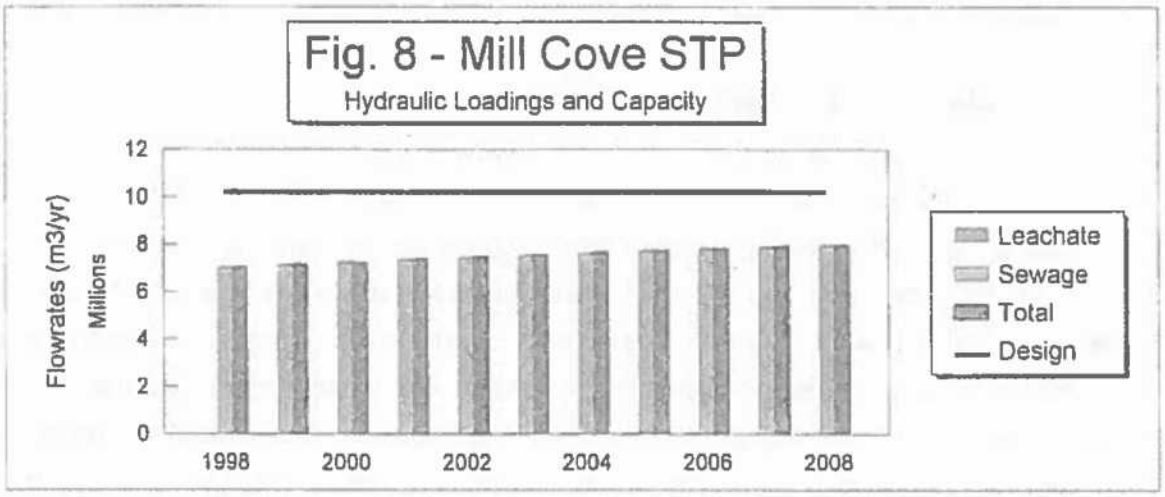
4.0 LEACHATE MANAGEMENT

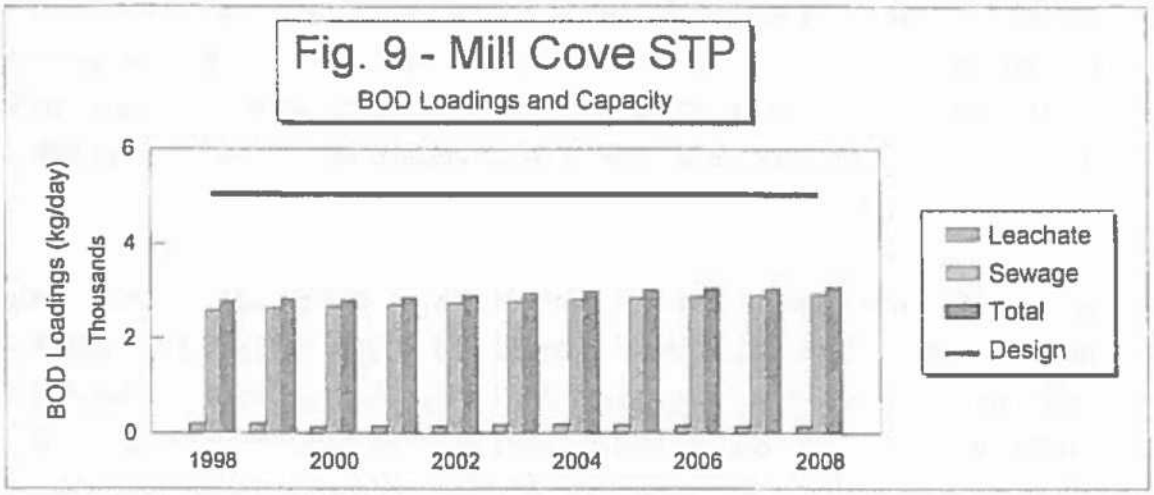
4.1 Mill Cove Sewage Treatment Plant

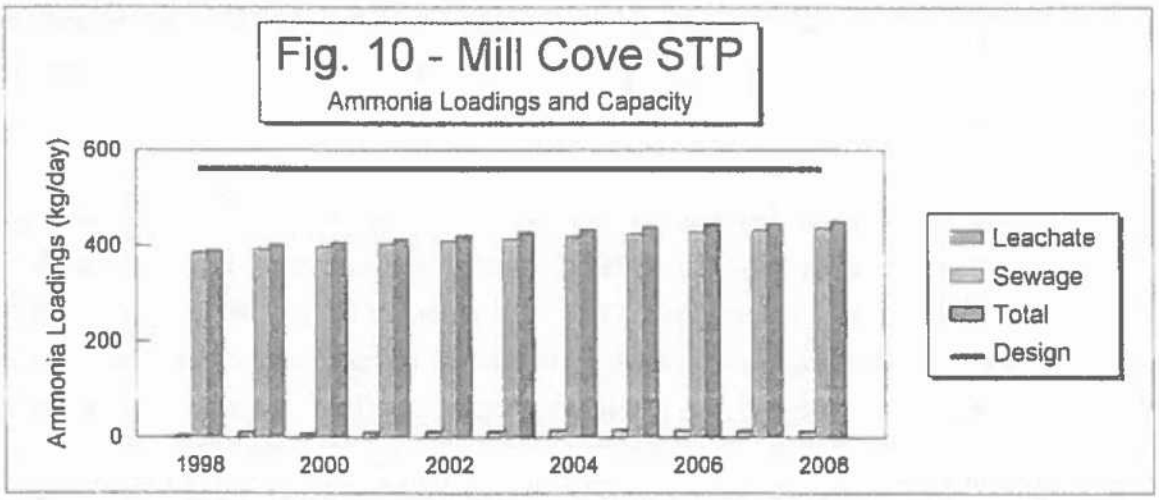
Figures 8 to 10 depict the available capacity of the Mill Cove Sewage Treatment Plant (STP) in terms of hydraulic, organic (BOD) and ammonia loadings. The total loading expected over the next decade incorporates the previously characterized leachates described in Section 2.0 and the expected sewage loadings based on operating data from the Mill Cove STP and population projections for the Mill Cove sewershed area. Leachate produced at the CCL is currently being treated at the Mill Cove STP. The values labelled as "sewage" are the measured and projected values based on the sanitary sewage discharged to the plant while the "leachate" values are the additional loadings resulting from delivery of all leachates to the plant. "Total" is simply the sum of the "sewage" and the "leachate" loadings.

As shown in these figures, there is ample capacity at this plant over the next decade with the addition of all the leachates and the projected sewage loadings. The approximate hydraulic loading at the plant after the addition of the leachates ranges from 57% at present to 66% in 2008 of the total plant capacity. Similarly, the organic and ammonia loading after leachates are added to the incoming sewage will only reach 61% of the plant capacity for BOD and from 81% of the capacity for ammonia. As the service population sewage production rates for the Mill Cove STP is significant compared to the leachate production rates, the loadings associated with the addition of the leachates has a minimal effect on the total hydraulic, organic, and ammonia loadings at the plant.

Mill Cove STP is estimated to have available capacity based on design hydraulic, organic, and ammonia loadings. Therefore, the effluent requirements of 30 mg/L BOD and 30 mg/L suspended solids should be met.


Fig. 8 - Mill Cove STP
Hydraulic Loadings and Capacity
Flowrates (m3/yr)
Millions
12
10
8
6
4
2
0
1998
2000
2002
2004
2006
2008
Leachate
Sewage
Total
Design


Fig. 9 - Mill Cove STP
BOD Loadings and Capacity
BOD Loadings (kg/day)
Thousands
6
4
2
0
1998
2000
2002
2004
2006
2008
Leachate
Sewage
Total
Design


Fig. 10 - Mill Cove STP
Ammonia Loadings and Capacity
Ammonia Loadings (kg/day)
600
400
200
0
1998
2000
2002
2004
2006
2008
Leachate
Sewage
Total
Design

4.2 Highway 101 Leachate Treatment Plant

The Highway 101 Landfill has been closed since December 1996. The normal trend for leachate generation following landfill closure and capping is a gradual decrease in both strength and production until a "steady state" condition is attained when the variations become relatively small. Since the closure of the Highway 101 Landfill there has been a gradual decrease in the raw leachate strength; however, the leachate generation has not yet begun to follow the typical trend. This is likely due to the construction of the toe drain during the summer of 1996 to collect leachate from the old landfill and direct it to the leachate treatment system and the fact that the final cap over Phases A&B was installed the summer following closure. Since capping of Phases A&B, however, there has generally been a significant reduction in loadings to the leachate treatment system. During the period from January to June 1998, for example, organic loadings have decreased from 2440 kg BOD/d to 440 kg BOD/d.

Review of historical operating data from the Highway 101 Leachate Treatment System indicates significant variations in the hydraulic and organic loadings. For example, in 1998, the highest and lowest average monthly leachate flows differed by a factor of 13. Similar variations in the organic loadings were observed, although not as severe as the variations in hydraulic loading since higher leachate production typically results in more dilute leachate. These wide variations are probably due to the installation of the toe drain in the old landfill and the final cap over Phases A&B and are expected to stabilize significantly through 1999.

Hydraulic and organic loading projections for the Highway 101 Landfill have been presented in previous reports. The most recent projections, presented in Porter Dillon Ltd's Site A - Final Design Report (June 1997), show that, by the year 2000, organic (BOD) and ammonia loadings are expected to decrease to approximately 600 kg/d and 115 kg/d, respectively, and remain relatively constant. These predicted loadings are significantly higher than those predicted in CBCL's *Leachate Treatment Study* (April 1997) and are, therefore, felt to be more conservative values for the purposes of this study. Annual averages for hydraulic, organic and ammonia loadings measured for 1996, 1997

and 1998 along with projections for 2000, 2005 and 2010 are presented on Figures 11, 12 and 13.

In the shorter term, leachate production and organic loading rates are expected to continue to decrease and stabilize with relatively minor seasonal variations. Incremental loadings to the treatment system resulting from the additional leachates (i.e., maximum increase of 200 kg BOD/d and 15 kg NH_3/d) would result in loadings to the treatment system that are significantly lower than loadings at which the system has successfully operated in the past as discussed in Section 3.2. Therefore, it appears that the Highway 101 Leachate Treatment System is capable of accepting the additional leachates without exceeding the target effluent ammonia concentration of 23 mg/L.

4.3 Lakeside-Timberlea Sewage Treatment Plant

Figures 14 to 16, depict the available capacity of the Lakeside-Timberlea STP in terms of hydraulic, organic (BOD) and ammonia loadings. The total loading expected over the next decade incorporates the previously characterized leachates described in Section 2.0 and the expected sewage loadings based on operating data from the Lakeside-Timberlea STP and population projections for the Lakeside-Timberlea sewershed area.

There appears to be sufficient capacity with the addition of all the leachates and the projected sewage loadings. The hydraulic loading to the plant after the addition of the leachates will only reach 77% of the capacity. Similarly, the organic and ammonia loading after leachates are added to the incoming sewage will only reach 69% of the capacity for BOD and 86% of the capacity for ammonia. The production rates for the leachates form a larger portion of the total loading to the plant than for the Mill Cove STP as the service population in Lakeside-Timberlea is much smaller.

Lakeside-Timberlea STP is estimated to have available capacity based on design hydraulic, organic, and ammonia loadings. Therefore, the effluent requirements of 15 mg/L BOD and 20 mg/L suspended solids should be met. However, due to the smaller service population as compared to that for Mill Cove, the effect of adding the leachates to the sewage in terms

Fig. 11 - HWY 101 Leachate Treatment System

Hydraulic Loading Projections

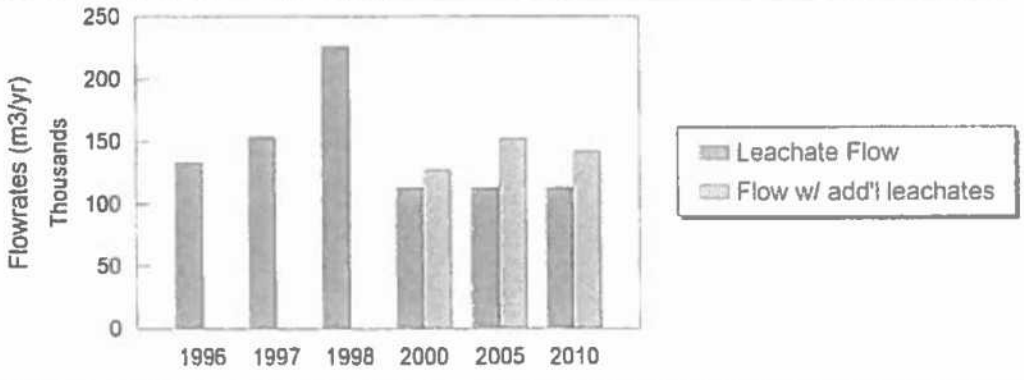


Fig. 12 - HWY 101 Leachate Treatment System

Organic Loading Projections

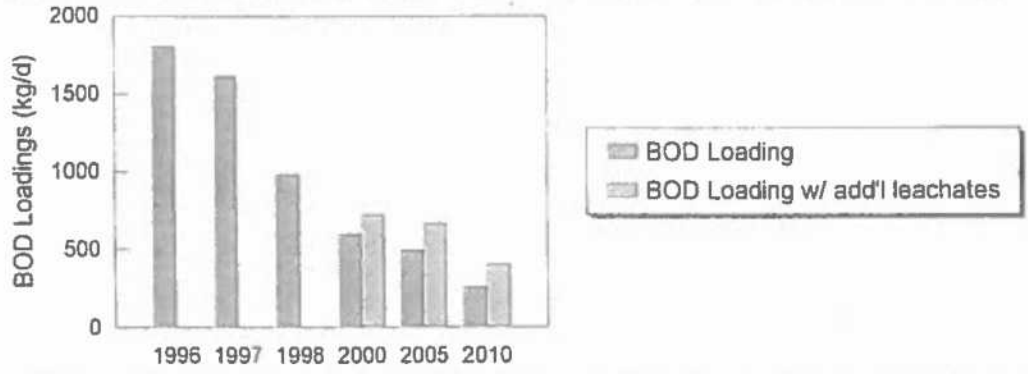
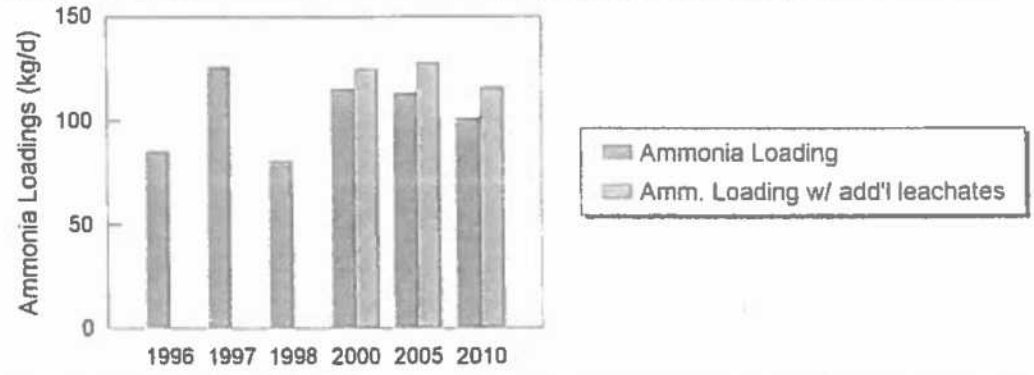
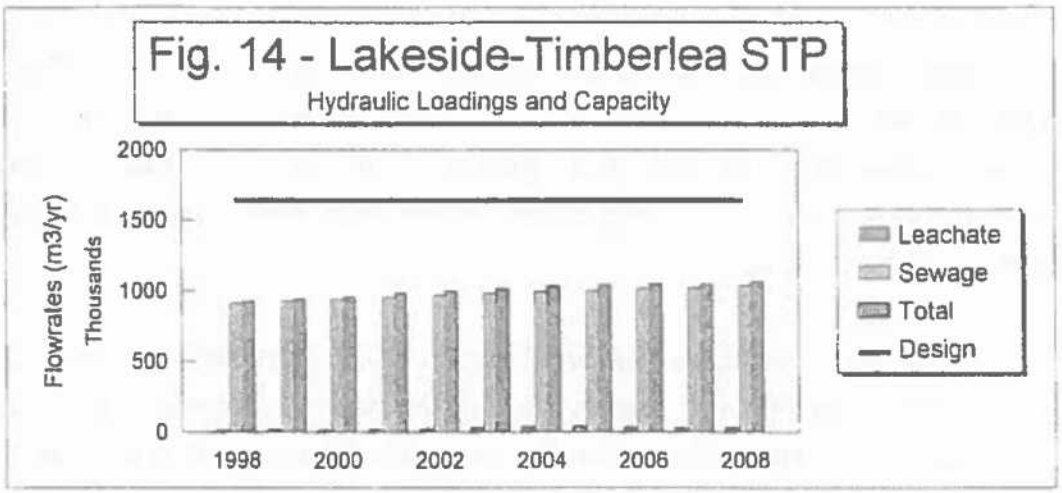
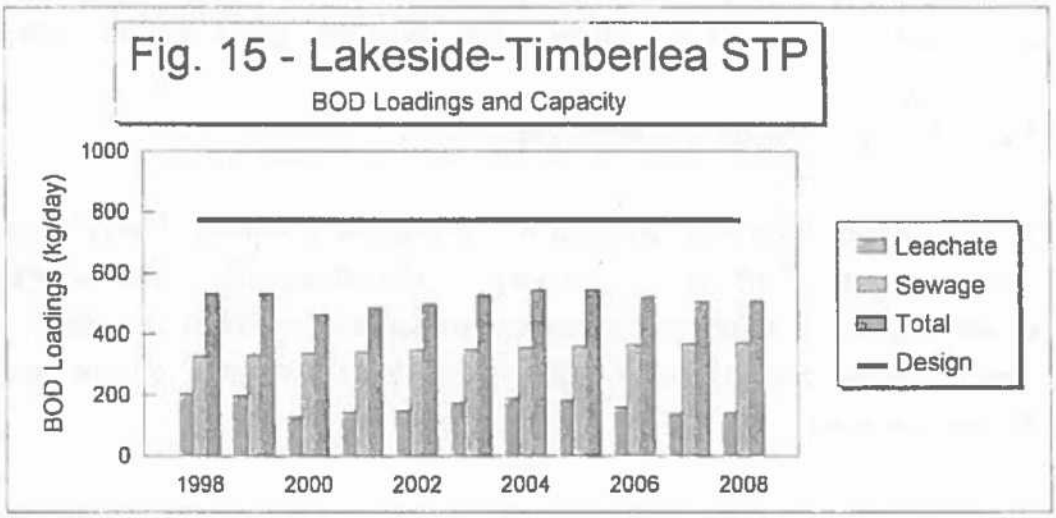


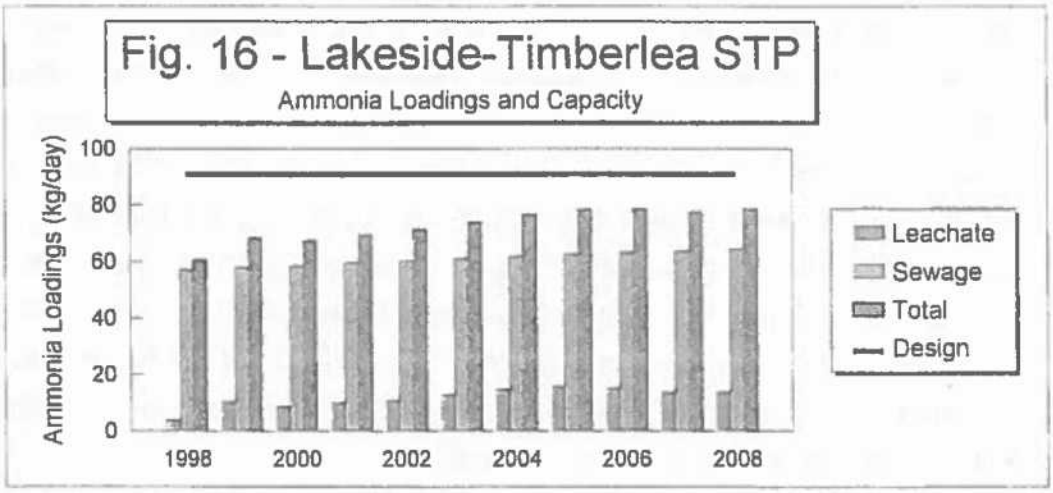
Fig. 13 - HWY 101 Leachate Treatment System

Ammonia Loading Projections




Fig. 14 - Lakeside-Timberlea STP
Hydraulic Loadings and Capacity
Flowrates (m3/yr)
Thousands
2000
1500
1000
500
0
1998
2000
2002
2004
2006
2008
Leachate
Sewage
Total
Design


Fig. 15 - Lakeside-Timberlea STP
BOD Loadings and Capacity
BOD Loadings (kg/day)
1000
800
600
400
200
0
1998
2000
2002
2004
2006
2008
Leachate
Sewage
Total
Design


Fig. 16 - Lakeside-Timberlea STP
Ammonia Loadings and Capacity
Ammonia Loadings (kg/day)
100
80
60
40
20
0
1998
2000
2002
2004
2006
2008
Leachate
Sewage
Total
Design

of available capacity is more pronounced. Another disadvantage of the Lakeside-Timberlea STP, compared with the Mill Cove STP, is the lack of a suitable location to discharge the trucked leachate into the treatment plant. Discharge to the plant must be accomplished by off-loading the truck into a nearby manhole which, when tried, was met with negative response from residents.

It should be noted that CBCL's *Leachate Treatment Study* (April 1997) concluded that the Lakeside-Timberlea STP was incapable of handle the increase in organic loading resulting from the CCL and Otter Lake leachates. This conclusion was based on the peak loading just prior to capping of the Cumberland Landfill. The lower leachate loadings following the capping of Cells 1 and 2a should be acceptable to the Lakeside-Timberlea STP.

4.4 Aerotech Sewage Treatment Plant

The available capacity of the Aerotech STP is depicted in Figures 17 to 19, in terms of hydraulic, organic (BOD) and ammonia loadings. The total loadings expected over the next decade incorporated the previously characterized leachates described in Section 2 and the expected sewage loadings based on operating data from the Aerotech STP and projections for the sewershed area.

There appears to be sufficient hydraulic capacity with the addition of all the leachates and the projected sewage loadings, however, there is insufficient capacity in terms of both organic and ammonia loadings. The hydraulic loading to the plant after the addition of the leachates will only reach 69% of the plant capacity. Yet, the organic and ammonia capacities of the plant are exceeded by the addition of the leachates to the projected plant influent. As the service population in Aerotech is much smaller than Mill Cove and Lakeside-Timberlea, the additional loadings from leachates have a substantial effect on the Aerotech Sewage Treatment Plant such that the effluent quality of 10 mg/L BOD and 10 mg/L suspended solids would not be met. Porter Dillon's Site A Report (June 1997) concluded that substantial upgrades, in the order of $2.2 million, would be required to the STP to accept Otter Lake RDF and CCL leachates.

Fig. 17 - Aerotech STP

Hydraulic Loadings and Capacity

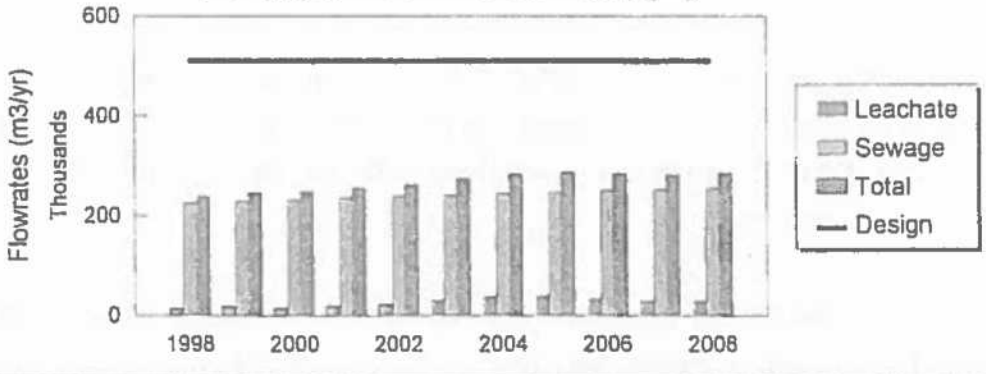


Fig. 18 - Aerotech STP

BOD Loadings and Capacity

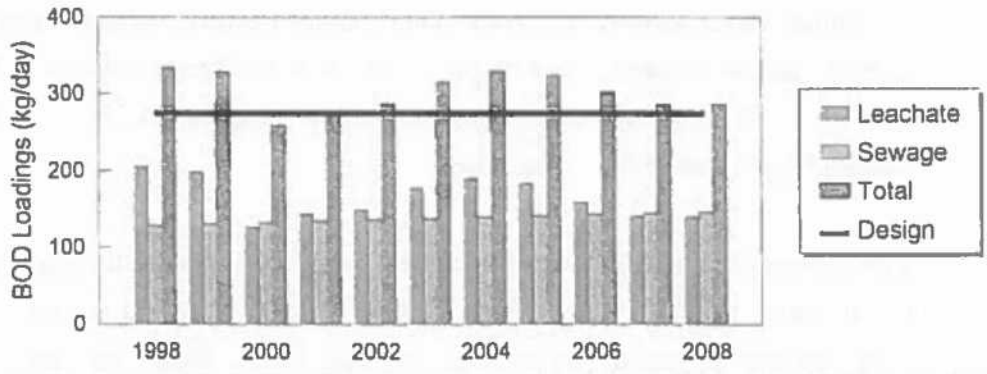
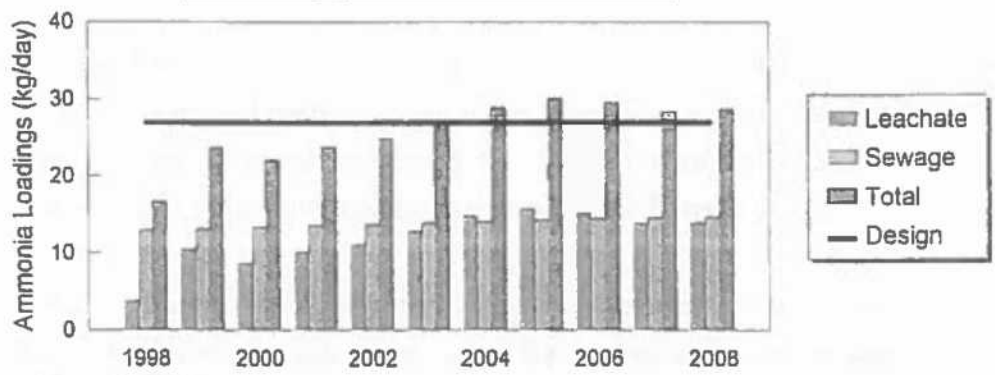


Fig. 19 - Aerotech STP

Ammonia Loadings and Capacity



5.0 SUMMARY AND CONCLUSIONS

The summary and conclusions resulting from this study on the capability over the next decade of the candidate treatment facilities to handle the addition of the leachate from the Otter Lake Facility, Cumberland Central Landfill, and the Ragged Lake Composting Facility are as follows:

- Combined leachate production from the Otter Lake Facility, Cumberland Central Landfill, and the Ragged Lake Composting Facility has been predicted to increase from approximately 12 000 m^3/yr (33 000 L/d) in 1998 to 36 000 m^3/yr (100 000 L/d) in 2005 and decreasing to 30 000 m^3/yr (83 000 L/d) in 2008.

- Combined BOD loading from the Otter Lake Facility, Cumberland Central Landfill, and the Ragged Lake Composting Facility has been predicted to fluctuate between 125 and 200 kg/d while ammonia loading is expected to fluctuate between 3 and 15 kg/d over the next ten years.

- The capacities of four candidate treatment facilities to accept the leachates were evaluated by projecting the sewage loadings to each plant and augmenting those projected loads by adding the predicted leachate loads. These augmented loadings were then compared to the plant's design loadings to ascertain available capacity. The loadings considered for the study included hydraulic, organic (BOD) and ammonia loadings.

- For the Mill Cove STP, the Lakeside-Timberlea STP and the Highway 101 Leachate Treatment Facility, the projected sewage loadings, augmented with the anticipated leachate loadings, are within the design loadings. Therefore, these facilities are deemed to have adequate capacity to handle the leachates.

- The Aerotech Sewage Treatment Plant was found to have available hydraulic capacity for the leachates, but both the organic and ammonia loadings exceeded the plant's design capacity. Therefore, it was deemed to be inadequate and, as noted

in Porter Dillon's Site A Report (June 1997) would require significant upgrades to increase its capacity.

DILLON CONSULTING

July 16, 1998

Porter Dillon Limited
270 Dutch Village Road
Suite 700
Halifax
Nova Scotia
Canada
B3H 2G6
Telephone
(902)453-1115
Fax
Other offices in Atlantic Canada
and
Porter Dillon Limited

NOVA SCOTIA DEPART
OF THE ENVIRONMEN
Central Region
Suite 224
1595 Bedford Highway
Bedford, Nova Scotia
B4A 3Y4

To be put in approvals file

ATTENTION: Steve Westhaver, [illegible]

Otter Lake Facility
Site A Septic System

Construction of the septic disposal system at the Otter Lake Facility has been completed. Porter Dillon has reviewed the constructed and found it to be in general conformance with the design specifications.

If you have any questions, please contact the undersigned at your convenience.

Yours truly,

PORTER DILLON LIMITED

[redacted]

Craig Chandler, P.Eng.
Environmental Engineer

DCC:ean
cc R. Orr, Halifax Regional Municipality
D. Tiller, Dexter Construction
K. Jacobs, MIRROR
G. Isenor, Porter Dillon Limited
M. Sarrouy, Porter Dillon Limited
Our File: 97-4550-02-01

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APPENDIX "E"

Table 4-1 Groundwater Sampling Recommendations

Well ID #	Aquifer	2015 Sampling Frequency	Analysis	Location
MW96-1B	Bedrock (Granite)	Quarterly	GC, M for each event	Perimeter well, down gradient of Cells 1&2
MW97-2B1	Bedrock (Granite)	Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX on one event (Sept.)	Perimeter well, down gradient of Cells 1&2
MW96-3A MW96-3B MW96-3C	Till Bedrock (Granite) Bedrock (Granite)	Quarterly Quarterly Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX for 3A on one event (Sept.)	Nested perimeter wells, down gradient of Cells 1&2 and Cell 3
MW96-4B	Bedrock (Granite)	Quarterly	GC, M for each event	Perimeter well, down gradient of Cell 4 and adjacent to leachate holding tank
MW96-5A MW96-5B MW96-5C	Till Bedrock (Granite) Bedrock (Granite)	Quarterly Quarterly Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX for 5B on one event (Sept.)	Nested perimeter wells, down gradient of Cell 5 and up gradient of South Sedimentation Ponds
MW96-7A MW96-7B MW96-7C	Till Bedrock (Granite) Bedrock (Granite)	Annually Annually Annually	GC, M for each event	Nested perimeter wells, down gradient of future cells and south of borrow area
MW96-8A MW96-8B MW96-8C	Till Bedrock (Granite) Bedrock (Granite)	Annually Annually Annually	GC, M for each event	Nested perimeter wells, down gradient of future cells
MW96-9A MW96-9B	Till Bedrock (Granite)	Annually Annually	GC, M for each event VOCs, PAHs, TPH/BTEX for 9A on one event (Sept.)	Nested perimeter wells, southwest of Cells 1&2, cross gradient of future cells

Table 4-1 Groundwater Sampling Recommendations (cont.)

Well ID #	Aquifer	2015 Sampling Frequency	Analysis	Location
MW96-10B MW96-10C	Bedrock (Granite) Bedrock (Granite)	Annually Annually	GC, M for each event	Nested perimeter wells, southwest of Cells 1&2, cross gradient of future cells
MW96-11B	Bedrock (Granite)	Annually	GC, M for each event	Perimeter well, south corner of landfill and up gradient of future cells
MW96-12B	Bedrock (Granite)	Annually	GC, M for each event	Perimeter well, southeast corner of landfill and up gradient of future cells
MW01-15B MW01-15C	Bedrock (Granite) Bedrock (Granite)	Annually Annually	GC, M for each event VOCs, PAHs, TPH/BTEX for 15B on one event (Sept.)	Nested perimeter wells, east of Cell 2 and up gradient of landfill
MW96-16A MW96-16B	Till Bedrock (Granite)	Quarterly Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX for 16B on one event (Sept.)	Nested perimeter wells, northeast corner of the landfill, topographically up gradient of the FEP compound
MW96-17A MW96-17B	Bedrock (Granite) Bedrock (Granite)	Quarterly Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX for 17B on one event (Sept.)	Nested perimeter wells, cross gradient between Cells 1&2 and the FEP compound
MW96-18B MW96-18C	Bedrock (Granite) Bedrock (Granite)	Quarterly Annually	GC, M for each event	Nested perimeter wells, cross gradient between Cells 1&2 and the FEP compound
MW96-19A MW96-19B	Bedrock (Till) Bedrock (Granite)	Quarterly Annually	GC, M for each event	Nested perimeter wells, north corner of the landfill (Cells 1&2) and down gradient of the FEP compound
MW96-20A MW96-20B	Bedrock (Till) Bedrock (Granite)	Quarterly Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX for 20A on one event (Sept.)	Nested perimeter wells, down gradient of Cells 1&2 and Cell 3

Table 4-1 Groundwater Sampling Recommendations (cont.)

Well ID #	Aquifer	2015 Sampling Frequency	Analysis	Location
MW96-21B	Bedrock (Granite)	Quarterly	GC, M for each event	Down gradient between North Sedimentation Ponds and Nine Mile River
MW96-22A MW97-22B	Till Bedrock (Granite)	Quarterly Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX for 22A on one event (Sept.)	Nested wells, down gradient between North Sedimentation Ponds and Nine Mile River
MW97-23A1	Till	Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX on one event (Sept.)	Down gradient between South Sedimentation Ponds and borrow pit area
MW97-24A MW97-24B	Till Bedrock (Granite)	Quarterly Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX for 24B on one event (Sept.)	Nested wells west of the North Sedimentation Ponds and grubbing area
MW97-25B	Bedrock (Granite)	Quarterly	GC, M for each event	Well northwest of the North Sedimentation Ponds and grubbing area
MW01-26B	Bedrock (Granite)	Annually	GC, M for each event	Along Greenhead Road and up gradient of borrow pit area
MW01-27B	Bedrock (Granite)	Annually	GC, M for each event	Along Greenhead Road and up gradient of borrow pit area
MW05-28B	Bedrock (Granite)	Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX on one event (Sept.)	Perimeter well, down gradient of landfill and adjacent to leachate holding tank
MW05-29C	Bedrock (Granite)	Quarterly	GC, M for each event	Perimeter well, down gradient of future cells and south of borrow area

Table 4-1 Groundwater Sampling Recommendations (cont.)

Well ID #	Aquifer	2015 Sampling Frequency	Analysis	Location
MW08-30B	Till/Shallow Bedrock (Granite)	Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX on one event (Sept.)	Down gradient of Cell 6 and up gradient of South Sedimentation Ponds
MW12-31B MW12-31C	Bedrock (Granite) Bedrock (Granite)	Annually Annually	GC, M for each event	Nested perimeter wells, up gradient of Cell 6 and future cells
MW95-2A MW95-2B	Bedrock (Granite) Till	Annually Annually	GC, M for each event	Nested wells up gradient of Cell 5
MW95-4A MW95-4B	Bedrock (Granite) Till	Quarterly Quarterly	GC, M for each event VOCs, PAHs, TPH/BTEX for 4B on one event (Sept.)	Nested perimeter wells north/cross gradient of Cells 1&2 and down gradient of the FEP compound

Notes:

GC	General Inorganic Chemistry Scan
M	Metals
VOCs	Volatile Organic Compounds (modified EPA 624 Scan)
PAHs	Polycyclic Aromatic Hydrocarbons (priority pollutants, part of an EPA 625 Scan)
TPH/BTEX	Petroleum Hydrocarbon Components (Atlantic RBCA Analysis)
*	Wells MW96-16A and -16B will be sampled quarterly in 2015 (similar to 2014, which was at NSE's request)

Table 4-2 Surface Water Sampling Recommendations

Station ID #	Status	2015 Sampling Frequency	Analysis	Location
SW-1	Up-gradient	Annually	GC, M, TSS for each event	Nine Mile River
SW-2	Up-gradient	Quarterly	GC, M, TSS, COD/BOD for each event	Nine Mile River
SW-3	Down-gradient	Quarterly	GC, M, TSS for each event VOCs, PAHs, TPH/BTEX on one event only Collection of a **sediment** sample for metals on one event only (Sept.)	Nine Mile River downstream of drainage from North Sedimentation Pond
SW-4	Facility Discharge Water	Quarterly	GC, M, TSS, COD/BOD for each event VOCs, PAHs, TPH/BTEX on one event only Collection of a **sediment** sample for metals on one event only (Sept.)	Drainage from South Sedimentation Pond
SW-5	Down-gradient	Quarterly	GC, M, TSS for each event	Nine Mile River
SW-6A	Down-gradient	Annually	GC, M, TSS for each event	Nine Mile River
SW-7	Down-gradient	Quarterly	GC, M, TSS for each event	Nine Mile River
SW-8A	Down-gradient	Quarterly	GC, M, TSS for each event	Duck Pond
SW-9	Down-gradient	Annually	GC, M, TSS for each event	Duck Pond
SW-10	Down-gradient, outside RDF watershed	Annually	GC, M, TSS for each event	Otter Lake

Table 4-2 Surface Water Sampling Recommendations (cont.)

Station ID #	Status	2015 Sampling Frequency	Analysis	Location
SW-11	Down-gradient, outside RDF watershed	Annually	GC, M, TSS for each event	Otter Lake
SW-13	On-Site	Quarterly (note: more frequent as part of operations)	pH and TSS either weekly or during rain events (part of operations) GC, M, TSS, COD/BOD for each event	North Sedimentation Pond
SW-14	On-Site	Quarterly (note: more frequent as part of operations)	pH and TSS either weekly or during rain events (part of operations) GC, M, TSS, COD/BOD for each event	South Sedimentation Pond
SW-15	On-Site	Quarterly (note: more frequent as part of operations)	pH and TSS either weekly or during rain events (part of operations) GC, M, TSS, COD/BOD for each quarterly event Collection of a sediment sample on one occasion	Ditch (FEP)
SW-16	Down-gradient	Quarterly	GC, M, TSS, for each event VOCs, PAHs, TPH/BTEX on one event (Sept)	Down-gradient of FEP ditch

Notes:

GC	General Inorganic Chemistry Scan
M	Metals
TSS	Total Suspended Solids
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
VOCs	Volatile Organic Compounds (modified EPA 624 Scan)
PAHs	Polycyclic Aromatic Hydrocarbons (priority pollutants, part of an EPA 625 Scan)
TPH/BTEX	Petroleum Hydrocarbon Components (Atlantic RBCA Analysis)

Table 4-3 Other Environmental Quality Monitoring Recommendations

Well ID #	2015 Sampling Frequency	Analysis
Underdrain Samples – Cell 1/2, Cell 3, Cell 4, Cell 5 and Cell 6	Quarterly	GC, M for each quarterly event VOCs, PAHs, TPH/BTEX on one event only (Sept)
Leachate	Quarterly	GC, M and TSS for each quarterly event VOCs, PAHs, TPH/BTEX on one event only (Sept)
Leak Detection Sump Cell 1/2, Cell 3, Cell 4, Cell 5 and Cell 6	Quarterly	GC parameters chloride, sodium and COD on a monthly basis as part of operations GC, M for each event VOCs, PAHs, TPH/BTEX on one event only (Sept)

Notes:

GC	General Inorganic Chemistry Scan
M	Metals
TSS	Total Suspended Solids
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
VOCs	Volatile Organic Compounds (modified EPA 624 Scan)
PAHs	Polyaromatic Hydrocarbons (priority pollutants, part of an EPA 625 Scan)
TPH/BTEX	Petroleum Hydrocarbon Components (Atlantic RBCA Analysis)

HALIFAX

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

COMMUNITY ENGAGEMENT AND CONSULTATIONS

September 20, 2011 Halifax Regional Council directed staff to advance the 'next steps' in order to achieve a more fiscally sustainable delivery of the Halifax solid waste system. Halifax Regional Council directed staff to:

- Commence the community engagement process, including consultation with the CMC and consideration by the Environmental and Sustainability Standing Committee, to review the Waste Resource Strategy, to include assessment of alternative options";
- With other landfill operators, work with the Province, and in consultation with the CMC and consideration by the Environment and Sustainability Standing Committee, to review the design specifications for landfill cells, and;
- Also included in that motion "it is further understood that any proposed terms to the contract which relate to future changes to the strategy provide for HRM consultation with the Community Monitoring Committee".

July 10, 2012 Halifax Regional Council approved budget for an independent consultant review of the Halifax Solid Waste system with the explicit instructions to direct staff to follow the community consultation process outlined in the September 20, 2011 Halifax Regional Council motion.

Throughout the Solid Waste Strategy review process Halifax Regional Council has demonstrated that they are firmly committed to consulting and engaging with the community and the Halifax Waste Resources Society / Community Monitoring Committee (HWRS/CMC). In order to meet Halifax Regional Council's requirements to ensure a high level of public engagement and dialog staff developed a consultation framework in accordance with the Halifax Regional Council approved Community Engagement Strategy. The following motion was approved on April 23, 2013 by Halifax Regional Council.

1. Approve the public engagement plan as outlined in the discussion section of staff report of February 26, 2013 including direct consultation with the local community in the form of town hall meetings;
2. Approve the public consultation process include the historical context of the Community Stakeholder Committee (CSC) process that led to the development of the waste management strategy, the CSC siting criteria for the Otter Lake facility, including the purpose of the Front End Processing Facility (FEP) and Waste Stabilization Facility WSF, and commitments to the local as well as the recommendations of the Stantec Report;
3. To support the public consultation process, approve the In Camera Report of February 5. 2013 be released, with the exception of any legal advice provided in the report, and;
4. Engage the Community Monitoring Committee (CMC) throughout the public engagement process as a key representative for the community. A key role for the CMC is to provide response to the appropriateness of scaling down the FEP processing as was contemplated in the Community Stakeholder Committee Integrated Resource Management Strategy of 1995, on page 7, as adopted in principle in 1996 by Regional Council.

These motions were influenced by the CMC's presentation to the Environment and Sustainability Standing Committee (ESCC) on April 4, 2013, wherein the ESCC decided to ensure the local community was directly engaged through town hall meetings before any other consultation began, and that more

information would be provided to the public on the history of the Otter Lake site and the Province's process to secure anb operations permit.

July 2012 the community engagement process was then actioned by Halifax staff with the assistance of National Public Relations, Canada's largest public relations firm. Throughout the community engagement process, National aligned all program components with the engagement plan outlined in the staff report to the Environment and Sustainability Standing Committee dated February 26, 2013, and the motions approved by Regional Council on April 23, 2013. This approach helped ensure that as many perspectives as possible from the landfill host community participants, other HRM residents, businesses, and waste industry stakeholders would be considered in Regional Council's eventual decisions for the entire solid waste system in HRM.

June 18, 2013 staff presented the Stantec Waste Resource Strategy Report ("the Stantec Report") to Halifax Regional Council. The CMC also presented to Halifax Regional Council on the Stantec Report. The purpose of CMC's presentation was to:

- Ensure you (Halifax Regional Council) have all information
- Seek support to stop consideration of closure of FEP/WSF at Otter Lake
- Accordingly, remove issue from consultation process.

The CMC did not discuss the matter of height in their presentation. This is because the CMC's primary concern was the potential closure of the FEP/WSF and the swapping of the liner for one of lower quality. CMC's engineering consultants Dillon, who were hired by Mirror the site operator, stated that HRM is unique with regards to having a FEP/WSF to process the material.

November 12, 2013 a midterm information report on the consultation process was provided to Halifax Regional Council.

December 5, 2013 the final consultation report was submitted to Halifax. The consultation process consisted of:

- 14 in-person meetings in two phases;
- Online engagement;
- National estimates about 700 people participated in the in-person events during Phase I of the community engagement program and approximately 600 attended during Phase II, with the majority of participants self-identifying as living in the districts (11, 12 and 13) which are closest to the Otter Lake landfill.
- 454 surveys, 291 quick polls and 95 comments completed online.

The marketing and communication tactics used for reaching out to residents with our invitation to participate in the process included:

- Mass e-mail invitations
- Follow up phone calls to key stakeholders and those identified as influencers in their communities and organizations, requesting that they assist in extending the invitation
- Municipal e-newsletter
- Spotlight in Halifax.ca main page gallery
- Request to members of Council to extend the invitation to their networks
- Posters in libraries, recreation centres, post offices, grocery stores, and universities
- Social media outreach
    - Tweets via @hfxgov
    - Facebook posts (regular and promoted) through the Halifax Recycles Facebook page
    - YouTube advertising
- Print media placements (including: the Chronicle Herald, Bedford-Sackville Weekly News, Dartmouth – Cole Harbour Weekly News, Shop the Shore, Masthead News)
- Direct mail invitation to residents of Beechville, Lakeside, Timberlea and Prospect Road

Prior to engaging the general public and as mandated by Regional Council, Halifax hosted two town hall meetings with a specific, direct mail invitation to residents of the communities in closest proximity to the Otter Lake landfill site. These events provided an open forum to hear directly from the residents who are most likely to be affected by potential changes at the Otter Lake landfill.

The town hall sessions consisted of the following:

- Introduction to the engagement program, event agenda, guidelines for the evening and overall facilitation
- Remarks - Community Monitoring Committee, represented by Ken Donnelly and Jack Mitchell
- Presentation – HRM Solid Waste Resources
- Open mic/question and answer period with HRM representatives
- Closing – invitation to participate in further engagement in-person at future events and online

It was estimated that the two town hall meetings were attended by a total of approximately 500 community members. The majority of comments and questions expressed were focused on the community's desire to maintain the status quo at the Otter Lake landfill.

The strongest themes that arose in both town hall sessions can be summarized as follows:

- HRM's agreement with (and commitments made to) the Otter Lake host communities and concerns that proposed changes to the operations are inconsistent with those commitments
- Opposition to recommendations of the Stantec report regarding closure of the Front End Processor and Waste Stabilization Facility (FEP and SWF)
- Concerns regarding potential changes to environmental and community protections
- Concerns regarding the intent and integrity of the Stantec report
- Emphasis on source separation, diversion, and education efforts as most important to continued success
- During the events, all town hall attendees were asked to write down their most important questions/concerns. Those questions were themed onsite, and attendees highlighted their three most important areas of concern through a "Dot-mocracy" exercise.

All of the questions identified in the town hall sessions were transcribed and answered, and a full list of them can be found at http://shapeyourcityhalifax.ca/solid-waste-management/documents .

Consultation events were held in

- Town Hall with Beechville Lakeside Timberlea & Prospect Rd - 18 Sep
- Town Hall with Beechville Lakeside Timberlea & Prospect Rd - 19 Sep
- Engagement Phase 1: What do we want?
- Session 1 of 2: Dartmouth - Wed 25 Sept
- Session 1 of 2: Bedford - Thu 26 Sept
- Session 1 of 2: Halifax - Wed 2 Oct
- Session 1 of 2: Eastern Shore - Thu 3 Oct
- Session 1 of 2: ICI Stakeholders - Monday 23 Sept
- Session 1 of 2: Waste Industry Stakeholders - Monday 30 Sept

Break - Integrate learnings from Phase 1 engagement

- Engagement Phase 2: How do we get there?
- Session 2 of 2: Dartmouth - Wed 16 Oct
- Session 2 of 2: Bedford - Thu 17 Oct
- Session 2 of 2: Halifax - Wed 23 Oct

- Session 2 of 2: Eastern Shore - Thu 24 Oct
- Session 2 of 2: ICI Stakeholders - Monday 14 Oct
- Session 2 of 2: Waste Industry Stakeholders - Monday 21 Oct

January 14, 2014 staff provided Halifax Regional Council with the Final Solid Waste Strategy Review recommendations. The public consultations document dated December 5, 2014 was incorporated into the Final Solid Waste Strategy Review. Halifax Regional Council approved recommendations 1-6 and deferred items 7, 8 & 9 for further debate.

Staff recommendations 7, 8, & 9 are as follows:

> 7. Amend By-law S-600 to allow for the export of ICI residual waste (garbage) outside HRM, and amend Administrative Order number 16 to provide for an increase in fees for disposal of ICI residual waste from $125 per tonne to the assessed system cost of $170.00 per tonne;
>
> 8. Direct staff to initiate consultation with MIRROR NS and the Community Monitoring Committee on options for changes in the operating model (front end processor facility, waste stabilization facility, residual disposal facility) at Otter Lake landfill site A, returning to Council with a transition plan for landfill operations at the site based on diversion outcomes resulting from the changes outlined in this report; and
>
> 9. Extend operations at Otter Lake beyond 2024 and direct staff to increase the vertical height of existing and future cells by 15 meters and establish an Integrated Solid Waste Management Campus at the site to support new facilities and alternative technologies as they become viable.

June 14, 2014 Halifax Regional Council approved to:

a) Defer consideration of recommendation number [7, 8 & 9] from the January 8, 2014 staff report, and;

b) Direct staff to meet and consult further with the Halifax Waste Resource Society Board of Directors on the technical issues and/or impacts and report back to Committee of the Whole by November 1, 2014 with a summary of recommendations from the Society and recommended changes to staff's report and recommendations, if any. Should the local Councillors not currently belong to the Board of Directors of the Halifax Waste Resource Society, the Councillors for Districts 11 and 12 be included in the consultation if they so choose.

July 28, 2014, September 3, 2014, October 30, 2014 Following Council's direction, senior staff of the municipality met with a working committee appointed by the Board of Directors of the Halifax Waste Resource Society Board over five months (meeting dates above). The meetings were co-chaired by Ken Meech, Executive Director of the Society and John Traves, Q.C., Director of Legal Services for Halifax. Also in attendance have been Councillors Rankin and Adams as members of the CMC working committee as well as Richard Butts, CAO. The discussions have been productive, frank and open. After extensive discussions and consultations it was agreed that the FEP/WSF would not be recommended to be decommissioned, the recommendations for liner adjustment would not be moved forward and that it was premature to site a waste campus at Otter Lake. As a result of staff amending their recommendations on changes to Otter Lake, the HWRS/CMC agreed that it would not object to vertical expansion.

December 9, 2014 staff presented their revised recommendation report based on HWRS/CMC consultations. HWRS/CMC also gave a presentation to Halifax Regional Council whereby through the Council directed consultative process they communicated that "The society has reviewed the recommendations from staff and has no objection to the proposal subject to our comments, conditions and ongoing participation by CMC in the process."

With respect to vertical expansion Halifax Regional Council approved:

> Direct staff to defer any action with respect to the siting of a new landfill site in order to assess the

> implications of system changes currently being implemented and direct staff to increase the vertical height of existing and future cells in accordance with the approach as set out in the report of Conestoga – Rovers & Associates dated October 8, 2014, subject to maintaining the visible isolation of the cells as outlined by the SNC Lavalin Environment balloon study findings with notice to the Chair of the Community Monitoring Committee in accordance with Section 6.05 of the Agreement for Community Monitoring of Solid Waste Facilities dated February 16, 1999 once an updated design and operations plan has been prepared.

With respect to the remaining recommendations Halifax Regional Council approved:

> Direct staff to take the necessary steps to maintain the current operating model, including front end processor facility, waste stabilization facility and residual disposal facility other than as directed by Regional Council as a consequence of decisions arising out of the ISWMS Review – Final Report dated January 8, 2014 at the Otter Lake Landfill site. Further, to assess the effects of the system changes currently being implemented, returning to Regional Council, with input from the Community Monitoring Committee, no earlier than March, 2019 with a report and recommendation respecting the effectiveness of the front end processor facility and waste stabilization facilities based on system and other changes since conception including diversion outcomes resulting from the changes currently being implemented.

Retaining the current operational model with the front end processor and waste stabilization facility was a concern for the Provincial Government as outlined within the April 23, 2013 Nova Scotia Legislature approved resolution 794:

> Whereas yesterday at Halifax City Hall, residents of Timberlea-Prospect spoke out loudly against any changes to the Otter Lake Waste Management Facility; and Whereas the Otter Lake Waste Management Facility operates according to a permit issued by the Department of Environment; and Whereas the member for Timberlea-Prospect and local councillors have diligently represented the concerns of local residents on this issue; Therefore be it resolved that all members of this House of Assembly direct the Minister of Environment to reject any requested changes to the Otter Lake Waste Management Facility operating permit that would remove the requirement of front-end separation and waste stabilization.

As outlined in the above Halifax Regional Council motion Council has retained the use of the front end processor and waste stabilization facility thereby addressing the Provincial government's concern.

Subsequent to Halifax Regional Council approval of vertical expansion, Solid Waste staff have been working with the site operator Mirror NS, their engineering consultants Dillon, and Halifax's owners engineer Conestoga-Rovers to develop a detailed work plan for all necessary deliverables to receive a vertical expansion permit from the Province. The work plan contains all HWRS/CMC's requests as outlined in their letter to Halifax Regional Council. This work plan was actioned June 3, 2015 by Dillon Consulting with project management and supervision by Conestoga Rovers.

The Agreement between Halifax Regional Municipality and the Halifax Waste Resource Society requires Halifax to provide notice to the HWRS/CMC with regards to proposed changes at Otter Lake. Section 6.05 requires Halifax to provide proposed specification amendments to the HWRS/CMC for review and comment. Halifax will continue to exceed the agreed consultative requirements as staff have committed to meet with the HWRS/CMC along with Dillon Consulting and Conestoga Rovers to review the completed work plan deliverables prior to submission to the Province for their review and subsequent permit approval. As per the Agreement, HWRS/CMC has the ability to address Halifax Regional Council regarding proposed specification changes. This provides yet another opportunity for the community to express their opinions and views to Halifax Regional Council.

August 4, 2015 Halifax Regional Council directed staff to apply for an amendment to the operating permit for the Otter Lake Facility providing for approximately 140,000 tonnes of additional landfill capacity in Cell 6. Halifax Regional Council also directed staff to initiate the by-law process to prohibit Industrial, Commercial and Institutional waste from being received at the Otter Lake Facility effective January 1, 2016 (unless the 140,000 tonne expansion of Cell 6 is approved by the Province prior to January 1, 2016,

in which case the change to the by-law will not be effective until April 1, 2016; or unless vertical expansion of the entire Otter Lake Facility is approved by the Province prior to April 1, 2016, in which case the change to the by-law will not be made effective at all).

August 6, 2015 the CMC was provided a memo which outlined the need for a contingency plan. Work commenced to develop the proposed contingency plan specifications in order to achieve an amended permit from NSE. These documents will be forwarded to the CMC for review as per 6.05 of the Agreement.

August 8, 2015 the CMC declined staffs offer to meet and review the contingency plan.

August 19, 2015 the CMC requests to address Halifax Regional Council as per section 6.05 of the Agreement.

August 31, 2015 the CMC was informed that the Agenda Review Committee was unclear from the email of August 19, 2015 as to the grounds for the request to present as per Section 6.05 of the Agreement. CMC was informed that staff have been tasked with preparing a submission in support of Halifax Regional Council's proposed direction related to the operating permit. Agenda Review Committee was satisfied that it was premature to hear from CMC prior to CMC having the opportunity, in accordance with the Agreement, to receive and review the details of the proposed permit changes. Upon formal notice and review if the Chair of CMC still wishes to be heard that opportunity will be provided. Any changes in the bylaw, as per the motion will be dealt with by Halifax Regional Council in accordance with provisions of the Charter.

September 11, 2015 the CMC wrote to the Minster of the Environment. In this letter the CMC withdrew its support of vertical expansion as communicated to Halifax Regional Council in CMC's December 3, 2014 letter which was included within the December 9, 2014 Halifax Regional Council report. The letter confirmed "The society has reviewed the recommendations from staff and has no objection to the proposal subject to our comments, conditions and ongoing participation by CMC in the process." In addition the CMC also stated they could not support the contingency plan.

September 22, 2015 Staff presented Halifax Regional Council with a Letter of Intent (LOI) from Mirror NS to amend the current operating Agreement at Otter Lake. Halifax Regional Council requested that staff meet and consult with the CMC and deferred direction on staff's recommendations for two weeks.

September 23, 2015 Staff and Mirror NS consulted with CMC on the Mirror Letter of Intent. The incamera meeting consisted of presentations by Mirror NS as well as Halifax. Questions were posed by the CMC to both Halifax staff and Mirror NS. After approximately 1.5 hours the Q&A session concluded. Mirror and Halifax staff left. The CMC continued their meeting.

October 1, 2015 the CMC was provided the proposed specifications for the 140,000 tonne contingency plan as per section 6.05 of the Agreement for review and comment. CMC has been provided the opportunity to address Halifax Regional Council on October 20, 2015.

October 5, 2015 the CMC provided a written position on the Letter of Intent from Mirror NS. They are seeking to set a specific date within the operating permit whereby Otter Lake must close (December 31, 2035) regardless if the facility has reached capacity. CMC is also seeking no vertical expansion as a condition of support. Staff are unclear on CMC's position as later in the letter CMC wrote "To be clear, regarding the current examination of the feasibility of a height expansion, CMC has not approved any vertical expansion of the Otter Lake facilities. CMC has expressed willingness to examine the results of an engineering study and work plans to conclude its position on the issue." This appears to be a change of position within the same correspondence. CMC communicated that "It should be anticipated that the local community may seek quid pro quo for the landfill being operated much longer than originally promised." A request has not been made to Halifax for consideration.

October 14, 2015 the CMC was provided another letter informing them of their ability to address Council, and that Halifax is committed to continued consultation and information sharing with the CMC and will make, upon request, Halifax Solid Waste staff, GHD (formerly Conestoga-Rovers), Mirror NS and Dillon

Consulting available to review any and all aspects of the proposed specifications.

October 15, 2015 Senior staff, including the CAO, along with Mirror executives met with the CMC members to review the Mirror proposal. The entire meeting consisted of discussions on vertical expansion. Staff reconfirmed that Council provided clear direction with regards to vertical expansion. There were concerns expressed by the CMC that Halifax was not sharing information on vertical expansion. It was reiterated that the CMC agreed in the summer/fall of 2014 that details would be provided when the engineering studies were complete. Halifax stated that the studies are still in progress and will be provided, as agreed and directed by Council to the CMC. Staff requested if the CMC had any questions with regards to the contingency expansion study provided on October 1 and if they discussed the matter with the community. CMC informed staff that their response would be delivered on October 16, 2015.

October 16, 2015 the CMC provided a letter to Mayor Savage regarding the contingency plan. The CMC confirmed that they were not exercising their right to speak to Council on October 20, 2015. The CMC has also not accepted staffs invitation to provide further information on the file.

The letter states:

> "Vertical expansion of the landfill requires consultation with the local community. It is our belief that the notion of increased height to existing cells requires public consultation with the local community. In fact, the Stantec Report Waste Resource Strategy Update of January 2013 recommended that any vertical expansion consideration be "subject to input from the immediate neighbours of the landfill." HRM has not satisfied this requirement and we do not believe that vertical expansion should be approved without it."

As outlined above Halifax has completed extensive public consultations with regards to vertical expansion and other proposed solid waste changes over the past three plus years. There have been multiple consolations completed within the local community where the CMC provided input and presented at.

The letter further provides 7 criteria which the CMC believe are required for meaningful public consultation.

1. Public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.
2. Public participation includes the promise that the public's contribution will influence the decision.
3. Public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers.
4. Public participation seeks out and facilitates the involvement of those potentially affected by or interested in a decision.
5. Public participation seeks input from participants in designing how they participate.
6. Public participation provides participants with the information they need to participate in a meaningful way.
7. Public participation communicates to participants how their input affected the decision.

Over the past three years of consultations, Halifax has meet all of the CMC's 7 criteria. This has been clearly demonstrated within this document as well as the attachments to this summary.

Solid Waste Review – Regional Council & COW Chronology
(plus select ESSC meetings)
Updated September 21, 2015

Feb 5/13 – 12.2.1 - Solid Waste Strategy Review
Reports: http://www.halifax.ca/council/agendasc/130205rcAgenda.php
Minutes: http://www.halifax.ca/council/agendasc/documents/c130205.pdf (pages 7-8)

March 7/13 – ESSC – 7.1.1– *Waste Strategy – Public Consultation Process*
(deferred, with discussion)
Report: http://www.halifax.ca/boardscom/SCenv/documents/130307essc711R.pdf
Minutes: http://www.halifax.ca/boardscom/SCenv/documents/130307.pdf (pages 4-5

April 4/13 – 5.1 – ESSC *– Waste Strategy – Public Consultation Process*
(deferred from March 7)
Report: http://www.halifax.ca/boardscom/SCenv/documents/130404essc51R.pdf
Minutes: http://www.halifax.ca/boardscom/SCenv/documents/130404.pdf (pages 4-9)

April 23/13 – 10.3.1 – Report from ESSC: Waste Strategy Public Consultation Process
Report: http://www.halifax.ca/council/agendasc/documents/130423ca1031.PDF
Extra info: http://www.halifax.ca/council/agendasc/130423rcAgenda.php
Minutes: http://www.halifax.ca/council/agendasc/documents/c130423.pdf (pages 6-9)

June 18/13 – COW (2 sessions) – Presentations from Staff & CMC
Reports: http://www.halifax.ca/council/agendasc/130618cow1.php
http://www.halifax.ca/council/agendasc/130618cow2.php
Minutes: http://www.halifax.ca/council/agendasc/documents/cw130618-1.pdf
http://www.halifax.ca/council/agendasc/documents/cw130618-2.pdf

July 23/13 – 7.1 - Deputy Mayor Rankin – Motion to Rescind re Public Consultation on Solid Waste Recommendations
Minutes: http://www.halifax.ca/council/agendasc/documents/c130723.pdf (page 5-8)

July 23/13 – 7.1 – Motion passed "that staff provide a monthly update to Council on the status of the consultation process."

Sept 17/13 – Info 3 - Solid Waste Strategy Review Community Engagement Update Report #1
http://www.halifax.ca/council/agendasc/documents/130917cai3.pdf

Oct 22/13 – Info 3 - Solid Waste Strategy Review Community Engagement Update Report #2
http://www.halifax.ca/council/agendasc/documents/131022cai03.pdf
Request from Councillor Adams that this item be added to Nov 12/13 agenda.

Oct 22/13 – 15.1 – Notice of Motion, Deputy Mayor Rankin
Minutes: http://www.halifax.ca/council/agendasc/documents/c131022.pdf (page 18)

Nov 12/13
10.3.1 – Presentation – Community Monitoring Committee
http://www.halifax.ca/council/agendasc/documents/131112ca1031.pdf

11.5.1 – Councillor Adams – Solid Waste Strategy Review Community Engagement Report #2
http://www.halifax.ca/council/agendasc/documents/131112ca1151.pdf
12.1 – Motion, Deputy Mayor Rankin – Solid Waste
Minutes: http://www.halifax.ca/council/agendasc/documents/c131112.pdf (pages 7 – 10)

Jan 14/14 – COW – Integrated Solid Waste Resource Management Strategy Review
Report: http://www.halifax.ca/council/agendasc/140114cow-Agenda.php
Minutes: http://www.halifax.ca/council/agendasc/documents/cw140114.pdf

Jan 14/14 – In Camera - Integrated Solid Waste Resource Management Strategy Review (Info Item)

June 24/14 – COW - Integrated Solid Waste Resource Management Strategy Review, Final Report
COW Reports (multiple docs): http://www.halifax.ca/council/agendasc/140624cow-agenda.php
COW Minutes: http://www.halifax.ca/council/agendasc/documents/cw140624.pdf
(In Camera info item from Jan 14/14 also recirculated this date)

June 24/14 – RC – NSE Solid Waste Regulation Review – Municipal Stakeholder Input (Item 11.3.3)
Report: http://www.halifax.ca/council/agendasc/documents/140624ca1133.pdf
Minutes: http://www.halifax.ca/council/agendasc/documents/c140624.pdf (pages 40-41)

Sept 9/14 – RC –By-Law S-608 Notice of Motion, Item 15.3
Minutes: http://www.halifax.ca/council/agendasc/documents/c140909.pdf (page 19)

Sept 23/14 – RC – By-Law S-608 First Reading, Item 11.1.4
Report: http://www.halifax.ca/council/agendasc/documents/140923ca1114.pdf
Minutes: http://www.halifax.ca/council/agendasc/documents/c140923.pdf (pages 7- 10)

Dec 2/14 – By-Law S-608 Public Hearing, Item 9.1
Report: http://www.halifax.ca/council/agendasc/documents/141202ca91.pdf
Presentation: http://www.halifax.ca/council/agendasc/documents/141202ca91-pres.pdf
Minutes: http://www.halifax.ca/council/agendasc/documents/c141202.pdf (pages 16-23)

Dec 9/14 – COW & RC – Integrated Solid Waste Resource Management Strategy Review
COW Reports (multiple docs): http://www.halifax.ca/council/agendasc/141209cow-agenda.php
COW Minutes: http://www.halifax.ca/council/agendasc/documents/cw141209.pdf
RC Minutes: http://www.halifax.ca/council/agendasc/documents/c141209.pdf (pages 15-16)
(In Camera info item from Jan 14/14 also recirculated this date)

Dec 9/14 – RC – By-Law S-609 Notice of Motion (Item 15.2)
http://www.halifax.ca/council/agendasc/documents/c141209.pdf (pages 16-17)

Jan 13/15 – RC
11.1.6 - By-Law S-608 First Reading
http://www.halifax.ca/council/agendasc/documents/150113ca1116.pdf
11.1.7 - By-Law S-609 First Reading
http://www.halifax.ca/council/agendasc/documents/150113ca1117.pdf
Minutes: http://www.halifax.ca/council/agendasc/documents/c150113.pdf

Feb 3/15 – RC

9.1 – By-Law S-609 Public Hearing
http://www.halifax.ca/council/agendasc/documents/150203ca92.pdf
http://www.halifax.ca/council/agendasc/documents/150203ca92pres.pdf
11.1.3 – By-Law S-608 Second Reading
http://www.halifax.ca/council/agendasc/documents/150203ca1113.pdf
Minutes: http://www.halifax.ca/council/agendasc/documents/c150203.pdf

Aug 4/15 RC

13.2.1 Vertical Expansion Contingency Plan – Private and Confidential Report

Oct 6/15

13.2.1 Otter Lake – Private and Confidential Report – Deferred from September 22, 2015

Motion: That Halifax Regional Council convene to in camera

Minutes http://www.halifax.ca/council/agendasc/151006rc-agenda.php

COPY

HALIFAX REGIONAL MUNICIPALITY
OCT 20 2015
MUNICIPAL CLERK

MUNICIPAL CLERKS OFFICE
Date Distributed: Oct Dec 30, 2015
RICHARD BUTTS
☑ Councillors CHIEF ADMINISTRATIVE OFFICER
☑ Mayor Meeting Oct. 6, 2015
☑ CAO Meeting Date: Regional Council
☑ DCAO
☑ Solicitor Item No. 13.2.1
☑ Communications
☑ Public Affairs
☑ Gov. Relations
☑ Other Bruce Zwicker
Mutt Kelly.

September 17, 2015

Jack Mitchell
Chair
Community Monitoring Committee
PO Box 213
Lakeside, NS B3T 1M6

Dear Mr. Mitchell:

I am writing in response to your letters of September 4th and 8th as well as your more recent response of October 16, 2015.

With the greatest respect, I must take issue with the Community Monitoring Committee's (the "CMC") position that there has been a lack of transparency or consultation in respect of the Integrated Solid Waste Resource Management Strategy Review and the resolutions of Regional Council arising from this review.

Consultation

Regional Council directed staff on September 20, 2011 to conduct a review to assess Integrated Solid Waste Resource Management Strategy to enhance system, environmental, and fiscal performance. This review included more than 3 years of substantive community input including public meetings throughout HRM and direct consultation with the Community Monitoring Committee. In addition to this extensive community and public input, based on feedback from the CMC and others, Regional Council directed staff to meet and consult further with the Halifax Waste Resource Society Board of Directors on the recommendations relating to the Front End Processor, Waste Stabilization Facility, vertical expansion, the concept of a campus, and the issue of the closure date before reaching a decision on them.

Senior staff of the Municipality met with a working committee appointed by the Board of Directors of the Society over a period of 5 months to discuss and obtain input from the Committee with respect to these recommendations and how they might be implemented if Council so chose. Also in attendance at those meetings were Councillors Rankin and Adams as members of the CMC working committee. Both I and the City Solicitor attended each and every meeting to ensure that not only was HRM's position clear but that we fully understood and were able to articulate for Council CMC's position on each issue.

In addition to these discussions and consultation, the Society provided written input to Council to assist it, in particular, in dealing with the recommendations relating to vertical expansion. While you are

correct that the written submission of the Community Monitoring Committee indicated that it had no objection to the recommendations from staff that were passed on December 9, 2015, "subject to our ongoing participation in the process", I am very disappointed that in your communication with Regional Council and the Minister you have chosen not to make it clear that staff and the CMC had a clear understanding that this ongoing participation would be as per the Halifax Waste – Resource Society position paper of December 3, 2014:

> "As design studies and operational changes ***are completed*** HRM should provide opportunities for the local community to view them and understand them." *(Emphasis added)*

As CMC is aware through discussions with staff, the design studies and operational changes have not been completed and are being prepared in accordance with the instructions set out in the terms of reference developed by staff and HRM's owner engineer.

The "Scope of Work" or "Terms of Reference"

I feel I should address your complaint that you have not been provided with these terms of reference (instructions setting out the scope of work) for the design of the higher cells. As has been discussed, the design, construction and commissioning of the FEP/WSF and the RDF facilities at Otter Lake are outside the scope of CMC's mandate with respect to monitoring "operations" at Otter Lake. This is in accordance with the position of CMC, in writing, at inception in 1997 and more recently as stated by members of CMC in our meetings in July. The CMC Monitoring Agreement reflects this as it specifically exempts these activities from the definition of the "operations" being monitored at Otter Lake.

Notwithstanding your legal advice, we have consistently advised you that the design of the facility is HRM's responsibility which we will not compromise on in terms of preparing a proposal in support of an amended Approval from the Department of the Environment any more than we would compromise on the consultation and community involvement that has and continues to go on in respect to Otter Lake. Despite this, we were pleased through the consultation process to receive constructive input regarding the topics CMC has identified as needing to be addressed. You will recall that we committed to ensuring they are fully addressed in any application to amend the Approval.

Council, based on the clear expectation set out in your presentation, position paper, the CMC agreement and feedback from our meetings, specifically gave direction to staff to give notice to you as Chair of the Community Monitoring Committee, in accordance with Section 6.05 of the Agreement "*once* an updated design and operations plan has been prepared." You were present at Council for this discussion and yet in your presentation to Council raised no issue with this direction.

Frankly it has been staff and Council's understanding that we had reached a consensus with respect to ongoing consultation on vertical expansion, supported by your position paper that there is little to consult on or to discuss with the Society in the absence of a clear understanding of the operational changes being proposed which HRM has repeatedly committed to providing upon receipt of an updated design and operations plan required to support either the contingency plan or full vertical expansion application for an Approval change. To now suggest otherwise through correspondence to the Minster, Council and through the Press is extremely disappointing and frankly frustrating.

Council has heard CMC's concerns that the Agreement for Community Monitoring and Solid Waste Facilities dated February 16, 1999 has not been given due consideration. We have taken steps to ensure that this is not the case, and once again with the greatest of respect, have the same expectation of CMC and its members.

Contingency Planning

I note further in your letters of September 24th and October 16th 2015, that you have also raised concerns with respect to the engagement of the Community Monitoring Committee in the development of contingency plans with respect to the landfill.

The process for CMC's engagement is set out in the CMC agreement and is separate and distinct from CMC's role in monitoring the "operations" at Otter Lake. In his letter of January 10th, 2014 John Merrick, on behalf of the CMC, wrote HRM's Solicitor and cited Section 6.05 of the agreement:

> 6.05 **If HRM proposes to have any Residuals Disposal Cell constructed according to specifications ("proposed specifications") which are different than those contained in the document** entitled "Halifax Regional Municipality Residuals Disposal Facility – Technical Specifications Site A January, 1997" prepared for Mirror NS by Porter Dillon Limited as updated and supplemented from time to time then, notwithstanding that such proposed specifications may be acceptable to the Nova Scotia Department of the Environment, **HRM shall notify the Chair of the Committee of HRM's intention to construct a Residual Disposal Cell according to such proposed specifications and if, within fifteen (15) days thereafter, the clerk of HRM receives notice from the Committee that its Chair wishes to address Council concerning the proposed specifications, the Chair**, or another representative of the Committee, **shall be provided with an opportunity to appear before Council to comment on the proposed specifications.** (Emphasis added by Mr. Merrick.)

Mr. Merrick goes on further to state: "As such, the Halifax Waste/Resource Society is entitled to be part of the debate of this issue and the notice period must be complied with as per the Agreement."

On August 4th, Council authorized staff to take a number of actions in order to put a contingency plan in place in the event of a delay in obtaining approval for vertical expansion. This was done with full recognition that this proposed course of action engages CMC's rights under the above section 6.05 (to be provided with any proposed specifications once prepared and to be provided with the agreed upon period of notice).

Mr. Meech was provided a full briefing both by telephone on August 5th and in writing on August 6, 2015 at the direction of Council. CMC subsequently rejected Staff's offer to meet with CMC to follow up on this briefing. As was explained to Mr. Meech, Council directed staff to commence planning and development of a contingency plan and give notice to the Community Monitoring Committee in advance of the preparation of new specifications. HRM subsequently provided the CMC with the proposed changed specifications and operations plan on October 1, 2105 in advance of determining if they are acceptable to the Department of Environment.

The proposed changes to the specifications resulting from the contingency plan's increase in vertical height of cell six as a result continue to respect our continued commitment to the environment. The nuisance factors such as odour and litter, identified as priorities for the community, remain subject to the same, if not higher, robust standards and expectations that both the community and HRM expect of the Operator. Given the concerns raised in your letter of October 16th we asked our owner's engineering firm GHD Limited to confirm that the specific concerns raised by the CMC have in fact been addressed (please see their letter of today's date attached).

Conclusion

Staff and I remain committed to honoring the agreement with the community and to continuing to meet and discuss the proposed changes to operations at Otter Lake in accordance with it, Council's direction and Halifax Waste-Resource Society's position paper of December 3, 2014. I believe these meetings would benefit from your participation and leadership. As Chair of CMC you have been involved from the very beginning and my hope is you would have a better understanding than some of the members we have been meeting with of HRM and CMC's rationale for excluding the design and construction of the cells from the operations being monitored by CMC.

It is also my hope that CMC and HRM can move forward with HRM designing the cells as required to give effect to Council's decision on vertical expansion together with comment as agreed from CMC in order that Council may then continue to make informed decisions on behalf of the municipality to ensure that the Otter Lake facility will remain the success the community has come to expect and rely on.

Sincerely,

HALIFAX REGIONAL MUNICIPALITY

[redacted]

Richard Butts
Chief Administrative Officer

Attachment

cc Members of Regional Council
Municipal Clerk
Honorable Andrew Younger, Minister of the Environment
Ken Meech

October 19, 2015 Reference No.088605-10

Mr. Matthew Keliher MBA, MPS, CHRP, CMA
Manager
Solid Waste Resources
Transportation & Public Works
Halifax Regional Municipality

Via Email: kelihem@halifax.ca

Dear Mr. Keliher:

Re: Cell 6 Contingency Plan
Otter Lake Facility
600 Otter Lake Drive, Halifax, Nova Scotia

Halifax Regional Municipality (Halifax) has retained GHD Limited (GHD) to peer review the Cell 6 Contingency Plan for the Otter Lake Facility prepared by Dillon Consulting (Dillon) (dated September 30, 2015) on behalf of Mirror Nova Scotia (Mirror NS). Overall, the plan adequately addresses adding 140,000 tonnes of material to Cell 6, resulting in an increase in the final height of Cell 6 by 6 m as compared to original design grades. Landfill design aspects addressed by Dillon include cell design, slope stability, landfill gas management, and surface water management. In addition, Mirror NS has adequately updated the Residual Disposal Facility (RDF) Operations Plan, which required minimal change to accommodate the additional 6 m waste lift on Cell 6.

Specific concerns that had been previously raised by the Halifax Waste Resources Society with regards to the full vertical expansion of the entire Residual Disposal Facility (RDF) have been addressed, as applicable, for the Cell 6 Contingency Plan as summarized below.

1. Landfill Cell Development Scope and Sequencing: The basis for the proposed contingency plan was to add an additional year of capacity in Cell 6. As noted in Section 1.0, the design shows that by vertically expanding Cell 6 by 6 m will accommodate approximately 140,000 tonnes of waste or approximately 1 to 1.5 years of capacity depending on incoming waste volumes.
2. Landfill Stability: As noted in Appendix B, it was determined that there were no slope stability concerns with the proposed 6 m vertical expansion. There is an existing steep slope (2.5:1) on the south side of Cell 6 that has been recommended to be filled to a flatter slope (4:1) to provide better long-term stability.
3. Area View Plane: Based on the previous balloon study completed (SNC Lavalin, 2013), there are no area view plan concerns.

GHD Limited
45 Akerley Boulevard Dartmouth Nova Scotia B3B 1J7 Canada
T 902 468 1248 F 902 468 2207 W www.ghd.com

4. Odour Management: As noted in Appendix C (Operations Plan, Section 5.2) Mirror NS will continue to manage odours by:
   - Applying daily cover (i.e., 0.150 m of shredded construction and demolition debris matrix)
   - Applying interim cover (i.e., 0.300 m of soil cover) to waste loads that are particularly odorous in addition to areas that will become dormant for more than six months
   - Use of waste acceptance and rejection procedures

   As noted in Section 3.0, one operational change is that Mirror NS will use horizontal landfill gas (LFG) collection trenches as part of the implementation of the contingency plan. The trenches will underlay the proposed 6 m lift and will allow for the immediate collection of LFG. The utilization of both horizontal trenches and existing vertical LFG collection wells will improve the overall capture of LFG and associated odours.

5. Landfill Gas Management: Please see response to #4. Existing LFG collection and flaring infrastructure is adequate to accommodate the 6 m vertical expansion.

6. Leachate Management: The existing leachate collection infrastructure in Cell 6 is adequate to accommodate the 6 m vertical expansion. Mirror NS has reported no challenges with leachate mounding or breakout in Cell 6.

7. Surface Water Management: As noted in Section 4.0, as part of the 6 m vertical expansion, there will be minor changes as to how surface water runoff drains to the south sedimentation pond. The existing surface water conveyance infrastructure is generally adequate (e.g., ditches, culverts, and ponds). Once the vertically expanded Cell 6 is capped, minor modifications to the surface water conveyance infrastructure may be required.

8. Litter Management: As noted in Appendix C (Operations Plan, Section 5.1), wind-blown litter will continue to be managed by maintaining control of the active face of the landfill by utilizing fixed and portable litter fencing, and by utilizing personnel to pick litter.

Sincerely,

GHD

[redacted]

Andrew Philopoulos, P.Eng., M.Sc.

AP/bar/9

Stewart, April

From: Ken Donnelly <ken@beyondattitude.com>
Sent: October-16-15 12:09 PM
To: Mayor
Cc: Keliher, Matthew; Andrew Giles; Dalrymple, Barry; Bob Angus; Jack Mitchell; John Cascadden; Ken Meech; Lindsay Gates; Mike Becigneul; Murray Power; Peter Lund; Rany Ibraham; Scott Guthrie; Tom Robertson; Rankin, Reg; Adams, Stephen; Office, Clerks
Subject: Response to request for feedback on the proposed contingency plan for Otter Lake landfill
Attachments: Letter to Mayor Savage respecting Vertical Expansion Contingency Plan.pdf

Dear Mayor Savage,

Please find attached the CMC response to a request from Matt Keliher regarding HRM's proposed application to Nova Scotia Environment for a contingency plan for the Otter Lake landfill.

I have copied the Office of the Clerk so that the letter can be distributed to members of Council.
--

Cheers,

Ken

HALIFAX REGIONAL MUNICIPALITY
OCT 16 2015
MUNICIPAL CLERK

Ken Donnelly
President, Beyond Attitude Consulting

t: 902-482-4575(Halifax), 604-484-6565(Vancouver), 403-770-9636(Calgary)
c: 902-223-6123
Website: www.beyondattitude.com

Inaugural Member: International Social Marketing Association
Member: International Association for Public Participation

MUNICIPAL CLERKS OFFICE
Date Distributed: Oct. 16/15
☑ Councillors Meeting In Camera Council
☑ Mayor
☑ CAO Meeting Date: Aug 4/15
☑ DCAO
☑ Solicitor Item No. 13.2.1
☑ Communications
☑ Public Affairs
☑ Gov. Relations
☑ Other B. Zvaniga, M. Keliher
M. Ward.

Otter Lake Community Monitoring

October 16, 2015

Mayor Savage
1841 Argyle Street
PO Box 1749
Halifax, NS B3J 3A5

Dear Mayor Savage,

I am writing in response to Mr. Keliher's letter dated October 1, 2015 and to provide feedback on HRM's contingency plan of vertical expansion for the Otter Lake landfill.

We recognize that HRM has provided CMC with the opportunity to review the contingency plan of vertical height expansion as per the requirements of the Agreement between HRM and the Halifax Waste-Resource Society.

We understand that there is currently no application from HRM before Nova Scotia Environment ("NSE") for the contingency plan and that HRM will allow CMC the opportunity to review the application prior to its submittal.

We further understand that HRM is currently studying possible vertical expansion for all of the current approved cells, referred to as cells 1 to 9, as preparation of an application for approval to NSE.

CMC is awaiting the opportunity to review the study on vertical expansion in order to consult with the community and provide HRM with an adequate response and feedback.

At this time, CMC would like to provide the following comments:

On September 23, 2015 HRM staff ("Staff") members met with the CMC, as directed by Council, and brought along representatives from Mirror Nova Scotia ("Mirror"). The purpose of the meeting was to brief CMC on the proposal from Mirror for an extension of their contract, and to secure feedback.

During the meeting we were told by Staff that vertical height expansion did not have to be addressed for 2 or 3 years. The following week we were asked to review the contingency proposal for vertical height expansion.

We understood from the presentation from Staff and Mirror that the contingency plan was not necessary as construction of cell 7 was to commence as soon as Council approved negotiations with Mirror. In fact, the CAO and the City Solicitor stated several times in the meeting that a benefit of the proposed approach with Mirror is that vertical expansion would not have to be considered for 2 or 3 years. As a result, it was surprising to us to receive, only 6 business days later, the package from Staff that is to form the basis of an application to Nova Scotia Environment for a vertical expansion of cell 6.

We were further surprised that Council passed a resolution last week requiring vertical expansion to be a part of the contract negotiations with Mirror.

On December 9th, 2014 we were promised a study on the risks of vertical expansion to the environment and community, and the necessary mitigation measures, and we still have not received it. We are unable to adequately respond to HRM's proposed vertical expansion contingency plan until we have reviewed the results of such a study.

As you are aware, last year Council directed Staff to meet with the CMC to discuss deferred recommendations 7, 8 and 9 regarding proposed changes to the Otter Lake landfill. During those discussions, CMC and Staff agreed that a detailed study would be undertaken to assess the risks and mitigation efforts required as they relate to vertical expansion. Staff agreed to accept a list developed by the CMC of areas of concern to be incorporated into the study.

Although the CMC has requested the Terms of Reference for the study several times, it has not been provided to us. Without it we have not been able to assure ourselves, and the local affected community, that the study indeed addresses the issues we raised, and Staff agreed to include. In fact the refusal of HRM to provide the Terms of Reference, even in the face of a FOIPOP application, leads us to be sceptical that our concerns are being addressed as promised.

Although the application for vertical height expansion includes some engineering design work, it does not satisfy the requirements of the study as agreed to by HRM.

Fifteen days does not allow us the time, nor do we have the resources, to conduct a full review of the engineering work that is included in the application documents. However we do note that the work does not address all of the issues that HRM agreed to study as per the Staff report of December 9, 2014. Most notably, there is no mention of nuisance factors such as odour and litter, which are priorities for the community. This omission is

both surprising and concerning, and we trust that a review by Nova Scotia Environment will find this as a significant shortcoming in the proposal.

The contingency plan constitutes a request for approval of vertical expansion, in case there is no approval for vertical expansion.

The purpose of the vertical expansion contingency plan is to ensure that there is capacity at the landfill for HRM's residential waste in case an application for vertical expansion of the landfill is not obtained by December 31, 2015.

The contingency plan has two elements:

1. To ban IC&I waste from the landfill, as necessary, to reserve landfill capacity in cell 6 for residential waste; and,
2. To increase the height of cell 6.

The contingency plan is to secure a vertical expansion of cell 6 in case there is not a timely approval of a vertical expansion of the entire landfill. The CMC fails to see the logic in this approach.

Vertical expansion of the landfill requires consultation with the local community.

It is our belief that the notion of increased height to existing cells requires public consultation with the local community. In fact, the Stantec Report *Waste Resource Strategy Update* of January 2013 recommended that any vertical expansion consideration be "subject to input from the immediate neighbours of the landfill." HRM has not satisfied this requirement and we do not believe that vertical expansion should be approved without it.

For clarity, the International Association for Public Participation, recognized internationally as an authority on public consultation/participation, lists 7 core values for public participation which we believe should be present in this instance to satisfy the requirement for public consultation and participation:

Core Values for the Practice of Public Participation

1. Public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.

2. Public participation includes the promise that the public's contribution will influence the decision.
3. Public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers.
4. Public participation seeks out and facilitates the involvement of those potentially affected by or interested in a decision.
5. Public participation seeks input from participants in designing how they participate.
6. Public participation provides participants with the information they need to participate in a meaningful way.
7. Public participation communicates to participants how their input affected the decision.

Giving 15 days for CMC to review a proposal for substantial changes to the Otter Lake landfill does not constitute community consultation.

To be clear, the notification to CMC under the agreement between HRM and the Halifax Waste-Resource Society certainly does not meet the definition of community consultation. There is a requirement in the agreement with the Halifax Waste-Resource Society to notify the CMC and allow the CMC to provide input, but nowhere does it suggest that doing so fulfills the requirements of community consultation.

Working together requires cooperation on both sides.

We certainly want to work cooperatively with HRM but that requires timely access to relevant information. Our requests for information remain unsatisfied. We ask again that the following information be provided to CMC immediately:

- The scope of work for the engineering study on risks and mitigation for height expansion
- The report from the August 4th in camera meeting on the contingency plan.

We are not requesting a meeting with Council at this time.

Because we still do not have adequate information to assess vertical height expansion, there is no point in meeting with Council at this time. We reserve the right to meet with Council at a later date when HRM provides all of the information required to assess vertical expansion and its potential impacts on the community, including the study that is not yet complete.

Otter Lake Community Monitoring

Yours truly,

[redacted]

Jack Mitchell

Chair, Community Monitoring Committee

cc: Members of Community Monitoring Committee
Members of HRM Council
Municipal Clerk
Matt Keliher
Honourable Andrew Younger, Minister of the Environment

October 13, 2015

Jack Mitchell
Chair
Community Monitoring Committee
PO Box 213
Lakeside, NS B3T 1M6

Dear Mr. Mitchell

As indicated in my October 1, 2015 letter, in order for Halifax to avoid restricting the ICI sector effective January 1, 2016 the 140,000 tonne capacity expansion must be approved by Nova Scotia Environment (NSE) no later than December 31, 2015. NSE has a 60 day legislative timeframe to review and render a decision on the application. Therefore an application must be submitted to NSE no later than October 30, 2015.

Halifax has yet to receive a request from the CMC to review documents related to the contingency vertical expansion nor has Halifax received a request to address Halifax Regional Council.

With the approaching deadlines Halifax is again reaching out to the CMC to determine if the CMC requires any further information regarding this proposal, and/or if the CMC would like to establish a time to review, in detail, the study and associated documents.

I would like to reiterate that Halifax is committed to continued consultation and information sharing with the CMC and will make, upon request, Halifax Solid Waste staff, GHD (formerly Conestoga-Rovers), Mirror NS and Dillon Consulting available to review any and all aspects of the proposed specifications. If after these consultations the CMC wishes to address Halifax Regional Council, time will be made available, upon request of the Chair, at the October 20, 2015 session of Halifax Regional Council.

Regards,

[redacted]

Matt Kelliher
Manager, Solid Waste

Otter Lake Community Monitoring

October 5, 2015

Private & Confidential

Mayor Savage
Halifax Regional Municipality
1841 Argyle Street
PO Box 1749
Halifax, NS B3J 3A5

Dear Mayor Savage:

Re: CMC RESPONSE TO MIRROR PROPOSAL

The Community Monitoring Committee ("CMC") has reviewed the proposal submitted by Mirror Nova Scotia ("Mirror") for the future operation of the Otter Lake landfill.

CMCs position is based on limited information provided by Mirror and HRM. Specifically, CMC bases its response on:

- The three-page letter proposal by Mirror dated September 15, 2015; and
- A verbal briefing by the CAO and HRM Counsel on September 23, 2015.

CMC acknowledges receipt of Mr. Matthew Keliher's correspondence dated October 1, 2015 enclosing the proposed specifications for the 140,000 tonne Cell 6 contingency (the "Specifications"). CMC has not had the opportunity to review or seek community feedback regarding those Specifications. Accordingly, this response does not address or constitute a formal response to those Specifications.

At this time, CMC offers conditional support for the proposal provided that:

1. Clear parameters for the landfill are defined in terms of duration and size;
2. Mirror makes a commitment to remain Operator;
3. Terms for the proposed transfer station are defined;
4. There are assurances that no waste will come from outside of HRM;
5. Concrete steps are taken to improve HRM's relationship with CMC; and
6. There is a commitment that there is no waste campus at the Otter Lake landfill.

CMC reserves the right to alter its position as new and more detailed information becomes available. This includes the right to alter its position after CMC has had the opportunity to review and seek community feedback with respect to the Specifications.

1. Parameters of Landfill: Duration and Size

The proposed agreement with Mirror/HRM provides for a term of 20 years to December 31, 2035 covering the remaining 8 years under existing contract and a further 12 years. This action will establish a termination of 20 years (2035) for the operation of the landfill. CMC indicates its willingness to support this extension as part of an amendment to the DOE permit, subject to conditions described below:

- The landfill will not exceed the current approved layout of 9 cells. If the 9 cells are filled, the landfill will be closed (regardless of whether the 20-year term has expired);

- The landfill height will not exceed the heights originally anticipated in the design of the landfill. To be clear, this means that existing and future cells will not be built higher than originally planned. With the reduced tonnages being received at the Otter Lake landfill, the capacity in the 9 cells is more than enough to handle HRM's waste for the term of the agreement. Accordingly, there is no need to expose the local affected communities to the risk of potential negative impacts that could arise from increased height at the landfill;

- The Operating Permit will be changed to indicate that the landfill is to close by December 31, 2035;

- There must be a commitment by HRM to commence the search for its next waste disposal facility by a certain date, to avoid a crisis where there is no replacement for the Otter Lake landfill when it is scheduled to close; and

- Mirror will begin construction of cell 7 immediately, eliminating the need for the contingency plan approved by Council on August 4th, which included a vertical height increase for cell 6.

It should be noted that limiting the landfill to the original planned footprint and height would likely make the proposed extension of the operating lifetime of the landfill more palatable to the local community. This will alleviate the concerns that have been expressed by many about visibility from local trails and potential odours and litter as a result of increased height and it will also confine the impact of this proposal on local communities to the length of time that the landfill is open.

To be clear, regarding the current examination of the feasibility of a height expansion, CMC has not approved any vertical expansion of the Otter Lake facilities. CMC has expressed willingness to examine the results of an engineering study and work plans to conclude its position on the issue. Notwithstanding this, CMC believes that under the current proposal from Mirror, vertical expansion is unnecessary.

2. Mirror as Operator

Support for the extension of the operation of the landfill is based on the excellent record of Mirror as the operator since the facility opened in 1999. Accordingly, CMC requires assurance in the revised contractual relationship that the contract cannot be transferred to another party.

It is critically important that any new contractual arrangements continue to ensure the continued protection of the environment and local community through warranties and responsibilities beyond the operation of the landfill, including the maintenance and monitoring of the landfill after it is closed. As such, CMC asks that Mirror/HRM share the new contract and/or any revisions to the existing contract, and any proposed changes to the Operating Permit with CMC for its review and feedback before they are finalized.

3. Terms of the Transfer Station

As part of the agreement, it is CMCs understanding that Mirror will construct a transfer station at the Otter Lake facility to receive and transfer Industrial, Commercial and Institutional (IC&I) waste to other landfills. This is based on the understanding that the Otter Lake tipping fee will not be competitive with the cost of hauling and tipping at some other landfills.

In order for CMC to make a determination on this matter, CMC will require an engineering and work plan on the construction and operation of the transfer station to ensure adequate safeguards against environmental or nuisance problems are in place. More specifically, CMC will require the opportunity to review and provide inputs with respect to any terms of reference for such work before it is started, and the opportunity to review and provide inputs with respect to the results of such work after it is completed and before it is submitted to NSE.

Without IC&I waste, Otter Lake is expected to receive approximately 50,000 tonnes per annum of residential waste generated in HRM only. Notwithstanding this, IC&I waste generated in HRM may be accepted and disposed at Otter Lake should the tipping fee become competitive, or should access to other landfills not be available. If the IC&I waste is

to be buried at Otter Lake, it will need to be processed through the Front End Processor and Waste Stabilization Facility.

4. No Waste from Other Municipalities

CMC would like assurances that no waste from outside the borders of HRM will be accepted at the Otter Lake facilities. CMC requests that this be included as a term of the contract with Mirror and in the Operating Permit.

5. Improved Relationship with HRM

CMC's support for this proposal is further conditional on an improved relationship with HRM. CMC requests that the current agreement between HRM and the Halifax Waste Resource Society be revised in order to improve CMC's access to information and ability to provide feedback on matters including, but not limited to, operations (size, duration and permits) and environmental and nuisance impacts of the Otter Lake landfill. CMC asks that a more robust process for community engagement, consultation and consent for changes to the Otter Lake landfill be developed between HRM, Mirror and CMC.

CMC will continue to exist as the watchdog for the community and will establish a program with Mirror to monitor the operations. The contract will commit Mirror to providing an annual budget to CMC that will flow through HRM for resources to fulfill CMC's mandate. CMC and HRM will work together to develop an improved process for the requisition for expenses.

6. No Waste Campus at Otter Lake

Additionally, CMC would like a guarantee that there is no waste campus at the Otter Lake landfill. There remains no agreement to have additional facilities based at the Otter Lake facilities. Any proposal for additional facilities will require review by CMC.

7. Other Issues

There are several other issues that should be addressed in a new paradigm for the operation of the landfill. These include, but are not limited to:

- Resolving the longstanding problem with garbage in the area from garbage trucks, particularly along the highways and roads that pass through the local communities; and

- Developing more meaningful consultation with the local community, beyond CMC. It should be anticipated that the local community may seek *quid pro quo* for the landfill being operated much longer than originally promised.

Conclusion

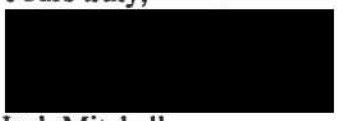
CMC understands that there are significant financial savings to the Municipality if the Mirror proposal is accepted and there is a change to the operating term of the landfill. CMC also recognizes that those significant savings can be realized without increased height at the landfill beyond the original planned heights.

CMC believes that if the original landfill design (in terms of height and footprint) is adhered to, an increased operating term of the landfill is reasonable, as long as the current level of environmental and community protection is maintained. CMC believes that this approach realizes fiscal advantages while maintaining most of the commitments made to the local communities when the landfill was sited.

CMC therefore provides its conditional support to the proposal at this time and asks that Mirror/HRM strongly consider CMCs comments and feedback outlined above. Given the importance of community involvement and HRM's commitment to ensuring that the operations of the facilities will be monitored by residents of the community, CMC further requests that HRM and Mirror continue to inform and involve CMC in the ongoing discussions concerning the future operations of the Otter Lake landfill.

We look forward to hearing from you.

Yours truly,



Jack Mitchell

Chair, Community Monitoring Committee

cc: Members of Community Monitoring Committee
Members of HRM Council
Municipal Clerk
John Traves, Q.C., Director of Legal Services
Richard Butts, CAO

October 1, 2015

Jack Mitchell
Chair
Community Monitoring Committee
PO Box 213
Lakeside, NS B3T 1M6

Dear Mr. Mitchell

As you are aware on August 4, 2015 Regional Council directed staff to apply for an amendment to the operating permit for the Otter Lake Facility providing for approximately 140,000 tonnes of additional landfill capacity in Cell 6. Council also directed staff to initiate the by-law process to prohibit Industrial, Commercial and Institutional waste from being received at the Otter Lake Facility effective January 1, 2016 (unless the 140,000 tonne expansion of Cell 6 is approved by the Province prior to January 1, 2016, in which case the change to the by-law will not be effective until April 1, 2016; or unless vertical expansion of the entire Otter Lake Facility is approved by the Province prior to April 1, 2016, in which case the change to the by-law will not be made effective at all).

In order for us to avoid restricting the ICI sector effective January 1, 2016 the 140,000 tonne capacity expansion must be approved by Nova Scotia Environment (NSE) no later than December 31, 2015. NSE has a 60 day legislative timeframe to review and render a decision on the application. Therefore an application must be submitted to NSE no later than October 30, 2015.

Pursuant to section 6.05 of the Agreement for Community Monitoring of Solid Waste Facilities dated February 16, 1999, Halifax is providing the CMC the "proposed specifications" for the additional 140,000 tonne capacity which are to be included within the application to NSE.

Halifax is committed to continued consultation and information sharing with the CMC and will make, upon request, Halifax Solid Waste staff, GHD (formerly Conestoga-Rovers), Mirror NS and Dillon Consulting available to review any and all aspects of the proposed specifications. If after these consultations the CMC wishes to address Halifax

Regional Council, time will be made available, upon request of the Chair, at the October 20, 2015 session of Halifax Regional Council.

If you require any further information or details regarding this proposal, or would like to establish a time to review the proposal with the CMC and staff please feel free to call or email.

Regards,

[redacted]

Matt Keliher
Manager, Solid Waste

Traves, John

From: Ken Meech <kmeech@nssba.ca>
Sent: September-26-14 11:06 AM
To: Traves, John
Subject: FW: resolution from HWRS /CMC

I am sharing a copy of the resolution recently adopted by the HWRS board .
As i mentioned recently we called a meeting of the Board to provide an update on the solid waste review .
After considerable discussion the Board directed that the following resolution be provided to the staff team and additionally that the Chair –Jack Mitchell send a copy to the council members as information .
The update was also intended to give support to a potential extension to the date of November 1 .
It might be useful for you and i to meet next week to discuss .

****

Whereas the HRM COUNCIL has agreed to a joint review of the proposed changes at the Otter Lake Landfill Facility involving the HRM staff team and the Halifax Waste-Resource Society Board;
Whereas the process established to review the specific recommendations is to be completed by November 1 with a staff report to council;
Whereas the staff report is to incorporate the input from the HWRS on behalf of the host community;
Whereas the review of proposed changes is being delayed for various reasons meaning the HWRS board is unable to access the detailed engineering information;
Therefore the HWRS board hereby gives notice of our time requirements ,understandings and concerns.

a. That the engineering detailed report on any cell height extension, including feasibility, assessment of risk of impact on local community, mitigation of impact and cost of mitigation, be provided to the HWRS team for a period of 3- 4 weeks for our examination and a peer review if found necessary;
b. Given the time lapse it is becoming certain that the feedback from HWRS will not be ready for the November 1 staff report;
c. Agreement that there is no carte-blanche approval for a campus, but agreement to a process which will include consultation with community through the society;
d. Landfill lifetime extension will be considered separately from the current height extension review as we believe it would be beneficial to examine the experience of increased height on the existing/ cells in order to determine if it would be impact-free;
e. The advice by HWRS is that the process of change move forward slowly with HRM gaining the community confidence by executing operational changes sequentially to demonstrate the operational changes will mitigate any further erosion of environmental or community impacts;
f. The FEP/WSF will remain open and operational consistent with the CMC agreement:
g. Expected that the flow control issue will go to public hearing, where it will provide an opportunity for all residents and businesses of HRM to have input.

****

Cheers,

Ken

Ken Donnelly
President, Beyond Attitude Consulting

Re: Item No. 13.2.1

HALIFAX REGIONAL MUNICIPALITY
SEP 22 2015
MUNICIPAL CLERK

Stewart, April

From: Ken Donnelly <ken@beyondattitude.com>
Sent: September-22-15 10:00 AM
To: Andrew Giles; Dalrymple, Barry; Bob Angus; Jack Mitchell; John Cascadden; Ken Donnelly; Ken Meech; Lindsay Gates; Mike Becigneul; Mike Savage; Murray Power; Peter Lund; Rany Ibraham; Rankin, Reg; Scott Guthrie; Adams, Stephen; Tom Robertson
Cc: Karsten, Bill; Johns, Brad; Whitman, Matt; Fisher, Darren; Hendsbee, David; McCluskey, Gloria; Watts, Jennifer; Mosher, Linda; Nicoll, Lorelei; Walker, Russell; Craig, Steve; Outhit, Tim; Mason, Waye; Office, Clerks
Subject: Press release from Halifax-Waste Resource Society
Attachments: Halifax Waste-Resource Society - Secrecy on Landfill.pdf

Hello,

Please find attached a press release regarding continued difficulties that the Community Monitoring Committee is having accessing information on the Otter Lake landfill.

The press release is being sent to media outlets this morning.

Cheers,

Ken

Ken Donnelly
President, Beyond Attitude Consulting

t: 902-482-4575(Halifax), 604-484-6565(Vancouver), 403-770-9636(Calgary)
c: 902-223-6123
Website: www.beyondattitude.com

Inaugural Member: International Social Marketing Association
Member: International Association for Public Participation

MUNICIPAL CLERKS OFFICE
Date Distributed: Sept 22, 2015
☑ Councillors Meeting: In Camera Regional Council
☐ Mayor
☐ CAO Meeting Date: Sept 22, 2015
☐ DCAO
☑ Solicitor Item No. 13.2.1
☑ Communications
☑ Public Affairs
☑ Gov. Relations
☐ Other M. Keliher B. Zvaniga.

HALIFAX WASTE-RESOURCE SOCIETY

Media Release

For Immediate Release - September 22, 2015

Halifax Waste-Resource Society Disappointed with Secrecy

Halifax - Halifax City Hall is in breach of its obligations to provide information about the Otter Lake landfill to its own watchdog committee, says the organization's solicitor.

John Merrick of Merrick Jamieson Sterns Washington and Mahody has reviewed the agreement between the City and the local community, and determined that "HRM is in clear breach of the Agreement."

Recent closed-door meetings of Council and a refusal by staff to provide information on planning for the landfill facility has the people in nearby communities concerned that there may be an unpleasant surprise in the works at City Hall.

An August 4th closed-door meeting of Council on a contingency plan for the landfill and a decision by council to keep the associated report secret raised a red flag for the Community Monitoring Committee, charged with being a watchdog for the local community.

Now, for the second time in three meetings, Council is again poised to go behind closed doors to consider staff recommendations for the Otter Lake landfill.

In particular, the Community Monitoring Committee members are concerned about the lack of consultation with the local community, and the City's denial of a request by the organization to speak to Council about its concerns, despite an agreement between the City and the Committee that ensures the right to appear before Council.

City officials have also refused to allow the Community Monitoring Committee to review the terms of reference for an engineering study currently being undertaken to assess the feasibility of increasing the height of the landfill. Several requests for a copy of the study parameters were refused by City Hall officials, prompting local Councillors Reg Rankin and Steve Adams to file a freedom-of-information request in early July. After initially delaying the response by 60 days, the City last week denied the request.

Community Monitoring Committee Chair Jack Mitchell points out that the Provincial Department of the Environment must approve any changes at Otter Lake, and it is on record as saying that any changes must have the consent of the local community. "How can the local community consent to a secret agenda?" asked Mitchell.

- 30 -

Contact: Ken Donnelly, Halifax Waste-Resource Society - 902-223-6123

HALIFAX REGIONAL MUNICIPALITY
SEP 11 2015
MUNICIPAL CLERK

Stewart, April

From: Ken Donnelly <ken@beyondattitude.com>
Sent: September-11-15 2:25 PM
To: Mayor
Cc: Office, Clerks
Subject: Copy of letter sent to Minister Younger
Attachments: Covering letter to Mayor Savage with legal opinion.pdf; Letter to Mayor Savage respecting lack of engagement with the CMC - Final.pdf; Letter to Minister Younger regarding Otter Lake planning.pdf

Dear Mayor Savage,

Please find attached a copy of a letter from the Community Monitoring Committee to Minister Younger, and the the associated attachments, including the letter recently sent to you by the CMC.

I have copied the Clerk's office.

Yours truly,

Ken Donnelly

Ken Donnelly
President, Beyond Attitude Consulting

t: 902-482-4575(Halifax), 604-484-6565(Vancouver), 403-770-9636(Calgary)
c: 902-223-6123
Website: www.beyondattitude.com

Inaugural Member: International Social Marketing Association
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RECEIVED
SEP 15 2015
LEGAL SERVICES

MUNICIPAL CLERKS OFFICE
Date Distributed: Sept 15/2015
☑ Councillors Meeting Regional Council
☑ Mayor
☑ CAO Meeting Date: Aug 4, 2015
☑ DCAO
☑ Solicitor Item No. 13.2.1
☑ Communications
☑ Public Affairs
☑ Gov. Relations
☑ Other B. Zurnigan, M. Kelliher, M. Ward

Otter Lake Community Monitoring

September 11, 2015

The Honourable Andrew Younger
Minister of the Environment
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Dear Mr. Younger,

Please find attached a copy of a September 4, 2015 letter sent to Mayor Savage regarding the lack of transparency of Halifax Regional Municipality's planning for the Otter Lake landfill facility.

In addition, I have attached a legal opinion that Halifax Regional Municipality is in breach of its responsibilities in the agreement between the City and the Halifax Waste-Resource Society regarding Community Monitoring Committee's right to information regarding the Otter Lake landfill. That legal opinion is referenced in the letter to Mayor Savage.

As noted in the letter, after considerable discussions with HRM, the Community Monitoring Committee took the position that it had no objections to the recommendations of staff regarding Otter Lake planning, passed on December 9, 2015, ***subject to our ongoing participation in the process***. One of those important recommendations was with respect to the potential for vertical expansion of the landfill.

As Halifax Regional Municipality has failed to meet the requirement of ongoing participation by the Community Monitoring Committee in the process, the Committee withdraws that statement.

Also, as HRM's contingency plan for not getting approval for a vertical expansion of the landfill by Nova Scotia Environment by December 31, 2015 is to request an interim vertical expansion, we cannot support the contingency plan.

Otter Lake Community Monitoring

Please contact us if you have any questions.

Yours truly,

[redacted]

Jack Mitchell

Chair, Community Monitoring Committee

cc: Members of Community Monitoring Committee
Iain Rankin, MLA
Mayor Savage
Municipal Clerk
Stephen Hiscock

Enc: Letter to Mayor Savage
Legal opinion from John Merrick

Otter Lake Community Monitoring

September 8, 2015

Mayor Savage
1841 Argyle Street
PO Box 1749
Halifax, NS B3J 3A5

Dear Mayor Savage,

Please find attached a legal opinion regarding the Community Monitoring Committee's right to information regarding the current planning regarding changes to the Otter Lake landfill.

Yours truly,

[redacted]

Jack Mitchell

Chair, Community Monitoring Committee

cc: Members of Community Monitoring Committee
Municipal Clerk
John Traves, QC

Enc: Legal opinion from John Merrick

Otter Lake Community Monitoring

September 4, 2015

Mayor Savage
1841 Argyle Street
PO Box 1749
Halifax, NS B3J 3A5

Dear Mayor Savage,

The Community Monitoring Committee is writing to you to register our objection to the lack of transparency of the City's planning for the Otter Lake facility.

Executive Summary

The Community Monitoring Committee has a right to access information regarding the operation of the Otter Lake landfill and plans to change the operation, including changes to height of cells, new facilities, and construction.

The Community Monitoring Committee stated last fall that it had no objection to the recommendations from staff that were passed on December 9, 2015, ***subject to our ongoing participation in the process.***

Since then, the Community Monitoring Committee's participation in the process has been frustrated by a lack of transparency, secret documents and not being allowed to address its concerns to Council.

Specifically:

1. HRM staff has refused multiple requests for the Terms of Reference of the engineering study currently being conducted, and are now delaying a formal request through the FOIPOP process by Councillors Rankin and Adams. The fact that two members of Council have had to resort to a FOIPOP filing to receive information they require to represent the interests of their constituents speaks volumes of the lack of open government in HRM.

2. The Community Monitoring Committee was not engaged in any manner in the development of the contingency plan for the Otter Lake Landfill. That contingency plan was discussed and approved by Council in camera, and the accompanying report is being kept secret. The plan includes material changes to the landfill, including a reconfigured cell and the establishment of a transfer station operation.

This should have been discussed with the Community Monitoring Committee; instead we were informed of the decision after the fact.

3. Section 6.05 of the agreement between Halifax Regional Municipality and the Halifax Waste-Resource Society stipulates that if the Community Monitoring Committee notifies the clerk within 15 days of an intent to construct a Residual Disposal Cell with different specifications than the current approved specifications, the Committee "shall be provided with an opportunity to appear before Council to comment on the proposed specifications." The Community Monitoring Committee made that request after receiving notification regarding the intention to build Cell 6 higher than currently approved. That request was denied, a clear breach of the Agreement.

The Community Monitoring Committee has received a legal opinion that it has the right to the information it seeks, and the City is in breach of its responsibilities as defined in the Agreement.

The Community Monitoring Committee is disappointed and frustrated in the actions of HRM that have resulted in the exclusion of the Committee from the ongoing process regarding potential changes at HRM.

As a result, the Community Monitoring Committee is taking action to inform the Province and the local community that HRM's lack of transparency and engagement with the CMC and the local community is unacceptable and is in violation of the spirit of the agreement between HRM and the Halifax Waste-Resource Society.

Background

You will recall that on June 24, 2014, HRM Council deferred considerations of recommendations 7, 8 and 9 respecting proposed changes at the Otter Lake Landfill facility until staff met and consulted with the Halifax Waste-Resource Society Board of Directors on technical issues and impacts regarding the recommendations. Subsequently a working committee of staff and the Society met several times to discuss the deferred recommendations, including the recommendation to extend the operations at Otter Lake beyond 2024 and to increase the vertical height of the landfill. As a result of those meetings, the parties agreed that an engineering study would be conducted to assess environmental and community risks that could arise from a vertical expansion of the landfill. The Society provided a list of potential risks that it felt should be addressed.

After the conclusion of those discussions, on December 9, 2014, Council passed amended recommendations, including one to conduct the risk assessment as agreed. The staff report noted the statement made by the Society, in good faith, that "The society has reviewed the recommendations from staff and has no objection to the proposal subject to our comments, conditions ***and ongoing participation in the process.***" (emphasis added). This included full participation in the review of the risk assessment study.

Since December 9, 2014, the Community Monitoring Committee has been excluded from participation in the process.

Risk Assessment Study

We have been refused access to the Terms of Reference that define the risk assessment study that staff agreed to have conducted, and which is crucial to the possibility of community acceptance of any changes at Otter Lake. We strongly recommended to staff that it was best practice to allow us to review the Terms of Reference so we could satisfy ourselves that the study would meet our requirements for risk assessment. As the body representing our communities, we have extensive knowledge of the local communities' concerns and interests. We have repeatedly asked staff for the document and have been repeatedly turned down. Councillor Rankin requested a copy from the Manager of Solid Waste who refused to provide a copy. After several months of the CMC trying to obtain a copy through informal requests, on July 3rd Councillors Adams and Rankin filed a formal request for the document under the Freedom of Information and Protection of Privacy (FOIPOP) provisions of the Municipal Government Act. On August 4th, Councillors Adams and Rankin received correspondence from the City stating that the 30 day response time had been extended because "more time is needed to consult with a third party... before the responsible officer can decide whether or not to have the applicant access to the requested record."

To date, the CMC has not been able to access the Terms of Reference for the study, and is unable to satisfy itself that the study meets its requirements. The CMC is left wondering what it is about the study that HRM feels is necessary to hide from the local community.

Contingency Plan

On August 4th, the day after the Natal Day weekend, and after a Council summer break, Council met in camera to discuss and vote on a contingency plan for the Otter Lake landfill. The recommendations for the contingency plan were included in an in camera report. Council passed the recommendations in an open session after the in camera session, and voted to keep the report secret.

The contingency plan addresses the possibility that there would not be approval secured from Nova Scotia Environment for a vertical expansion of the current operating cell (#6) at the Otter Lake landfill by December 31, 2015. Because HRM has not begun construction of the next cell (#7) at Otter Lake, there is not enough existing capacity to dispose of the approximately 140,000 tonnes of waste expected to be generated in the next 12 months. The contingency plan comprises a ban on delivery of Industrial, Commercial and Institutional waste to Otter Lake, and a request for a vertical expansion of cell 6 at Otter Lake. So, the contingency for not receiving approval for a vertical expansion of cell 6 is to ask for a vertical expansion of cell 6.

Further, we are informed by Mr. Traves that the contingency plan includes the repurposing of a portion of the Front-End Processing Facility to be used as a transfer station in order to facilitate the transfer of waste to other municipalities, under agreements to be negotiated by the CAO.

A vertical expansion and development of a transfer station at the Otter Lake landfill represents a significant change in the operation of the facility, and the CMC is disappointed that HRM staff did not consult with us on the contingency plan, or to even provide the courtesy of informing us that the report was going to Council. We are also very disappointed and frustrated that Council is withholding the report from the public, and are concerned what may be in it that warrants such secrecy. Further, we are unable to imagine what might be contained in the report that justified going in camera as *a matter pertaining to any subject, the discussion of which could, violate the confidentiality of information obtained from another body of government, or a public body.*

Refusal to Allow CMC to Appear Before Council

Our concerns regarding the increasing lack of transparency with respect to the studies and decisions made regarding Otter Lake, especially the intention to increase the height of the current cell and the addition of transfer station operations, led us to request an opportunity to appear before Council at the meeting of September 8th. We feel that we are justified in appearing to speak to Council under Section 6.05 of the agreement between HRM and the Halifax Waste-Resource Society (the Agreement). However we have been told that we will not be allowed to speak to Council, which constitutes a breach of the Agreement.

Legal Opinion

We are in possession of a legal opinion from Mr. John Merrick of Merrick Jamieson Sterns Washington & Mahody. We asked Mr. Merrick to review the agreement between

Halifax Regional Municipality and the Halifax Waste-Resource Society with respect to the CMC's right to access information regarding the Otter Lake Landfill operation. The following is quoted from his legal opinion:

> "The Agreement should be interpreted against the context in which the Strategy and facilities were established. The Strategy was largely the result of community participation. A key element of the Strategy was to maintain community involvement and participation, and HRM made a commitment to ensuring that operations at the facilities would be monitored by the community. The entitlement of the Committee to be fully informed must be liberally interpreted in order for the intent and spirit of the Agreement to be achieved.
>
> The Agreement is binding on both parties, and remains in effect for the duration of the operation of the Facility. HRM has a duty to keep the Committee regularly and fully informed. We fail to see how vital information related to the future of the Facility falls outside the ambit of the Agreement, especially when such information will directly impact the front-end waste processing facility and the foundational elements of the Strategy. Accordingly, it is our opinion that HRM is in clear breach of the Agreement."

Conclusion

For several months now the Community Monitoring Committee has been frustrated in its attempts to obtain the documents to which it is entitled. We are disappointed about the lack of open government at City Hall. We are therefore pursuing alternate actions.

We are bringing the situation regarding lack of transparency to the attention of the local community. The CMC has a duty to inform the local community about information, or lack thereof, concerning the operation of the facilities, as per section 7.01(d) of the Agreement. We feel that the residents surrounding the Otter Lake Landfill should understand the situation regarding the contingency plan, the ongoing risk assessment study, and the difficulty we are receiving in accessing pertinent information.

We are also ensuring that the Province is aware that the CMC, and through it the local affected community, is not able to access important information regarding proposed changes at the landfill. This is in accordance with section 7.01(f) of the Agreement. The Department of Environment has stated that changes at Otter Lake will not be allowed unless there is consent from the local community. It would be challenging for the local community to consent to something that is being kept secret from them.

Otter Lake Community Monitoring

We trust that our frustration and disappointment are clear.

Yours truly,

[redacted]

Jack Mitchell

Chair, Community Monitoring Committee

cc: Members of Community Monitoring Committee
Members of HRM Council
Municipal Clerk

MERRICK JAMIESON STERNS WASHINGTON & MAHODY
BARRISTERS

TRUSTED COUNSEL SKILLED ADVOCATES

August 31, 2015

VIA EMAIL - klmeech@bellaliant.net
25623

Mr. Ken Meech
Executive Director
Halifax Waste/Resource Society
1492 St. Margaret's Bay Road
PO Box 213
Lakeside, NS B3T 1M6

Dear Mr. Meech:

Re: Community Monitoring Committee – Right to Information from HRM

You have requested our opinion regarding whether the Halifax Regional Municipality ("HRM") is in breach of their obligations to keep the Community Monitoring Committee (the "Committee") informed regarding the operations of the Otter Lake Waste Processing and Disposal Facility (the "Facility").

In February 1999, HRM entered an agreement with the Halifax Waste/Resource Society (the "Agreement") to create a citizen-based review group known as the Community Monitoring Committee. The Committee was tasked with monitoring the operation of the facilities and reporting to area residents, Council and other applicable authorities concerning the operation of the facilities or any other element of the solid waste resource management. Conversely, HRM was tasked with providing the Committee with full and complete reports concerning the operation of the facilities and reasonable access to information in the possession of HRM concerning the operation of the facilities and the operation of any aspect of HRM's integrated solid waste resource management system which has a direct impact on the operation of the facilities.

The Agreement is binding on both parties and remains in effect for the duration of the operation of the Facility.

You have informed us that HRM is withholding information from the Committee related to the Terms and References of a technical study conducted at the landfill site, as well as information related to possible contingencies that will affect the foundational elements of the Integrated Waste/Resource Management Strategy (the "Strategy").

It is our opinion such information falls within the ambit of the Agreement. Not only is HRM in breach of their obligations under the Agreement, but their actions are contrary to the spirit of the very strategy that positioned HRM as a leader in waste resource management.

BACKGROUND

In 1994, HRM launched the Regional Solid Waste Management Project to develop a strategy to address the solid waste generated within the HRM. At the initial stages of public consultations, a community group, known as the Community Stakeholders Committee ("CSC") was formed. CSC comprised of interested citizens from the HRM; its purpose was to provide recommendations regarding all aspects of the Regional Solid Waste Management Project. CSC coordinated the public consultation process and consulted with professional environmental groups. Ultimately, their work resulted in the Integrated Waste/Resource Management Strategy which was adopted by HRM Council in February 1996 for the Facility.

A vital component of the Strategy was the requirement for a citizens-based review group which would monitor the implementation of the Strategy. This component required the creation of an independent arm's length organization, the Halifax Waste/Resource Society, which then contracted with HRM in February 1999 to create a Community Monitoring Committee. In good faith, both parties agreed to fulfill their obligations and work together for the benefit of the residents of the adjacent communities and the residents of HRM in general. At the time of the Agreement, HRM made a clear commitment "to ensuring that operations at [the] facilities will be monitored by residents of the communities which are adjacent to the facilities, and by residents of the Regional Municipality at large".

The Agreement clearly provides that the Committee has a duty to monitor the operation of the facilities; and report to area residents, Council and other applicable authorities concerning the operation of the facilities or any other element of the solid waste resource management system where the operation of such elements has a direct impact on the operation of the facilities.

Specifically, the Agreement provides:

> 2.05 The Committee shall, as of the Commencement of Operations, monitor the operation of the Facilities at the Site and otherwise fulfil the responsibilities conferred on it under this Agreement in a manner consistent with this Agreement.
>
> ...
>
> 7.01 The Committee shall, effective as of the Commencement of Operations,
> (a) monitor the operation of the Facilities;
>
> ...
>
> (d) report to the Area Residents information concerning the operation of the Facilities;
>
> ...

(f) report to the Council of HRM and other authorities having jurisdiction the views and comments of the Committee, and of Area Residents, concerning the operation of any element of HRM's integrated solid waste resource management system other than the Facilities, where the operation of such element or elements has a direct impact on the operation of the Facilities;

In order to effectively monitor and report, the Committee must be regularly and fully informed by HRM. The Agreement provides that HRM has a duty to ensure that the Committee receives full and complete reports concerning the operation of the Facilities, and has reasonable access to information that is in the possession of HRM concerning the operation of the Facilities or any aspect of HRM's integrated solid waste resource management system which has a direct impact on the operation of the Facilities.

Specifically, the Agreement provides:

8.01 HRM shall ensure, for and during the period that the Facilities are in operation, that:

(a) the Committee receives full and complete reports concerning the operation of the Facilities, in such form and at such times, as may be required by the Committee;

...

(c) the Committee has, through its Chair or other representative designated by the Committee, reasonable access to such information as is from time to time in the possession of either an Operator or HRM, or both, concerning the operation of the Facilities, including, without limitation, the results of tests conducted by an Operator relating thereto;

(d) the Committee has access to information in the possession of HRM concerning the operation of any aspect of HRM's integrated solid waste resource management system which has a direct impact on the operation of the Facilities.

CURRENT SITUATION

We understand that the Facility is about to undergo a number of changes. Current projections indicate that the landfill is near capacity and is predicted to be full between September and October 2016 unless action is taken. HRM Council has been meeting in-camera to discuss options and develop contingencies related to the operation of the Facility. HRM Council has been developing contingencies in the event that the Province rejects their application for vertical expansion. Current contingencies include: plans to increase the landfill capacity of Cell 6; the possibility of prohibiting Industrial, Commercial and Institutional waste from being received at the Facility; and an option to run the Front End Processor Facility as a transfer station in order to export waste to other landfills as required.

While HRM provided the Committee with a summary of the contingency options, they have not disclosed minutes and reports from the August 4, 2015 in-camera Council meeting discussing the vertical expansion contingency plans, nor have they given the Committee an opportunity to be part of the debate.

Further, despite the Committee's continued requests, HRM Council continues to keep the Terms of Reference for the technical study at the landfill private and confidential. The Committee has had to make a formal application under freedom of information legislation to which they continue to await a response.

This lack of transparency is concerning. In our opinion, it is not only a breach of the terms of the Agreement, but it is contrary to the spirit of the Agreement.

CONCLUSION

The Agreement should be interpreted against the context in which the Strategy and facilities were established. The Strategy was largely the result of community participation. A key element of the Strategy was to maintain community involvement and participation, and HRM made a commitment to ensuring that operations at the facilities would be monitored by the community. The entitlement of the Committee to be fully informed must be liberally interpreted in order for the intent and spirit of the Agreement to be achieved.

The Agreement is binding on both parties, and remains in effect for the duration of the operation of the Facility. HRM has a duty to keep the Committee regularly and fully informed. We fail to see how vital information related to the future of the Facility falls outside the ambit of the Agreement, especially when such information will directly impact the front-end waste processing facility and the foundational elements of the Strategy. Accordingly, it is our opinion that HRM is in clear breach of the Agreement.

For many years, the HRM has been internationally known for its waste resource management system. This can largely be attributed to the collaborative efforts of HRM and the community, who, through a series of public consultations and substantial community involvement, developed an Integrated Waste/Resource Management Strategy to address the solid waste generated within the HRM. The Strategy was a significant accomplishment, not only was it an outstanding example of citizen involvement but it also set world class standards for the treatment of waste resources.

It would be regrettable if possible changes to the waste management system were to receive consideration without having the citizen input that is one of the outstanding and commendable features of the Strategy.

A letter should be written to the HRM asking them to stand by their commitments and to provide the Committee with all relevant information, including but not limited to, the Terms of Reference for the technical study at the landfill, the in-camera minutes and reports from the August 4, 2015 HRM Council meeting, and any and all information related to the construction of Cell 7, the proposed vertical expansion of the Facility and any other contemplated contingencies. If HRM

continues to breach the Agreement, a next step may be to pursue a declaration confirming the entitlement to information from the Court.

We hope that we have adequately responded to your request. We would be pleased to answer any questions or to discuss this further with you.

Yours truly,

[redacted]

John Merrick

[redacted]

Jaimie Tax

#218288

Keliher, Matthew

From: Mellett, Cathy
Sent: August-31-15 5:10 PM
To: Ken Meech (klmeech@bellaliant.net)
Cc: oscarmitch@eastlink.ca; Keliher, Matthew; Nicoll, Lorelei; Mayor; MacKinlay, Shaune; Butts, Richard; Traves, John; Lewis, Laura; Labrecque, Mike
Subject: Community Monitoring Committee- Request to Present August 19, 2015

Dear Mr. Meech (Ken);
Agenda Review Committee was somewhat unclear from the email of August 16, 2015 as to the grounds for the request to present as per Section 6.05 of the agreement.

As you are aware Council at the meeting of August 4,2015 passed the following motion:
THAT Halifax Regional Council authorize the following actions as a contingency plan in the event that Halifax's application for vertical expansion of the Otter Lake landfill is delayed or not approved by the Province:

1. *Direct staff to apply for an amendment to the operating permit for the Otter Lake Facility providing for approximately 140,000 tonnes of additional landfill capacity in Cell 6;*

2. *Direct staff to initiate the by-law process to prohibit Industrial, Commercial and Institutional waste from being received at the Otter Lake Facility effective January 1, 2016 (unless the 140,000 tonne expansion of Cell 6 is approved by the Province prior to January 1, 2016, in which case the change to the by-law will not be effective until April 1, 2016; or unless vertical expansion of the entire Otter Lake Facility is approved by the Province prior to April 1, 2016, in which case the change to the by-law will not be made effective at all);*

3. *Direct staff to apply for an amendment to the Otter Lake Facility operating permit to have the Front End Processor Facility approved as a transfer station and authorize staff to negotiate the terms and conditions for its operation by Mirror NS and direct staff to provide notice to the Community Monitoring Committee;*

4. *Authorize the Chief Administrative Officer to negotiate and enter into agreements with other landfill operators to accept Halifax waste, and to export waste to such landfills as required;*

5. *That, if approved, the above recommendations be made public, and;*

6. *That this report not be released to the public.*

As a result of this motion staff have been tasked with preparing a submission in support of Council's proposed direction related to the operating permit. As per Mr. Traves email of August 19, 2015 Agenda Review is satisfied that it is premature at this time to hear from CMC prior to CMC having the opportunity, in accordance with the agreement, to receive and review the details of the proposed permit changes. Upon formal notice and review if the Chair of CMC still wishes to be heard that opportunity will be provided. Any changes in the bylaw, as per the motion will be dealt with by Council in accordance with provisions of the Charter.

Most sincerely;

CATHY J. MELLETT
MUNICIPAL CLERK
CAO S OFFICE

HALIFAX
T. 902.490.6456
melletc@halifax.ca
halifax.ca

Traves, John

From: Traves, John
Sent: August-19-15 3:55 PM
To: 'Ken Meech'; Office, Clerks
Cc: 'Jack Mitchell'; Keliher, Matthew
Subject: RE: notice from COMMUNITY MONITORING COMMITTEE

Ken
Thanks for copying me on this.

Solid Waste advises me they hope to have the proposed specifications for the Transfer Station permit and Vertical contingency plan permit applications ready by mid-September. Although the s 6.05 of agreement only contemplates notice to CMC of changes to the Residual Disposal Cell specifications it seems reasonable to provide CMC with the details of the proposed permit changes to the FEP in order that Committee can satisfy itself there is no proposed change to the FEP operations which would impact the Cell(s).

The Chair's right under s 6.05 of 15 days to give Notice to address Council regarding a proposed change in the specifications runs from receipt of HRM's notice together with the proposed change in specifications. Council asked me to provide you advance notice so this is not a surprise and to clarify it's intentions with respect to the contingency plan.

You may wish to consider waiting until you have received formal notice and the proposed specifications before taking a position on them.

Hope this helps. Please feel free to give me a call to discuss.

John

From: Ken Meech [mailto:klmeech@bellaliant.net]
Sent: August-19-15 3:21 PM
To: Office, Clerks
Cc: Traves, John; 'Jack Mitchell'
Subject: notice from COMMUNITY MONITORING COMMITTEE

On august 6 the CMC was advised by john Traves of a contingency plan for OTTER LAKE landfill proposed vertical extension.
CMC IS PLANNING TO MEET AGAIN SOON TO PREPARE A RESPONSE HOWEVER IN THE MEANTIME WE ARE ADVISING OF OUR REQUEST TO ADDRESS COUNCIL IN ACCORD WITH SECTION 6.05 OF THE CMC AGREEMENT AT A COUNCIL SESSION IN SEPTEMBER IN CASE WE WISH TO DO SO.

Traves, John

From: Traves, John
Sent: August-07-15 1:58 PM
To: Ken Meech
Cc: Jack Mitchell; Keliher, Matthew; Butts, Richard
Subject: Re: communication re contingency plan

Fair enough. We would appreciate an opportunity to meet should their be an intention to change CMC's position regarding vertical expansion generally otherwise I expect we will definitely need to sit down once we have something concrete to discuss regarding any change to the permit with respect to the contingency plan and ultimately the longer term vertical expansion amendment.

Sent from my iPad

On Aug 7, 2015, at 1:48 PM, Ken Meech <klmeech@bellaliant.net> wrote:

> At this point no meeting required but we will be meeting again soon to decide our next steps thanks
>
> ---
>
> **From:** Traves, John [mailto:travesj@halifax.ca]
> **Sent:** August-07-15 9:37 AM
> **To:** Ken Meech
> **Subject:** RE: communication re contingency plan
>
> Ken – If you have a chance today I would appreciate any insight you can provide with respect to last night's meeting and if there is a desire for us to meet with the executive on this or not.
>
> ---
>
> **From:** Ken Meech [mailto:klmeech@bellaliant.net]
> **Sent:** August-06-15 3:58 PM
> **To:** Traves, John
> **Subject:** communication re contingency plan
>
> What happened to the offer to meet with CMC to discuss.

August 6, 2015

COPY

By Email

Ken Meech
Executive Director
Community Monitoring Committee
PO Box 213
Lakeside, NS B3T 1M6

Ken,

Re: Vertical Expansion Contingency Plan

As discussed yesterday, I am writing to provide you a sense of the background with respect to Council's decision Tuesday regarding contingency planning for Otter lake.

As you are aware Staff has engaged the Operator to prepare a submission for a change to the operating permit to allow for vertical expansion of the landfill as a consequence of Council's decision of December 9th, 2014. As you will appreciate from our discussions leading up to Council's decision there are a number of factors which must be dealt with not the least of which are the items raised in our consultations around the topics identified by CMC as needing Review and Assessment as part of the preparation of any submission. At this point in time Staff determined that it was appropriate to seek direction with respect to a contingency plan in the event there is a delay in obtaining the necessary permit changes.

To this end, following an in-camera discussion Tuesday, Council passed the following Motion:

> It is recommended that Halifax Regional Council authorize the following actions as a contingency plan in the event that Halifax's application for vertical expansion of the Otter Lake landfill is delayed or not approved by the Province:
>
> 1. Direct staff to apply for an amendment to the operating permit for the Otter Lake Facility providing for approximately 140,000 tonnes of additional landfill capacity in Cell 6;
>
> 2. Direct staff to initiate the by-law process to prohibit Industrial, Commercial and Institutional waste from being received at the Otter Lake Facility effective January 1, 2016 (unless the 140,000 tonne expansion of Cell 6 is approved by the Province prior to January 1, 2016, in which case the change to the by-law will not be effective until April 1, 2016; or unless vertical expansion of the entire Otter Lake Facility is approved by the Province prior to April 1, 2016, in which case the change to the by-law will not be made effective at all);

3. Direct staff to apply for an amendment to the Otter Lake Facility operating permit to have the Front End Processor Facility approved as a transfer station and authorize staff to negotiate the terms and conditions for its operation by Mirror NS and direct staff to provide notice to the Community Monitoring Committee;

4. Authorize the Chief Administrative Officer to negotiate and enter into agreements with other landfill operators to accept Halifax waste, and to export waste to such landfills as required;

5. That, if approved, the above recommendations be made public, and;

6. That this report not be released to the public.

Mirror and Dillon commenced work on the preparation of new specifications (and the supporting permit application) on site June 3, 2015 with project management and oversight being completed by CRA. The expected completion date of all work plan deliverables in relation to the application to amend the Permit is October 31, 2015. The final deliverable will be a permit application to Nova Scotia Environment (NSE) once HRM's commitment under s 6.05 of the CMC Agreement (to obtain input from CMC) has been satisfied. It is the consultant's belief, given the elements of the work plan which address the required areas of landfill design and operations, that there is adequate time available and that NSE will be in a position to issue a permit by January 1, 2016.

It is hopeful that our submission will be timely and that NSE is expedient in processing the application and approving the permit; however a risk mitigation strategy is required in the event the permit approval process is slow, NSE requires additional studies and/or information, or in the unlikely event NSE denies vertical expansion. There is also the possibility that while completing the work plan, capital components critical to landfill operations may not be working in optimal condition and require repair or upgrade. For instance, sump chambers or infrastructure may need to be replaced/upgraded or leachate collection piping may need to be unplugged. This could also delay the approval from NSE and/or delay the placement of waste if work is being completed onsite. Based on the investigations completed to date, the system appears to be in good working order and these concerns have lessened.

Based on current tonnage projections, Cell 6 is estimated to be full between September - October 2016. This date could shift to August depending on the amount of waste that is actually exported over the next year. A cell construction typically takes up to 17 months with 13 months required for construction. Construction does not typically take place over the winter months. If the permit application for vertical expansion is delayed or rejected, the earliest Cell 7 construction could start is April 2016. As a result Halifax could possibly be without a landfill cell at the Otter Lake site until September 2017. This amounts to 12 months (September 2016 – September 2017) of waste which is approximately 130,000 – 140,000 tonnes of material that is required to be managed. As a result a contingency plan is required.

Halifax has made a request in discussions with NSE to permit/allow Halifax to dispose of up to an additional 140,000 tonnes of residual waste (historical annual tonnage) above the current height restrictions for Cell 6 as part of developing a contingency plan for Halifax's solid waste. This contingency plan will allow Halifax to manage its solid waste at the Otter Lake Site for a minimum of one year if there happens to be a delay in the vertical expansion approval. There is precedence in allowing increased cell volumes and heights at the Otter Lake Site. In 2008, there was a delay in the issuance of an approval for Cell 5 operations, and NSE allowed an increased height to Cell 4 as an interim disposal solution while the final operating approval for Cell 5 was being completed. NSE has advised that Halifax's request will require a formal application for an amendment to the operating permit for the contingency period.

Contingency Plan Options

1. Close Otter Lake site to all Industrial, Commercial and Institutional (ICI) Waste haulers

Historically the Otter Lake site received approximately 140,000 tonnes of waste each year. Of this, approximately 80,000 tonnes is ICI and the remaining 60,000 tonnes is residential. With the removal of flow control, the ICI sector waste has decreased by 20% since February 2015. With this trend continuing, the ICI annual waste is estimated to be 64,000 tonnes per year, bringing the annual total to an estimated 124,000 tonnes. As of July 1, 2015 there was approximately 155,000 tonnes of space available in Cell 6. Based on the revised ICI tonnage data, assuming the trend remains consistent, Cell 6 will be full in October 2016. If the ICI sector was prohibited from using Otter Lake starting January 1, 2016 Cell 6 would be full in August 2017 (Table 1). By restricting site use to only residential waste, Halifax secures disposal space for an additional 9-10 months for residential garbage. This will provide enough time to construct a full or partial cell if vertical expansion is not approved by the Province. The ICI sector, who has lobbied for the removal of flow control and the ability/discretion to export, would then be required to export waste to other landfill sites. Collectors can direct haul or construct a transfer station in order to export the material.

The prohibition on accepting ICI waste could be restricted until vertical expansion was approved or some other timeframe. If vertical expansion is not approved for the entire site (Cells 1-6) but instead approved in stages, the prohibition could remain in order to maximize the timeframe between constructing new cells as approval of future stages may be unknown.

For each ICI tonne received and processed at Otter Lake there is a cost of $170. The ICI sector pays a $125 tip fee. In addition for each tonne received and placed in Cell 6 of the landfill, it uses valuable space and advances the timeline to build Cell 7 at an estimated cost of $21,500,000. Although there will be a loss in tip fee revenue, the tip fee revenue currently does not cover the costs at Otter Lake.

2. File an application for an amendment to the Operating Permit at the Otter Lake Facility for an additional 140,000 tonnes of waste on Cell 6

Currently Cell 6 is the active operational cell at Otter Lake. No section of Cell 6 has been capped with a permanent closure system. As a result, increasing the height on Cell 6 as a contingency is optimal. Based on CRA's initial review they believe that the scope of work necessary to meet the requirements is of modest scope and can be completed in a timely manner while still providing opportunity for input from CMC as per the agreement.

If NSE approves the increased height on Cell 6, it is expected to provide Halifax with 12 months of added capacity at Otter Lake based on historical tonnages or 13 - 14 months based on current projected tonnages (Table 1 & 2). If only residential waste is being accepted at Otter Lake, then the increased approved volume will last the Municipality 27 - 28 months (Table 1 & 2). This additional capacity should provide Halifax the required time to meet all of NSE's requirements for vertical expansion of the entire Otter Lake Facility. If the permit for vertical expansion of the entire Otter Lake Facility is denied, the added time will allow for Cell 7 to be developed or time to review other options. Although staff and consultants believe a permit is achievable both in terms of engineering feasibility and community consultation requirements being met, increasing Cell 6 by 140,000 tonnes will provide service and disposal continuity if there are delays in the vertical expansion permitting process.

3. Transfer all Waste when Cell 6 is Full

Section 16.4 of By-law S-600 provides that "... the Municipality may export solid waste materials to licensed disposal facilities outside the boundaries of the Municipality only when the volumes of solid waste delivered to municipal facilities exceed the capacity of the facilities to handle the materials". If Cell 6 is full and Cell 7 is not yet constructed, then the facilities will be at capacity and waste will have to be exported.

There are 6 landfills in Nova Scotia other than the Otter Lake landfill. Halifax has agreements drafted with the Region of Queens Municipality and the Municipality of the District of Chester to accept Halifax waste on emergency or a contingency short term basis. Solid Waste staff are currently gathering information from all sites with regards to: their desire and ability to accept Halifax waste, the potential tip fees, the amount of space available, annual tonnages and their future plans for cell development. This will allow staff to understand the available capacity at all provincial landfills and plan for their use as a contingency. Staff will also be investigating other landfill sites outside the province. Without agreements in place there is a risk that landfill operators may not provide competitive pricing when Halifax requires the space. These agreements may take time to be approved if they require local Council ratification. There is a risk that sites in Nova Scotia or elsewhere do not have capacity to accept Halifax waste or they may not wish to receive the waste.

In order to transfer materials, Halifax would need to utilize the existing Otter Lake Front End Processing (FEP) facility as a waste transfer station. The Front End Processing facility building is an enclosed seven bay steel structure with concrete tip floor and load out compactor(s). This facility meets the requirements for an approved transfer station (as outlined in the NSE Guidelines for the Siting and Operation of Waste Transfer Stations dated October 5, 2006) such as the leachate and odor controls that are in place, a ground and surface water monitoring regime exists, and the existing site infrastructure and facility procedures for the current waste processing and disposal facilities site which are the same as are required for transfer station operations (as an alternate use).

Although the FEP/WSF are in essence operating as a transfer station whereby waste is received on the tip floor, processed and then transferred to the Residual Disposal Facility (RDF), also known as the landfill cell, only a few hundred meters behind the building by way of transfer trucks and trailers, the site approval from NSE does not include specific operations as a transfer station. The current site approval for Otter Lake (Approval No: 2008-065580-A01) requires that all municipal solid waste will be processed through the Front End Processor building unless written authorization for alternate procedures is obtained from the Administrator. Therefore, Halifax would need to seek an Approval amendment to allow waste to be transferred from the site without going through the FEP as well as a transfer station permit to move the waste to other locations. This work should be done regardless of the contingency plan option chosen since there could be unforeseen incidences which may require the transfer of waste in the future. No other landfill in Nova Scotia has the requirement to process waste prior to being deposited into a landfill, therefore staff expect NSE to be amenable to a change in Halifax's operating permit allowing for the FEP to be used as a transfer station (provided that the waste is not being disposed of in a RDF at Otter Lake). All waste being disposed in the Otter Lake RDF will continue to be processed through the FEP/WSF.

The transportation of these trailers would be tendered. The operations of a transfer station were not contemplated within the Mirror Agreement. Halifax may choose to issue an RFP for transfer station operations or negotiate with Mirror for its continued operation of the site as a transfer station. Therefore the current cost to operate a transfer station is unknown at this.

4. Construct Cell 7

The estimated cost to construct Cell 7 is $21,500,000. Cell 7 capacity is estimated to be 520,000 tonnes ($40/tonne) and have a useful life of 4 years based on current estimated tonnage (125,000 per year). If ICI waste was restricted from tipping at the Otter lake landfill, the useful life would increase to over 8 years.

Halifax has directed Mirror to make an "other modification" to the Facilities (i.e. vertical expansion) and has therefore withheld its notice to proceed with the construction of cell 7. If Halifax/Mirror are ultimately unsuccessful in obtaining a permit from NSE for vertical expansion, Halifax may then allow Mirror to proceed with cell 7 construction, but it

makes little sense to do so at this time, particularly given the enormous capital cost. Another option would be to construct a partial cell, however based on advice from Conestoga Rovers it is more costly per tonne to construct in stages and vertical expansion is technically and operationally achievable, therefore constructing a cell is not required for some time.

The Solid Waste Reserve Q123, which is used to fund cell construction, has an available balance of $9.2 million. In anticipation of vertical expansion, the annual appropriation of $8 million was redirected to Q103, the Capital Surplus Reserve, so as to support the overall capital budget. As such, these funds are available for a broad range of capital projects but may still be used for cell construction. If Cell 7 must be constructed in 2016-17 it can be funded by using the existing $9.2 million in Q123 plus the funds in the Capital Surplus Reserve ($8 million from 2015-16 and an expected $8 million in 2016-17). The cost to Halifax will not be higher taxes or debt but rather will be opportunity costs. Capital projects that might have been funded by Council from Q103 will now have to be foregone.

Staff believe construction of Cell 7 is the least favorable option considering the capital cost required and the fact the Stantec, SNC Lavalin, and CRA reports confirm vertical expansion is achievable and that it is the preferred way to reduce landfill costs and environmental impacts.

I appreciate a large part of this covers ground previously discussed but I have included it out of caution. I hope this goes some way towards bring you upto speed on where we are and what you can expect as the process of implementing Council's decision on Vertical Expansion progresses.

Yours very truly,

[redacted]

John Traves
Director
Legal, Insurance and Risk Management Services
Halifax Regional Municipality

Tel 902.490.4219
Cell [redacted]
Email travesj@halifax.ca

cc Mayor, Council

EXHIBITS:

Exhibit A: Table 1 – Cell Fill Rate Status Quo
Table 2 - Cell Fill Rate with Additional Capacity

EXHIBIT: A

Table 1 – Cell Fill Rate Status Quo

Current Cell Capacity 503,000 Tonnes

	Annual Tonnes Current Projection 125,000	Construction Timeframe	Annual Tonnes Residential Only 60,000	Construction Timeframe
Jul-15	347,126			
Aug-15	357,543			
Sep-15	367,959			
Oct-15	378,376			
Nov-15	388,793			
Dec-15	399,209			
Jan-16	409,626		409,626	
Feb-16	420,043		414,626	
Mar-16	430,459		419,626	
Apr-16	440,876		424,626	
May-16	451,293		429,626	
Jun-16	461,709		434,626	
Jul-16	472,126		439,626	
Aug-16	482,543		444,626	
Sep-16	492,959	With 125,000 tonnes per year	449,626	With 60,000 tonnes per year
Oct-16	503,376		454,626	
Nov-16	Transfer Station to manage waste		459,626	
Dec-16			464,626	
Jan-17			469,626	
Feb-17			474,626	
Mar-17			479,626	
Apr-17			484,626	
May-17			489,626	
Jun-17			494,626	
Jul-17			499,626	
Aug-17			504,626	

There is not enough time available to construct a new cell if ICI waste remains being accepted at Otter Lake. If only residential waste is permitted there is enough time to construct a new cell if required

Table 2 – Cell Fill Rate with Additional Capacity

Capacity with additional 140,000 tonnes = 643,000 Tonnes

	Annual Tonnes Current Projection 125,000	Construction Timeframe	Annual Tonnes Residential Only 60,000	Construction Timeframe
Jul-15	347,126			
Aug-15	357,543			
Sep-15	367,959			
Oct-15	378,376			
Nov-15	388,793			
Dec-15	399,209			
Jan-16	409,626			
Feb-16	420,043			
Mar-16	430,459			
Apr-16	440,876		440,876	
May-16	451,293		445,876	
Jun-16	461,709		450,876	
Jul-16	472,126		455,876	
Aug-16	482,543		460,876	
Sep-16	492,959	With 125,000 tonnes per year	465,876	
Oct-16	503,376		470,876	
Nov-16	513,793		475,876	
Dec-16	524,209		480,876	
Jan-17	534,626		485,876	
Feb-17	545,043		490,876	
Mar-17	555,459		495,876	
Apr-17	565,876		500,876	
May-17	576,293		505,876	
Jun-17	586,709		510,876	
Jul-17	597,126		515,876	
Aug-17	607,543		520,876	
Sep-17	617,959		525,876	
Oct-17	628,376		530,876	
Nov-17	638,793		535,876	
Dec-17	649,209		540,876	
Jan-18			545,876	
Feb-18			550,876	
Mar-18			555,876	
Apr-18			560,876	
May-18			565,876	
Jun-18			570,876	
Jul-18			575,876	With 60,000 tonnes per year
Aug-18			580,876	
Sep-18			585,876	
Oct-18			590,876	
Nov-18			595,876	
Dec-18			600,876	
Jan-19			605,876	
Feb-19			610,876	
Mar-19			615,876	
Apr-19			620,876	
May-19			625,876	
Jun-19			630,876	
Jul-19			635,876	
Aug-19			640,876	
Sep-19			645,876	

If NSE approves the 140,000 contingency and ICI waste is still accepted construction of a new cell would be required to start April 1, 2016 if vertical expansion is not approved.

If NSE approves the 140,000 contingency and ICI waste is not accepted construction of a new cell would be required to start April 1, 2018, if vertical expansion if not approved.

Keliher, Matthew

From: Keliher, Matthew
Sent: June-12-15 10:46 AM
To: 'Ken Meech'; Traves, John
Subject: RE: otter lake changes

Ken,

As indicated in the letter dated May 8, 2015, Halifax will provide the CMC with the final study results for review. As discussed, Halifax has also committed to brief the CMC executive on the completed study. This good faith gesture exceeds our obligations under the CMC agreement. We expect the final study results will be available by the end of November 2015.

Matt

From: Ken Meech [mailto:klmeech@bellaliant.net]
Sent: June-12-15 10:12 AM
To: Traves, John; Keliher, Matthew
Subject: otter lake changes

Thanks for your recent letter on the above .
My advice is to send me a copy of the scope of work for the engineers and as discussed with john give me an opportunity to have a confidential session with the engineers so i can provide an update to the CMC with a copy of the scope .
My concern is that should you lose the confidence of the committee over a tactical issue my belief is that the next response from the community will be to push strongly for the closure of the landfill on 2023 /2024
Fy consideration.

May 8, 2015

Jack Mitchell
Chair, Community Monitoring Committee

Dear Jack,

The December 3, 2014 CMC/HWRS letter titled "Update on Discussions with HRM on Otter Lake Recommendations" outlined CMC/HWRS's position that an odour and landfill gas (LFG) management program must be included in an operational plan for vertical expansion.

> "One of the key issues for the Society remains the odour standards/outcomes. It is expected that the operational plan to be developed will address this specific issue consistent with CRA advise that the vertical extension can be implemented while maintain or enhancing all environmental and community protection."

Included in the above noted letter of support for vertical expansion CMC/HWRS outlined specific odour and LFG gas management work required to be included in the vertical expansion work plan:

4) Odour Management
- Confirmation of potential odour impacts and approaches for lessoning the potential impact of; a) the removal of the cap system from previously completed cells, and b) excavation/inspection and potential upgrade of the original leachate collection system.
- Identification of a preferred daily/interim cover material to enhance to the control of landfill gas and odours.
- The evaluation of potential odour impacts associated with vertical expansion must acknowledge stipulations included in Section 10 (Air Emissions) of site's Approval to Operate.

5) Landfill Gas Management
- Evaluation of landfill gas management needs for the new vertical expansion areas, including connection existing site systems and the potential requirement for new collection and flaring infrastructure.

- Evaluation of potential impacts to surface/sub-surface gas system infrastructure in the closed cells, including buried collection piping.

As part of the scope of work, odours will be assessed within of the LFG Management Plan. LFG production under vertical expansion will be estimated/modelled. This information will be used in support of designing the LFG collection field with the ultimate objective of mitigating and eliminating odours. In addition to the LFG Management Plan, revised odour control procedures will be developed as part of an updated RDF Operations Plan. The revised odour control procedures will include inspection methodologies and contingency plans to address any odour issues. The use of a field olfactomer (e.g., Nasal Ranger) as part of an on and off site odour monitoring program will be evaluated. Contingency plans will include measures to be implemented during final cover removal operations and during normal operations and will consist of such items as modifying operations, utilizing cover soils, utilizing oxidizing misting agents, and installing temporary LFG infrastructure.

Halifax recognizes that under the terms of the CMC Agreement, we are required to provide the Chair of the CMC notification on proposed modifications to the Residual Disposal Facility (section 6.05). Within 15 days after this notification is provided, the CMC may request to address Council on the proposed specifications. Halifax is looking to satisfy all of the CMC's concerns in this regard and Halifax will provide the final study results for review.

I can assure you that managing odours during vertical expansion is a priority and will be addressed principally through work consisting of 1) Minimizing the active face of the landfill; 2) Utilizing effective daily cover materials; 3) Utilizing LFG collection and destruction infrastructure; and 4) Updated standard procedures.

I am disappointed that a representative from the Operator has informed you, the CMC and the HWRS that Halifax has not addressed odour and LFG management within the scope of work. This is simply not true.

Regards,

[redacted]

Matthew Keliher
Manager, Solid Waste Resources
Halifax Regional Municipality
Tel 902.490.6606
Cell 902.225.2677
Email kelihem@halifax.ca

Otter Lake Community Monitoring

May 1, 2015

Matthew Keliher
Manager, Solid Waste Resources
Halifax Regional Municipality
PO Box 1749
Halifax, NS B3J 3A5

Dear Matt,

We are writing to inquire about the Scope of Work that is being developed for the engineering studies pertaining to the potential increased height of the Otter Lake Landfill.

As you are aware, the Community Monitoring Committee prepared a list of studies that we felt had to be conducted in order to satisfy concerns in the community about the risks of increasing the height of the landfill. The CMC provided that list in our discussions on items 7, 8 and 9 of the initial staff recommendations to Council regarding the Otter Lake Landfill Facility. It was our understanding that there was agreement that the Scope of Work would include those studies.

The CMC's request to be included in the discussions with the operator regarding the Scope of Work was denied. Our request to be able to review and comment on the Scope of Work before it is finalized was similarly denied.

At our meeting of April 30, 2015, we asked representatives of Mirror Nova Scotia to review the list of our recommended studies and to let us know if they were all included in the draft Scope of Work. They replied that elements of the risk assessment regarding air emissions, particularly odour modeling, are not part of the Scope of Work.

Could you please let us know right away if the air emissions risk assessment is or is not part of the Scope of Work? This is a very important issue to the community, and we are particularly concerned about potential increases in odour events should the landfill be higher, where gases may be carried further and in different directions than they are now.

The Minister of the Environment has indicated that changes to Otter Lake will only be allowed with the consent of the community. It would be difficult to imagine the community consenting to an increase in the height of the landfill without a proper assessment of the risk of odours in the local affected community.

Otter Lake Community Monitoring

We would appreciate your immediate attention to this concern and a response before the Scope of Work has been finalized.

Yours truly,

[redacted]

Jack Mitchell
Chair, Community Monitoring Committee

cc: Members of the Community Monitoring Committee
Richard Butts
John Traves, Q.C.
Iain Rankin, MLA
Ken Meech, Executive Director, Community Monitoring Committee
Ken Donnelly

Halifax Waste-Resource Society
P.O. Box 213
Lakeside, NS
B3T 1M6

December 3, 2014

John Traves, Q.C.
Director
Legal, Insurance And Risk Management Services
Halifax Regional Municipality
PO Box 1749
Halifax, NS
B3J 3A5

Dear Mr. Traves:

Re: Solid Waste/Resource Strategy Review

Please find attached the Halifax Waste-Resource Society's position paper on the January 14, 2014 staff recommendations #7, 8 and 9 with respect to the Otter Lake landfill.

Yours sincerely,

[redacted]

Jack Mitchell,
Chair, HWRS

Cc: Ken Meech, Executive Director, HWRS

Update on Discussions with HRM on Otter Lake Recommendations

BACKGROUND AT COMMENCEMENT OF DISCUSSIONS

At the outset of these discussions, there were certain understandings and expectations held by the community, and some held by HRM.

COMMUNITY UNDERSTANDINGS/EXPECTATIONS:

A. Otter Lake Landfill Facility would close by December 31, 2023;

B. There was a predetermined outcome for the community engagement program;

C. The existing agreement between HRM and the HWRS is based on verifiable trust (confidence in commitments);

Verifiable Trust

Trust [trust] noun
1.reliance on the integrity, strength, ability, surety, etc., of a person or thing; confidence.

D. There is a need for more time to monitor (c) before any willingness to support extending life of landfill; and,

E. HRM will honor the commitment by Council that the environmental and community protection standards remain the same or better.

HRM UNDERSTANDINGS/EXPECTATIONS:

A. Based on the solid waste review, there is an opportunity to reduce operational/capital costs; and,

B. There is an ability to extend the operational life of the landfill and eliminate the need to locate a new replacement facility at considerable cost ($100 million).

POSITION OF HALIFAX WASTE RESOURCE SOCIETY(HWRS)/COMMUNITY MONITORING COMMITTEE(CMC) FOR INPUT TO HRM COUNCIL

Four joint sessions were held to review and discuss recommendations 7, 8, & 9 in the STAFF REPORT dated JANUARY 14, 2014:

A. With respect to ITEM #7 regarding export the HWRS/CMC has no objection. On behalf of the interests of the wider community we suggest due process as it represents changing a principle of the Community Stakeholder Strategy, and export was not included in the waste management public consultation. Accordingly we recommend an additional public hearing to solicit and hear the views from the wider public.

B. In accordance with the CMC agreement we expect that the FEP/WSF facilities will remain in operation.

C. No detail was presented for our review on the proposed integrated waste management campus. It is not recommended that a campus be created in the absence of an opportunity for the HWRS/CMC to view detail of what may be proposed.

D. We recommend the further exploration of alternative technologies.

Based on this starting point the focus of the meetings has been to explore the implications of **vertical expansion to existing cells at the**

Residual Waste Disposal Facility (RDF).

HRM retained Conestoga-Rovers & Associates to complete a high level technical review of the proposed vertical expansion of the RDF at Otter Lake.

The report has concluded that a vertical cell expansion is **technically possible while still maintaining or enhancing environmental protection and control measures** and that it should begin with cells 1 & 2 and continue through to all existing cells.

In the view of the Society an expansion of the landfill by opening closed cells and building higher upon them presents increased environmental risks, including:

- Increased litter;
- Impacts to the Nine Mile River;
- Increased leachate generation; and,
- Potential for significant odour and noise issues.

The report concludes that **design and operational changes** will be **required** to mitigate the risks and meet the objective of vertical cell expansion. As a minimum the report determined the following should be considered in the vertical expansion design:

- Design and Sequencing
- Slope stability
- Leachate and surface water management
- Landfill system components
- Landfill Gas (LFG) management
- Visual impact

The design changes will necessitate the need to develop a **revised operational plan** covering each of these aforementioned elements.

While the report concludes that a vertical extension is technically feasible it confirms that **operational changes** may be necessary to meet environmental objectives and obligations to the community. This represents a risk that is best mitigated by ensuring that the existing operator and its consultant, who are most familiar with the landfill facility, design any required operational modifications subject to review by HRM and CMC.

As design studies and operational changes are completed, HRM should provide opportunities for the local community to view them and understand them.

One of the key issues for the Society remains the **odour standards/outcome**s. It is expected that the operational plan to be developed will address this specific issue consistent with CRA advice that the vertical extension can be implemented while maintaining or enhancing all environmental and community protection.

The society expects that vertical extension will only proceed in small incremental steps thereby providing the operator, CMC, and HRM the opportunity to bring a halt to the process if unsuccessful. Environmental outcomes will be monitored to ensure compliance.

The society has reviewed the recommendations from staff and has no objection to the proposal subject to our comments, conditions and ongoing participation by CMC in the process.

Appendix

TECHNICAL REQUIREMENTS AS DETAILED BY HWRS AT COMMENCEMENT OF DISCUSSIONS.

Otter Lake - Residuals Disposal Facility – Vertical Expansion

With regard to the proposed vertical expansion and the site's current Provincial Approval to Operate, the following two clauses are highlighted:

> *3.p) Pursuant to Section 60 of the Act, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.*
>
> *3.t) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the active area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change.*

The Approval to Operate regulates a number of practices and emissions including the following, all of which will need to be dealt with by any change in the RDF cells;

- Air Emissions
- Sound Levels
- Liquid Effluent (Leachate)
- Vector / Litter Control
- Spills or Releases
- Erosion and Sediment Control
- Surface Water Discharge
- Groundwater

Topics Needing Review and Assessment Prior to Detailed Design

1) **Landfill Cell Development Scope & Sequencing**

- What is the most satisfactory height increase and based on what rationale (e.g., is it 15 m versus 10 m, 20 m or some other value?).
- Based on the selected height increase, confirmation of the required fill/long term construction sequence that best deals with vehicle access for waste placement, the original cover and gas collection system, and final cap installation. This evaluation must include selection of a preferred start point (ex., Cell 1 or Cell 6) of the vertical expansion effort.
- [redacted] closing date and overall fill capacity for the RDF.

2) **Landfill Stability**

- Confirmation that establishing new disposal areas on top of previously completed portions of the landfill will not create issues related to potential sinking of the present ground level of the closed cells and/or side slope failure.

3) **Area View Planes**

- With reference to Dillon's September 2012 conclusion that the top of Cell 5 was visible to area residents, completion of a view plane study to determine the visibility of the RDF during/following vertical expansion including consideration of ongoing/planned area developments.

4) **Odour Management**

- Confirmation of potential odour impacts and approaches for lessoning the potential impact of; a) the removal of the cap system from previously completed cells, and b) excavation/inspection and potential upgrade of the original leachate collection system.
- Identification of a preferred daily/interim cover material to enhance to the control of landfill gas and odours.
- The evaluation of potential odour impacts associated with vertical expansion must acknowledge stipulations included in Section 10 (Air Emissions) of site's Approval to Operate.

5) **Landfill Gas Management**

- Evaluation of landfill gas management needs for the new vertical expansion areas, including connection existing site systems and the potential requirement for new collection and flaring infrastructure.
- Evaluation of potential impacts to surface/sub-surface gas system infrastructure in the closed cells, including buried collection piping.

6) **Leachate Management**

- Confirmation that leachate from the new vertical expansion areas will move down through the closed disposal cells and to the original collection system without flow barriers (including soil cover in Cell 1); blockages; or exceedance of the 300 mm head limit on the RDF liner system.
- Inspection of original cell leachate collection sumps to assess their capability to manage increased quantities of leachate from the new vertical expansion areas. Due to bio-fouling (i.e., material deposits) and design improvements carried out over the years, it is anticipated that some sumps and pumping systems will require excavation and replacement.
- Inspection and possible upgrading of the leachate transmission piping outside of the cells to assess the capability to manage increased quantities of leachate.

7) **Surface Water Management**

- Determining drainage features (including terracing) necessary to accommodate runoff volumes and velocities down extended landfill side slopes.
- Confirmation of upgrade requirements to surface water management infrastructure (e.g., ditching, culverts and ponds) to manage runoff from new vertical expansion areas.

8) **Litter Management**

- Assessment of the adequacy of existing litter management procedures due to the increased elevation/exposure of the working disposal face.

Update on HRM/Halifax Waste-Resource Society Discussions

September 9, 2014

The Halifax Waste-Resource Society has been meeting with HRM staff. This is an update on the discussions.

What are we discussing?

We are discussing the Halifax Regional Municipality staff recommendations 7 through 9 of the January 14, 2014 Committee of the Whole report. These recommendations are:

7. Amend By-law S-600 to allow for the export of ICI residual waste (garbage) outside HRM, and amend Administrative Order number 16 to provide for an increase in fees for disposal of ICI residual waste from $125 per tonne to the assessed system cost of $170.00 per tonne;

8. Direct staff to initiate consultation with MIRROR NS and the Community Monitoring Committee on options for changes in the operating model (front end processor facility, waste stabilization facility, residual disposal facility) at Otter Lake landfill site A, returning to Council with a transition plan for landfill operations at the site based on diversion outcomes resulting from the changes outlined in this report; and

9. Extend operations at Otter Lake beyond 2024 and direct staff to increase the vertical height of existing and future cells by 15 meters and establish an Integrated Solid Waste Management Campus at the site to support new facilities and alternative technologies as they become viable.

Why are we discussing them?

At a Committee of the Whole meeting on June 24, 2014, HRM staff was directed to meet with the community, through the Society, to discuss further the impacts of these proposed recommendations on the community. That motion was:

MOVED by Councillor Rankin, seconded by Councillor Adams, that Committee of the Whole:
(a) Defer consideration of recommendation number 9 from the January 8, 2014 staff report; and
(b) Direct staff to meet and consult further with the Halifax Waste Resource Society Board of Directors on the technical issues and/or impacts and report back to Committee of the Whole by November 1, 2014 with a summary of recommendations from the Society and recommended changes to staff's report and recommendations, if any.
MOTION PUT AND PASSED UNANIMOUSLY.

What has been done so far?

The Society has met with staff on two occasions. On July 28th and on September 3rd.

With respect to allowing the export of waste to other municipalities, the Society has said that a majority of people in the local affected community would likely be unopposed to a reduction in waste going to Otter Lake, and therefore would not be opposed to the export of waste to another landfill. However, we did also indicate that there are many people who feel strongly that flow control is important, and that Council should ensure a public hearing process where residents of the wider HRM community will have the opportunity to be heard - whether in opposition or in support of the current export by-law.

With respect to the recommendations for closure of the FEP and WSF, the Society has indicated that the community expects these facilities to continue to be operated as per the agreement between HRM and the Society. Discussion continues, but at this point the Society is encouraged that this integral part of the landfill operation will continue.

The Society believes that there is a need for further study on the technical and financial feasibility of the proposed increase in height of the landfill cells, as well as an assessment of the risk to the local community and environment. Accordingly, on July 28th the Society provided a list of potential impacts such as air, land, water, aesthetics, litter, etc., and requested that analysis be done to determine how the existing level of protection and community impact can be maintained or exceeded if the landfill height is increased. HRM staff agreed to have such a study done by an independent engineering consultant, and have accepted all of the recommendations made by the Society for the terms of reference of the study. It is expected that the findings on the concept feasibility regarding the proposed cell height increase will be made available to the Society for its evaluation by late September.

With respect to the waste campus model, it is the position of the Society that there needs to be clarity in order for the community, and Council, to consider the recommendation. Accordingly, discussions have included a process whereby any potential operations to be added to the existing facility would be subject to discussion with the community through the Halifax Waste-Resource Society, as per the existing agreement between HRM and the Society. Nonetheless, the Society has indicated that it is specifically opposed to outdoor windrow composting/curing because of concern of potential odours.

It has also been clearly articulated to HRM that the Society and the local affected community are justifiably concerned that extended height of existing cells and the establishment of a "waste management campus" could lead to the life of the cells being extended; it would encourage a request from HRM to the Province for an extension of the landfill's expected life operating term ending in 2023. The Society has stated, on behalf of the affected surrounding community, that the answer to an extension of the landfill operation at this time is No, and that HRM should restore confidence with the community before revisiting the question.

Next Steps

It is expected that the next meeting with HRM will be shortly after the technical analysis by both parties of the above referenced study . With the benefit of that information, the discussions can be more informed. Staff has been directed to report back to Council on these discussions by November 1st.

No Negotiation

The Society reiterates that it is not negotiating on any of the proposed changes to Otter Lake. Rather, we believe it is our responsibility on behalf of the public across HRM and the impacted community in particular, to accommodate requested operational changes that will not negatively change the present level of environmental protection to nearby residents, including any potential elevation of odour and litter outcomes.

Submitted by the Halifax Waste-Resource Society

Notes of Solid Waste Working Committee – Meeting #1
July 28 2014, 1-3 PM, Lakeside Community Centre

Attendees:

John Traves, Mike Labrecque, Gord Helm, Ken Meech, Reg Rankin, Steve Adams, Andrew Giles, Ken Donnelly

=========

*****Notes on our position on issues*****

1.BOD HAS APPOINTED THE FOLLOWING 6 MEMBERS AS OUR WORKING COMMITTEE FOR THE JOINT DISCUSSIONS
Ø JACK MITCHELL
Ø ANDREW GILES
Ø COUN.ADAMS
Ø COUN.RANKIN
Ø KEN DONNELLY –CONSULTANT
Ø KEN MEECH –EX.DIRECTOR

2.OUR APPROACH RE :STANDARDS/OUTCOMES FOR ANY CHANGES CONSISTENT WITH THE FORMAT OF THE DOE PERMIT

3. COMMUNICATION WITH MINISTER OF ENVIRONMENT –SHARE LETTER

4.VERTICAL EXPANSION TO THE EXISTING AND NEW CELLS –TABLE OUR MINIMUM INFORMATION /SPECS FOR TERMS OF REFERENCE WITH CONSULTANT
A. EXPECTATION THAT THE INITIAL DRAFT OF THE CONSULTANT REPORT WILL BE SHARED AND DISCUSSED WITH THIS GROUP

5.FEP/WSF –OUR POSITION INCLUDES THE RETENTION OF THESE FACILITIES .

6.EXPORT OF WASTE NO OBJECTION WITH ABILITY TO EXAMINE THE DETAIL OF THIS PROPOSAL .
A. WE ASSUME HRM COUNCIL WILL CONDUCT A PUBLIC HEARING ON POTENTIAL CHANGES TO THE FLOW CONTROL BY-LAW

7.CAMPUS PROPOSAL –RECOMMEND THAT HRM STAFF PROVIDE DETAIL OF THE PROPOSAL FOR OUR REVIEW AND RESPONSE .

8.EXTEND OPERATIONS BEYOND 2024 .DISCUSS

9.COMMUNICATIONS –OUR OBJECTIVE IS TO BE OPEN AND TRANSPARENT WITH THE EXPECTATION THAT INFORMATION SESSIONS WILL BE NEEDED IN THE COMMUNITY

TO PROVIDE UPDATES AND FACTS ON ANY PROPOSED CHANGES .

UTLIIZATION OF THE WEBSITE/FACEBOOK PAGE /SOCIAL MEDIA TO ENSURE NO SURPRISES .ETC.

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1. Ken Meech had provided letter to Minister to HRM for their information. John Traves commented that he thought the letter was premature as there had been no request from HRM for an amendment to the current operating permit at Otter Lake.

2. Ken Meech had previously provided to HRM the document that outlined elements of the technical considerations with respect to any potential change in the cell elevations at Otter Lake. It was clarified that the purpose was to ensure that there were no negative changes to the current level of protection, nor to impacts on the community, than there was with the current operations. As such, the document focused on minimal requirements and outcomes. Accordingly, the CMC representatives said that they believed the elements in the document should help inform the Terms of Reference for technical work done by HRM's consultants.

3. HRM took the document under advisement, and indicated that they were looking to hire an engineering consultant to examine the technical requirements for increased height. After discussion on whether the engineering consultant would be managed by the steering group or by HRM, HRM stated that they would manage the consultant contract but agreed that the consultant would report its draft findings to the entire working grou

4. HWRS representatives indicated that the position of the COMMUNITY is that the FEP/WSF must remain open. HRM staff did not state a position, but seemed to leave the door open for them to remain operational.

5. HWRS representatives stated that they do not have an objection to the export of waste, as it is expected that the community would want to see less waste rather than more going to Otter Lake. However, it was made clear that the position was not universally held by all members of the Society. It was noted though that a change to the by-law would require a public hearing, and that would provide an opportunity for the public, including members of the Society, to raise concerns about the proposed export.

   HWRS representatives pointed out that they were concerned that HRM might, at a later date, try to justify the closure of the FEP/WSF based on increased cost per ton calculations. They said that would not be acceptable.

6. Discussion about the campus concept followed. HWRS members said that they, and the community, wanted to know what was envisioned on a campus. Gord Helm listed several possibilities, including a new MRF, anaerobic composting, an incinerator and a proposed facility that would create energy-from-waste pellets. However no decision had been made yet about what would be located there. HWRS members expressed concern about the wide-open nature of the request to Council for establishment of a campus concept, and that increased facilities at the campus would lead to a much longer life-span for the RDF, and increased potential for impacts of the local affected community.

   HRM agreed to look more closely at what a waste management campus would likely contain and get back to the working group.

7. While it was acknowledged that there is nothing in written documents that says that the landfill must close by 2023, it was noted that the contract for operation is a 25 year contract, and that at the time of the establishment of the landfill, it was always described as a 25 year landfill. It was noted to HRM staff that any change they might be considering in changing the operating life of the landfill must acknowledge that the local community was told it would be operational until 2023.

   Further discussion pointed out that the local community has lost trust in HRM, and the wholesale changes recommended in the Stantec report and then in the staff recommendations to Council has galvanized local opposition to changes in a way that would not have happened had a more consultative approach with partners been taken.

   It was also pointed out that the Minister of the Environment has stated that changes at Otter Lake would not be permitted without the consent of the local community. The Society has a role to play in representing the community, and the current recommendations and lack of trust make it very difficult to have consent to changes at the facility.

8. HWRS stated that they had a need to communicate with the local community and the Society members about this process. It was agreed that a draft notice would be circulated for review before posting on social media sites.

Ken Meech

HWRS POSITIONS ON SOLID WASTE DISCUSSIONS-JOINT SESSION MONDAY JULY 28

1.BOD HAS APPOINTED THE FOLLOWING 6 MEMBERS AS OUR WORKING COMMITTEE FOR THE JOINT DISCUSSIONS

- JACK MITCHELL
- ANDREW GILES
- COUN.ADAMS
- COUN.RANKIN
- KEN DONNELLY –CONSULTANT
- KEN MEECH –EX.DIRECTOR

2.OUR APPROACH RE :STANDARDS/OUTCOMES FOR ANY CHANGES CONSISTENT WITH THE FORMAT OF THE DOE PERMIT

3. COMMUNICATION WITH MINISTER OF ENVIRONMENT –SHARE LETTER

4.VERTICAL EXPANSION TO THE EXISTING AND NEW CELLS –TABLE OUR MINIMUM INFORMATION /SPECS FOR TERMS OF REFERENCE WITH CONSULTANT

A. EXPECTATION THAT THE INITIAL DRAFT OF THE CONSULTANT REPORT WILL BE SHARED AND DISCUSSED WITH THIS GROUP

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7.CAMPUS PROPOSAL –RECOMMEND THAT HRM STAFF PROVIDE DETAIL OF THE PROPOSAL FOR OUR REVIEW AND RESPONSE .

8.EXTEND OPERATIONS BEYOND 2024 .DISCUSS

9. Communications

Halifax Waste-Resource Society
P.O. Box 213
Lakeside, NS
B3T 1M6

July 15, 2014

Honourable Randy Delorey
Minister of the Environment
Nova Scotia Environment
PO Box 442
Halifax, NS B3J 2P8

Dear Minister Delorey,

Re: HRM Solid Waste/Resource Strategy Review

The Halifax Waste-Resource Society is commencing discussions with HRM staff to review and examine items #7, 8,and 9 in the staff report dated January 14, 2014, which is attached.

The Society Board of Directors has appointed a smaller working committee to conduct the discussions and to report back to the full Board of Directors and the host community as necessary.

In the spirit of collaboration we welcome an opportunity to meet with senior officials in your Department to discuss the process.

Our purpose is to seek their advice as to how the Society can best provide assurances on the environmental/nuisance safeguards to the community; that is that the facility will continue to function at the same standard or better as now exists. Halifax Regional Municipality Council also shares this objective so we are seeking your input/advice on how this can be accomplished.

As you know the existing permit from the DOE documents the requirements for HRM, which becomes the operating requirements and standards for the facility. The permit also acknowledges the existence and role of the Community Monitoring Committee.

We do expect that the issue of increased height to existing and/or future cells will be an issue for the community unless HRM can demonstrate with solid engineering data that this can be accomplished without compromising the slopes or the leachate collection system, or fostering nuisance effects to the local community.

Also it is our understanding that HRM will be required to obtain DOE approval for the changes so we would want to discuss the process and assurances that will be required.

Another large issue is the extension of the life of the landfill beyond 2024, which is sensitive in the community with or without guarantees on the operating performance and standards. For example, does the request to extend the landfill beyond 2024 require an environmental hearing prior to any approval by DOE?
In closing we ask for your support in organizing the requested meeting to review this critical issue to the host community.

Halifax Waste-Resource Society
P.O. Box 213
Lakeside, NS
B3T 1M6

Given the aforementioned we ask that your senior officials meet with our representatives to allow us to better understand the regulatory environment around the staff recommendations for changes at the landfill facility.

Yours sincerely,

[redacted]

Jack Mitchell,
Chair, HWRS

Cc:
Patricia Arab, MLA, Fairview-Clayton Park

Ben Jessome, MLA, Hammonds Plains-Lucasville

Iain Rankin, MLA, Timberlea-Prospect

Honourable Deputy Premier Diana Whalen, MLA, Clayton Park West

Otter Lake - Residuals Disposal Facility – Vertical Expansion

With regard to the proposed vertical expansion and the site's current Provincial Approval to Operate, the following two clauses are highlighted:

> *3.p) Pursuant to Section 60 of the Act, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.*
>
> *3.t) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the active area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change.*

The Approval to Operate regulates a number of practices and emissions including the following, all of which will need to be dealt with by any change in the RDF cells;

- Air Emissions
- Sound Levels
- Liquid Effluent (Leachate)
- Vector / Litter Control
- Spills or Releases
- Erosion and Sediment Control
- Surface Water Discharge
- Groundwater

Topics Needing Review and Assessment Prior to Detailed Design

1) **Landfill Cell Development Scope & Sequencing**

- What is the most satisfactory height increase and based on what rationale (e.g., is it 15 m versus 10 m, 20 m or some other value?).
- Based on the selected height increase, confirmation of the required fill/long term construction sequence that best deals with vehicle access for waste placement, the original cover and gas collection system, and final cap installation. This evaluation must include selection of a preferred start point (ex., Cell 1 or Cell 6) of the vertical expansion effort.
- [redacted] closing date and overall fill capacity for the RDF.

2) **Landfill Stability**

- Confirmation that establishing new disposal areas on top of previously completed portions of the landfill will not create issues related to potential sinking of the present ground level of the closed cells and/or side slope failure.

3) **Area View Planes**

- With reference to Dillon's September 2012 conclusion that the top of Cell 5 was visible to area residents, completion of a view plane study to determine the visibility of the RDF during/following vertical expansion including consideration of ongoing/planned area developments.

4) **Odour Management**

- Confirmation of potential odour impacts and approaches for lessoning the potential impact of; a) the removal of the cap system from previously completed cells, and b) excavation/inspection and potential upgrade of the original leachate collection system.
- Identification of a preferred daily/interim cover material to enhance to the control of landfill gas and odours.
- The evaluation of potential odour impacts associated with vertical expansion must acknowledge stipulations included in Section 10 (Air Emissions) of site's Approval to Operate.

5) **Landfill Gas Management**

- Evaluation of landfill gas management needs for the new vertical expansion areas, including connection existing site systems and the potential requirement for new collection and flaring infrastructure.
- Evaluation of potential impacts to surface/sub-surface gas system infrastructure in the closed cells, including buried collection piping.

6) **Leachate Management**

- Confirmation that leachate from the new vertical expansion areas will move down through the closed disposal cells and to the original collection system without flow barriers (including soil cover in Cell 1); blockages; or exceedance of the 300 mm head limit on the RDF liner system.
- Inspection of original cell leachate collection sumps to assess their capability to manage increased quantities of leachate from the new vertical expansion areas. Due to bio-fouling (i.e., material deposits) and design improvements carried out over the years, it is anticipated that some sumps and pumping systems will require excavation and replacement.
- Inspection and possible upgrading of the leachate transmission piping outside of the cells to assess the capability to manage increased quantities of leachate.

7) **Surface Water Management**

- Determining drainage features (including terracing) necessary to accommodate runoff volumes and velocities down extended landfill side slopes.
- Confirmation of upgrade requirements to surface water management infrastructure (e.g., ditching, culverts and ponds) to manage runoff from new vertical expansion areas.

8) **Litter Management**

- Assessment of the adequacy of existing litter management procedures due to the increased elevation/exposure of the working disposal face.

HALIFAX
REGIONAL MUNICIPALITY

Legal Services

3rd Floor, 5251 Duke Street
P.O. Box 1749
Halifax, Nova Scotia B3J 3A5

Tel: (902) 490-4226
Fax: (902) 490-4232
Website: www.halifax.ca

January 13, 2014

Via e-mail: jmerrick@mjswm.com
John Merrick, Q.C.
Merrick Jamieson Sterns Washington & Mahody
5475 Spring Garden Road
Suite 503
Halifax, NS B3J 3T2

Dear Mr. Merrick:

RE: Otter Lake Landfill
Your File: 25623; Our File 14392

I acknowledge receipt of your letter of January 10, 2014.

Please be assured that HRM Council will be provided with a copy of your letter in advance of the scheduled discussion at Halifax Regional Council's Committee of the Whole meeting of January 14, 2014.

While the issues you have raised are matters for Council's consideration, there are two points I feel I should address in respect to your comments regarding the Staff recommendation in respect of increasing the vertical height of the Residual Disposal Cells. First, I am advised by Staff that the recommendation does not appear to require a change in the Technical Specifications you have cited in your letter and therefore would not trigger s. 6.05 of the Community Monitoring Agreement. I would be happy to review any of the Technical Specifications your client feels are impacted although I realize this might be premature in advance of a decision from Council and any determination on implementation, if required.

Secondly, I wish to point out that HRM's intentions with respect to any changes to the Integrated Solid-Waste Strategy and System will be decided by Council rather than Staff. I anticipate that any decision by Council in respect of this matter will need to be reviewed in light of both the CMC Agreement and the operating agreement. However, should Council accept Staff's recommendation, this will not entitle your client to notice or an opportunity to address Council as you assert. Section 6.05 deals with notice to the Chair of the Community Monitoring Committee ("CMC") rather than the Halifax Waste/Resource Society. I note that the CMC was provided an opportunity to address Council on June 18, 2013 on the issues of increasing cell height, removing FEP/WSF and the campus proposal and indicated to Council at that time that it had elected not to address the issue of increasing cell height.

I trust this is of some assistance to you and provides some clarity as to our position regarding Council's process. Should you have any questions or wish to discuss this further please feel free to give me a call, I can be reached at 490-4226.

Yours very truly,

HALIFAX REGIONAL MUNICIPALITY



John Traves, Q.C.
Director
Legal, Insurance and Risk Management Services
e-mail: travesj@halifax.ca

JT/kam

MERRICK
JAMIESON
STERNS
WASHINGTON
& MAHODY
BARRISTERS

TRUSTED COUNSEL. SKILLED ADVOCATES.

January 10, 2014

VIA EMAIL
25623

John W. Traves, Q.C.
Legal Services
Halifax Regional Municipality
Duke Tower, Scotia Square, 3rd Floor
P. O. Box 1749
Halifax NS B3J 3A5

Dear Mr. Traves:

Re: Otter Lake Landfill

We have been retained by the Halifax Waste/Resource Society in relation to the Halifax Regional Municipality's stated review of the Otter Lake landfill. We are aware of the public release of the Stantec Consulting Limited's Waste Resource Strategy Update Report, which proposes significant changes to the facilities at the landfill. Specifically, the proposed changes that have been discussed before the HRM council relate to the closure of the Front-End Waste Processing Facility ("FEP") and Waste Stabilization Facility ("WSF") that are operated at the site. The closure of these two facilities would be contrary to the Agreement for community monitoring of solid waste facilities between HRM and the Halifax Waste/Resource Society.

The Community Monitoring Agreement between HRM and the Halifax Waste/Resource Society is binding on both parties, and remains in effect for the duration of the operation of the facilities at the site. Section 2.03 addresses the type of waste allowed in the cells at the site:

> 2.03 It is understood and agreed that only **Acceptable Waste** will be authorized for disposal in the Residual Disposal Cells. It is further understood and agreed that any contract between HRM and an Operator of the RDF Facilities will impose on the Operator the obligation not to dispose of in the Residual Disposal Cells material other than **Acceptable Waste**. (Emphasis added.)

Acceptable waste is defined throughout the Agreement to include Inert Materials, Stable Materials and Residual Materials. These definitions expressly or impliedly exclude readily putrescible elements. The purpose of the FEP/WSF facilities is to remove readily putrescible

materials from the waste before it is placed in Residual Disposal Cells. Without the FEP/WSF Facilities, readily putrescible elements would be disposed of at the site. As that is not Acceptable Waste, it is therefore unauthorized by the contract with the Halifax Waste/Resource Society for disposal in the cells at the site. By closing these facilities and allowing readily putrescible elements to be disposed of in the Residual Disposal Cells, HRM would be in breach of its Agreement with the Halifax Waste/Resource Society.

Furthermore, HRM does not have the requisite permit from the Department of Environment ("DOE") to close the FEP/WSF. The Approval provided from the DOE was granted for the following activity:

> Operation of a municipal solid waste landfill including the Front End Processing (FEP), the Waste Stabilization Facility (WSF) and the Residuals Disposal Facility (RDF) at or near 600 Otter Lake Drive, Halifax Regional Municipality, in the Province of Nova Scotia.

The Approval states in para. 3.b) that the Facility (ie. the FEP/WSF and RDF facilities) must be operated in accordance with the Operations Plan for the FEP and the WSF, and the Operations Plan for the RDF, among other documents. Para. 3.d) states that any changes in the Operations Plans must be authorized in writing, by the DOE. As per para. 3.t), an amendment to the Approval is required before any change to the Facility can be implemented, and 4.c)(i) specifically requires written authorization from the DOE to modify the processing of solid waste from the FEP to an alternate process.

In reviewing the Agreement, it is clear that the parties entered into it in good faith that each would fulfill their obligations and work together for the benefit of the residents of the adjacent communities and the residents of HRM in general. The preface of the Agreement states:

> HRM has, pursuant to HRM's integrated solid waste resource management strategy, designated a site near Goodwood, Halifax County, as the site for a residuals disposal facility and waste processing facility.
>
> HRM is committed to ensuring that operations at these facilities will be monitored by residents of the communities which are adjacent to the facilities, and by residents of the Regional Municipality at large.
>
> The Society has been formed by residents of the adjacent communities and of the Regional Municipality for the purpose of working together with HRM in the establishment and implementation of a monitoring process and of facilitating the participation of residents in that process.
>
> HRM and the Society wish to enter into an agreement, on the terms set out below, establishing a structure and procedures for the monitoring of operations at the facilities.

> **NOW THEREFORE** this Agreement witnesses that for and in consideration of the mutual covenants hereinafter set out, and other good and valuable consideration, the parties agree as follows…

There are also several stipulations in Article 6.04 regarding the good faith of the parties are set out for compliance testing, results monitoring, procedures for conducting inspections and measuring the composition of waste, the cleanliness of vehicles hauling waste to the site, and reclamation and restoration of the site after closure. Considering the actions taken by HRM to date, we question whether HRM has done so in good faith of its obligations under this contract.

We further note that in the Item No. 3 - Committee of the Whole - January 14, 2014, regarding Integrated Solid-Waste Resource Management Strategy Review – Final Report, dated January 8, 2014, the ninth recommendation is, inter alia, that staff be directed to increase the vertical height of the existing and future cells by 15 metres. In the Agreement, s. 6.05 states the following:

> 6.05 **If HRM proposes to have any Residuals Disposal Cell constructed according to specifications ("proposed specifications") which are different than those contained in the document** entitled "Halifax Regional Municipality Residuals Disposal Facility – Technical Specifications Site A January, 1997" prepared for Mirror NS by Porter Dillon Limited as updated and supplemented from time to time then, notwithstanding that such proposed specifications may be acceptable to the Nova Scotia Department of the Environment, **HRM shall notify the Chair of the Committee of HRM's intention to construct a Residual Disposal Cell according to such proposed specifications and if, within fifteen (15) days thereafter, the clerk of HRM receives notice from the Committee that its Chair wishes to address Council concerning the proposed specifications, the Chair**, or another representative of the Committee, **shall be provided with an opportunity to appear before Council to comment on the proposed specifications.** (Emphasis added.)

As such, the Halifax Waste/Resource Society is entitled to be part of the debate of this issue and the notice period must be complied with as per the Agreement.

We therefore ask that HRM stand by the commitments it has made to the adjacent communities of the Otter Lake landfill, and that the proposed changes to the landfill be withdrawn. If HRM breaches this agreement, we will seek instructions to pursue a declaration confirming same from the Court.

Yours truly,

[redacted]

John Merrick
Direct: (902) 429-3178
jmerrick@mjswm.com

JM:jef
203209

HALIFAX

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 3
Committee of the Whole
December 9, 2014

TO: Mayor Savage and Members of Halifax Regional Council

SUBMITTED BY: Original signed by

Richard Butts, Chief Administrative Officer

Original Signed by

Mike Labrecque, Deputy Chief Administrative Officer

DATE: November 24, 2014

SUBJECT: Integrated Solid Waste Resource Management Strategy Review – Consultations with Halifax Waste Resource Society Board of Directors with respect to Recommendations #7, 8 and 9.

SUPPLEMENTARY REPORT

ORIGIN

Regional Council directed staff to conduct a review to assess Integrated Solid Waste Resource Management Strategy (the "Review") to enhance system, environmental and fiscal performance.

The Review resulted in a Final Report dated January 8, 2014 (the "Report") which was presented to Committee of the Whole and Regional Council on January 14, 2014. Committee of the Whole approved recommendations 1 through 6 contained in the Report and deferred items 7 through 9 to a future Committee of the Whole Meeting. Committee of the Whole met on June 24, 2014 to consider the deferred items. The following motion was put and passed with respect to each of the recommendations #7, 8 and 9:

> (a) Defer consideration of recommendation number [7, 8 & 9] from the January 8, 2014 staff report; and
>
> (b) Direct staff to meet and consult further with the Halifax Waste Resource Society Board of Directors on the technical issues and/or impacts and report back to Committee of the Whole by November 1, 2014 with a summary of recommendations from the Society and recommended changes to staff's report and recommendations, if any. Should the local Councillors not currently belong to the Board of Directors of the Halifax Waste Resource Society, the Councillors for Districts 11 and 12 be included in the consultation if they so choose.

At its meeting of October 7, 2014, Regional Council directed that the timeframe for staff to report back to Committee of the Whole be extended to December 9, 2014.

LEGISLATIVE AUTHORITY

Halifax Regional Municipality Charter, Part XIII, Solid Waste Resource Management

RECOMMENDATION

In respect of the deferred motions regarding recommendations 7, 8 &9 it is recommended that Committee of the Whole recommend to Halifax Regional Council that:

1. The motion with respect to recommendation #9 be amended to read as follows:

   Direct staff to defer any action with respect to the siting of a new landfill site in order to assess the implications of system changes currently being implemented and direct staff to increase the vertical height of existing and future cells in accordance with the approach as set out in the report of Conestoga – Rovers & Associates dated October 8, 2014, subject to maintaining the visible isolation of the cells as outlined by the SNC Lavalin Environment balloon study findings with notice to the Chair of the Community Monitoring Committee in accordance with Section 6.05 of the Agreement for Community Monitoring of Solid Waste Facilities dated February 16, 1999 once an updated design and operations plan has been prepared.

2. Further, that the motion with respect to recommendation #8 be amended to read as follows:

   Direct staff to take the necessary steps to maintain the current operating model, including front end processor facility, waste stabilization facility and residual disposal facility other than as directed by Regional Council as a consequence of decisions arising out of the ISWMS Review – Final Report dated January 8, 2014 at the Otter Lake Landfill site. Further, to assess the effects of the system changes currently being implemented, returning to Regional Council, with input from the Community Monitoring Committee, no earlier than March, 2019 with a report and recommendation respecting the effectiveness of the front end processor facility and waste stabilization facilities based on system and other changes since conception including diversion outcomes resulting from the changes currently being implemented;

BACKGROUND

Committee of the Whole deferred deliberation on the following recommendations pending further meetings and discussions with the Halifax Waste Society Board of Directors:

Deferred Item #7

> Amend By-law S-600 to allow for the export of ICI Residual Waste (garbage) outside HRM and amend Administration Order No. 16 to provide for an increase in fees for disposal of ICI Residual Waste from $125 per tonne to the assessed system cost of $170 per tonne.

Deferred Item #8

> Direct staff to initiate consultation with Mirror Nova Scotia and the Community Monitoring Committee on options for changes in the operating model (front end processor facility, waste stabilization facility, residual disposal facility) at Otter Lake Landfill Site A, returning to Council with a transition plan for landfill operations at the site based on diversion outcomes resulting from the changes outlined in this report.

Deferred Item #9

> Extend operations at Otter Lake beyond 2024 and direct staff to increase the vertical height of existing and future cells by 15m and establish an Integrated Solid Waste Management Campus at the site to support new facilities and alternative technologies as they become viable.

EXECUTIVE SUMMARY

This report and recommendations augments the work done by staff of HRM with respect to the ISWMS system review and provides Committee of the Whole with a recommendations for amendments to deferred recommendations #7, 8 and 9 arising out of (and based on) recommendations resulting from the consultations undertaken with the Halifax Waste Resource Society Board of Directors' representatives on the technical issues and/or impacts arising as a result of recommendations #7, 8 and 9.

Senior staff of the municipality met with a working committee appointed by the Board of Directors of the Society over the past five months. The meetings were co-chaired by Ken Meech, Executive Director of the Society and John Traves, Q.C. Also in attendance have been Councillors Rankin and Adams as members of the CMC working committee as well as Richard Butts, CAO. The discussions have been productive, frank and open.

The working committee has been provided with an opportunity to review a draft of this report and recommendation and the opportunity to have input. The Society has now had an opportunity to meet and its comments are attached as Attachment #1 to this report. Where the working committee and staff have been unable to agree on matters, their position has been noted in this report.

With respect to deferred items #7, 8 and 9, the consultations have primarily focused on the technical feasibility of increasing the vertical height of the existing and future cells. Specifically concerns with respect to environmental impacts off-site and in particular, with respect to odor and/or leachate have been discussed.

The Society's position with respect to the front end processor and waste stabilization facility, was clear from the outset and has not changed – at this point in time the retention of these facilities, notwithstanding the findings of the ISWMS system review and the costs associated with these facilities is a priority for the Society and the community as a whole. The Society does not object to the export of waste as per recommendation #7, subject to certain expectations as are dealt with below.

The proposal to establish an Integrated Solid Waste Management Campus at the site is premature in the Society's view in the absence of specific proposal(s). The Society has however indicated it is not opposed to HRM considering new facilities and alternative technologies being established at the site, subject to its continued right under the Agreement for a Community Monitoring of Solid Waste Facilities for input with respect to any proposed changes to the specifications for the facility and continued right of monitoring the operations of the facilities.

It is recognized that should Council proceed with the recommendations (whether amended or not) there will be an impact on the expected lifespan of the residual disposal facility. In the circumstances it is premature to begin the siting of a new facility.

The Society has advised, as per attachment #1, that in respect to the recommendations contained in this supplementary report: "The society has reviewed the recommendations from staff and has no objection to the proposal subject to our comments, conditions and ongoing participation by CMC in the process."

DISCUSSION

Deferred Item #7

> **Amend By-law S-600 to allow for the export of ICI Residual Waste (garbage) outside HRM and amend Administration Order No. 16 to provide for an increase in fees for disposal of ICI Residual Waste from $125 per tonne to the assessed system cost of $170 per tonne.**

There are no technical issues identified with respect to recommendation #7. The reduction in the amount of ICI Residual Waste (garbage) received at Otter Lake would, in fact, have a positive impact in terms of reducing the amount of waste handled at Otter Lake and the cost to the system which is currently not being fully recovered.

Although outside the scope of its mandate, the Society has indicated an assumption that Halifax Regional Council would conduct a public hearing on the amendment to By-law S-600. It is recognized that such a decision is within the sole discretion of Regional Council.

Having regard to the Society's position and the discussions on this item, staff is not recommending any changes to recommendation #7.

Deferred Item #9

> **Extend operations at Otter Lake beyond 2024 and direct staff to increase the vertical height of existing and future cells by 15m and establish an Integrated Solid Waste Management Campus at the site to support new facilities and alternative technologies as they become viable.**

i) Vertical Expansion

The Society indicated at the outset of discussions a desire to be satisfied with respect to the technical feasibility of any vertical expansion. As a consequence, the parties determined early in their discussions that an independent, high level review of the proposed vertical expansion was needed to satisfy these concerns. Conestoga-Rovers & Associates (CRA) was retained by HRM to conduct this work. CRA's report and supporting presentation to the group are consistent with the conclusions as set out in the Stantec report and SNC Lavalin peer review and are attached as Attachment #2 to this report and recommendation. CRA`s conclusions, in summary, are as follows:

1. They found no technical reason to not consider vertical expansion;
2. The proposed overall height and depth of the landfill is within the range of other North American landfills;
3. Vertical expansion can be implemented while maintaining or enhancing all environmental protection and control measures (e.g., esthetics, odour, ground water);
4. Vertically expanding cells 1-5 represents $68M to $85M of capital costs savings versus the development of new cells.

The Society was provided an opportunity to review both the Terms of Reference for CRA and their report. They were further provided an opportunity to meet with CRA to review CRA`s conclusions and satisfy themselves with respect to the work undertaken.

It is recognized that while technically feasible, should Council direct staff to increase the vertical height as recommended, that the Community Monitoring Committee would continue to have a role with respect to implementation. An updated design and operations plan will be required from the Operator and would need to address such items as cell design and sequencing, slope stability, and landfill gas (LFG)

management. CRA has recommended that in order to reduce exposure to more recently placed waste (ie to minimize odors) and to minimize differential settlement that the vertical expansion be started in the oldest cells (i.e. number 1 and 2) first. Proceeding with the implementation will result in changes to the technical specifications for the site and it is recognized that as a consequence of the Agreement for Community Monitoring of Solid Waste Facilities the Community Monitoring Committee will have an opportunity for review and input on any new technical specifications.

The operator (Mirror Nova Scotia) has been provided an opportunity to review all reports and has not raised any concerns with the technical feasibility of the vertical expansion as proposed by CRA that would prevent them from preparing an updated design and operations plan needed for implementation or otherwise.

Vertical expansion, as proposed by CRA, has the advantage of progressing in stages such that portions of the residual disposal facility are re-opened progressively starting with only a portion of the oldest cells for the rationale set out above and thereby minimizing the risk of adverse impacts from the operations. This provides further protections to help ensure the operator proceeds in accordance with the updated design and operations plan and all DOE permitting thereby helping with the goal of maintaining or enhancing all environmental protection and control.

ii) Extension of Operations at Otter Lake beyond 2024

At this point in time, the pre-conditions which would require HRM to permanently close the facilities have not occurred and any decisions with respect to the siting of a new landfill are therefore premature.

Due to the success of diversion programs and other changes to the operating model including those resulting from the most recent strategy review, the Otter Lake facility will not reach capacity as a landfill by 2024. As a result of discussions with the Society, staff and the Society have reviewed this matter and despite the expectations that some people have in the community to the contrary, have been unable to locate any authority for the proposition that the Otter Lake facility operations end in 2024.

As set out in the Report, the Mirror Agreement at Section 24.2 only requires HRM to permanently close the facilities at the end of the operating term: a) if it elects to do so, or b) if the facilities have reached capacity and no additional permits can be obtained to permit further waste to be disposed of at the site. It is not now anticipated that the facility would reach capacity or that additional permits could not be obtained until sometime after 2024.

As a consequence, staff concurs with the Society's view that discussions with respect to the closure of Otter Lake landfill are premature.

iii) Integrated Solid Waste Management Campus

The proposal to establish an Integrated Solid Waste Management Campus at the site is premature in the Society's view in the absence of specific proposal(s). The Society has however indicated it is not opposed to HRM considering new facilities and alternative technologies being established at the site, subject to its continued right under the Agreement for a Community Monitoring of Solid Waste Facilities for input with respect to any proposed changes to the specifications for the facility and continued right of monitoring the operations of the facilities. Currently there are no proposed new facilities or alternative technologies under active consideration. As a consequence of the discussions to date, staff are satisfied that any proposed future changes can be addressed in the context of the existing CMC agreement.

Deferred Item #8

> **Direct staff to initiate consultation with Mirror Nova Scotia and the Community Monitoring Committee on options for changes in the operating model (front end processor facility, waste stabilization facility, residual disposal facility) at Otter Lake Landfill Site A, returning to Council with a transition plan for landfill operations at the site based on diversion outcomes resulting from the changes outlined in this report.**

HRM, the Society and the local community are all too well aware of the failures of the Sackville Landfill. The failures at the Sackville Landfill and the decision in 1999 to locate the successor landfill at Otter Lake led to the formation of the Society and HRM's commitment to ensure that operations at the facilities would be monitored by residents of the communities adjacent to Otter Lake as well as by residents of the Regional Municipality at large. Staff recognizes that it is against this backdrop that the current operating model was developed. Notwithstanding the findings of the Review, the community is not yet satisfied that changes in the operating model, diversion outcomes and other changes resulting from amendments to the ISWMS result or will result in the materials disposed of in the residual disposal facility being substantially free of readily putrescible elements.

In consideration of the experience at Otter Lake to date and recognizing that there will be impacts to the operations due to the implementation of the recommended changes as set out in the ISWMS - Final Report (as amended), staff is recommending that recommendation #8 be amended as set out above and that measures be implemented to measure the amount of readily putrescible elements being received at Otter Lake prior to bio-stabilization.

iv Role Clarity and Future Opportunities for Improved Relation

Despite best efforts by all parties, there remains a need for greater role clarity with respect to CMC, HRM and the Operator. The consultations with the Society have resulted in a much better appreciation by staff of the role of CMC under the terms of the Community Monitoring Agreement. Further, these discussions have resulted in the recognition of the need for HRM to take a more active role itself in monitoring the operations and activities at Otter Lake. This has resulted in a decision to hire an owner's engineer with the anticipation that the owner's engineer will be able to ensure HRM's responsibilities are met and that the Society's and HRM's expectations with respect to the operator continue to result in operations that achieve the highest environmental outcomes for the protection of HRM and the community.

FINANCIAL IMPLICATIONS

As set out in the discussion section above, CRA has provided additional confirmation that vertically expanding cells 1-5 represents $68M to $85M of capital costs savings versus the development of new cells. Some of the savings will be immediate. Since cell development is funded over multiple fiscal years there is an estimated $19 million within the Solid Waste Reserve Q123 for fiscal yearend 2014/15. An additional $6 million contribution for cell development is planned for 2015/16. Some portion of this $25 million in projected savings will be required to offset implementation costs.

COMMUNITY ENGAGEMENT

See the Report.

ENVIRONMENTAL IMPLICATIONS

See the Report.

ALTERNATIVES

1. Committee of the Whole could recommend that Regional Council proceed with the deferred recommendations without amendment (either in part or in whole). The proposed amendments to recommendations 8 and 9 reflect a more cautious and staged implementation of changes at Otter Lake although at some cost to HRM. This approach is no longer recommended based on the reasons as set out in this report.

2. Committee of the Whole could recommend to Regional Council not to pass recommendations #7, 8 or 9 in part or in whole. This is not recommended for the reasons set out in the Report.

ATTACHMENTS

Attachment #1 – Letter from Solid Waste Society
Attachment #2 – CRA Report - Review and Analysis of Increasing Landfill Cell Height, Otter Lake Facility
Attachment #3 – CRA Presentation

If the report is released to the public, a copy can be obtained by contacting the Office of the Municipal Clerk at 902.490.4210, or Fax 902.490.4208.

Report Prepared by: Original Signed
John Traves Q.C. Municipal Solicitor 902.490.4226

Financial Approval by:
Greg Keefe, Director of Finance & ICT/CFO, 902.490.6308

Halifax Waste-Resource Society
P.O. Box 213
Lakeside, NS
B3T 1M6

December 3, 2014

John Traves, Q.C.
Director
Legal, Insurance And Risk Management Services
Halifax Regional Municipality
PO Box 1749
Halifax, NS
B3J 3A5

Dear Mr. Traves:

Re: Solid Waste/Resource Strategy Review

Please find attached the Halifax Waste-Resource Society's position paper on the January 14, 2014 staff recommendations #7, 8 and 9 with respect to the Otter Lake landfill.

Yours sincerely,

Original Signed

Jack Mitchell,
Chair, HWRS

Cc: Ken Meech, Executive Director, HWRS

Update on Discussions with HRM on Otter Lake Recommendations

BACKGROUND AT COMMENCEMENT OF DISCUSSIONS

At the outset of these discussions, there were certain understandings and expectations held by the community, and some held by HRM.

COMMUNITY UNDERSTANDINGS/EXPECTATIONS:

A. Otter Lake Landfill Facility would close by December 31, 2023;

B. There was a predetermined outcome for the community engagement program;

C. The existing agreement between HRM and the HWRS is based on verifiable trust (confidence in commitments);

Verifiable Trust

Trust [trust] noun
1.reliance on the integrity, strength, ability, surety, etc., of a person or thing; confidence.

D. There is a need for more time to monitor (c) before any willingness to support extending life of landfill; and,

E. HRM will honor the commitment by Council that the environmental and community protection standards remain the same or better.

HRM UNDERSTANDINGS/EXPECTATIONS:

A. Based on the solid waste review, there is an opportunity to reduce operational/capital costs; and,

B. There is an ability to extend the operational life of the landfill and eliminate the need to locate a new replacement facility at considerable cost ($100 million).

POSITION OF HALIFAX WASTE RESOURCE SOCIETY(HWRS)/COMMUNITY MONITORING COMMITTEE(CMC) FOR INPUT TO HRM COUNCIL

Four joint sessions were held to review and discuss recommendations 7, 8, & 9 in the STAFF REPORT dated JANUARY 14, 2014:

A. With respect to ITEM #7 regarding export the HWRS/CMC has no objection. On behalf of the interests of the wider community we suggest due process as it represents changing a principle of the Community Stakeholder Strategy, and export was not included in the waste management public consultation. Accordingly we recommend an additional public hearing to solicit and hear the views from the wider public.

B. In accordance with the CMC agreement we expect that the FEP/WSF facilities will remain in operation.

C. No detail was presented for our review on the proposed integrated waste management campus. It is not recommended that a campus be created in the absence of an opportunity for the HWRS/CMC to view detail of what may be proposed.

D. We recommend the further exploration of alternative technologies.

Based on this starting point the focus of the meetings has been to explore the implications of **vertical expansion to existing cells at the**

Residual Waste Disposal Facility (RDF).

HRM retained Conestoga-Rovers & Associates to complete a high level technical review of the proposed vertical expansion of the RDF at Otter Lake.

The report has concluded that a vertical cell expansion is **technically possible while still maintaining or enhancing environmental protection and control measures** and that it should begin with cells 1 & 2 and continue through to all existing cells.

In the view of the Society an expansion of the landfill by opening closed cells and building higher upon them presents increased environmental risks, including:

- Increased litter;
- Impacts to the Nine Mile River;
- Increased leachate generation; and,
- Potential for significant odour and noise issues.

The report concludes that **design and operational changes** will be **required** to mitigate the risks and meet the objective of vertical cell expansion. As a minimum the report determined the following should be considered in the vertical expansion design:

- Design and Sequencing
- Slope stability
- Leachate and surface water management
- Landfill system components
- Landfill Gas (LFG) management
- Visual impact

The design changes will necessitate the need to develop a **revised operational plan** covering each of these aforementioned elements.

While the report concludes that a vertical extension is technically feasible it confirms that **operational changes** may be necessary to meet environmental objectives and obligations to the community. This represents a risk that is best mitigated by ensuring that the existing operator and its consultant, who are most familiar with the landfill facility, design any required operational modifications subject to review by HRM and CMC.

As design studies and operational changes are completed, HRM should provide opportunities for the local community to view them and understand them.

One of the key issues for the Society remains the **odour standards/outcome**s. It is expected that the operational plan to be developed will address this specific issue consistent with CRA advice that the vertical extension can be implemented while maintaining or enhancing all environmental and community protection.

The society expects that vertical extension will only proceed in small incremental steps thereby providing the operator, CMC, and HRM the opportunity to bring a halt to the process if unsuccessful. Environmental outcomes will be monitored to ensure compliance.

The society has reviewed the recommendations from staff and has no objection to the proposal subject to our comments, conditions and ongoing participation by CMC in the process.

Appendix

TECHNICAL REQUIREMENTS AS DETAILED BY HWRS AT COMMENCEMENT OF DISCUSSIONS.

Otter Lake - Residuals Disposal Facility – Vertical Expansion

With regard to the proposed vertical expansion and the site's current Provincial Approval to Operate, the following two clauses are highlighted:

> *3.p) Pursuant to Section 60 of the Act, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.*
>
> *3.t) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the active area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change.*

The Approval to Operate regulates a number of practices and emissions including the following, all of which will need to be dealt with by any change in the RDF cells;

- Air Emissions
- Sound Levels
- Liquid Effluent (Leachate)
- Vector / Litter Control
- Spills or Releases
- Erosion and Sediment Control
- Surface Water Discharge
- Groundwater

Topics Needing Review and Assessment Prior to Detailed Design

1) **Landfill Cell Development Scope & Sequencing**

- What is the most satisfactory height increase and based on what rationale (e.g., is it 15 m versus 10 m, 20 m or some other value?).
- Based on the selected height increase, confirmation of the required fill/long term construction sequence that best deals with vehicle access for waste placement, the original cover and gas collection system, and final cap installation. This evaluation must include selection of a preferred start point (ex., Cell 1 or Cell 6) of the vertical expansion effort.
- [redacted] closing date and overall fill capacity for the RDF.

2) **Landfill Stability**

- Confirmation that establishing new disposal areas on top of previously completed portions of the landfill will not create issues related to potential sinking of the present ground level of the closed cells and/or side slope failure.

3) **Area View Planes**

- With reference to Dillon's September 2012 conclusion that the top of Cell 5 was visible to area residents, completion of a view plane study to determine the visibility of the RDF during/following vertical expansion including consideration of ongoing/planned area developments.

4) **Odour Management**

- Confirmation of potential odour impacts and approaches for lessoning the potential impact of; a) the removal of the cap system from previously completed cells, and b) excavation/inspection and potential upgrade of the original leachate collection system.
- Identification of a preferred daily/interim cover material to enhance to the control of landfill gas and odours.
- The evaluation of potential odour impacts associated with vertical expansion must acknowledge stipulations included in Section 10 (Air Emissions) of site's Approval to Operate.

5) **Landfill Gas Management**

- Evaluation of landfill gas management needs for the new vertical expansion areas, including connection existing site systems and the potential requirement for new collection and flaring infrastructure.
- Evaluation of potential impacts to surface/sub-surface gas system infrastructure in the closed cells, including buried collection piping.

6) **Leachate Management**

- Confirmation that leachate from the new vertical expansion areas will move down through the closed disposal cells and to the original collection system without flow barriers (including soil cover in Cell 1); blockages; or exceedance of the 300 mm head limit on the RDF liner system.
- Inspection of original cell leachate collection sumps to assess their capability to manage increased quantities of leachate from the new vertical expansion areas. Due to bio-fouling (i.e., material deposits) and design improvements carried out over the years, it is anticipated that some sumps and pumping systems will require excavation and replacement.
- Inspection and possible upgrading of the leachate transmission piping outside of the cells to assess the capability to manage increased quantities of leachate.

7) **Surface Water Management**

- Determining drainage features (including terracing) necessary to accommodate runoff volumes and velocities down extended landfill side slopes.
- Confirmation of upgrade requirements to surface water management infrastructure (e.g., ditching, culverts and ponds) to manage runoff from new vertical expansion areas.

8) **Litter Management**

- Assessment of the adequacy of existing litter management procedures due to the increased elevation/exposure of the working disposal face.

CONESTOGA-ROVERS
& ASSOCIATES

45 Akerley Boulevard
Dartmouth, Nova Scotia B3B 1J7
Telephone: (902) 468-1248 Fax: (902) 468-2207
www.CRAworld.com

October 8, 2014

Reference No. 088605

Mr. Robert Orr
Coordinator, Collection & Processing
Solid Waste Resources
Transportation & Public Works
Halifax Regional Municipality
orrr@halifax.ca

Dear Mr. Orr:

Re: Review and Analysis of Increasing Landfill Cell Height
Otter Lake Facility, Halifax Regional Municipality, Nova Scotia

Executive Summary

Conestoga-Rovers & Associates (CRA) was retained by Halifax Regional Municipality (HRM) to complete a high level technical review of the proposed vertical expansion of the Residual Disposal Facility (RDF) located at the Otter Lake Facility (Site). CRA understands that, as part of the Solid Waste Resources Strategy Review, a vertical expansion of the RDF up to a maximum increase of 15 m has been proposed for consideration by HRM.

There is no technical reason to prevent the vertical expansion of the RDF. A vertically expanded RDF will be within the range of waste depths and heights at a number of landfills across North America. To optimize the vertical expansion of the RDF, design and operational changes will be required that address such items as cell design and sequencing, slope stability, and landfill gas (LFG) management. Therefore a revised design and operations plan for the RDF vertical expansion will need to be developed.

A reasonable approach to implement vertical expansion would be to start in Cells 1 and 2, filling from northwest to southeast to final grades and then moving progressively in a southwest direction towards Cell 6. Benefits of this approach include: progressively re-opening portions of the RDF that has older waste and therefore less LFG generation and associated concerns for odours and differential settlement (due to degradation of organics); and easier transition for the Site operator given that Cells 1 and 2 are shallower cells and have a larger footprint when compared to subsequent cells.

From a cost perspective, substantial changes in operational costs are not anticipated, while significant capital costs reductions will be realized through reductions in capital savings on a capital cost per waste tonne basis. As an example, the vertical expansion capacity over Cells 1-5 is approximately 1.8 million to 2.25 million metric tonnes (MT) (based volume



CONESTOGA-ROVERS
& ASSOCIATES

October 8, 2014 Reference No. 088605

calculations completed by Dillon Consulting assuming a density range of 0.8-1.0 MT/cubic metre). This quantity of waste represents the construction of 3.6 to 4.5 new cells (assuming 500,000 MT per cell which is roughly the capacity of Cells 7-9). With the capital cost to develop each cell at roughly $19 million, a vertical expansion in Cells 1-5 represents a $68 to $85 million reduction in capital costs.

1.0 Introduction

Conestoga-Rovers & Associates (CRA) was retained by Halifax Regional Municipality (HRM) to complete a high level technical review of the proposed vertical expansion of the Residual Disposal Facility (RDF) located at the Otter Lake Facility (Site). CRA understands that, as part of the Solid Waste Resources Strategy Review, a vertical expansion of the RDF up to a maximum increase of 15 m has been proposed for consideration by HRM. The recommendations are presented and discussed in the following reports:

- Waste Resource Strategy Update (Stantec, 2013)
- A Peer Review of the January 2013 Stantec Report "Waste Resource Strategy Update" (SNC Lavalin, 2013)
- Integrated Solid-Waste Resource Management Strategy Review – Final Report (HRM, 2014)

The Stantec 2013 report concluded that:

- The main benefits for vertical expansion include increasing the RDF capacity by 4.28 million cubic metres and approximately 23-years of capacity, and reducing landfill capital cost substantially on a cost per tonne basis.
- There were no technical issues in expanding the RDF by 10-15 m.
- The vertical expansion should be subject to meaningful stakeholder consultation.

The peer review documented by SNC Lavalin concurred with Stantec's recommendation. SNC Lavalin's 2013 report also documented the findings from a visual impact assessment completed in support of the vertical expansion. The visual assessment utilized six balloons positioned at the proposed maximum elevation in the RDF; and concluded that the balloons were not visible from residential areas visited. SNC Lavalin also noted that increasing the height of the RDF could potentially increase groundwater elevations causing groundwater to come in contact with the cell liner.

Dillon Consulting (Dillon), on behalf of the Site operator Mirror Nova Scotia (Mirror NS), also completed a review of the recommendations with respect to technical, operational, and environmental challenges with vertical expansion of the RDF. Dillon's comments are presented in Memorandums dated September 2012 and May 2013; and are the subject of this review.

CRA's review provides a high level technical review and opinion on components of increasing the height of the RDF for the closed and active cells. Section 2.0 provides an overview of considerations for vertical expansion of the RDF, and Section 3.0 provides CRA's comments on the specific challenges identified by Dillon.

1.1 Background

The RDF has approval for nine cells. Cells 1 to 5 have been filled and capped, while Cell 6 is in operation. The RDF blends into the local topography with the final cover design elevation nominally at 113 m AMSL. The base of the landfill also follows the topography resulting in a depth of waste that increases as landfill development is advanced to the southwest. The final depth of refuse at the crest of the landfill ranges from 12 to 27 m based on the original design (Design Drawings Mirror NS, 1998). A 15 m vertical expansion of the RDF would increase the final cover elevation to a nominal elevation of 128 m AMSL and increase the depth of waste at the crest of the landfill to 27 to 42 m, depending on the final design contours.

2.0 Increasing Landfill Cell Height Overview

2.1 Overview

Landfill design takes into account a number of technical components including site setting (e.g., topography, site size, geologic and hydrogeologic conditions), system components (e.g., leachate, surface water, landfill gas), and operational requirements (e.g., access, waste placement, fill rate, maintenance). The optimal landfill height can be best determined with all of the above considered. The following are several examples of sites that CRA has recently been involved with that demonstrate landfill design solutions that can be applied, as needed, to the RDF to facilitate vertical expansion:

- Lloydminster Waste Disposal Facility (AB): 46 m above grade vertical expansion over existing waste for a total depth of waste of approximately 60 m. Footprint and capacity requirements permitted the use of 4:1 side slopes with terracing for slope stability, site access, and progressive capping.

- Atlantic Waste Facility (BC): 35 m above grade depth of waste. Site size required 3:1 side slopes to accommodate the volume of waste. Textured geomembrane and drainage net with side slope swales were required for slope stability and site maintenance.
- New York State Area Landfill: Approximately 30 m vertical expansion over existing waste for a total depth of waste of 85 m. Horizontal landfill gas (LFG) collection system used at site to facilitate early collection of LFG. As part of vertical expansion, depth of pipe bedding and cover used for horizontal LFG collection pipe increased to minimize the impact of differential settlement on the LFG collection system.

2.2 Vertical Expansion of the RDF

The proposed depth of waste at the RDF, including a 15 m vertical expansion, is well within the range of waste depths at a number of landfills, noting the reference sites above. However, to optimize the vertical expansion of the RDF, design and operational changes will be required. At a minimum, the following should be considered in the vertical expansion design:

- Design and sequencing
- Slope stability
- Leachate and surface water management
- Landfill system components
- LFG management
- Visual impact

2.2.1 Design and Sequencing

A design and sequencing plan needs to be developed as part of a revised operational plan for the RDF. Design considerations should include, but are not limited to:

- Sizing new cells to accommodate progressive capping thus minimizing operational concerns (e.g., leachate generation, LFG collection).
- Sizing new cells to accommodate landfill operations (e.g., haul roads, safe access and use by site personnel and other entities that require access to the active landfill area).
- Balancing capital and operational costs as well as nuisance factors (e.g., construction mobilization, use of interim cover and temporary LFG collection system, relocation of haul roads, and leachate management).

A practical approach would be to implement vertical expansion starting in Cells 1 and 2 filling from northwest to southeast to final grades and then moving progressively in a southeast

direction towards Cell 6. The width of each cell does not necessarily need to be aligned with the current cell limit but rather should be sized to suit operational considerations.

Starting in the northwest end of Cell 1 would:

- Minimize odours generated from previously placed waste: Mirror NS has reported that only small quantities of LFG are generated in older cells, therefore minimizing any potential odour issues from the previously landfilled waste as portions of the final cover are removed.
- Minimize differential settlement: A substantial amount landfill settlement occurs as a result of degradation of organics. The potential for differential settlement in the older cells would be lower given the reported low generation of LFG.
- Cells 1 and 2 are shallower cells and have a larger footprint when compared to subsequent cells, which will allow for an easier transition for the Site operator.
- Realize cost saving from use of existing haul roads and shorter haul distance.

Increasing the height of Cells 7-9 will require a review of the cell layout and modifications to optimize the footprint for each sub-cell, facilitate progressive closure, and minimize leachate generation. Cell 6, which is currently being filled, should continue to be filled and completed with an enhanced interim cover to existing design elevations prior to commencing the vertical expansion. An enhanced interim cover would consist of a minimum 0.3 m low permeable soil completed with 0.15 m vegetative cover. The interim cover would need to be graded to promote drainage and maintained until the vertical expansion progresses to Cell 6.

Existing final cover should be removed to the extent required to accommodate the active fill area. Soil material removed from the existing final cover can be reused in support of landfill operations (e.g., interim or daily cover) or as final cover. Layers stripped below the existing final cover geomembrane should only be reused under the future final cover geomembrane layer (whether to support landfill operations or to be reused in final cover construction). Salvaging of the geomembrane and geotextile materials for reuse as final cover is not practical, however it may be suitable to use the recovered material for temporary uses.

With the progressive removal of final cover, the permanent LFG system that has been installed in the existing cells could be modified[1] to allow for the continued recovery of LFG without extending the vertical LFG wells. While such an approach will reduce the ability to spatially

[1] This could be accomplished by capping the wellhead below the existing waste and by constructing a permanent connection between the wellhead and the sub-header. Control of vacuum applied at each well will be accomplished through a single valve for each sub-header.

control and optimize the quality of LFG collected, it will provide temporary LFG collection until a permanent LFG collection system with new vertical extraction wells is constructed with the placement of final cover (or possibly horizontal LFG collections trenches are installed and operational).

2.2.2 Slope Stability

A slope stability analysis will need to be completed in support of vertical expansion to determine the need for design modifications or implementation of slope stability controls. Slope stability concerns are typically readily addressed through the use of slope flattening, terraced slope design, toe of landfill slope armoring with heavy rock, and surface water management controls (e.g., landfill side slope interceptor swales).

2.2.3 Leachate and Surface Water Management

Given that the landfill footprint will not increase, the quantity of leachate and surface water to be managed should not increase with vertical expansion and implementation of an optimized cell design and sequencing plan.

Leachate is generated as a result of precipitation infiltration into the waste. In order to minimize leachate generation, the cell design and sequencing plan should include the use of soil berms and/or grading to divert clean surface water from coming in contact with waste, minimize the active face, and encourage surface water runoff from areas completed with final and or interim cover through grading.

Surface water is collected from runoff from areas of the landfill completed with final or interim cover or diverted from the active waste disposal area. Enhanced vegetation on the final and interim cover systems and over bare soil areas around the Site (if any), as well as ditch controls, will reduce erosion and will increase evapotranspiration and infiltration (outside of the lined landfill footprint), reducing the volume of surface water to be managed while improving the quality of the surface water collected.

2.2.4 Landfill System Components

The current landfill base liner and leachate collection system are adequate to support a 15 m vertical expansion. The vertical expansion will not adversely impact the performance of the base liner system including the leachate collection piping (150 mm HDPE DR11). The

perforated leachate collection pipe is a redundant means of leachate transport should the drainage media clog due to biofouling or other chemical reactions (e.g., calcium).

The final cover over the vertical expansion area may need to be modified to include a stronger geomembrane and side slope swales. If needed, these modifications can be readily incorporated into the final cover over the vertical expansion area.

2.2.5 Landfill Gas Management

There are no technical challenges due to vertical expansion for LFG collection that cannot be readily addressed. A LFG collection system within the vertical expansion area should consider the benefits and drawbacks of both vertical extraction wells and horizontal collection trench components. The advantage of horizontal collection trenches is that they permit nearly immediate collection of LFG from active areas and provide long term collection once the area is closed, however, present operational challenges for waste placement and construction. The use of vertical collection wells only may not be sufficient to adequately control odours, without the addition of temporary wells and/or use of soil based daily cover on a regular basis.

2.2.6 Visual Impact

Based on the visual assessment completed by SNC Lavalin, it does not appear that the proposed vertical expansion will cause a visual impact to the local communities. In the event of any visual concerns, practical options exist to mitigate visual impacts such as the installation of planting beds or visual screening berms on top of the landfill or the side slopes to break-up the skyline view in select areas. Planting beds consist of a topsoil layer sufficiently thick enough (minimum 0.45 m) to allow for the growth of vegetation such as shrubs while not impacting the performance of the landfill final cover. A visual screening berm would consist of a soil berm sized sufficiently based on its purpose and could also be vegetated with shrubs or small trees.

3.0 Items Raised by Dillon on Behalf of Mirror NS

3.1 The Assessed Potential Lift Capacity and Duration of Operations in Each Cell and Anticipated Duration between Capping Events

A carefully planned and implemented design and sequencing plan would minimize the active area and facilitate the installation of operational controls to minimize leachate generation and facilitate LFG collection. The optimized cell area needs to balance the cost and safety of operations, including waste placement and temporary facilities (daily/interim cover, LFG

collection, surface water controls, and haul roads), verses nuisance factors (odour, dust, vector and vermin) and costs for leachate management. At a minimum, the design should accommodate progressive capping and expansion of the LFG collection system. Therefore the duration to fill each cell and duration between capping events should not change substantially from current site practices.

3.2 Based on Balloon Study Conducted by SNC Lavalin, Assess the Practical Cell Lift Operation Limits Achievable While Maintaining the Site's Isolation and Visual Impacts

SNC Lavalin completed a visual assessment utilizing six balloons setup at the proposed 15 m vertical expansion elevation of RDF (i.e., 128 m AMSL). The balloons were not visible from nine residential areas visited, however, the balloons and current landfill mound were visible from a bedrock outcrop near the commercial area of the Brunello Estates commercial / residential / golf course (Exist 3, Highway 103). The SNC Lavalin assessment demonstrates that visual impact from the proposed vertical expansion would likely be minimal.

Based on information provide a 15 m vertical expansion is achievable while maintaining the site's limited visual impacts. In the event of any visual concerns, cost effective mitigation measures that could be implemented to break-up the skyline view in select areas include the use of planting beds or visual screening berms on top or along the side slopes of the landfill closest to any receptors. As an example, currently the Waterloo Landfill uses planting beds established with small trees and shrubs on top of the landfill to break-up the skyline view.

3.3 Provide Brief Overview of Best Practices for Phased Removal of the Existing Cap in Cells 1 to 5, Corresponding Operational Issues to be Dealt With, and the Degree to which any Salvage of Cap Construction Materials Would/Should be Available for Re-Use

As noted in Section 2.2.1, a reasonable approach would be to implement vertical expansion starting in Cells 1 and 2 filling from northwest to southeast to final grades and then moving progressively in a northwest direction towards Cell 6. Benefits of this approach include: progressively re-opening portions of the RDF that has older waste and therefore less LFG generation and associated concerns for odours and differential settlement (due to degradation of organics); and easier transition for the Site operator given that Cells 1 and 2 are shallower cells and have a larger footprint when compared to subsequent cells.

Existing final cover should only be progressively removed to the extent required to accommodate the active area. As noted in Section 2.2.1, soil material removed from the existing final cover could be reused in support of landfill operations or as final cover. Use of the cover soils in daily operations verses obtaining material from the borrow area would reduce borrow area operations and minimize the effort for stockpile management of the salvaged soils.

With the progressive removal of final cover, the permanent LFG system that has been installed in the existing cells could be modified to allow for the continued recovery of LFG in the older placed waste as the new waste is being landfilled, as noted in Section 2.2.1. Should the existing system become damaged (e.g., due to landfill operations or differential settlement), vertical replacement wells could be installed, as needed, and incorporated in the LFG collection system.

3.4 By Comparison to Existing On-Going Active Cell Temporary Gas Management Techniques and Existing Permanent Gas Management Infrastructure, Provide any Envisioned Operational or System Changes in Terms of Methods and Infrastructure for Gas Control During Landfill Operations Related to Cell Lift Activities on Cells as a Result of Extending the Period When Cells Would be Open

It is CRA's understanding that the use of the temporary LFG system was implemented with the development of Cells 1 and 2 as a result of odour issues. The Stantec 2013 report indicates that an un-intended consequence of the Front End Processor (FEP) and Waste Stabilization Facility (WSF) is that LFG is generated earlier in the RDF than in a typical municipal solid waste landfill as a result of the shredding and mixing of organic waste in the FEP/WSF. CRA also understands that a shredded construction and demolition (C&D) material has been used substantially since 2001 as a daily cover.

There are no technical challenges with vertical expansion for LFG collection that cannot be readily addressed. The vertical expansion design needs to meet both the short term and long term LFG collection requirements, while minimizing capital and operational costs. As noted in Section 3.1, a carefully planned and implemented design and sequencing plan would minimize the active area and facilitate the installation of operational controls to minimize leachate generation and facilitate LFG collection. The use of temporary LFG systems is not ideal and the design should minimize the need of temporary systems. CRA understands that temporary LFG collection wells and above grade piping are installed on an annual basis; and as the landfill reaches final contours, the vertical wells are extended with solid risers to form part of the permanent system. While the temporary system is effective at collecting LFG in the short term to address potential odour issues , as designed is inherently labour intensive with the need to manually drain condensate from the collection piping. In addition, the temporary system does

not facilitate placement of additional waste while operational, and does not maximize the collection of LFG post closure as the extended wells are not screened in the upper portion of the waste. Vertical expansion design considerations include the use of horizontal LFG collection trenches in conjunction with vertical collection wells, the use of the temporary LFG collections system (modified as necessary) that promotes gravity condensate drainage, and the use of soil based daily cover soils. The use of soil based daily cover would minimize moisture infiltration and as such leachate generation and potentially slow LFG generation.

3.5 Cell Access Operational Considerations to Address Access Road Routing and Slopes, Access Road Section on Top of Existing Cells With the Objective of Minimizing Impact to Permanent Gas Management Infrastructure, Potential for Differential Settlement in the Cover, Effect on Leachate Production (if any), and Operational Issues Related to Associated Cells, Firewalls, Cell Walls And Slopes for Cell Lift Construction and Capping

As noted in Section 2.2.1, a reasonable approach would be to implement vertical expansion starting in Cells 1 and 2 filling from northwest to southeast to final grades and then moving progressively in a northwest to southeast direction towards Cell 6. This would allow for the use of the existing roads over the landfill cover to be utilized as haul roads to the active area. A review of the material types and depths should be completed to determine if improvements are required for landfill traffic, to minimize routine maintenance, to ensure the protection of the cover and LFG collection system, and for safety. The improvements may be as simple as adding an aggregate surface course and routine grading or may involve the widening and buildup of the roads (uniformly or specifically where they cross LFG collection piping), ditching to direct surface water runoff, and protection of above grade LFG components. Long term integrity of the final cover geomembrane is of less importance as it will be removed as landfilling advances to the southeast. Haul road construction within the active area would be similar to the current practice.

Haul traffic on top of the landfill may cause an increase in settlement. The settlement will primarily impact LFG collection piping and efforts should be made to minimize crossing of the pipes. As noted above, additional aggregate (or potentially temporary steel plates) may need to be added over the LFG collection pipe to better distribute the load and to protect the infrastructure. Differential settlement in the landfill may require maintenance to promote drainage and maintain the integrity of the final cover. Though vertical expansion will cause differential settlement due to the additional placed waste, other factors play an important role such as placement techniques, waste characteristics, and landfill design and operation.

As noted in Section 2.2.3, in order to minimize leachate generation the cell design and sequencing plan should include the use of soil berms and or grading to divert clean surface water from coming in contact with waste, minimize the active face, and encourage surface water runoff from areas completed with final and/or interim cover through grading. Overall, leachate generation for the Site should not increase as the landfill footprint is not increasing. As the landfill is vertically expanded, lower layers of previously placed waste will consolidate therefore potentially impeding the collection of leachate and contribute to leachate mounding. The presence of fire breaks used in the RDF may compound this issue by limiting the vertical migration of leachate and lateral/vertical migration of LFG. Potentially operational issues could involve an increased number of leachate seeps (prior to final cap placement) and lower LFG recovery. By only removing the final cover from the top of the cell, leachate seeps from the side slopes should not be a concern and will help minimize the generation of new leachate. Currently Mirror NS has reported that no leachate mounding is occurring in the RDF and seeps have been observed with minimal frequency from un-capped portions of the RDF.

There should be no concerns in applying interim cover, fire breaks, or final cover on an adequately designed vertically expanded RDF. Health and safety considerations should be evaluated by completing a slope stability assessment which may result in design modifications or the implementation of controls in support of vertical expansion, in conjunction with operational procedures.

3.6 Cell Lift Operations to Increase Cell Usage Could Have Operational Consequences that may Affect Operational Costs, Including:

- Waste placement/sequencing limitations
- Extended use of temporary landfill gas collection systems
- Modification of existing landfill gas infrastructure
- Staged installation and design modification of future landfill gas management infrastructure
- Increased leachate production
- Modified stormwater management provisions (e.g., terraced construction) to accommodate extended landfill side slopes
- Provide reasonable order of magnitude cost assessment of operational changes and compare to individual cell construction and closure costs (40 months; $25 million)

The vertical expansion design and operation needs to balance the cost and safety of operations, including waste placement and temporary facilities (e.g., daily/interim cover, LFG collection, surface water controls, haul roads), verse the nuisance factors (e.g., odour, dust, vector and vermin) and costs for leachate management. At a minimum, the design should accommodate

progressive capping and expansion of the LFG collection system. The duration to fill each cell and duration between capping events should not change substantially from current site practices (i.e., filling Cells 1-6). For Cells 7-9, a revised design and sequencing plan should be developed and consider progressive landfill closure thus minimizing operational concerns (e.g., leachate generation, LFG generation).

As discussed in Section 2.2.3, the quantity of leachate and surface water generation should not increase as the landfill footprint will not change with a vertical expansion. In order to minimize leachate generation, the cell design and sequencing plan should include the use of soil berms and/or grading to divert clean surface water from coming in contact with waste, minimize the active face, and encourage surface water runoff from areas completed with final and or interim cover through grading. Enhanced vegetation on the final and interim cover systems and over bare soil areas around the Site (if any), as well as ditch controls, will reduce erosion and will increase evapotranspiration and infiltration (outside of the lined landfill footprint), reducing the volume of surface water to be managed while improving the quality of the surface water collected.

Side slope swales may be required to channel surface water runoff horizontally midway along the side slope. This can readily be incorporated into the final cover design with minimal overall costs and without a decrease in air space available for the disposal of refuse and daily cover. The use of terracing is effective for slope stability and provides ample space for installation of surface water control features, however it reduces landfill air space for waste placement.

As previously noted, a reasonable approach would be to implement vertical expansion starting in Cells 1 and 2 filling from northwest to southeast to final grades and then moving progressively in a northwest to southeast direction towards Cell 6. The width of each cell does not necessarily need to be aligned with the current cell limits and should be sized to suit operational considerations.

A vertical expansion is not expected to increase the overall operational costs at the Site. Minor cost increases are expected for some items but cost reductions can also be realized. Several examples include (assuming vertical expansion progresses as described):

- Removal and management of salvaged cover material will increase operational costs, however, the use of the salvaged material in the daily operations will reduce costs to supply temporary cover soils from the borrow area and will allow the clean borrow supply for final cover works.

- Increased operational costs to modify the existing permanent LFG system (i.e., capping each well head) and install horizontal LFG collection trenches, however, the use of the temporary LFG system will no longer be needed (resulting in operational cost savings). Overall, the operation of the LFG collection system should not increase on a cost per tonne/basis.
- Landfill Access Roads: Construction of the total length of access road will be deferred resulting in a decrease cost for winter maintenance (e.g., snow removal, sanding), road side ditch maintenance (e.g., ditch cleaning, grass cutting), and grading and aggregate for road maintenance/improvements. This will be offset by increases in cost for improving roads to accommodate truck traffic and to protect the LFG collection system.
- Shorter haul time to the active face will reduce cost (less time and less fuel). When filling in Cells 1 and 2 the travel distance per load is reduce by at least 1 km round trip as compared to filling Cell 7.
- Cost to manage windblown litter may increase due to fill height relative to surrounding areas.

Overall, any increases in operational cost, if any, will be substantially lower than capital cost savings association with the construction and closure of new cells at the RDF (i.e., on a cost per waste tonnage basis). In addition, annual capital savings set aside for new cell construction will be greatly reduced given that new cells will not be required for an extended period of time (i.e., > 15 years).

3.7 Assess the Potential that Conducting Cell Lift Operations Could Increase the Bearing Pressure of the Cells on the Soil/Bedrock Below to such an Extent to Impact Groundwater Elevations Under the Liner

CRA understands that the geology underlying the base liner at the RDF consists of a thin layer of overburden over bedrock. As part of a revised design plan a geotechnical assessment should be completed to ensure that the integrity of the base liner system is not adversely affected due to differential settlement in the underlying native soils and bedrock as a result of vertical expansion and corresponding increase in landfill bearing pressure. It is not anticipated that this will be a concern due to the depth of overburden, nor is it expected that this would result in an increase groundwater elevations beneath or surrounding the cells.

3.8 Assess the Potential Impact of Cell Operations Improving the in Place Density of the Compacted Waste, and the Additional Capacity Realization of this Added Compaction

The vertical expansion will result in further consolidation of previously placed waste in the RDF. This net gain in landfill air space realized from the consolidation of adequately placed waste (modern landfilling practices typically result in an in-place waste density in the range of 0.8-1 MT/m^3) however, is minimal (potentially 5 percent), when compared to net gain in air space due to degradation (potentially 20-30 percent depending on the waste characteristics).

3.9 Assess the Potential Impact of any Cell Density Increase on the Liner System Itself; Including the Leak Detection Layer, Leachate Collection Layer, and Overall Environmental Protective Resilience

The current landfill base liner and leachate collection system are adequate to support a 15 m vertical expansion. The vertical expansion will not adversely impact the performance of the base liner system including the leachate collection piping (150 mm HDPE DR11). It is noted that the perforated pipe is a redundant means of leachate transport should the drainage media clog due to biofouling or other chemical restrictions (e.g., calcium).

4.0 Conclusion

There is no technical reason to prevent the vertical expansion of the RDF. A vertically expanded RDF will be within the range of waste depths and heights at a number of landfills across North America. To optimize the vertical expansion of the RDF, design and operational changes will be required that address such items as cell design and sequencing, slope stability, and landfill gas (LFG) management. Therefore a revised design and operations plan for the RDF vertical expansion will need to be developed.

A reasonable approach to implement vertical expansion would be to start in Cells 1 and 2, filling from northwest to southeast to final grades and then moving progressively in a southwest direction towards Cell 6. Benefits of this approach include: progressively re-opening portions of the RDF that has older waste and therefore less LFG generation and associated concerns for odours and differential settlement (due to degradation of organics); and easier transition for the Site operator given that Cells 1 and 2 are shallower cells and have a larger footprint when compared to subsequent cells.

CONESTOGA-ROVERS
& ASSOCIATES

October 8, 2014 Reference No. 088605

From a cost perspective, substantial changes in operational costs are not anticipated, while significant capital costs reductions will be realized through reductions in capital savings and on a capital cost per waste tonne basis.

We trust that this technical evaluation provides the relevant information required by HRM regarding the proposed vertical expansion of the RDF. Should you have any questions please do not hesitate to contact us.

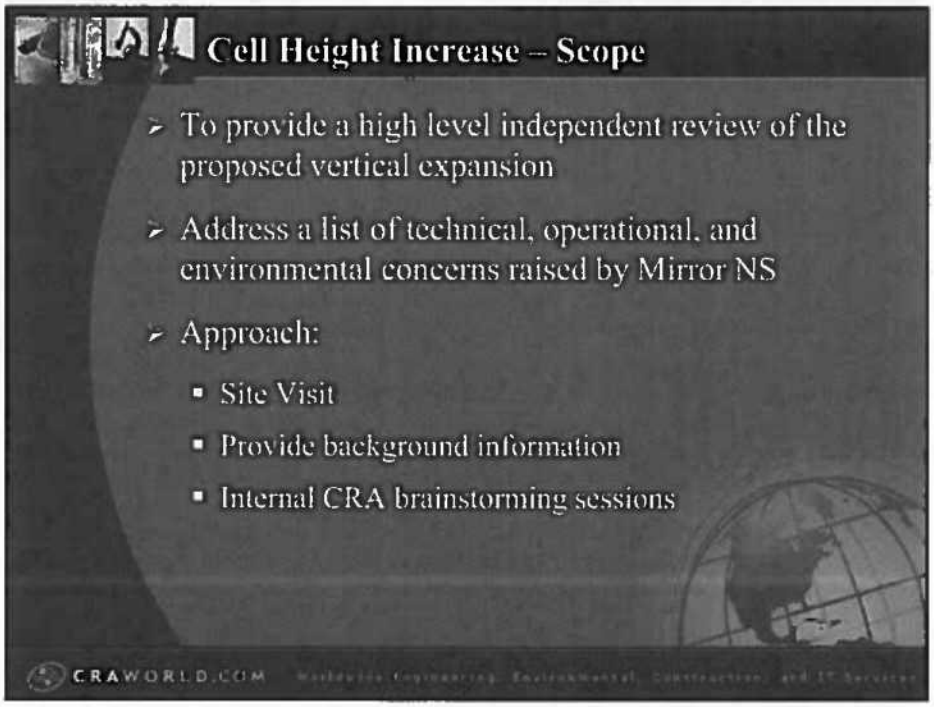
Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Andrew Philopoulos, P.Eng., M.Sc. Christine Skirth, CET, PMP

AP/al/4
Encl.


Increasing Landfill Cell Height
Otter Lake Facility – Technical Review
Conestoga-Rovers & Associates
November 21, 2014
CRAWORLD.COM


Cell Height Increase – Scope
To provide a high level independent review of the proposed vertical expansion
Address a list of technical, operational, and environmental concerns raised by Mirror NS
Approach:
Site Visit
Provide background information
Internal CRA brainstorming sessions
CRAWORLD.COM

Cell Height Increase - Findings

- No technical reason to not consider vertical expansion
- Proposed overall height and depth of landfill within range of other North American landfills
- Vertical expansion can be implemented while maintaining all environmental protection and controls (e.g., aesthetics, odour, groundwater)
- Vertically expanded Cells 1-5 represents $68 to $85 million capital cost savings versus development of new cells

Cell Height Increase - Implementation

- Revised Design & Operations Plan is needed to address such items as:
  - Cell Design and Sequencing
  - Slope Stability
  - Landfill Gas (LFG) Management
- Starting vertical expansion in oldest cells (i.e., 1 & 2) would provide the following benefits:
  - Reduce exposure to more recently placed waste (less odours)
  - Minimize differential settlement

Community Monitoring Committee
Presentation to Regional Council

December 9, 2014

Next Steps at the Otter Lake Landfill

Presentation to HRM Committee of the Whole

December 9, 2014

Halifax Waste-Resource Society

Acknowledgements

* Council for putting the process back on proper track
* John Traves for his efforts to work collaboratively
* The members of our community who have clearly expressed their views
* Councillors Rankin and Adams for their persistence

Focus on Vertical Expansion

* Vertical expansion presents significant risk
  * Increased potential for impacts in community of odour, noise, litter, visual impacts from community, Bluff Trail and other areas
  * Increased risk of impact on Nine Mile River through siltation
  * No-one knows exactly what will happen when the landfill cover is peeled back on closed cells

Recommendation 7

* Modification of By-law to allow export of waste
  * Society feels most in community would support less garbage at landfill
  * Not universal position
  * No public consultation has been done on this issue
  * Financial impact must be revisited
  * Strongly recommend that a public hearing be held to ensure wider community has opportunity to speak

Recommendation 8

* Pleased that FEP and WSF will continue to operate
* Pleased that this will not come back for discussion until 2019 at the earliest

Recommendation 9

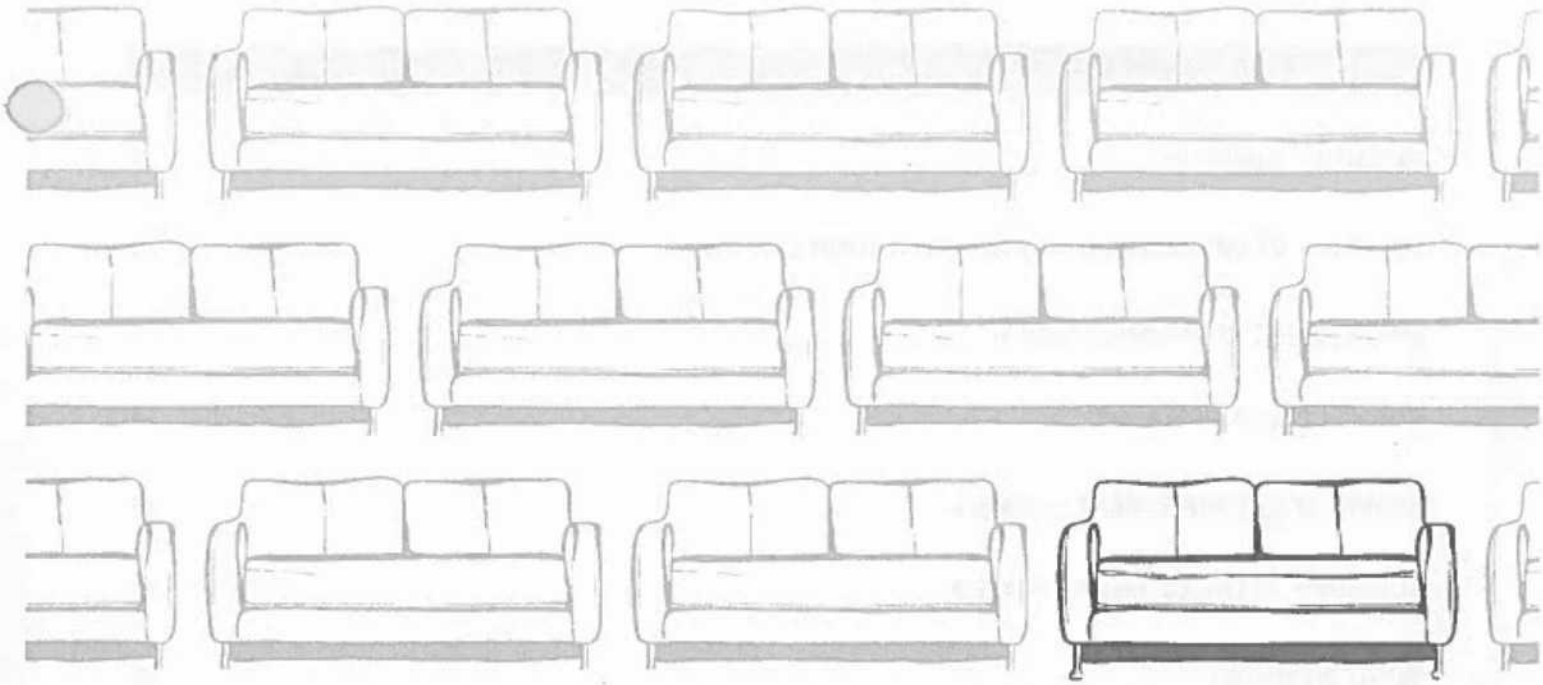
* Accept that vertical lift is technically possible
* Acknowledge that there is no legal requirement to close the landfill in 2023
  * However, people in the community were told the landfill would be open for 25 years
* Vigilance required to ensure "environmental and community protection will be maintained or enhanced"

CMC Role

* Important - "much better appreciation by staff of the role of CMC under the terms of the Community Monitoring Agreement"
* CMC will continue to be a watchdog
* Protecting community and environment a responsibility
  * Staff, Operator, Consultant, CMC/Society, and Council
* Council must continue to ensure commitments to community are met

Looking Forward

- Lots more work to be done
- We will be vigilant
  - Monitoring measurable environmental outcomes
- The CMC will ensure that the Otter Lake landfill facility continues to be an example of excellence



BUILDING A BETTER WASTE SYSTEM, TOGETHER

HRM Solid Waste Strategy Review
Community Engagement Program
Final Report

December 5, 2013

PREPARED BY: NATIONAL PUBLIC RELATIONS

Halifax
Founders Square
1701 Hollis Street, Suite L101
Halifax, NS B3J 3M8
Tel. 902.420.1860

New Brunswick
75 Prince William Street, Suite 210
Saint John, NB E2L 2B2
Tel. 506.672.1860

Newfoundland and Labrador
448 Water Street
St. John's, Newfoundland and Labrador A1E 1B1
Tel. 709.754.9614

www.RedCouch.ca

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EXECUTIVE SUMMARY

PROGRAM OVERVIEW

The HRM solid waste strategy review community engagement program was carried out in September and October 2013. The goal of the program was to educate HRM residents about the HRM solid waste system and have a balanced conversation about how to evolve the overall system, while continuing to protect the environment and community.

The program consisted of 14 in-person events held throughout the Halifax Regional Municipality as well as ongoing online engagement via the ShapeYourCityHalifax.ca website over the same period.

Throughout the process, the engagement team was mindful of the requirement for participants to have an authentic opportunity to influence Regional Council's decision making and have their voices heard, regardless of their previous knowledge or current position on the issues. In order to achieve this, we were diligent in creating a wide variety of opportunities for participants to have their say.

In Person:

- Town hall meetings
- Small group discussions
- Harvest of all comments (including comment cards)
- Harvest of all questions from town hall meetings
- Paper ballots listing 22 options as proposed by the Stantec report for residents to indicate their level of favour as "Yes", "No", or "Unsure"

Online:

- Discussion forums mirroring the questions and topics discussed during in-person events
- Harvest of all comments
- Invitation to submit questions for response
- Online survey listing 22 options as proposed by the Stantec report for residents to indicate their level of favour as "Yes", "No", or "Unsure"

PARTICIPATION

Despite extensive communications and invitation efforts outlined in greater detail later in this report, garnering general public interest and attendance at engagement events was an ongoing challenge. Of those who attended regional public events, most identified themselves as having a direct interest in the Otter Lake landfill through either residential proximity or employment. A number of others indicated they had historically been involved the development of the 1996 Solid Waste Resource Management Strategy.

In summary, those that care about solid waste issues showed up often and were very determined to articulate their point of view on the options under consideration – specifically those relating to landfill changes. Many of these individuals were very vocal at events, interrupted the program with unprompted statements, handed unsolicited literature to newcomers, and resisted the invitation to participate in small group conversations about any topic other than the Otter Lake landfill.

The public at large demonstrated a low level of interest in the topic– more willing to complete a survey at home or work, than attend an evening session in their community.

The focus on the Otter Lake landfill had such a significant negative impact on the quality and quantity of conversation about the broader solid waste system that the engagement team chose to modify the methodology used in the second phase of engagement to ensure that the public's feedback about the entire waste system and the options presented in the Stantec report could be gathered, as mandated by Regional Council.

The map shown in **Figure 1** illustrates the geographic distribution of participants in the engagement, based on community names or council districts identified by participants at events and online. The highest levels of participation were derived from council districts in nearest proximity to the Otter Lake landfill - 11 (Spryfield – Sambro Loop – Prospect Road), 12 (Timberlea - Beechville - Clayton Park West), and 13 (Hammonds Plains – St. Margarets).

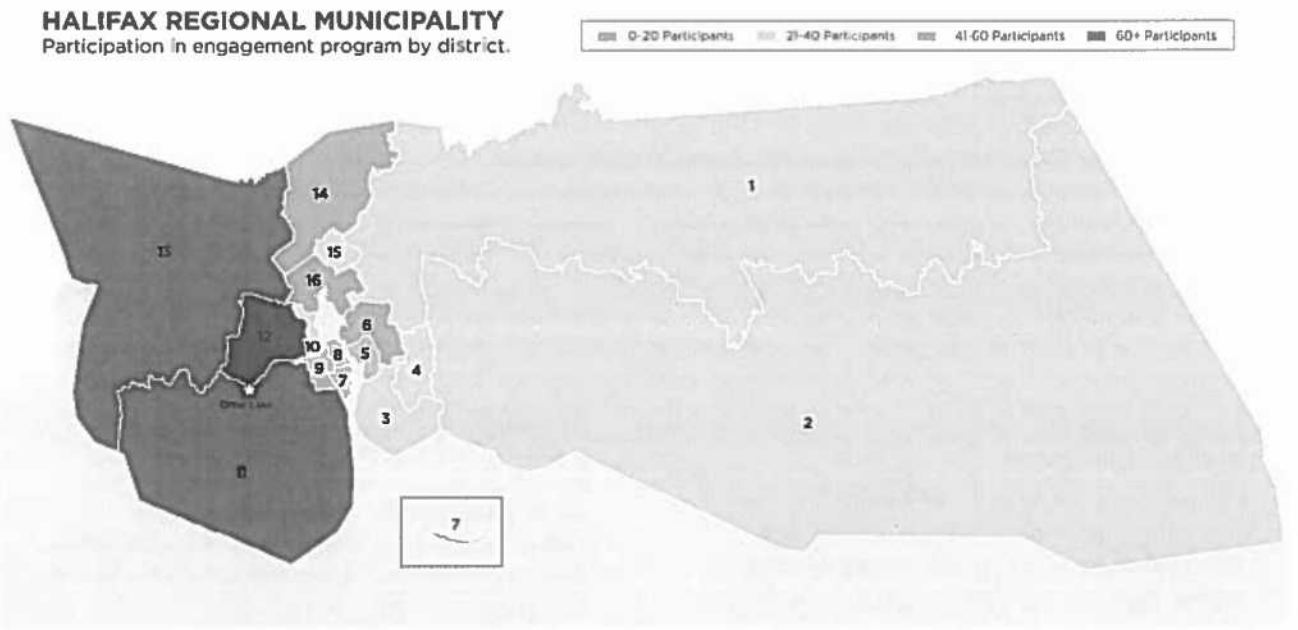


Figure 1. Distribution of engagement program participants by council district.

The number of surveys completed in Phase 2 of engagement provides an estimate of the number of residents who participated in the process:

- In-person surveys collected: 187
- Online surveys submitted: 454
- Total: 641 citizens provided quantitative feedback on the options under consideration

WHAT WE HEARD

The top three messages expressed by participants throughout the engagement program were:

- Honour the agreement (referring to the Agreement for Community Monitoring of Solid Waste Facilities, 1999)
- Focus on diversion and source separation (specifically education, enforcement and apartments)
- Protect the environment

Despite the strong opinions about the proposed changes at the Otter Lake landfill expressed at all events, the second phase of the engagement program was designed to solicit specific feedback from residents on ways to increase reuse and reduce behaviours and opportunities to make enhancing diversion simpler and more efficient. Some of the valuable takeaways were:

- Strong support for:
    - Increasing education and enforcement efforts at high rise apartments/condos and commercial properties

  - Expanding the household hazardous waste program
  - Making HRM compost available for purchase
  - Explore new technology options

- Strong opposition to:
  - Collecting yard waste separate from green cart
  - Accepting only paper bags for collection of leaf and yard waste
  - Smaller green carts for food waste only
  - Extend operations at existing site (Otter Lake)*
  - Discontinue garbage processing at FEP/WSF and repurpose for organics processing
  - Construct consolidated waste campus model at Otter Lake*
  - Increase cell height*

It is important to note that an average of 27 per cent of respondents indicated they were "Unsure" of their position across all 22 options under consideration. This suggests that a significant portion, nearly a third, of engagement participants felt ill-equipped or lacked adequate understanding to provide a point of view on the technical and complex subject matter of solid waste systems.

Results from in-person and online surveys were fairly consistent across all topic areas, except the topic area of "Landfill Site Changes." Results in that category of options differed quite dramatically, with approximately twice as many "No" responses from participants at events. In the case of the options identified with an asterisk (*) above, the majority of online respondents did not express any opposition to those ideas.

Our takeaway is that opponents to changes at Otter Lake organized and mobilized to have the loudest voices in any room, and therefore significantly affected the point of view of others who may have come to an event truly undecided. As a result, we believe the online survey respondents might reflect a broader and more representative collection of resident voices.

STAKEHOLDER ENGAGEMENT

The primary purpose of this public engagement consultation was to engage a broad range of stakeholders to ensure residential, business, and industry perspectives were considered in Regional Council's decision-making about the entire solid waste system in HRM. At the outset of the consultation, the engagement team from NATIONAL met with the Community Monitoring Committee (CMC) to discuss the overall engagement approach and how the CMC could best represent the communities closest to the existing landfill site. The CMC provided the engagement team written recommendations for community engagement that helped inform the event design, location and timing of the town hall meetings and regional public sessions. The CMC was also provided a speaking opportunity at public events to present information on the history of the solid waste resource management strategy, siting of the landfill and the agreement with the host community.

Stakeholder engagement began with the CMC and the communities in nearest proximity to the Otter Lake landfill and progressed with broader engagement of residents and industry stakeholders as directed by Regional Council, including:

- *General public:* Engaged a wide spectrum of HRM citizens across the entire region both in-person and online, in order to educate about the HRM's existing solid waste system and the proposed options being assessed as a result of the Stantec report recommendations.

- *Institutional-commercial-industrial (ICI):* Engaged to gather feedback on the Stantec report and to identify what issues are preventing enhanced ICI source separation, and achieve increases to diversion of organics and recyclables.

- *Waste Industry:* Engaged contractors, haulers and waste resource operators to gather feedback on the Stantec report and to identify challenges and opportunities between the current dissipated facility systems versus a waste campus environment.

SUPPLEMENTAL RESEARCH

With respect to our objective of increasing understanding public understanding of "what happens beyond the curb" and how the solid waste management system currently operates, public opinion research conducted in early September and November 2013 indicated a 9 per cent increase in residents' self-reporting an advanced level of knowledge of how the system works, over a 9-week period. This result suggests that the engagement program resulted in greater community awareness and conversation than might have been strictly observed based on event and online participation.

Having determined that the most resounding message received in the in person and online engagement we conducted was "honour the agreement" with the landfill host communities regarding standards of protection for people and the environment, we elected to pose a related question to a broader sample of 300 members of the HRM general public in the November survey:

The question posed was: *"As you may or may not know, the Halifax Regional Municipality currently operates a landfill at Otter Lake. If existing community and environmental protections were maintained, would you be supportive of the current site remaining in operation beyond 2024, or do you think the HRM should build a new landfill?"*

A majority of respondents (56 per cent) indicated openness to supporting the extension of use of the Otter Lake site; of which a segment of 11 per cent qualified their support as conditional upon considerations such as: environmental impact, cost, commitments made to neighbouring communities, and the scale of the current landfill's remaining capacity.

SUMMARY OF COMMUNICATIONS AND INVITATION EFFORTS

With the goal of informing and inviting a broad cross-section of citizens to participate in the engagement program, we executed multiple promotional tactics through a variety of traditional and online channels.

Our invitation process began with a stakeholder mapping exercise, expanding upon lists of individuals, organizations, and communities already identified as likely to have an interest in the process and its outcomes. We also targeted key influencers whom we expected may have a general interest in the process from the perspectives of civic engagement, responsible city management, environmental stewardship, sustainability, and quality of life. This included business development organizations, environmental and relevant industry associations, and educational institutions to name a few.

Our tactics for reaching out to these audiences with our invitation to participate in the process included:

- Mass e-mail invitations

- Follow up phone calls to key stakeholders and those identified as influencers in their communities and organizations, requesting that they assist in extending the invitation

- Grand Parade newsletter
- Spotlight in Halifax.ca main page gallery
- Request to members of Council to extend the invitation to their networks
- Posters
- Social media outreach
    - Tweets via @hfxgov
    - Facebook posts (regular and promoted) through the Halifax Recycles Facebook page
    - Facebook advertising
    - YouTube advertising
- Print media placements (including: the Chronicle Herald, Bedford-Sackville Weekly News, Dartmouth – Cole Harbour Weekly News, Shop the Shore, Masthead News)
- Print invitations distributed via direct mail and at public events

SHAPEYOURCITYHALIFAX.CA PORTAL

Working in conjunction with the in-person sessions, the engagement program was also executed online through the Shape Your City Halifax website. As the online hub for the engagement program, the portal is intended to be a space populated with clear content on an ongoing basis that is easy to understand, engage with, and share.



Content on the portal includes:

- Educational videos
- Background information (presentations, reports, regulations, etc.)
- Frequently asked questions and answers
- Event summaries
- Event schedule

The engagement functionality of the portal consisted of:

- Discussion forums
- Question submission form
- Quick polls and surveys

Key statistics indicating the portal's level of use over the engagement period are as follows:

- Site visits: 7,314
- Page views: 16,514
- Document downloads: 2,198
- Video views: 5,394

- Survey responses: 454
- Quick poll responses: 291
- Forum posts: 95

The highest level of engagement with the portal was through the online survey. Survey responses came in steadily over time, which indicates that people used the portal to engage on their own time, a key advantage the website offers.

Not all website visitors were actually engaged or participating on the website. This is to be expected. However it's interesting to note that many more people completed the survey than left any comments in the discussion forums, but those that did leave comments tended to say a lot. Also, creating a related forum topic to further discuss the survey questions, and linking to this in the survey's "thank you" message, was successful in directing more traffic to the related discussion forum.

If we look at the visitors that did engage/interact, by completing a survey for example, the top ways they arrived at the site were:

- Direct visits by typing in the web address (seen in an advertisement, poster, word of mouth, etc.)
- Regular email notices with clear call to action
- Halifax.ca website (there was a rotating lure to the portal on the homepage)

A full list of comments made on the portal through the discussion boards can be found in **Appendix D.**

PUBLIC OPINION RESEARCH

To inform the effort to develop a strategic and effective engagement program, public opinion research was commissioned to gauge what residents cared about and wanted to know related to solid waste management and the strategy review. In addition to informing the design of the engagement program, this research provided a baseline against which we could measure what, if any, impact the engagement process and related public dialogue had on residents' level of awareness and engagement in the subject matter.

Two public opinion surveys were conducted by Thinkwell Research. The first surveyed 328 adult residents of HRM from September 3 to 12, 2013 and the second surveyed 300 residents from November 7 to 9, 2013.

A summary of those results is presented as follows:

1) **General awareness of the Solid Waste Strategy Review**

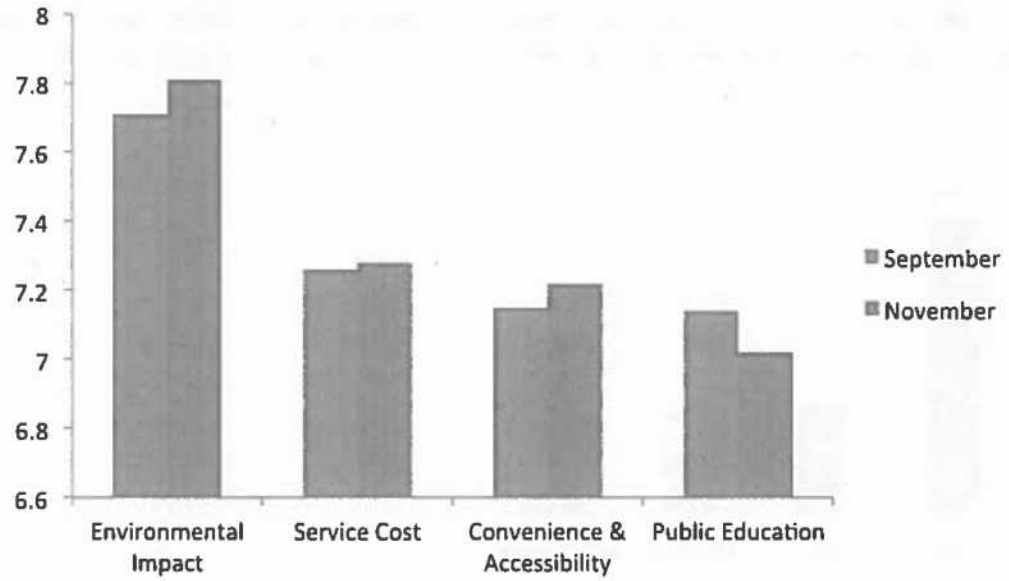
   September: 27%
   November: 30%

2) **Self-described level of personal understanding of how solid waste is managed in HRM (on a scale of 1-10)**

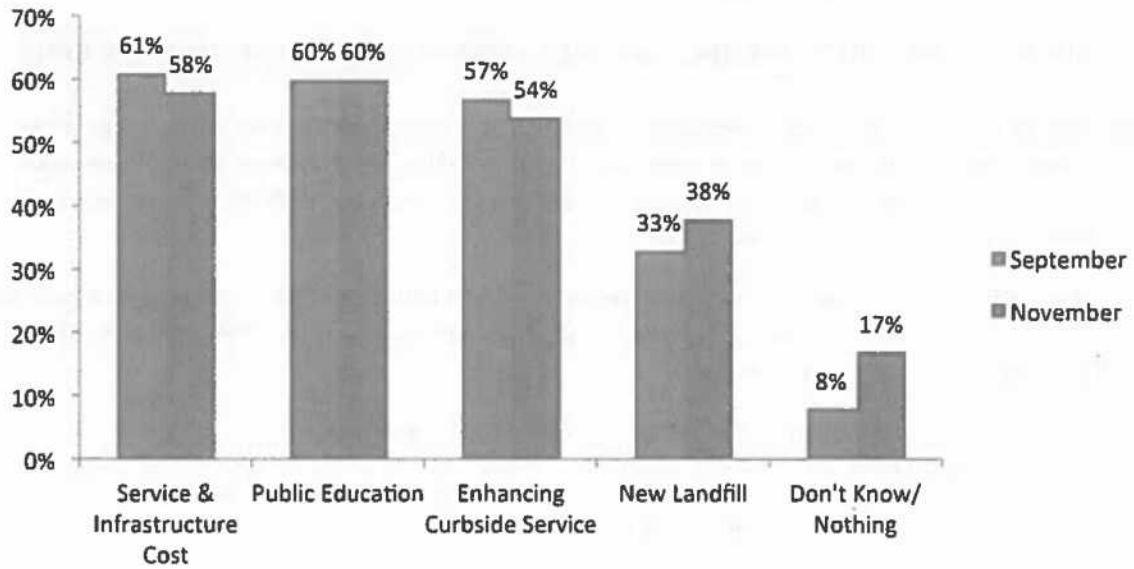
   Over 9 weeks, this question saw an increase of 9 percentage points in respondents who identified a high level of understanding (8/9/10), where 1 was "I know very little" and 10 was "I know a great deal". This result suggests the engagement program had an impact on increasing public understanding of how the current system operates.

3) Self-described level of interest in key priority areas pertaining to solid waste management (on a scale of 1-10)

On this question, environmental impact had a slightly higher median level of interest assigned to it, however all four priority areas were ranked at a fairly comparable high level of interest, between 7 and 8 out of 10.

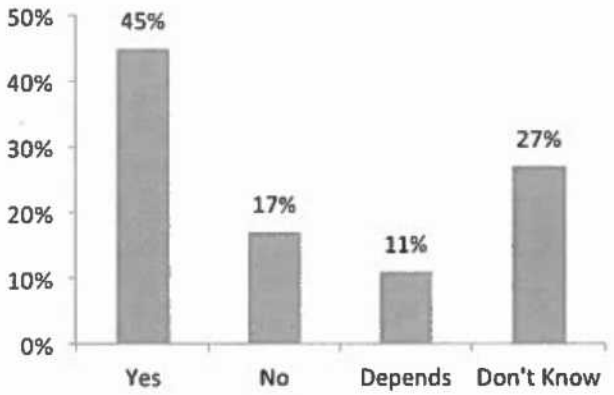


4) Issues deemed of greatest importance to residents and their households



5) **Level of support for extending operations of the Otter Lake landfill beyond 2024, if environmental and community protections are maintained.**

This question was only posed during the November survey, based upon the key messages heard throughout the engagement program. The results indicated that 56 per cent of respondents expressed some level of support for extending operation of the current landfill beyond 2024, of which 11 per cent fell into the category of "Depends" suggesting their support would be conditional upon certain considerations, which included: overall environmental impact, cost, commitments made to neighbouring communities, and the scale of the current landfill's remaining capacity.



SUMMARY OF ENGAGEMENT – PHASE 1

Estimated number of in-person participants: 700

HOST COMMUNITIES: BEECHVILLE, LAKESIDE, TIMBERLEA AND PROSPECT ROAD (BLTP) TOWN HALLS

Prior to engaging the general public and as mandated by Regional Council, we hosted two town hall meetings at Exhibition Park on September 18 and 19, 2013 with a specific invitation to residents of the communities in closest proximity to the Otter Lake landfill site. These events provided an open forum to hear directly from the residents who are most likely to be affected by potential changes at the Otter Lake landfill.

We estimate that the two town hall meetings were attended by a total of approximately 500 community members, based on event sign-in figures. The majority of comments and questions expressed were focused on the community's desire to maintain the status quo at the Otter Lake landfill.

The strongest themes that arose in both town hall sessions can be summarized as follows:

- HRM's agreement with (and commitments made to) the Otter Lake host communities and concerns that proposed changes to the operations are inconsistent with those commitments
- Opposition to recommendations of the Stantec report regarding closure of the Front End Processor and Waste Stabilization Facility (FEP and SWF)
- Concerns regarding potential changes to environmental and community protections

- Concerns regarding the intent and integrity of the Stantec report

- Emphasis on source separation, diversion, and education efforts as most important to continued success

During the events, all town hall attendees were asked to write down their most important questions/concerns. Those questions were themed onsite, and attendees highlighted their three most important areas of concern through a "Dot-mocracy" exercise.

All of the questions identified in the town hall sessions were transcribed, and a full list of them can be found in **Appendix A**. HRM representatives committed to providing responses to these questions over the course of the engagement process, which have been posted to the engagement portal.







GENERAL PUBLIC

The regional public events in Phase 1 were held in central locations across the entirety of HRM, including Dartmouth and vicinity (September 25, 2013), Bedford and vicinity (September 26, 2013), Halifax and vicinity (October 2, 2013), and Eastern Shore and vicinity (October 3, 2013).

Session 1 was designed to focus on information sharing and capturing high level feedback. This approach acknowledged that a number of individuals in attendance would be entirely new to the conversation about the waste management system, and would need to establish a baseline understanding of the system and options under consideration, in order to provide informed feedback.

The content presented in the public session included an educational presentation by HRM on the waste management system and options under consideration, and a presentation by the CMC articulating the key concerns of the host communities of the Otter Lake landfill. Discussions were hosted in a world café format and framed by three questions:

1. "What do you appreciate most about the way we handle our trash in HRM?"
2. "What is most important to you as we evolve our waste system?"
3. "What values and principles should guide our future decisions?"

Please see **Figure 3** for a summary of the key themes and topics that arose from those discussions. A complete, categorized list of verbatim priorities is provided in **Appendix B**.

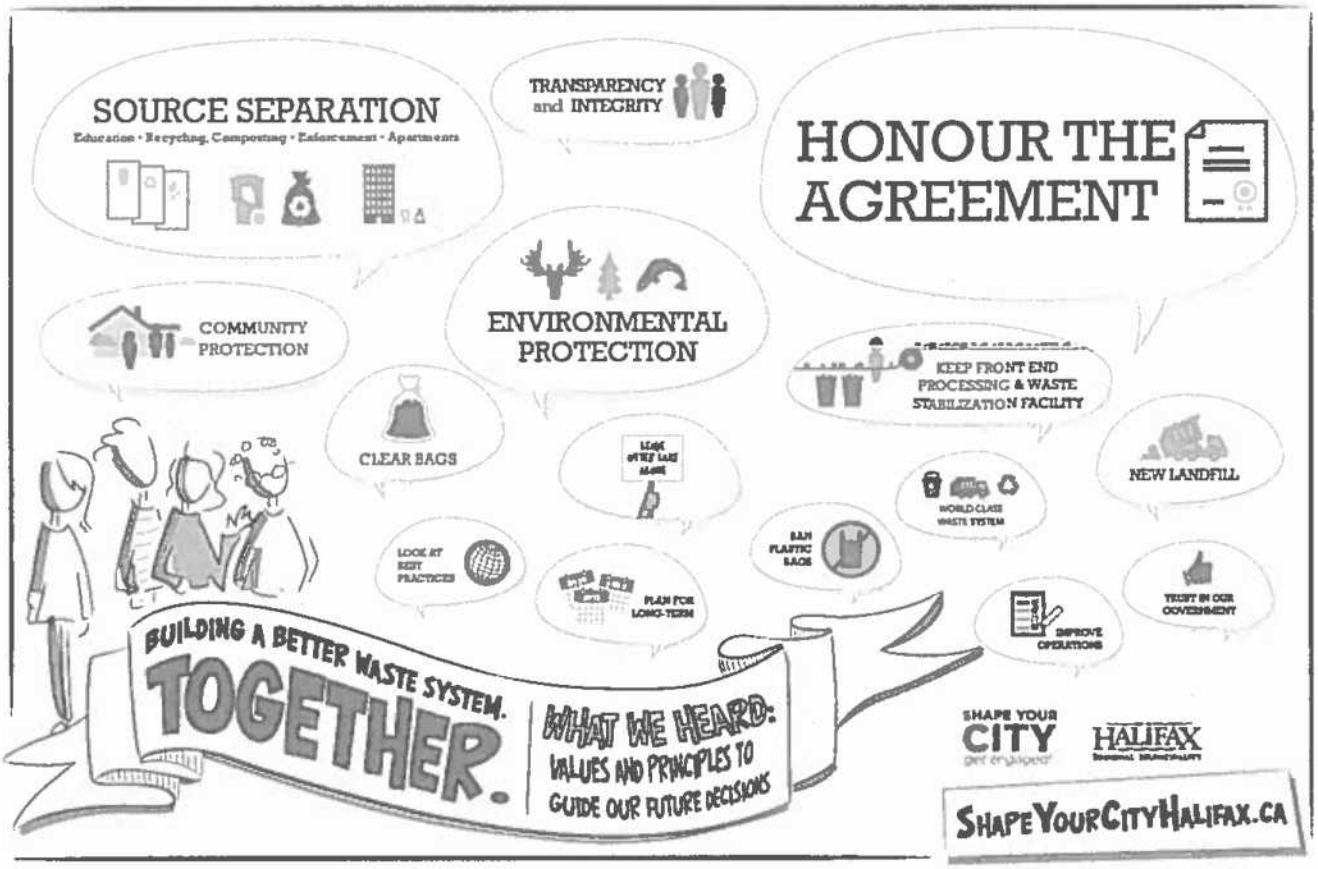


Figure 3. What we heard: key themes from phase 1 of community engagement.

Comment cards were also made available to event participants in Phases 1 and 2 of the engagement program. They have been transcribed, categorized and are presented verbatim in **Appendix C.**

We estimate that approximately 200 community members participated in the general public events during Phase 1. It is worth noting that many individuals from the host communities of the Otter Lake landfill were repeat attendees at events across HRM and brought the voice and concerns of those communities into the broader general public conversation about how the waste system should/could evolve. As a result, small group discussions were overwhelmed by those most concerned with Otter Lake, leaving little opportunity for discussion related to other system needs and/or opportunities unrelated to the landfill.

SUMMARY OF ENGAGEMENT – PHASE 2

Estimated number of total in-person participants: *600*

The objective of Phase 2 of the public engagement program was to seek feedback on specific options under consideration for changes to the waste management system. In addition to assessing the position of residents on the recommendations outlined in the Stantec report, we also aimed to gather more general insights from residents on opportunities to increase reuse/reduce behaviours and make waste diversion simpler and more efficient.

Recognizing the primary interest and intense focus of many program participants on the proposed landfill site changes, the engagement team designed this phase of engagement to gather concrete feedback about options being assessed that included Otter Lake, but also provided space for discussion of other options that stand to impact the system overall.

Similar to the first phase of engagement, events were held across HRM, including: Dartmouth and vicinity (October 16 2013), Bedford and vicinity (October 17, 2013), Eastern Shore and vicinity (October 23, 2013), and Halifax and vicinity (October 24, 2013). Two additional sessions were held with waste industry stakeholders (October 15, 2013) and the industrial-commercial-institutional (ICI) sector (October 16, 2013).

We estimate that approximately 175 people participated in events and more than 400 participated online during Phase 2.

At the beginning of each event, participants were provided with a "passport" listing 22 specific options under consideration in five topic areas. Serving as a discussion guide as well as a private ballot, the passports facilitated gathering feedback from each resident on the full scope of options under consideration. The same survey was also administered online.





To allow all participants to engage in the discussions that were of most interest to them, in person events and discussion forums on the engagement portal were segmented by subject area, as follows:

1) Increasing diversion
2) Changes at your curb
3) Recycling
4) Organics and composting
5) Landfill site changes

Each subject area was supported by an information station, consisting of poster boards that outlined general background information on the service area, the options under consideration, and their associated benefits and implications/ considerations. Each station was staffed by a HRM Solid Waste Resources subject matter expert available to address questions pertaining to the options and the overall solid waste management system.

After having the opportunity to visit the stations and learn more about the service areas and options under consideration, participants were asked to select a topic for a small group discussion. Table conversations were hosted by members of the engagement team, not subject matter experts in solid waste management.

Table hosts were responsible for facilitating good conversation, making sure all voices were heard and recording participant feedback on two questions:

1. What are the tensions and trade-offs associated around this topic?
2. What outcome do you care about most?







3.

Each attendee had the opportunity to explore two of the five topic areas with their fellow residents over the course of one hour. After the two rounds of small group conversations, table hosts reported back to the room on the discussion at their tables.

Each regional public event closed with attendees completing their individual passports and dropping them into a collection box on their way out.

PASSPORT - SOLID WASTE OPTIONS

The survey tool was used to collect data regarding residents' support for 22 system changes under consideration. Each option could be marked "Yes", "No", or "Unsure".

Increasing Diversion (Reduce, Reuse, Recycle)

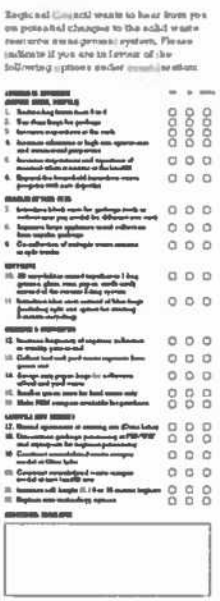
1. Reduce bag limits from 6 to 4
2. Use clear bags for garbage
3. Increase inspections at the curb
4. Increase education at high rise apartments and commercial properties
5. Increase inspections and rejections of material when it arrives at the landfill
6. Expand the Household Hazardous Waste program

Changes at Your Curb

7. Introduce black carts for garbage (with or without user pay







model for different size cart)
8. Separate large appliance metal collection from regular garbage
9. Co-collection of multiple waste streams in split trucks

Recycling

10. All recyclables mixed together in 1 bag (plastic, glass, cans, paper, cardboard) instead of the current 2-bag system
11. Introduce blue carts instead of blue bags (including split cart option for existing 2-stream recycling)

Organics & Composting

12. Increase frequency of organics collection to weekly, year-round
13. Collect leaf and yard waste separate from green cart
14. Accept only paper bags for collection of leaf and yard waste
15. Smaller green carts for food waste only
16. Make HRM compost available for purchase

Landfill Site Changes

17. Extend operations at existing site
18. Discontinue garbage processing at FEP/WSF and repurpose for organics processing
19. Construct consolidated waste campus model at Otter Lake
20. Construct consolidated waste campus model at new site
21. Increase cell height (5, 10 or 15 metres higher)
22. Explore new technology options

WHAT WE HEARD

STAKEHOLDER: GENERAL PUBLIC

While we welcomed a number of new people to the conversation at every event hosted, the majority of the attendees at regional public sessions had a direct interest in the operations of the Otter Lake landfill (e.g. through residential proximity or employment). Those participants were vocal in presenting their opposition to any and all changes under consideration for operations at Otter Lake, often handing out unsolicited literature to newcomers, interrupting the events with spontaneous statements, and resisting the invitation to participate in small group conversations about any topic other than the Otter Lake landfill.

To get a quantitative sense for the impact of this environment on the views expressed by fellow participants, the engagement team compared the results of ballots completed at events to surveys completed online. Results were fairly consistent across the first four topic areas. However, a dramatic difference in responses was observed on options in the category of Landfill Site Changes, as shown in **Figure 6**.

There were approximately twice as many "No" responses at in-person events, attended predominately by Otter Lake focused citizens, as online ballots which reflected a greater geographic spread. We also observed nearly three times as many, "Unsure" responses from the online ballots, compared to the in-person results, which suggests that respondents didn't feel they could provide an informed opinion on the options presented.

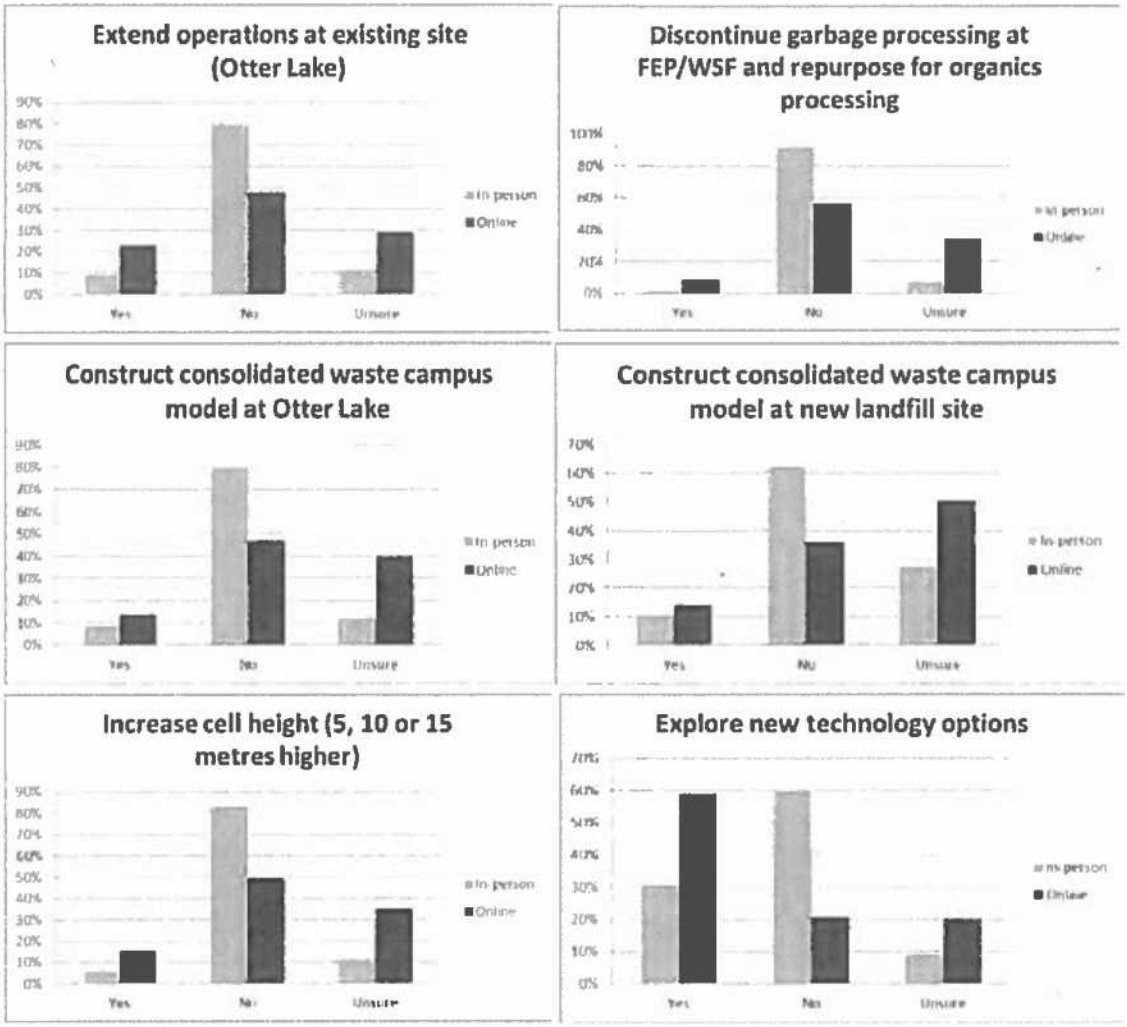


Figure 6. Comparison of survey results from events and online related to the topic of "Landfill Site Changes".

TOPIC #1 - INCREASING DIVERSION (REDUCE, REUSE, RECYCLE)

KEY TAKEAWAYS

- Strong support for increasing education and enforcement efforts at high rise apartments/condos and commercial properties
- Strong support for expanding the household hazardous waste program
- A mixed reaction to reducing trash bag limits from 6 to 4 bags, increasing inspections at the curb, and increasing inspections and rejections at the landfill
- A mixed reaction to the introduction of mandatory clear bags

FEEDBACK FROM BREAKOUT DISCUSSIONS

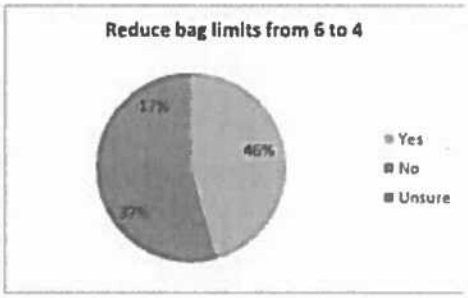
Outcomes most important to residents:

- Increasing education and enforcement
- Expanding the household hazardous waste program and making it more accessible
- Financially sustainable program and service delivery

Tensions and trade offs:

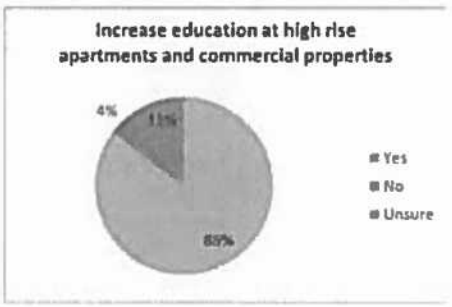
- Concern that clear bags and bag limit reductions would not have a significant impact
- Concern that illegal dumping would increase
- Large families, Christmas, and missed pick-ups all require consideration – special exemptions might be considered
- Concern with feasibility of implementation and effectiveness of changes

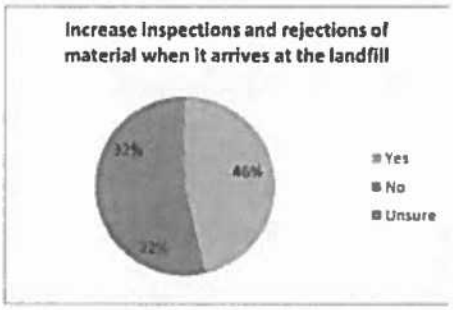
SURVEY RESULTS - IN-PERSON AND ONLINE

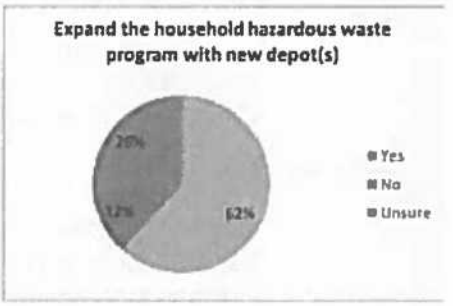












TOPIC #2 - CHANGES AT YOUR CURB

KEY TAKEAWAYS

- Participants had a largely mixed reaction to all three options proposed in this area.

QUALITATIVE FEEDBACK FROM BREAKOUT DISCUSSIONS

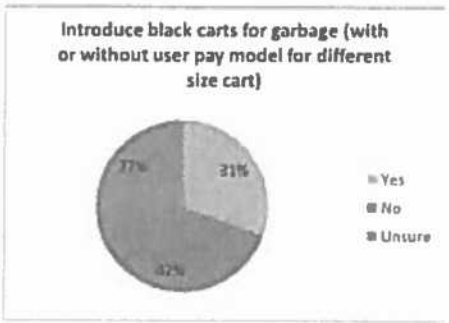
Outcomes most important to residents:

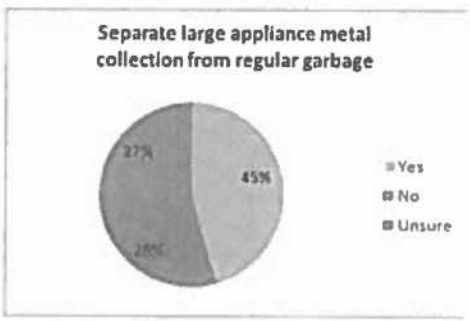
- Increasing education – specifically at apartments, condos, and commercial properties
- Increase inspections and rejections

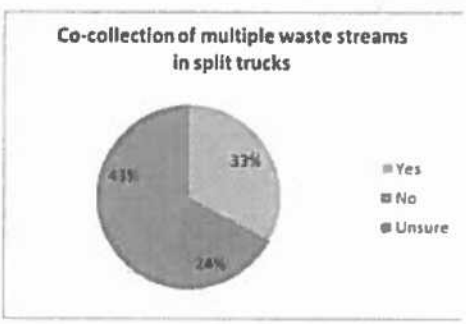
Tensions and trade offs:

- Striking an acceptable cost-benefit balance

SURVEY RESULTS - IN-PERSON AND ONLINE







TOPIC #3 - RECYCLING

KEY TAKEAWAYS

- Participants had a largely mixed reaction to the two options proposed in this area.

QUALITATIVE FEEDBACK FROM BREAKOUT DISCUSSIONS

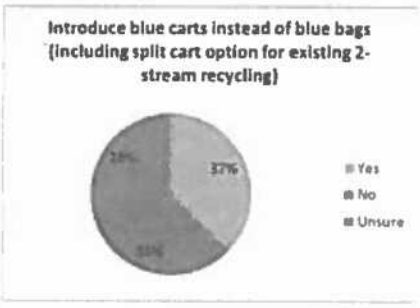
Outcomes most important to residents:

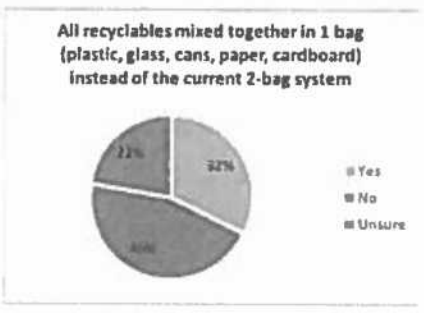
- Increasing education
- Improving compliance at apartments, condos and commercial properties
- Making it easy to participate

Tensions & trade offs

- Risk of contamination with single-stream recycling
- Challenges associated with blue carts
- Challenges for apartments/multi-unit dwellings not well equipped to comply

SURVEY RESULTS - IN-PERSON AND ONLINE





TOPIC #4 - ORGANICS AND COMPOSTING

KEY TAKEAWAYS

- Opposition to all the proposed changes to organics except for making HRM compost available for purchase

QUALITATIVE FEEDBACK FROM BREAKOUT DISCUSSIONS

ORGANICS

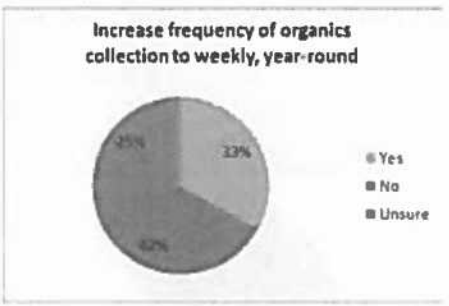
Outcomes most important to residents:

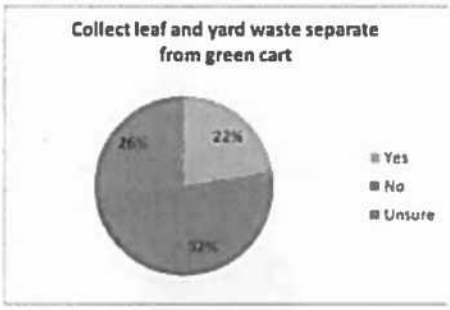
- A marketable product at a reasonable price
- Ease of participation
- Focus on backyard composting
- Increasing education and enforcement
- Apartments, condos need to do their part
- Production of a "Category B" compost product from the Waste Stabilization Facility at Otter Lake

Tensions and trade offs:

- Cost
- Weekly pick-up might make more sense for only part of the year (April to October)
- Durability of paper bags for leaf and yard waste
- Concern with rodents associated with backyard composting

SURVEY RESULTS - IN-PERSON AND ONLINE











TOPIC #5 – LANDFILL SITE CHANGES

KEY TAKEAWAYS

- Strong opposition to all of the proposed changes at the Otter lake landfill.
- Strong support for exploration of new technology options.
- Mixed reaction to option to construct a consolidated waste campus at a new landfill site.

QUALITATIVE FEEDBACK FROM BREAKOUT DISCUSSIONS

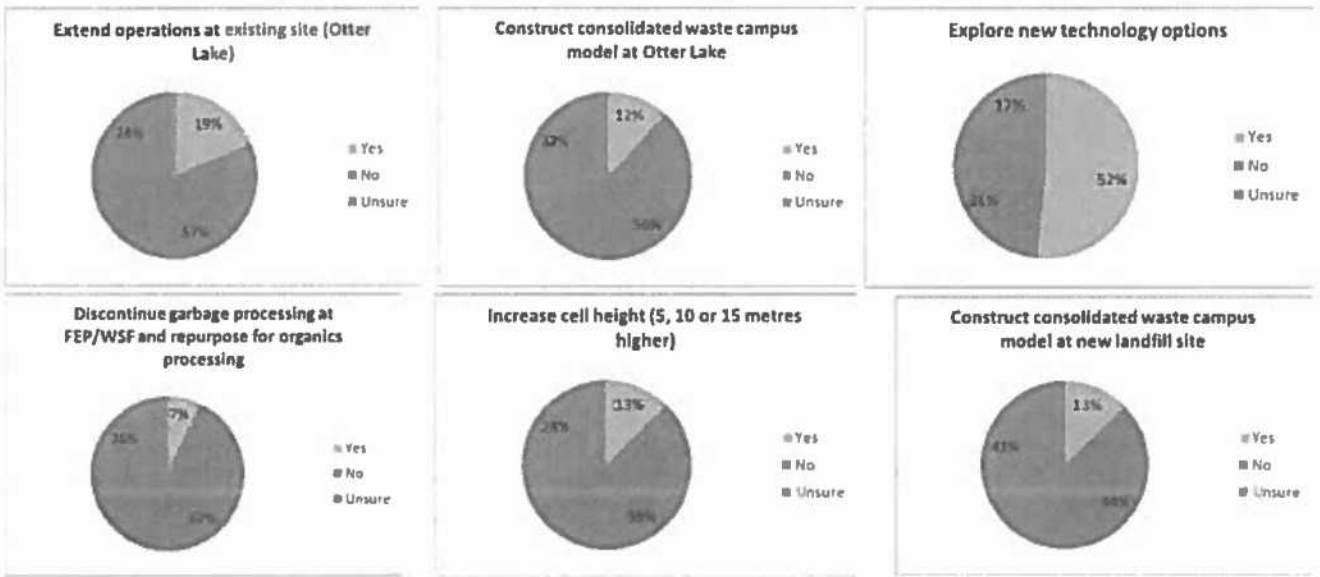
Outcomes most important to residents:

- Honour the contract
  - Keep the front end processor and waste stabilization facility
  - No reduction of landfill liner
  - No increase in cell height
  - No waste campus
  - Site a new landfill
- Protect the environment
- Citizen led process
- Shared understanding (HRM/community) of the agreement

Tensions and trade offs:

- Cost of current system is worth it
- Lack of trust – HRM has broken its word
- Integrity of the process – no one is listening
- Respect of partnership with the community
- ICI sector needs to catch up

SURVEY RESULTS - IN-PERSON AND ONLINE



STAKEHOLDER: COMMUNITY MONITORING COMMITTEE (CMC)

The engagement team communicated directly with the Community Monitoring Committee (CMC), interfacing with Ken Donnelly as the primary point of contact, to ensure that the voices and interests of the residents that live closest to the Otter Lake landfill were represented throughout the process.

Before the public engagement project began, the engagement team from NATIONAL met with the CMC executive at the Otter Lake landfill followed by the CMC in its entirety at the Prospect Road Community Centre to brief them on the solid waste strategy review community engagement program and come to a better understanding of their concerns and how they envisioned being involved.

The engagement team met with the CMC before each phase of the engagement to review event design for the town hall sessions, and regional public sessions. For each phase, the CMC advocated for the local community and provided valuable input that resulted in changes to the event agendas. In addition, the CMC had a presentation and/or speaking opportunity at all of the events. Additional reference materials were also posted by the engagement team to the Shape Your City Halifax online engagement portal, at the CMC's request.

As directed in the ESSC Report dated March 7, 2013, the engagement team gathered specific feedback from the CMC on the Stantec report recommendations as follows:

- Close the Front End Processor and Waste Stabilization Facility
- Extend the life of the Otter Lake landfill site through vertical cell expansion
- Modify the NS landfill liner specification
- Create a centralized waste resource campus

The full response from the CMC is included in its entirety in **Appendix F**.

STAKEHOLDER: INSTITUTIONAL COMMERCIAL INDUSTRIAL (ICI)

Estimated number of total in-person participants: *42*

The options being considered for the waste system could have significant business implications for the ICI sector. Like the general public, the ICI sector generally lacked awareness of the potential impacts the options under consideration for the waste system could have on their organizations, should they be implemented (e.g. service level, cost).

The design of the sessions with ICI sector stakeholders was similar to the general public events, with the event design adjusted to reflect commercial collection requirements and allow more open discussion with HRM Solid Waste Resources staff.

In general, ICI stakeholders wanted to know how the proposed options might affect their bottom line and there was a general desire for more business case information around proposed changes with explicit analysis on cost.

The engagement team also received letters from the Canadian Restaurant and Foodservices Association and the Investment Property Owners Association of Nova Scotia on November 18 and 21 respectively. These communications outlined the position of both groups on the options under consideration and are provided in **Appendix H**.

KEY TAKEAWAYS

- Businesses are looking for lower waste management costs. The high expense of both commercial taxes and collection fees are ultimately passed on to customers and tenants, making HRM businesses less competitive.
- Find cost-effective programs that still meet environmental and diversion objectives
- Changing the HRM bylaws that prohibit exporting waste outside of the HRM solid waste system could lead to considerable cost savings and greater competitive advantages for businesses
- Greater enforcement and education needed for apartments and condos
- Success with source separation depends a lot on the property manager and management company priorities
- Single stream recycling would streamline the current three blue bin system, but final opinion depends on cost

QUALITATIVE FEEDBACK FROM BREAKOUT DISCUSSIONS

INCREASING DIVERSION

Most important outcomes:

- Greater enforcement and education for apartments and condos
- A desire for more information around clear bag program – has it been successful for other communities in NS
- Greater enforcement around illegal dumping

Tensions and trade offs:

- Build on current successes
- Don't go backwards
- Cost implications

CHANGES AT THE CURB

**Decided not to report from this table, as deemed not applicable to this audience.*

RECYCLING

Most important outcomes:

- Increasing separation overall
- Diverting material away from landfill
- Responsibility and accountability for source separation shared by all

Tensions and trade offs:

- Single stream recycling perceived as a step backwards
    - More convenient, but also more costly

ORGANICS

Most important outcomes:

- Quality
- Cost-efficient system
- Increased education and improved understanding around what goes where

Tensions and trade offs:

- More frequent collection could increase source separation
- Sales of compost to public – lost revenue, should be considered

- Leaf and yard – not typically an issue with ICI. If it can be kept separate, could be more cost efficient since it's treated at another processing centre

LANDFILL SITE CHANGES

Most important outcomes:

- A desire for more information around proposed changes and benefits/cost implications
- Must consider impact on communities around Otter Lake
- Need more information around how proposed changes will impact business operators

Tensions and trade offs:

- Changes in "tipping" procedure are a concern - what is process to segregate and identify any contaminated loads?

STAKEHOLDER: WASTE INDUSTRY

Estimated number of total in-person participants: 24

The waste industry sessions were attended by more than 20 stakeholders, which was a strong turnout and considered representative of the businesses that play a direct role in waste management services in HRM. Given the existing expertise of this group of stakeholders, the format of the consultation was focused on gathering specific feedback on the recommendations of the Stantec report, pertaining to their business areas.

The engagement team also received a letter from waste industry stakeholder, Waste Management of Canada, on November 25. The letter requested that their points be tabled because, "certain participants at the (waste industry stakeholder) meeting, those with direct interest in maintaining the status quo, insisted upon interrupting and monopolizing discussion to the detriment of others." Waste Management's letter is provided in **Appendix I**.

KEY TAKEAWAYS

- Haulers want a clear process for inspections and rejections of loads on the tipping floor, especially if changes such as clear bags are implemented
- Increasing organic collection is difficult for compost processors due to increased staffing needs – they prefer a year round consistent schedule
- Single stream recycling would require a new Materials Recovery Facility (MRF) and the economics behind paying for a new MRF are a concern
- Compost product should be made available for purchase

- Strong support for:
    - Reducing bag limits from 6 to 4
    - Increased inspection at the curb
    - Increased education for high rise apartments and commercial properties
    - Increased inspection and rejection of material when it arrives at the landfill
    - Expansion of household hazardous waste program with new depot(s)
    - Separation of large appliance metal collection from regular garbage
    - Increased frequency of organics collection to weekly, year round
    - Making HRM waste available for purchase
    - Extending operations at Otter Lake
    - Exploring new technology options

- Strong opposition to:
  - Use of clear bags for garbage
  - Introduction of black carts for garbage
  - Co-collection of multiple waste streams in split trucks
  - Single-stream recycling
  - Introduction of blue carts instead of blue bags
  - Smaller green carts for food waste only
  - Discontinuing garbage processing at FEP/WSF and repurposing for organics processing

- A mixed reaction to:
  - Collection of yard and leaf waste separate from green cart
  - Accepting only paper bags for collection of leaf and yard waste
  - Construction of consolidated waste campus model at Otter Lake
  - Construction of consolidated waste campus model at new landfill site
  - Increased cell height

QUALITATIVE FEEDBACK FROM BREAKOUT DISCUSSIONS

INCREASING DIVERSION

Most important outcomes:

- Increasing education and enforcement
- Need a model for ICI sector and apartments and condos
- Education for waste industry – a focused approach that highlights benefits for haulers
- Clarity around inspections and rejections of material at landfill – what to do with inappropriate material/what to discard
- Hazardous waste pick-up must be more accessible

Tensions and trade offs:

- Size of household should impact bag reduction

CHANGES AT THE CURB

Most important outcomes:

- Efficiency
- Must be effective and cost efficient for both residential and commercial, urban and rural
- Increasing education – specifically at apartments, condos, and commercial properties

Tensions and trade offs:

- Striking an acceptable cost-benefit balance
- Weather and storage could be a problem for additional cart roll-out
- Separate cart for metals could be good revenue stream if controlled – separate pickup

RECYCLING

Most important outcomes:

- Safety – ensuring changes do not impact loading
- Make it easy, particularly for commercial side

Tensions and trade offs:

- Risk of contamination with single-stream recycling
- Singles stream-recycling may not work with existing MRF

ORGANICS

Most important outcomes:

- Compost product should be made available for purchase
- Roll-out of green carts as part of set criteria for new homes
- A marketable product at a reasonable price
- Increasing education and enforcement
- Reduce contamination

Tensions and trade offs:

- More frequent collection could be logistically difficult
- May not cost effective during the winter months
- Contamination challenge: separate yard waste could become too wet for collection

LANDFILL SITE CHANGES

Most important outcomes:

- Commitment to community is most important
- Need more participation by commercial sector in organics program
- Operational safety – need an appropriate surface for tipping at the landfill

Tensions and trade offs:

- Split trucks don't always let you optimize your loads and are most costly
- Concerns around campus model - can we use gas generated to support operations at the site?
- Concerns around proposed cell elevation - could potentially get through 15 years without new cells
- Concerns regarding closing existing site and export materials to alternative sites - existing by-law.
- In terms of proposed campus, could be potential issues around dealing with congestion
    - What happens if the landfill must shut-down due to emergency – if campus model, we would lose access to all facilities
    - Labour issues - if there is a strike people could picket one access road to the landfill

APPENDIX A: VERBATIM QUESTIONS FROM TOWN HALL MEETINGS

1. If there's a contract, why is this even being considered?
2. Why push to void contract with the communities? Not a good use of our tax dollars
3. Is the contract being broken because the city wants to use the savings for a stadium?
4. If HRM breaks this contract, how can they be trusted to uphold future contracts?
5. The community agreed to host the landfill for 25 years. How is it fair of HRM to extend the life beyond 2023?
6. Why are we here when there is a contract in place. Why not just leave Otter Lake alone? Why 14 meetings?
7. Is it legal for the contract to be broken?
8. Why did council decide they should break the contract? What did they see wrong with it?
9. Why was the agreement with the community (contract between HRM and residents) not taken into account in the Stantec consultation?
10. If HRM has no legal jurisdiction to make changes, why is all this money and time being wasted here and now to strong arm the citizens of this area to accept the Stantec report?
11. What gives you the right to break our trust and contract signed in good faith?
12. How can HRM justify talking about extending the life of the landfill when the community agreed to only 25 years?
13. "Government: of the people, for the people, by the people." Who changed the definition?
14. If HRM is going against their word to the community, how are we supposed to trust them again?
15. Politicians should work for us, not for them. What has changed?
16. Why do HRM staff continue to misrepresent the operations of FEP and WSF?
17. What plan does HRM have to repair and restore the relationship with our community? We feel dishonoured.
18. What will the effect of the increased cell height be?
19. How high will the landfill cells be raised to if the proposed changes are made?
20. What is the status of extending the life of the landfill?
21. Where would an alternative landfill be located? Are there proposed options?
22. Why won't HRM council start looking for a new site? Our community did our part. It took 10 years to settle Otter Lake, why not start looking now?
23. If there is no new site, what is the length of time HRM wants to extend the life of this landfill?
24. Why are we not discussing the replacement to Otter Lake? This is our chance to take what we've learned and improve?
25. Beside alleged savings, what is the other benefit to making the facility a dump?
26. Is it true that only 3% of the waste is prevented by the facility?
27. How will property values be affected?
28. How much will my property value go down?
29. The concern to me is the proposal to bring all compost to Goodwood area to "try" compost. This area experiences a high putrid smell on many days as it is – will this not increase the problem?
30. Why would we agree to having a landfill that smells, attracts birds in our neighbourhood and have it for another 100 years?
31. Will there be foul odors?
32. Will the smell increase at the landfill, making homeowner value go down?
33. How are you going to deal with the rodents like the ones near my parents' house, they live in a rural area with a dump a few kms away?

34. Currently, several times a year there are strong odours from the landfill. What guarantee is there this would not become worse with the proposed changes?
35. The landfill did smell without sorting 1-2 years ago. Why do you think it didn't?
36. How will a waste campus reduce odors at Otter Lake?
37. How does closing the landfill gatekeeper (FEP/WSF) possibly "enhance" or "evolve" the waste system?
38. Laurie Lewis stated that the WSF does not work as intended. Then why aren't we researching how to make it work better instead of scrapping it?
39. Are you saying that the state of the art waste management facility is mostly due to the cells and not the front end processer?
40. How are the proposed options going to protect the environment in a facility that was not designed for these extra years of operation?
41. What changes if HRM keeps the Otter Lake landfill site open?
42. If the province has already said they won't close or change the facility, why are we here? How can these changes still be made?
43. If the province is refusing to okay these changes what is the point of HRM continuing this process?
44. Is this a ploy to force the province to contribute more money to the city for waste processing?
45. How do you plan to overcome the province's objection to your proposed unilateral action?
46. Why is HRM proceeding in the face of opposition from the province?
47. Why is HRM doing this if different levels of government oppose the change? What is the percentage chance of HRM succeeding?
48. Why are we wasting the time and money if the province isn't going to change what is in place?
49. If Otter Lake is world renowned, why are we discussing change?
50. Why are you changing a system that works?
51. Why not leave the present system in place and treat those "new" green house gases as a new project, or extension of present system?
52. Why are there town hall meetings in areas that don't have anything to lose?
53. Has this decision already been made, or are we really going to be listened to? Does our opinion count?
54. Why are we here? Who started this idea? The deal was 25 years – was it working too well?
55. What triggered the desire to change the agreement since you indicated it wasn't for money?
56. What happens to the current employees at Otter Lake?
57. How many jobs will be lost?
58. What would the proposed increased employment mentioned by HRM look like?
59. Why would anyone reduce recycling to save money and cut jobs?
60. How will non source separated items be flagged without the FEP?
61. If cells are built higher, will noise of trucks and equipment be more of a nuisance?
62. What are the dangers of increasing cell heights? What is the environmental impact of the vertical cell increase?
63. If cells are built higher, will noise of trucks and equipment be more of a nuisance?
64. If this is an effort to save money? Has the city done an analysis of the cost of defending a class action lawsuit and the payments to the community for damages and diminished property values? Have this estimated the cost of reporting the environmental damage?
65. How do we know that the environment will be protected with the proposed changes?
66. Without a sorting facility, will hazardous waste go into the landfill?
67. We know harmful material is diverted on-site so why shut those safe-guards down?
68. Are there any environmental issues or laws to protect this from happening?

69. Why are some environmental checks and balances being raised in some areas but lowered at site A (Otter Lake)?
70. Does WSF/FEP produce more GHG or the same amount but faster? How much GHG produced without? How can we improve?
71. Without the FEP/WSF protections in place, would all organic material go to landfill site?
72. Why can you not produce useable compost?
73. What is the future of HRM composting and garbage?
74. Where will the organics go?
75. Where does the raw potato peel go if it gets to Otter Lake?
76. What model of landfill will Otter Lake be if these changes are implemented? What is the vision?
77. Why are we looking to save money short term? Not looking to make more ethical environmentally responsible choices?
78. Is there any truth to the statement that millions can be saved and no harm to the environment by closing the FEP?
79. The cost per year of the FEP is about $10 million, but did you know that if you divide by the number of households (near 200,000) the cost per household would be minimal? About $60.
80. Local businesses will suffer. Home owners will suffer. How does anyone think this will be okay?
81. Is HRM embracing bad/incorrect consulting reports?
82. Why did HRM take it upon themselves to approach Stantec?
83. Which version of the scientific evaluation is correct? The rosy view presented by HRM or; the contrary perspective voiced by CMC and the scientist mentioned vis-à-vis the Stantec report?
84. What does HRM (major and councillors) plan to do about the Stantec report? What do they want to implement?
85. What happens if you change the landfill and it doesn't work?
86. Is there a guarantee that there will be no leachate?
87. If you want to pick up everything in one truck to take it to Otter Lake to dump into one hole, do we stop using green bins?
88. If organics end up in the landfill (from restaurants/workplaces) are they separated and collected for composting, or treated on-site?
89. Was the FEP/WSF designed to separate the waste, or to process it to make the material inert?
90. If a large amount of items arriving at Otter Lake have not been separated should we not be looking at how we could reduce this amount?
91. How can removing one of the two barrier layers in the liner system provide the same level of protection? By definition it can't.
92. Will the liner be reduced from double to single? What happens when that change is made?

APPENDIX B: VERBATIM "VALUES AND PRINCIPLES TO GUIDE FUTURE DECISION-MAKING"

DARTMOUTH & VICINITY (SEPTEMBER 25)

"What do you appreciate most about the way we handle our trash in HRM?"

- Front end process
- Public consensus
- Improve without tearing it all apart
- Ahead of the curve
- Education of children
- Input from the public
- Proud! (we want clear bags)

"What is most important to you as we evolve our current waste system?"

Honor the Contract

- Honor the agreement created by host community for protection
- Simple principle- honor the commitment to host community
- The promise to the people
- Honor the existing agreement and permits without change and no extension for Otter Lake operational term past 25 years
- Honor agreements with community
- The same values and principles that were evident when the agreement between HRM and the host community for Otter Lake
- HRM must honor their contract
- Honor the contracts
- Keep promises made
- Honesty and support from HRM government

Education, Source Separation and Diversion

- Focus on education and source separation
- Public responsibility to separate at the source
- Work to increase source separation. Education, awareness, enforcement, accountability
- Diversion/ Source separation
- Improve source separation through education and enforcement
- Source separation- commercial building (especially new). Build better source separation in the design and through permit
- Education- commercial, institutional, general public
- Focus on diverting more from ICI sector- apartments, businesses, commercial
- Use waste audits to tackle recyclables and organics not diverted
- Collect organics from restaurants and apartments
- Increase diversion at source including businesses

Environmental Protection

- Environment over dollars and cents. Willing to pay more for state of the art.
- Environment- do not reduce liner, keep processes at Otter Lake and look at how to enhance
- Environmental protection
- Environmental and community protection

- Don't reduce existing environmental protections
- Reliable data and environmental assessment

Community Protection

- Community commitment and protection (now at Otter Lake and future site)
- Ensuring that the citizens understand the ramifications both financially and environmentally, especially those citizens who host the landfill in their area

Not Listening

- I thought the listening meant that HRM would listen to us. Instead, we got a sales job and we did the listening
- I do not see any demonstration of values and principle in the way this meeting is being conducted

Plan for the Long Term

Celebrate our World Class Landfill

Trust in our Government

Look at Best Practices

Improve Operations

Leave Otter Lake Alone

Use Clear Bags

BEDFORD & VICINITY (SEPTEMBER 26)

"What do you appreciate most about the way we handle our trash in HRM?"

- Way ahead, state of the art
- % of things put in recycling and compost
- Diversion and source separation
- Transient population- FEP and WSF protect us
- They pick it up! (the trash)

"What is most important to you as we evolve our waste system?"

- Honor the agreement and take care of the people
- Move towards a zero waste system
- Otter Lake remains the same
- Maintain or improve- education, operation and protection
- Stantec report is false
- Problem- no green bins for apartments
- Truth about GHG? How much?
- Keep the commitment to the community
- Review and consider all information and transparency
- Clear bags
- More processing will not increase methane production

"What principles should guide our future decisions?"

Honor the Contract

- Honor the contracts
- Honor contracts- Respect host community
- Integrity- live up to your commitments HRM
- Honoring commitments
- Trust- a deal is a deal
- Honor contracts and commitments
- A deal is a deal- LOLA!
- A deal is a dead- the local community
- Moral imperative to honor existing contract
- Respect CSC commitment, original strategy was brilliant
- Honor agreement
- Honor the agreement
- Honor commitments made to community around landfill
- Respect the CSC decision and commitment
- Honor commitment
- Honor past commitments
- The city made a commitment, let's keep it

Education, Source Separation and Diversion

- Improve education, enforcement and communication
- More education in regards to source separation
- Apartment building owners should be held responsible for waste management
- Provide tenants with tools to recycle and compost with as much ease as home owners
- Emphasize source separation- education, enforcement, clear bags
- Citizen driven strategy to increase diversion and establish waste system
- Perfect source seperation

Environmental Protection

- Environmental protection for everyone- host community should not suffer; they did not ask to be compensated
- Environmental protections
- Increase environmental responsibility and protection
- Environmental protection- liner + FEP + WSF + no organics
- Environmental protection

Transparency

- Transparency
- Give all points of view information from ALL reports
- Transparency! Equal time for all reports and executive summaries
- Transparency and consider equal footing for all information
- Full disclosure- focus on all reports Re: Otter Lake

Community Protection

- Community protection (FEP and WSF)
- Have some respect for your partners: the people of Beechville, Lakeside, Timberlea and Prospect

Leave Otter Lake Alone

- Leave the landfill and Otter Lake alone
- We are not interested in changing Otter Lake

Use Clear Bags

- Clear bags
- Use clear bags

Trust

Ban Plastic Bags- Use paper- Not about money

Extension past 25 years not supported

Get on with site selection

Make category B compost from WSF organics and use it beneficially

HALIFAX & VICINITY (OCTOBER 2)

"What do you appreciate most about the way we handle our trash in HRM?"

- FEP and WSF stay in place
- Not everything gets seperated at source
- HRM is a leader as a whole
- Why fix what is not broken
- World class waste facility- NS is not always so ahead
- Community process
- Proud of the state of the art system
- HRM doesn't seem to be listening- Is the respect still there?
- Where is the Dillon report?
- Community protection
- Community driven process
- Can't take the FEP out and have the system still work

"What is most important to you as we evolve our waste system?"

- GHG unintended? It is intended
- We need reality to the facts being brought forward
- WSF and FEP keep the community safe- helps us meet our diversion goals
- What about reducing waste?
- Lack of education about sorting
- We should go above and beyond
- We need another gatekeeper if people don't comply. FEP is a double check
- No food waste to landfill
- Go to zero waste
- Source separation
- Reduce bag limits? People will get bigger bags
- Environment priority
- Add protection, not take it away
- Education source separation at home- apartments and condos
- FEP and WSF are the best protection
- Landfill without a condom

- Most important environmental protection-Lakes- they affect us all
- Keep the system the way it is

"What principles should guide our future decisions?"

Honor the Contract

- Honor the contracts
- Honor contracts- Respect the agreements
- You should honor the agreement to close Otter Lake
- Don't make promises you can't keep
- Keep promise to community
- Honor contracts with host community
- Honor your commitments to the contract and the host community
- Honor the contract
- Honor commitment including CSE strategy
- Honor the contract with community
- Keep your word
- Keep the trust of the people by honoring your word
- Honor commitment
- Honor the contracts and agreements
- Keeping your word- to the community, no manipulations/bribes/ buy outs
- Honor the contract
- Honor your commitments

Education, Source Separation and Diversion

- Source separation
- Source separation and education
- Reduction and source separation, education
- More diversion, more education, more enforcement= less waste
- Educate the public- homeowners, businesses, apartments, condos
- Improving source separation which will reduce what ends up at Otter Lake. There by reducing what ends up at OL we reduce cost and the number of employees
- Source separation needs to be promoted and marketed to the residents (commercial, restaurants, elementary schools, apartments) Focus on education.
- More educational resources

Environmental Protection

- Commitment to environment
- Environment commitments
- Environment
- Environmental protection- protect environment, keep FEP and WSF till 2023 and close the landfill
- Environmental protection of all systems

Community Protection

- Community commitment -2023 closure focus on new options
- Respect community
- Keep commitment to community

- Treat Otter Lake community with dignity. We should be celebrating this community
- Our community is priceless

Integrity

- More truthfulness and facts instead of spin
- Openness, collaboration, sharing factual info
- Listening would be a great start
- No manipulation, speak truth

Leave Otter Lake Alone

- Leave the landfill and Otter Lake alone
- Leave the system alone

Keep the FEP and WSF

- Safeguarding our WSF and FEP

Get on with site selection

- Start process for another landfill

EASTERN SHORE & VICINITY (OCTOBER 3)

"What do you appreciate most about the way we handle our trash in HRM?"

- Look to other places when improving the system
- Proud of the system
- The way the system is currently working
- Exporting expertise
- Citizen design
- FEP and WSF
- Large item picked up at the curb
- No smelly landfill
- Recycle, compost and diversion
- Compost and organics don't go to the landfill
- Household hazardous waste facility
- World class leader

"What is most important to you as we evolve our waste system?"

- Residents are paying for green carts-tax dollars
- Campus model- trucks will fill too fast
- Clear bags
- Protection of the environment
- Don't save pennies by taking things away instead of growing the system
- Lack of trust- betrayal
- Only 10 years left at Otter Lake- Find new Landfill
- Stantec- what's their background?
- Limit on bags
- Cost recovery?

"What principles should guide our future decisions?"

Honor the Contract

- Honor the agreements
- Honor existing agreements
- Honor agreement- keep public trust

Education, Source Separation and Diversion

- Enhance source separation
- Concentrate on more source separation
- Improve source separation

Environmental Protection

- Protection of environment and community
- Future decisions need to be guided by environmental security- current and future

Community Protection

- Respect Otter Lake community
- Community must be partners. We must all work together for the success. We all live here and should do it together

Original Principles

- Stick to original principles- non-campus, non-direct dump
- Keep what we have and make it better- take nothing away

Keep the FEP and WSF

- Leave the FEP and WSF in place- they perform an important process

Get on with site selection

- Find a new landfill site

APPENDIX C: TRANSCRIPTION OF COMMENT CARDS

HONOUR THE AGREEMENT

1. "Why is it since the release of the Stantec Report has the regional plan in particular in the "solid waste resource management section being re-written that appears to almost eliminate the original intent of SU-22?"
2. "Council should keep their Word!"
3. "We learn the most by listening to people talk- by not letting us go longer this evening & have more people speak indicates we are not going to be heard. I/we don't want the landfill extended past 2023. Trust. Truth. Integrity. Keeping your word."
4. "Your memory is foggy!! No way would the landfill have been accepted in the Timberlea area without an end. You are traitors. Shame on you."
5. "Honor the contract."
6. "Our environment is priceless, money is not enough. Respect the people and commitments. Trust."
7. "Honour the agreements between HRM and the public & the landfill operator."
8. "Keep the promise. HRM staff need to improve their education program & better explain their goals honestly."
9. "A deal is a deal. It was reached after years of consultation. Now HRM is trying to undermine the agreement with the community by a false "consultation" process. No trust for HRM. Fire the arrogant fat staffers who have no respect for the people. They were laughing at the participants- makes me sick that HRM mayor and councilors allow this."
10. "Honouring the existing contract. Maximizing environmental protection. Repetitive, misleading, irresponsible on HRM. "
11. "Let HRM respect their promise to the community. Keep the FEP + WSP in place."
12. "Honour the contract. Keep commitment to community & environment. If it's not broke, don't fix it."
13. "Honour commitment. "
14. "Honor your contract to the people of HRM!"
15. "Keep commitments that have been made."
16. "Keep your word and honour your signed contract."
17. "Do NOT break the agreement with the host communities."
18. "You had asked the community how they felt about a landfill, we agree to host based on trust. We expect it to stay that way."
19. "Honour the commitment you made to the community."
20. "Stop wasting money on this process- honour your commitments!"
21. "Do you understand the tree trunk example? Please consider the long-term costs related to an unstable landfill. Odors, environments, leaks, long cycle of stabilization= decades. And, honour the contract with the community. The FEP/WAP are an important component of our accomplishments. Education about diversion, source separation and ways to improve the current process are the way to go forward. Removing protections are not the answer."
22. "The suspected cost savings suggested is not a sufficient goal for changing a system mid-stream and breaking a commitment to the community and maintain the WSF/FEP."
23. "No change to the contract."
24. "Uphold the contract & do not make proposed changes."
25. "Why are you not standing behind the original agreement?"
26. "The people need to be certain that contracts & promises made will be kept. No! No! No!"

27. "I can't believe that my city leaders would even consider going back on its word- an agreement with the community. How can you expect anyone to trust you again? It's a total betrayal."
28. "I do not support any of the Stantec recommends. The flawed Stantec reports should be shelved."
29. "They have a commitment to the city to keep their word. Why turn back time and reverse all the good we have done by having this facility? We have been recognized for it across the country/world and show them how to do the same, why stop now. "
30. "I am embarrassed as a citizen that council would ever even consider going back on their PROMISE TO ITS CITIZENS. Please do the right thing and keep this facility open. It's the right choice for the following reasons: Proving councils integrity, Environmental associated long-term benefits, proving that WE ARE LEADERS and that WE ARE STRONG for the rest of our province/country/world. This is an OPPORTUNITY to demonstrate/ lead by examples. Jobs! Think of the people who rely on this facility to feed their families."
31. "Honor the commitment to our community."
32. "Unilaterally breaking a contract is not an option. Honour the agreement, and close it in 8 years."
33. "Close Otter Lake when it was contracted to close 2023."
34. "Stop this bullying! A deal is a deal! "Dismay" "Angry" "Disheartened."
35. "HRM needs to honour its agreement (contract) with the people of BLT, Prospect Road, etc."
36. "When you sign a contract don't you think you should keep up your end of the agreement? Residents work hard to keep their end paying taxes & doing separation. What legal right do you have to break that contract?"
37. "I would like council to remember its promises to the area residents and uphold its agreement with the community."
38. "Keep your word. A deal is a deal!"
39. "Why the big rush to break a contract."
40. "They cannot break the contract, cannot close FEP/WSP and have people lose their jobs. Don't chance ruining a community."
41. "Stop bullying. Follow contract. Listen to the people. Leave Otter Lake alone."
42. "Honor the original contract."
43. "Honour the agreement and start working on the next site. For the future, let us move on."
44. "As a resident of Prospect Bay since 1975 and protested against Otter Lake, I only accepted it with the contract that was presented to the people to protect the environment & thus the community."
45. "To honour the original legal agreement with the community where Otter Lake was sited. Otter Lake should close when the agreement expires after 25 years in 2023."
46. "We want HRM to keep their promises to our community and leave the Otter Lake site alone! Be fair and leave it alone."
47. "I would like to see no changes. Contracts should not be broken because of money."
48. "A contract is made by two parties... but it is being denied by City of HFX."
49. "Honor your contract."
50. "Retain the contract. Height of cell should remain as is."
51. "I want you to keep the agreement. Close landfill in 2023."
52. "No means no!"
53. "Peoples homes, local businesses, our livelihood will all suffer from this. Why should we suffer for, first of all, allowing the facility to come into our community in the first place, and trusting that the contract would be fulfilled, but now a potential break in that contract has/will betray the trust we had in this operation. And it will have a direct effect on us, the people who allowed this to happen in the first place, 13 years ago. Why should we be forced to suffer the consequences?"
54. "It is necessary and honourable to keep the original agreement."
55. "Honour the contract. "Fire" the funkies who continue to try to sell their ideas to our community."

56. "2023 is the contract end date. Is this about extending the life of Otter Lake?"
57. "The environment!! Jobs!! Finish what you/we started!! Engage the people."
58. "That the landfill site not be extended and contracts not change or be broken. Don't fix what's not broken!!"
59. "The intent to break the contract was loud & clear when HRM staff asked for the Stantec Report without the parameters of the existing contract with the community."
60. "A promise/contract was made with the people of Timberlea. Keep the word made by your previous council. NS had had enough closures & families devastated by gov't decisions HRM should not follow this trend."
61. "No means no! A deal is a deal!"
62. "Integrity, keeping a promise. Close landfill on time as agree."
63. " I want HRM to live up to its commitments with the community, not just because I believe it is best environmentally, but also because it is ethically and morally right."
64. "We have a contract, stick to it."
65. "Keep your promise to our community! Since when is a contract so easily broken?"
66. "Honor your contracts and agreements."
67. "The contract with the community needs to be kept."
68. "I am most concerned that commitments made to the area residents for hosting a landfill be respected."
69. "Honour the agreement!"
70. "Do not renig on contract with community."
71. "Ditch the Stantec report. Keep the contract."
72. "Honour the contract!"
73. "Has the Stantec Report done an accurate analysis? Does the amount going through the FEP/WSF even if not 100% matter? How can all residents trust contracts= commitments if this is not honored? Are steps being taken to implement clear bags? Will an EAP be done? ICI waste is flagged at the FEP (this is a huge bulk of waste that goes through the FEP) how will this be addressed? Should energy $$$ go towards siting a new landfill? Energy on education & improving waste diversion & reduction strategies. Will rodents, vermin rise without the FEP/WSF (there will be organics going through)? What about hazardous waste being removed at FEP?"
74. "You've broken trust with this community. We feel betrayed. This process of public consultation should have started with a guarantee that the contract will be honored for the duration. Now is the time to start planning for when the contract expires. That's what good faith looks like. Council- you still have time to save face: Admit this was handled poorly. Honour the contract- restore good faith. Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens."
75. "Trust-honor- your word is your word."
76. "Honour signed agreements & communities."
77. "These meetings should not be necessary. The contract with the community says FEP & WSF are to be part of Otter Lake; since when is a contract not a binding document? The province says it won't allow changes. Why is this even being discussed? In all seriousness, lets save money here in HRM by avoiding wasting money elsewhere. Put together a committee of people like university students, single-moms and seniors. They'll help you figure out where the fault is."
78. "Promises to the host community."
79. "Honor contract."
80. "That changing the agreement will cause citizens to forever distrust any future agreements between citizens & city council. This would be a tragedy. And, why hasn't staff started looking for a post 2023 landfill site?"
81. "Honour the contracts!!"
82. "If this contract is breached and our community is not protected, it would be hard to continue to have faith in/support HRM counsel in the future."

83. "A contract is a contract. Leave our community alone."
84. "Council to honor its commitment to local host community. Honor the 25 year contract and get on with siting a new landfill site."
85. "Honour the contract at Otter Lake."
86. "Honour the contract."
87. "Honour commitments & contracts already made."
88. "Consider reports other than Stantec. Honor commitments made to the community."
89. "Honor your commitment! If you ever want anybody to agree to have a landfill in HRM again, you must honor your commitment. Consider all expert sources, not just one. Use facts and not conjecture."
90. "A deal is a deal. Honour the contract. Honour the spirit of the contract."
91. "A deal is a deal. Honour the contract. Honour the intent of the contract. Don't waste more tax payers money on legal technicalities. You made a deal HONOUR IT!"
92. "Honour the agreements."
93. "Please consider the past commitments and look to future success through increased diversion and source separation."
94. "Honour the agreement that is now in place with the hosting communities. Fire the flunkies who are trying to push this idea down our throat. Before we make changes to the system we now have in place, let's concentrate on the agreement that was put in place before. The communities have spoke loud about the proposed changes. They are not prepared to the ..... changes or the extended life of the present site. "
95. "You will have more citizen apathy if you break a promise."
96. "Honour the commitment to the host communities."
97. "Separation at curb side needs to improve before anything else. Keep your word to residents. Perhaps cost should not be most important thing."
98. "Keep your word! We have a contract! You are elected! We can change that."
99. "Why bother to sign a contract? HRM can't be trusted!!!"
100. "I do not support any of the recommendations put forward from the Stantec report. No extension past the 25 year term. The science supports that the FEP $ WSF do work as detailed in the initial build spec. Stop this public engagement process and restart the CSC process as occurred pre-1995."
101. "Do not interfere with this current contract!!"
102. "HRM must honor the agreements and contracts that were made at the time of the community voluntarily agreed to host the landfill."
103. "The agreement contract."
104. "Do not change a contract that has been working well. Honour what has signed. Spend our tax money in an area that needs it or planning on the next Otter Lake in 2023."
105. "It is not ethical to change a contract that was made. Our property values and quality of life will plummet."
106. "Honesty and keeping promises. We teach our children to keep their promises. As adults and politicians we need to model honesty by honoring our promises. It is amazing to me that $600,000 of taxpayer money has been spent studying this subject. If there is a contract, and there is, why are considering/wasting money trying to break the contract?"
107. "Just to honor your commitments."
108. "It is morally, ethically, and legally wrong to unilaterally change the terms of a contract."
109. "Do not change the agreement!! Citizen revolt will occur!! Even for councilors in other areas of HRM!"
110. "Do not break the contract!!! Bring in stricter rules around source separation like: clear bags, reduce the # of bags collected, recycle more products like Styrofoam, stricter rules for commercial institutions (ICI). Get a better sorter for the WSFE. Educate, educate, educate for organic waste separation. Why have we spent

$600,000 on this review to date and will end up over $1 million. That would have paid of inspectors, educators, purchased new sorters."

111. "No breaking the contract!"
112. "Contract= no changes. Honour contract. New site in 10 years."
113. "Honor the contract."
114. "A contract exists between the citizens and HRM. It must not be broken. Citizens are proud to be the guardians of a leading North American waste management system."
115. "Keep the process that the community was promised and created."
116. "Keep your word. Turn this around to be a positive process. Shame on HRM. How much have be spent on this process? Continue to spend? If you wanted ideas on diversion, happy to give for free if asked!"
117. "Honour the contract."
118. "HRM has changed their story through this process. First the Otter Lake site didn't do what it was supposed to, then it did. The WSF didn't work but now it does! The liner was supposed to be reduced, now it isn't. HRM doesn't understand their own system. Honour the commitment!"
119. "The commitment must be honoured before moving forward with new systems and changes to the existing facility. Campus style is breaking the contract!!"
120. "Honor the agreement & find new site for the next landfill- you have 10 years."
121. "Honour agreements and commitments to the local group. If you want to make changes, that's fine but negotiate in good faith with the local organization."
122. "You made a commitment, you need to honour it- this planning needs to be implemented after current agreement expires."
123. "If you break one contract, how can we trust that you can be trusted to make any other contracts. They won't be worth the paper it is written on."
124. "Stand up and honour the contract you signed with the Timberlea, Lakeside, Beechville, Prospect area."
125. "HRM should honour agreements they made with residents. When they don't it diminishes trust in the HRM."
126. "To move forward first answer this: Will you honour the agreements & find new site? You cannot move forward without an answer."
127. "Why are you not standing behind the original agreement?!"

SOURCE SEPARATION

Education

Recycling, Composting

Enforcement

Apartments

1. "More education is needed."
2. "Promote more separation at residents. The $$$ spent on Stantec and useless consultation should have gone to public education for source separation. Better use of our $ than biased studies and fake "consultation"! How much were consultants paid?"
3. "Education 1st then go forward."
4. "When coming to a decision on this topic, please base it on facts, science and evidence rather than on opinions, spin doctoring and personal agendas. I also think adding bluecarts to the program is a great idea."

5. "Education about diversion, source separation and ways to improve the current process are the way to go forward."
6. "There needs to be more education for people on how powerful it is to recycle & compost! So important. Perhaps a video on Top 10 recycling crimes!"
7. "Consider improving collection/ recycling & reducing garbage to start with."
8. "Why are new apartment not built to facilitate at source separation?"
9. "Reject Stantec report recommendations. Perfect source-separation without delay and with determined courage & vision. Bag limits, cost per bag after 1st bag weekly, clear bags, fines for non-compliance for ICI & residential, enforcement. Need a real Zero Waste Solutions Citizens Task Force- a permanent, funded, official body with full HRM & provincial cooperation."
10. "Educate the population of the ramifications of not recycling properly. "
11. "How could any individual in charge of our tax funds make a decision to spend almost 1 million dollars without being sure if the province would amend the law or source separation?
12. "Embrace clear bag for garbage and increase enforcement to weed out all of those that are not separating at source. "
13. "More education on source separation."
14. "Develop strategies to up recycling/composting/sorting at source especially in apartment buildings & commercial businesses."
15. "Energy on education & improving waste diversion & reduction strategies."
16. "Why is there no source separation in apartment buildings? Where does that garbage get separated?"
17. "Make source separation/ front end processing facility."
18. "Please consider the past commitments and look to future success through increased diversion and source separation."
19. "Separation at curb side needs to improve before anything else."
20. "Let's promote source separation."
21. "Bring in stricter rules around source separation like: clear bags, reduce the # of bags collected, recycle more products like Styrofoam, stricter rules for commercial institutions (ICI)."
22. "Why if something works so well (FEP & WSF) would you want to change it, when other systems need to be improved (source separation in apartments & business). Work with the operator & community as a team, not against as opposition."
23. "Keep it as is. Improve source separation."
24. "Develop strategies to up recycling/composting/sorting at source especially in apartment buildings & commercial businesses."
25. "Other systems need to be improved (source separation in apartments & business)."
26. "When you sign a contract don't you think you should keep up your end of the agreement? Residents work hard to keep their end paying taxes & doing separation."
27. "It's important to continually educate all newcomers to the city on how the waste system works, promote compliance and discourage littering. New renters and students seem misinformed on arrival. We need to promote waste reduction to help make the whole system more sustainable. There is an opportunity to promote frequent messages that link the importance of having a good waste system so that all residents take pride and responsibility for living in a clean city."

Questions:

1. "Monitoring and warnings for ICI loads not properly sorted is done at the FEP to my understanding; how will this be monitored and enforced if the FEP is closed? What is being proposed and has this been costed?"
2. "Why are some residents not separating?"

ENVIRONMENTAL PROTECTION

1. "Protect our Lakes for Future Needs"
2. "Please consider that the environment assessment was waived because the FEP/WSF were in place. What happens if the FEP/WSF are taken away, will there be a new environmental assessment? "
3. "Our environment is priceless, money is not enough. Respect the people and commitments. Trust."
4. "Original construction liner only engineered for 25 years or less when cells get full. Need to protect surrounding lakes in case all of HRM need water in future. Only 60% of waste is diverted, need FEP & WSF to protect what goes into cells."
5. "Honoring the existing contract. Maximizing environmental protection. Repetitive, misleading, irresponsible on HRM. "
6. "Keep commitment to community & environment. If it's not broke, don't fix it."
7. "When coming to a decision on this topic, please base it on facts, science and evidence rather than on opinions, spin doctoring and personal agendas. I also think adding bluecarts to the program is a great idea."
8. "Do you understand the tree trunk example? Please consider the long-term costs related to an unstable landfill. Odors, environments, leaks, long cycle of stabilization= decades."
9. "That the communities are not uneducated homeowners. Many are experts & are informed, dedicated & committed to ensure that we will not have a disaster on our lands which HRM will be baffled & not in any position to pay cost of environmental damage plus homes losing worth."
10. "Should we not look for ways to improve environment protection than decrease protection? How many other places are proud of their garbage dump?"
11. "As a resident of Prospect Bay since 1975 and protested against Otter Lake, I only accepted it with the contract that was presented to the people to protect the environment & thus the community."
12. "If the liners should fail, and matter leaks into the water system, who is responsible for the clean-up and associated costs? Not the little taxpayer surely! Who will supply water to my home forever and ever? Not me!"
13. "How will the increased Height and weight of the garbage affect the liner and gas recovery system at the base of the cell?"
14. "It is most advisable to go on in perfecting ways to dispose of community waste while causing the least environmental impact. Priority is to protect the Nine Mile River system."
15. "I want HRM to strengthen environmental protections at Otter Lake, and I'm willing to pay higher taxes to make that happen."
16. "What is HRM doing to reduce waste?"
17. "Are you working with manufacturers to get them to make items that will not end up in the landfill or the curb?"
18. "Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens. "
19. "How can you claim there will be no environmental consequences when an environmental assessment has not been completed?"
20. "Protect our environments and do not reduce specs."
21. "Our lakes and rivers. Fires from clumping in a cell without being sorted first."
22. "Enviro safety. Life expectancy of Otter Lake."
23. "What is the reclamation plan for site after closure?"

Questions:

1. "Please consider that the environment assessment was waived because the FEP/WSF were in place. What happens if the FEP/WSF are taken away, will there be a new environmental assessment?"

2. "Structurally, what if the structure of the landfill fails, then what will be done? Is there an action plan in place in case of this occurrence?"
3. "What is the recovery procedure to deal with a breach/failure in the cell liners? What is the lifespan of the cell liners?
4. "Will an environmental impact assessment be required if changes are made?"
5. "How does allowing hazardous & banned materials into the landfill maintain the same level of environment?
6. "What is the reclamation plan for site after closure?"
7. "ICI waste is flagged at the FEP (this is a huge bulk of waste that goes through the FEP) how will this be addressed?"
8. "Will rodents, vermin rise without the FEP/WSF (there will be organics going through)."
9. "What about hazardous waste being removed at FEP?"
10. "Without FEP how will we ensure hazardous materials are not put into our landfill?"

COMMUNITY PROTECTION

1. "Your memory is foggy!! No way would the landfill have been accepted in the Timberlea area without an end. You are traitors. Shame on you."
2. "The fact that this process is even taking place is a total breach of trust. The only community that has an interest in this (or at least an overwhelmingly more significant interest) is the one near Otter Lake. No one will ever trust HRM again for a project they view as a nuisance."
3. "This is a waste of money & time. You will not get new innovative ideas of ways to improve the system unless you stop trying to reneg on community commitment."
4. "Our environment is priceless, money is not enough. Respect the people and commitments. Trust."
5. "The process for consultation is questionable. Someone filling the summary sheet based on HRM speakers- not enough from people from community."
6. "Now HRM is trying to undermine the agreement with the community by a false "consultation" process. No trust for HRM."
7. "Only 3 table discussions were brought forth- don't want to hear community input."
8. "Keep commitment to community & environment. If it's not broke, don't fix it."
9. "Keep promise to community."
10. "Do NOT break the agreement with the host communities."
11. "You had asked the community how they felt about a landfill, we agree to host based on trust. We expect it to stay that way."
12. "Honour the commitment you made to the community."
13. "That the decision to even revisit the HRM proposal is not valid & breaks community trust."
14. "You will never get another community to agree to a landfill. Never. Best bet, leave HRM & become a town. "
15. "That the communities are not uneducated homeowners. Many are experts & are informed, dedicated & committed to ensure that we will not have a disaster on our lands which HRM will be baffled & not in any position to pay cost of environmental damage plus homes losing worth."
16. "It is time to start looking at other sites. Please respect the CMC. You have a legal agreement with the community."
17. "Have you considered the people who will lose their jobs if you close WSP-FEP? DON'T IGNORE THE COMMUNITY. They stated their terms in the 1990's. We have not changed our minds about protecting our environment and our community. Leave Otter Lake alone!"
18. "They cannot break the contract, cannot close FEP/WSP and have people lose their jobs. Don't chance ruining a community."
19. "As a resident of Prospect Bay since 1975 and protested against Otter Lake, I only accepted it with the contract that was presented to the people to protect the environment & thus the community."

20. "SMELL- I live in middle Sackville. At times the smell of an open dump was sickening. RODENTS- It was in the Sackville dump. There were rats everywhere."
21. "People's homes, local businesses, our livelihood will all suffer from this. Why should we suffer for, first of all, allowing the facility to come into our community in the first place, and trusting that the contract would be fulfilled, but now a potential break in that contract has/will betray the trust we had in this operation. And it will have a direct effect on us, the people who allowed this to happen in the first place, 13 years ago. Why should we be forced to suffer the consequences?"
22. "You have ignored the community except for this controlled consultation."
23. "Please listen to the people from the communities close to the Otter Lake site!!"
24. "The contract with the community needs to be kept."
25. "I am most concerned that commitments made to the area residents for hosting a landfill be respected."
26. "Very much concerned about our communities & our province."
27. "Consider the community & their wishes. Consider all info available (i.e. Dillon, Stantec etc.) Honour commitments & contracts already made. Protect our environments and do not reduce specs."
28. "It is not ethical to change a contract that was made. Our property values and quality of life will plummet."
29. "Job losses due to closure both directly and sub-directly."
30. "What is the reclamation plan for site after closure?"
31. "HRM should maintain the FEP-WSF which was a condition of the host community accepting the landfill."
32. "Why if something works so well (FEP & WSF) would you want to change it, when other systems need to be improved (source separation in apartments & business) Work with the operator & community as a team, not against as opposition."

Questions:

1. "What is going to happen to the staff? What compensation will we have to pay to Mirror?"
2. "Why back to back in affected community but spread out in other communities for consultation?"

TRANSPARENCY AND INTEGRITY

1. "We learn the most by listening to people talk- by not letting us go longer this evening & have more people speak indicates we are not going to be heard. I/we don't want the landfill extended past 2023. Trust. Truth. Integrity. Keeping your word."
2. "They are wasting our taxpayers money. Many councilors have not visited Otter Lake- yet they vote on a topic they do not have first hand experience on. Keep the promise. HRM staff need to improve their education program & better explain their goals honestly."
3. "Study the fact & know the science behind the Otter Lake facility. Show where the MONEY is going i.e. - community meetings/ reports."
4. "The process for consultation is questionable. Someone filling the summary sheet based on HRM speakers- not enough from people from community."
5. "You had asked the community how they felt about a landfill, we agree to host based on trust. We expect it to stay that way."
6. "HRM image is suffering due to dishonesty & lack of transparency."
7. "The people need to be certain that contracts & promises made will be kept. No! No! No!"
8. "The agreement that protects the districts surrounding Otter Lake if broken by HRM staff will be a betrayal of our trust we have in HRM administrators. When HRM are searching for a new location for the next landfill, no one will want to sign an agreement with HRM only to be broken."

9. "TRUST."
10. "NO NO NO NO NO NO NO NO NO What don't you understand, what a bunch of crooks."
11. "Where is the useless mayor? The 3 HRM staff sitting on the stage should be ashamed- fire the bozos. The consultation process will not stand in court. Your day of reckoning is coming. The consultants ignore the people, rude, biased, fire them! The consultants organizing this discussion process are not worth the $200K! Sticky notes & dots- seriously! On this day & age there are far more fair, equitable and effective ways to do this ridiculous process."
12. "How can council be trusted on any contract if they are going to break a legal contract here?"
13. "How could any individual in charge of our tax funds make a decision to spend almost 1 million dollars without being sure if the province would amend the law or source separation?
14. "Why didn't anyone at least attend a site tour, even put on a pair of coveralls, talk to people who work there prior to commissioning such an expensive and rather weak assessment (to say the least) of the facility?"
15. "You have killed your credibility by moving in a direction that breaks a contract."
16. "There needs to be a choice, I know that no community wants a landfill in their area, but we need to have one somewhere."
17. "This was a waste of my time, I feel the decision was already made."
18. "This is not an open process. This is not a fair process. This is not a well publicized or accessible. You idiots have already decided the outcome."
19. "How does HRM staff have the ability to spend $600K without council knowing? Who runs this city? HRM staff needs a cap on how much they can spend. Council was elected to look after my tax dollars."
20. "Integrity, keeping a promise. Close landfill on time as agree."
21. "Why? No one wants this. There are more pressing issues that should be considered. The mayor & council need to listen to the people. It has been a waste of our money. Do not base comments on a lot of people who don't care because it is not in their backyard. The trust is gone."
22. "I appreciate the efforts made by the HRM staff in carrying out these consultations but I feel that using stickies and dots diminish my concerns- is this kindergarten?"
23. "You are wasting our time & money because the decision was already made when you made the large hole needed to do this in the city plan that was made the other year. None of you can be trusted."
24. "Breaking a contract with residents is illegal and immoral."
25. "That I filled out the post it notes and they weren't pasted on the white board. Another example of democracy???"
26. "Why was consultation started if the province says no, why are we still discussing the changes?"
27. "Stop the entire process, listen to the people."
28. "You've broken trust with this community. We feel betrayed. This process of public consultation should have started with a guarantee that the contract will be honored for the duration. Now is the time to start planning for when the contract expires. That's what good faith looks like. Council- you still have time to save face: Admit this was handled poorly. Honour the contract- restore good faith. Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens. "
29. "The unauthorized extension of Otter Lake with blatant disregard for legal contracts while undermining the due process and power of the monitoring committee by changing the "deal"/agreements that were to be binding. We shouldn't have to be here!! After the 2 meetings here where the people are stakeholders/residents in the area, you are going to "consult" with other districts in HRM, "spin" the data, they will be relieved they wont have to deal with the problem if Otter Lake is extended (NIMBY) and you will distort and get your majority of HRM to agree with your ultimate DONE DEAL. SHAME on you!!"
30. "Waste of HRM taxpayers money doing these consultations."
31. "I believe HRM council is not getting full information from Council's advisors, staff & consultants. Stantec spent 1.5 hours at Otter Lake & wrote a 180 page landfill report on the visit."

32. "Cost of reverse cleaning up & permanent damage."
33. "Height off the cells. Why we are being lied to for 10 million dollars. The Stantec report is wrong."
34. "What will it cost to clean if it is stopped?"
35. "Can we stop this stupid consultation? How much do the consultants make with this flawed process? Shows how stupid the city staff are."
36. "If this contract is breached and our community is not protected, it would be hard to continue to have faith in/support HRM counsel in the future."
37. "Property values."
38. "It is probably easier to show respect for the people, contracts and procedures than to carry on campaigns aimed to mislead or based on the assumption people are complacent/stupid. In this age, information gets around. Develop trust and maybe people will trust government officials and opinions. You will feel better, you won't come across as shady bureaucrats and people will be inclined to work with you."
39. "Stantac-Stantac-Stantec... although it was mentioned that there was actually 5 reports on the landfill operation only 1 (Stantac) was mentioned continuously during (lady's) presentation.
40. "A deal is a deal. Honour the contract. Honour the spirit of the contract,"
41. "Put provincial regulatory documents on the website. After 4 engagements they still are missing."
42. "You will have more citizen apathy if you break a promise."
43. "Please treat the public who speak with respect. It is not very professional. I learned you are not listeners!"
44. "It is not ethical to change a contract that was made. Our property values and quality of life will plummet."
45. "Honesty and keeping promises. We teach our children to keep their promises. As adults and politicians we need to model honesty by honoring our promises. It is amazing to me that $600,000 of taxpayer money has been spent studying this subject. If there is a contract, and there is, why are you considering/wasting money trying to break the contract?"
46. "It is morally, ethically, and legally wrong to unilaterally change the terms of a contract."
47. "Keep your word. Turn this around to be a positive process. Shame on HRM. How much have be spent on this process? Continue to spend? If you wanted ideas on diversion, happy to give for free if asked!"
48. "Incompleteness of report, in regards to organic waste engineered report, need more social science and biology input (psychology of participation/education)."
49. "When a new landfill site is needed it is imperative to keep commitments to the community OR it will be impossible to find a new site in the future."
50. "Why aren't all reports getting equal billing. Moral imperative- contract is sacred!"

Questions:

1. "Why isn't there another meeting in Otter Lake are when all public consultations are finished? More education is needed. "
2. "How much were consultants paid?"
3. "Who will be the scapegoat if this project fails to go ahead? What would be the cost of importing clay if it came from Shubie?"
4. "Beyond Stantec, how much as the PR consultants now costing?"
5. "2023 is the contract end date. Is this about extending the life of Otter Lake?"
6. "Why hasn't HRM senior staff explained to the residents of Otter Lake area why they recommend the changes contained in the Santec Report?"
7. "If the landfill leaches out and pollutes well water does the city have to supply water lines to these households?"
8. "HRM does not have the authority to stop FEP & WSF. Authority to close FEP is provincial. How is HRM getting around that? "

9. "If we're assuming Otter Lake completes its cycle in 2023 as expected, is HRM currently looking for a new site or is the evolution of Otter Lake planned to eliminate the need to go through this process with another community?"
10. "Why hasn't staff started looking for a post 2023 landfill site?"
11. "Has the Stantec Report done an accurate analysis?"
12. "Why has HRM not addressed flaws identified in the Stantec report before proceeding to public consultations?"
13. "Will an EAP be done?"

LEAVE OTTER LAKE ALONE

1. "If it ain't broke don't fix it."
2. "Leave Otter Lake alone."
3. "I support Leave Otter Lake Alone."
4. "Stop bullying. Follow contract. Listen to the people. Leave Otter Lake alone."
5. "Maintain Otter Lake as is. Close site at end of the contract in July 2022."
6. "We want HRM to keep their promises to our community and leave the Otter Lake site alone! Be fair and leave it alone."
7. "Keep the landfill as it is. At the end of its life cycle, close the landfill & start a new one somewhere else."
8. "I would like to see no changes. Contracts should not be broken because of money."
9. "Leave Otter Lake alone."
10. "Keep Otter Lake open. It is time to move forward not backward."
11. "I am against changes to Otter Lake."
12. "Leave us alone. Do the right thing."
13. "Do not change the setup of Otter Lake."
14. "Why change something that is working not like Sackville landfill."
15. "Leave things alone."
16. "Leave Otter Lake and the landfill alone. HRM needs to learn to be honest."

CLEAR BAGS

1. "Bag limits, cost per bag after 1st bag weekly, clear bags, fines for non-compliance for ICI & residential, enforcement. Need a real Zero Waste Solutions Citizens Task Force- a permanent, funded, official body with full HRM & provincial cooperation."
2. "Clear bags for recycling, deny mistakes."
3. "Embrace clear bag for garbage and increase enforcement to weed out all of those that are not separating at source. "
4. "Use clear bag approach."
5. "Should we be looking at clear bags to help front end sorting."
6. "Are steps being taken to implement clear bags?"
7. "Please HRM- bring in the clear bag policy to force residents who aren't separating to get on board."
8. "Bring in stricter rules around source separation like: clear bags, reduce the # of bags collected, recycle more products like Styrofoam, stricter rules for commercial institutions (ICI)."

NEW LANDFILL

1. "Use this time to find a new site for landfill due to open 2023"

2. "Close Otter Lake facility no later than 2024."
3. "Locate new landfill site & rebirth the CSC."
4. "It is time to evolve in 2023 Take everything that is good that we have now & add to it but at another site where it is planned- 10 years."
5. "Close Otter Lake."
6. "Begin to look for new site. It will take 10 years to site new location."
7. "It is time to start looking at other sites. Please respect the CMC. You have a legal agreement with the community."
8. "It makes me realize that landfill in Otter Lake must be closed."
9. "We do not want the landfill!!"
10. "Honour the agreement and start working on the next site. For the future, let us move on."
11. "The Otter Lake facility should close in 2023. So get on with finding new site."
12. "Also, at the end of this contract, the Otter Lake site must close as promised to us."
13. "I want HRM to start finding new landfill sites and to at the end of 25 years to close the Otter Lake site and turn it over to the community for recreational purposes."
14. "And, why hasn't staff started looking for a post 2023 landfill site?"
15. "Honor the 25 year contract and get on with siting a new landfill site."
16. "Look for new site."
17. "Find a new site and have it operating by the agreed closing date."
18. "Spend our tax money in an area that needs it or planning on the next Otter Lake in 2023."
19. "Let's look for the next facility."
20. "Contract= no changes. Honour contract. New site in 10 years."
21. "Honor the agreement & find new site for the next landfill- you have 10 years."
22. "To move forward first answer this: Will you honour the agreements & find new site? You cannot move forward without an answer."

FRONT END PROCESSING & WASTE STABILIZATION FACILITY

1. "Leave Otter Lake alone. Leave FSP & W (FEP-WSF) "
2. "Keep FEP, WSF, Enhanced liner and CMC."
3. "Why fix a process that is not broken? The FEP/WSF helps so do not remove it."
4. "Keep the FEP & WSF. "
5. "Original construction liner only engineered for 25 years or less when cells get full. Need to protect surrounding lakes in case all of HRM need water in future. Only 60% of waste is diverted, need FEP & WSF to protect what goes into cells."
6. "Please consider the long-term costs related to an unstable landfill. Odors, environments, leaks, long cycle of stabilization= decades. And, honour the contract with the community. The FEP/WAP are an important component of our accomplishments. Education about diversion, source separation and ways to improve the current process are the way to go forward. Removing protections are not the answer."
7. "If it ain't broke don't fix it."
8. "Let HRM respect their promise to the community. Keep the FEP + WSP in place."
9. "Keep FEP & WSF."
10. "Have you considered the people who will lose their jobs if you close WSP-FEP? DON'T IGNORE THE COMMUNITY. They stated their terms in the 1990's. We have not changed our minds about protecting our environment and our community. Leave Otter Lake alone!"
11. "They cannot break the contract, cannot close FEP/WSP and have people lose their jobs. Don't chance ruining a community."

12. "Keep the same if it works."
13. We have a facility that is top notch with dedicated employees. The fact that closure is an issue is ridiculous."
14. "I want the FEP/WSF maintained, and, if possible, expanded."
15. "Maintain the integrity of the system. Develop strategies to up recycling/composting/sorting at source especially in apartment buildings & commercial businesses. Honor the agreement!"
16. "Do not close the FEP & WSF."
17. "HRM does not have the authority to stop FEP & WSF. Authority to close FEP is provincial. How is HRM getting around that? "
18. "The WSF and FEF must remain. It is in the agreement."
19. "The science supports that the FEP $ WSF do work as detailed in the initial build spec."
20. "Do not close the FEP or the WSF!!"
21. "Keep the WSF & FEP open."
22. "We don't want to changes to the current facility. "
23. "Keep the process that the community was promised and created."
24. "HRM should maintain the FEP-WSF which was a condition of the host community accepting the landfill."
25. "Why if something works so well (FEP & WSF) would you want to change it, when other systems need to be improved (source separation in apartments & business)"
26. "Keep the process that the community was promised and created."
27. "A contract exists between the citizens and HRM. It must not be broken. Citizens are proud to be the guardians of a leading North American waste management system."
28. "Do not interfere with this current contract!!"
29. "HRM must honor the agreements and contracts that were made at the time of the community voluntarily agreed to host the landfill."
30. "The contract with the community says FEP & WSF are to be part of Otter Lake; since when is a contract not a binding document? The province says it won't allow changes. Why is this even being discussed?"
31. "Has the Stantec Report done an accurate analysis? Does the amount going through the FEP/WSF even if not 100% matter? How can all residents trust contrasts= commitments if this is not honored? Are steps being taken to implement clear bags? Will an EAP be done? ICI waste is flagged at the FEP (this is a huge bulk of waste that goes through the FEP) how will this be addressed? Should energy $$$ go towards siting a new landfill? Energy on education & improving waste diversion & reduction strategies. Will rodents, vermin rise without the FEP/WSF (there will be organics going through). What about hazardous waste being removed at FEP?"
32. "I do not support any of the recommendations put forward from the Stantec report. No extension past the 25 year term. The science supports that the FEP $ WSF do work as detailed in the initial build spec. Stop this public engagement process and restart the CSC process as occurred pre-1995."

IMPROVE OPERATIONS

1. "This is a waste of money & time. You will not get new innovative ideas of ways to improve the system unless you stop trying to reneg on community commitment."
2. "It is time to evolve in 2023 Take everything that is good that we have now & add to it but at another site where it is planned- 10 yrs."
3. "Changes to the next landfill."
4. "Don't regress."
5. "Why back to back in affected community but spread out in other communities for consultation? Why has HRM not addressed flaws identified in the Stantec report before proceeding to public consultations? Where are

recommendations to improve effectiveness? Without FEP how will we ensure hazardous materials are not put into our landfill?

6. "It's time to start planning future waste management and learn how to continue to improve. "
7. "Consider the data that is supplied by Mirror daily of what goes in the landfill & ask the people who run it how the landfill is working. Stantec does not have all or correct info. Consider the community stakeholders."
8. "Reconvene the CSC process, participants of the CSC- to examine if the present system fulfills their integrated resource management strategy. And to propose and champion ways to fulfill any remaining parts- and to save money, build community equity & happiness and to benefit the environment."
9. "That an elected council would make a decision to change a system that is not broken!"
10. "This process has been flawed since staff took it upon themselves. Open your eyes and stop this nonsense!"
11. "Improve composting & recycling programs & hazardous waste collection i.e. include CFL bulbs."
12. "The downstream costs of removing FEP/WSF in 1) environmental cleanup of Nine Mile River and community downstream, 2) loss of tax revenue due to loss of property values, 3) loss of tourism (e.g. The Bluff Wilderness Hiking Trail lies within sight of the landfill and will be ruined by the cell tower that is proposed), 4) legal costs, no matter which side wins, paid by all who are paying now for FEP/WSF, the public."
13. "Better separation."
14. "Term organics- 8K tons of paper- why not recycled, why include it in term organics- when you just asked for it not to be included. "
15. "Make improvements with city input & agreements only."
16. "Rather than just looking @ saving $$ by putting "more" in the landfill, explore saving money by putting "less" in landfill. E.g. Support cloth diapers. 5% of your landfill is disposable @ a cost of savings of $500 per child that uses cloth."
17. "Monitor commercial waste."
18. "Can FEP & WSF become more efficient in order to decrease costs?"
19. "HRM has changed their story through this process. First the Otter Lake site didn't do what it was supposed to, then it did. The WSF didn't work but now it does! The liner was supposed to be reduced, now it isn't. HRM doesn't understand their own system."
20. "Why if something works so well (FEP & WSF) would you want to change it, when other systems need to be improved (source separation in apartments & business) Work with the operator & community as a team, not against as opposition."
21. "Keep it as is. Improve source separation."
22. "I would like to see 3 coloured bins for collection. This would simplify and take many garbage bags out of the system."

Questions:

1. "What will be the negative effects if HRM proceeds with the intended plans of change to the present system?"
2. "What is the alternative to the system we now have?"
3. "What is HRM doing to reduce waste?"
4. "Are you working with manufacturers to get them to make items that will not end up in the landfill or the curb?"
5. "I also understand HRM is considering outside curing pads to allow compost to rot into compost, my question is wouldn't this cause odors & draw seagulls & rats?"
6. "What is the plan after 25 year life of landfill; next location/ new technology etc."
7. "Can FEP & WSF become more efficient in order to decrease costs?
8. "What is the reclamation plan for site after closure?"
9. "ICI waste is flagged at the FEP (this is a huge bulk of waste that goes through the FEP) how will this be addressed?"

10. "Will rodents, vermin rise without the FEP/WSF (there will be organics going through)."
11. "What about hazardous waste being removed at FEP?"
12. "Where are recommendations to improve effectiveness?"

LOOK AT BEST PRACTICES

1. "Complete the mandate of no-organics to the landfill by a little more processing of the composted/stabilized facility to make a Class 2 compost and use that material for final top cover (&similar uses). The Paul Arnold, PhD report correctly identifies that as possible to produce the class 2 compost and thus have a usable product- so this will save money, create equity and benefit the environment. This could virtually eliminate methane production. Invite Paul Connett, PhD, to keynote a conference starting a Zero waste Solutions Citizens Task Force."
2. "It is most advisable to go on in perfecting ways to dispose of community waste while causing the least environmental impact. Priority is to protect the Nine Mile River system."

TRUST IN OUR GOVERNMENT

1. "Council should keep their Word! Council should consider the job loss! Council should be shamed!"
2. "Trust. Truth. Integrity. Keeping your word."
3. "The fact that this process is even taking place is a total breach of trust. The only community that has an interest in this (or at least an overwhelmingly more significant interest) is the one near Otter Lake. No one will ever trust HRM again for a project they view as a nuisance."
4. "Our environment is priceless, money is not enough. Respect the people and commitments. Trust."
5. "The money required to operate Otter Lake comes from the public through HRM. The public is willing to pay the price and HRM has no mandate to effect changes detailed in the Stantec report."
6. "Citizens of HRM are not happy with members of council who would consider breaking promises to a community."
7. "They are wasting our taxpayers money. Many councilors have not visited Otter Lake- yet they vote on a topic they do not have first hand experience on. Keep the promise. HRM staff needs to improve their education program & better explain their goals honestly."
8. "Now HRM is trying to undermine the agreement with the community by a false "consultation" process. No trust for HRM. Fire the arrogant fat staffers who have no respect for the people. They were laughing at the participants- makes me sick that HRM mayor and councilors allows this."
9. "Honouring the existing contract. Maximizing environmental protection. Repetitive, misleading, irresponsible on HRM. "
10. "Let HRM respect their promise to the community. Keep the FEP + WSP in place."
11. "That the decision to even revisit the HRM proposal is not valid & breaks community trust."
12. "I can't believe that my city leaders would even consider going back on its word- an agreement with the community. How can you expect anyone to trust you again? It's a total betrayal."
13. "The agreement that protects the districts surrounding Otter Lake if broken by HRM staff will be a betrayal of our trust we have in HRM administrators. When HRM are searching for a new location for the next landfill, no one will want to sign an agreement with HRM only to be broken."
14. "You did not need to hire Stantec when you have the CMC. HRM should have included CMC at the outset not after receiving the Stantec report."
15. "I am embarrassed as a citizen that council would ever even consider going back on their PROMISE TO ITS CITIZENS. Please do the right thing and keep this facility open. It's the right choice for the following reasons: Proving council's integrity...proving that WE ARE LEADERS and that WE ARE STRONG for the rest of our

province/country/world. This is an OPPORTUNITY to demonstrate/ lead by examples. Jobs! Think of the people who rely on this facility to feed their families."

16. "Where is the useless mayor? The 3 HRM staff sitting on the stage should be ashamed- fire the bozos."
17. "How will people be able to trust their government?
18. "How can council be trusted on any contract if they are going to break a legal contract here? No questions answered by HRM."
19. "Fire the consultants. No means no."
20. "No trust in city management."
21. "We have an agreement with HRM, do not try to break it!"
22. "They've said a lot without saying anything. I highly expect the lawyers to filter all answers before they reach the website. It helped show that as usual the decision as already been made."
23. "If our safeguards are taken away, who pays when it doesn't work? If HRM breaks the contract how can they be trusted in the future?"
24. "Honor your contracts and agreements. Show some leadership for once."
25. "Why hasn't HRM senior staff explained to the residents of Otter Lake area why they recommend the changes contained in the Santec Report?"
26. "Now is the time to start planning for when the contract expires. That's what good faith looks like. Council- you still have time to save face: Admit this was handled poorly. Honour the contract- restore good faith. Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens. "
27. "Concerned about the will of the HRM council to have a top notch landfill process & waste stabilization facility."
28. "That changing the agreement will cause citizens to forever distrust any future agreements between citizens & city council."
29. "If this contract is breached and our community is not protected, it would be hard to continue to have faith in/support HRM counsel in the future."
30. Develop trust and maybe people will trust government officials and opinions. You will feel better, you won't come across as shady bureaucrats and people will be inclined to work with you."
31. "Keep your word! We have a contract! You are elected! We can change that."
32. "Why bother to sign a contract? HRM can't be trusted!!!"
33. "If the levels of government will not support this why are HRM continuing with this cause."
34. "I am disappointed with the mayor and council for considering change."
35. "If you break one contract, how can we trust that you can be trusted to make any other contracts. They won't be worth the paper it is written on."

Questions:

1. "HRM does not have the authority to stop FEP & WSF. Authority to close FEP is provincial. How is HRM getting around that? "
2. "Why hasn't HRM senior staff explained to the residents of Otter Lake area why they recommend the changes contained in the Santec Report?"
3. "If we're assuming Otter Lake completes its cycle in 2023 as expected, is HRM currently looking for a new site or is the evolution of Otter Lake planned to eliminate the need to go through this process with another community?"
4. "Why hasn't staff started looking for a post 2023 landfill site?"
5. "Why has HRM not addressed flaws identified in the Stantec report before proceeding to public consultations?"

WORLD CLASS SYSTEM

1. "Our pride around our extensive recycling capabilities undermines awareness & engagement around reduction- people should be educated that recycling also uses resources/energy."
2. "Why turn back time and reverse all the good we have done by having this facility? We have been recognized for it across the country/world and show them how to do the same, why stop now. "
3. "When you have a facility leading the way, why go backward?"
4. "We have a facility that is top notch with dedicated employees. The fact that closure is an issue is ridiculous."
5. "Our landfill is world class, leave it alone."
6. "Maintain world class waste management program."
7. "Keep present system- let's not go back to the Dark Ages. I'm willing to pay more for this system."
8. "Citizens are proud to be the guardians of a leading North American waste management system."
9. "We are proud of the strides that have been made in the recycling. Why take a step backwards. If it isn't broken why fix it with backwards changes."

PLAN FOR LONG-TERM

1. "Original construction liner only engineered for 25 years or less when cells get full. Need to protect surrounding lakes in case all of HRM need water in future. Only 60% of waste is diverted, need FEP & WSF to protect what goes into cells."
2. "It is time to evolve in 2023. Take everything that is good that we have now & add to it but at another site where it is planned- 10 yrs."
3. "The future needs to be considered, preventative measures need to be in place now to prepare for environmental disasters if they occur. No matter how much preparation is done prior to construction & maintenance, nothing is perfect! There needs to be a choice, I know that no community wants a landfill in their area, but we need to have one somewhere. "
4. "Please consider the past commitments and look to future success through increased diversion and source separation."
5. "Please do the right thing and keep this facility open. It's the right choice for the following reasons: Proving councils integrity, Environmental associated long-term benefits, proving that WE ARE LEADERS and that WE ARE STRONG for the rest of our province/country/world."
6. "Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens."

BAN PLASTIC BAGS

4. "Give up all plastic bags & use paper bags. The paper will demonstrate if organics are hidden!

Questions:

1. "Are steps being taken to implement clear bags?"

APPENDIX D: PHASE 1 ONLINE COMMENTS AND QUESTIONS

HONOUR THE AGREEMENT

Comments:

1. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment. Until recently I was proud that my community worked VERY hard to come to an agreement with HRM that ensured the above. The Stantec report is being touted as gospel by HRM staff and they are giving the signed agreement with citizens no weight at all. I now feel betrayed by HRM."
2. "That agreements between HRM and the host communities are honoured. If we want to come up with some new innovations in waste diversion and management you need to take the recommendations from the Stantec report in regards to Otter Lake, the removal of FEP & WSP, increasing cell height, removing the leachate detector liners, extending the life and activity at Otter Lake off the table. No one seems to be able to get past the betrayal that community feels to have no negotiables become negotiable."
3. "Honor the contracts and agreements already in place. Focus more on education. You cannot get rid of the gatekeeper when the majority of people do not source separate properly."
4. "We need to ensure the same high standards that were set out in the initial Otter Lake agreement are in here as well. There should not even be talk of lowering our standards."
5. "Honoring the commitments made to surrounding communities for the operation of Otter Lake."
6. "Honouring commitment is obviously HUGE. If HRM renege on commitments to communities surrounding the Otter Lake facility how could any other community expect to trust our Municipal government in the future."
7. "The commitments made by previous council must be continued and honored otherwise it is inevitable that money will be spent on legal challenges, and the HRM reputation sullied if contract is altered unilaterally. It is morally offensive to contemplate altering the agreement."
8. "It's very sad really. HRM seems to also be developing a reputation for not honouring existing contacts and policies that it has...What affects one area of HRM affects us all. It may not be in my backyard this time but it could be next time. Isn't the government for and of the people? It's starting to feel like it's us against them and that's not good for anyone."
9. "After two Town Hall and four Public Engagement meetings, it MUST be recognized that at every event the following held true: Honouring the Agreements between the Public and the Landfill Operator as well as retiring the Otter Lake solid waste management facility after its 25 year Operational Term (Dec 31, 2023 or Jan 1, 2024) was the priority message which the Public desired to articulate to HRM and the National presentation staff. In fact I doubt if any would disagree that if the Public had been asked directly what was the main reason for them attending, the message would have been even clearer...I am once again recommending that HRM Regional Council take exceptional action, but this time, I recommend that you direct HRM Staff to recognize that honouring the Agreements and retiring the Otter Lake facility is the pivotal concept that is essential in order to move ahead. Please direct HRM Staff to take those options off the table and focus on the next solution."
10. "Environmental responsibility should be first and foremost. Maintaining the commitments made for the operation of Otter Lake. My take away from the public CMC meeting I attended was that it takes about 10 years to properly site a new landfill and Otter Lake is meant to close in 2023, so I think the focus should be on siting a new landfill and making improvements to processing, operation and design of it."

SOURCE SEPARATION

Comments:

1. "Source separation and enforcement. Education, education, education.....at all levels – ICI (Industrial, Commercial and Institutional, including all school - let's discuss waste with the kids regularly) and households. Why are some residents not separating?"

2. "Continue your present ad campaign to encourage correct sorting in residences. Get apartment buildings to participate fully!"
3. "Honor the contracts and agreements already in place. Focus more on education. You cannot get rid of the gatekeeper when the majority of people do not source separate properly."
4. "Continue public education to reuse, recycle and reduce waste - challenge the public to reduce their footprint. "
5. "In fact the only secondary options that almost every attendee could substantially agree on was that more "at source separation" educational initiatives are required for the public & ICI sectors, and finding a real solution to the obstacles that thwart achieving acceptable "at source separation" levels in the ICI sector should be a high priority."
6. "HRM WM should concentrate on educating the public on 'source separation'. By developing a new program to handle waste separation at apartments, condos and other multi purpose buildings, commercial outlets including restaurants, we could reduce what goes to Otter Lake meaning less to sort and reducing the dependency on the FEP and WSF at Otter Lake."
7. "I feel that HRM should keep focus on enhancing source separation and education. Improving the efficiencies without taking away any of the environmental protections in place. None of the protections at Otter Lake to include but not limited to : FEP, WSF, Cell Liners, Cell Height, geographical footprint, operation permits, environmental permits, contracts and agreements with all stake holders (especially those to the immediate communities) must remain in place as is. We should be refocusing our strategic plan for the future of waste management to adding to these components and taking nothing away. Increased source separation so less goes to the facility and diverted elsewhere is the way of the future. Until such time as we embrace new technology and practices eliminate the need to ever bury another piece of trash.
8. "We should be refocusing our strategic plan for the future of waste management to adding to these components and taking nothing away. Increased source separation so less goes to the facility and diverted elsewhere is the way of the future. Until such time as we embrace new technology and practices eliminate the need to ever bury another piece of trash."
9. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment."
10. "I really appreciate the weekly green bin collection in the summer but it ends too soon in September when the days are still warm and the green carts have a foul odor. Similarly, leaf collection starts too late and storm drains and gutters get clogged and cause flooding on rainy days."
11. "It's important to continually educate all newcomers to the city on how the waste system works, promote compliance and discourage littering. New renters and students seem misinformed on arrival. We need to promote waste reduction to help make the whole system more sustainable. There is an opportunity to promote frequent messages that link the importance of having a good waste system so that all residents take pride and responsibility for living in a clean city."

12. "If there are improvements that can be implemented at the Otter Lake facility that are cost effective for the remaining 10 or so years, and do not remove or change the essential components of the existing Agreements, then

you can be sure that the Public will be interested in exploring those options. Focus on geographically locating the next landfill site, and planning how this new facility will be operated. HRM Staff have a number of other interesting solid waste management initiatives that do not directly affect operations and infrastructure at the Otter Lake landfill facility, and they should all be duly considered; but the existing public engagement process has been woefully ineffective thus far in actually focusing on these options. In fact the only secondary options that almost every attendee could substantially agree on was that more "at source separation" educational initiatives are required for the public & ICI sectors, and finding a real solution to the obstacles that thwart achieving acceptable "at source separation" levels in the ICI sector should be a high priority."

13. "HRM WM should concentrate on educating the public on 'source separation'. By developing a new program to handle waste separation at apartments, condos and other multi-purpose buildings, commercial outlets including restaurants, we could reduce what goes to Otter Lake meaning less to sort and reducing the dependency on the FEP and WSF at Otter Lake."
14. "Throughout our city we have different coloured bins into which we throw our waste. HRM should develop a standard number of boxes, say 4, with the same colour scheme. If you have a recyclable item then it is thrown into the green box. Non-recyclable items goes into the black box. How do you know what to throw into each box? It's simple. Have manufacturers apply a black dot on the bottom of the coffee cup, for instance, so we know it would go into the BLACK box. If the item is recyclable then apply a green dot to this item so it can properly be put into the Green box. People, customers don't know which box to throw their item into so they toss it into any box. Take the guess work out and make it simple, then we will improve source separation."

ENVIRONMENTAL PROTECTION

Comments:

1. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment."
2. "I appreciate most that we continue to front end process our waste and stabilize organics for 21 days prior to disposal in landfill. I appreciate that we already have the perfect system which is working diligently to see that all environmental safeguards that were negotiated and contracted back in 1998 are continually met."
3. "Our world class system was born and developed with the environment and communities in mind. Community consultation must continue and be given priority."
4. "Environmental and Community Protection. As one example, hazardous waste is a concern, particularly under the Stantec recommendations to remove the FEP, reduce the cell liners and increase height."
5. "The NUMBER 1 priority is environmental safeguards and to not even consider back peddling there. Number 2 removal of Hazardous materials and Waste stabilization prior to landfill disposal to control vectors. Number 3 Contractual obligations to the surrounding communities."
6. "Next to protection of the environment (which I feel should be paramount), innovative ideas and concepts that are proven elsewhere need to be explored. "
7. "Environmental responsibility."
8. "Environmental responsibility should be first and foremost. Maintaining the commitments made for the operation of Otter Lake. My take away from the public CMC meeting I attended was that it takes about 10 years to properly site a new landfill and Otter Lake is meant to close in 2023, so I think the focus should be on siting a new landfill and making improvements to processing, operation and design of it."

COMMUNITY PROTECTION

Comments:

1. "I appreciate that we already have the perfect system which is working diligently to see that all environmental safeguards that were negotiated and contracted back in 1998 are continually met. If anyone has any legitimate questions that they want honest answers too about how the facility operates and what is accomplished, I have been employed there for 8 years and have seen the evolution and changes to the waste stream and can provide you with straight non-technical answers."
2. "Our world class system was born and developed with the environment and communities in mind. Community consultation must continue and be given priority."
3. "That agreements between HRM and the host communities are honoured. If we want to come up with some new innovations in waste diversion and management you need to take the recommendations from the Stantec report in regards to Otter Lake, the removal of FEP & WSP, increasing cell height, removing the leachate detector liners, extending the life and activity at Otter Lake off the table. No one seems to be able to get past the betrayal that community feels to have no negotiables become negotiable."
4. "Commitment to communities and trust in the community engagement process. The community accepted Otter Lake, without an Environmental Impact Assessment, based on certain safeguards and commitments. I believe these commitments should be honored. And when a future site is determined commitments to that host community need to be honored and respected as well. Listen to residents in the public engagement process. This has not been done or this engagement process would look very different. There has to be trust in our elected officials and staff. Even in meetings outside the host community, residents are saying there has to be integrity and commitments/agreements need to be honored. Time will tell if staff and Council is listening. "
5. "The NUMBER 1 priority is environmental safeguards and to not even consider back peddling there. Number 2, removal of Hazardous materials and Waste stabilization prior to landfill disposal to control vectors. Number 3 Contractual obligations to the surrounding communities."
6. "It's very sad really. HRM seems to also be developing a reputation for not honouring existing contracts and policies that it has. I just attended my local HRM waste management meeting tonight in Porters Lake. There were approx. 6 residents from the Porters Lake Area and the rest were from the Timberlea area. The Timberlea area residents were basically told to sit down and shut up by one of the HRM staff. I was a bit shocked by that. What I should have said was no, I as a resident of the local area want to hear what they have to say. What affects one area of HRM affects us all. It may not be in my backyard this time but it could be next time. Isn't the government for and of the people? It's starting to feel like it's us against them and that's not good for anyone."
7. "I would like to know why it is that after someone presents at these "Public Consultation" meetings that we as citizens are not permitted to ask these presenters questions? I am of the opinion if the person who is presenting is educated enough on the topic to present, they should be educated enough to answer our questions on their presentations. This "Public Consultation" process does not seem as though it is really consulting the community, it seems as though it is more of a dictation of incorrect facts from HRM."
8. "There has to be trust in our elected officials and staff. Even in meetings outside the host community, residents are saying there has to be integrity and commitments/agreements need to be honored. Time will tell if staff and Council is listening."

TRANSPARENCY AND INTEGRITY

Comments:

1. "Commitment to communities and trust in the community engagement process. The community accepted Otter Lake, without an Environmental Impact Assessment, based on certain safeguards and commitments. I believe these commitments should be honored. And when a future site is determined commitments to that host community need to be honored and respected as well. Listen to residents in the public engagement process. This has not been done or this engagement process would look very different. There has to be trust in our elected officials and staff. Even in meetings outside the host community, residents are saying there has to be integrity and commitments/agreements need to be honored. Time will tell if staff and Council is listening."
2. "It's very sad really. HRM seems to also be developing a reputation for not honouring existing contacts and policies that it has. I just attended my local HRM waste management meeting tonight in Porters Lake. There were approx. 6 residents from the Porters Lake Area and the rest were from the Timberlea area. The Timberlea area residents were basically told to sit down and shut up by one of the HRM staff. I was a bit shocked by that. What I should have said was no, I as a resident of the local area want to hear what they have to say. What affects one area of HRM affects us all. It may not be in my backyard this time but it could be next time. Isn't the government for and of the people. It's starting to feel like it's us against them and that's not good for anyone."
3. "Be bold, be proactive, be open and transparent. HRM Regional Council has allowed this public engagement evolution to proceed unchecked thus far; but Council can give HRM Staff essential guidance at this stage which could turn a public relations disaster into a potential policy making solution. If HRM and National Staff require some additional time to rework their public engagement process in order to achieve a solution that should be acceptable to the Public, then give them the option to delay the next round of events until they are ready. The goal should be to truly accomplish something."
4. "I would like to know why it is that after someone presents at these "Public Consultation" meetings that we as citizens are not permitted to ask these presenters questions? I am of the opinion if the person who is presenting is educated enough on the topic to present, they should be educated enough to answer our questions on their presentations. This "Public Consultation" process does not seem as though it is really consulting the community, it seems as though it is more of a dictation of incorrect facts from HRM."

Questions:

1. "I would like to know why it is that after someone presents at these "Public Consultation" meetings that we as citizens are not permitted to ask these presenters questions?"

CLEAR BAGS

Comments:

1. "Do not ban plastic refuse bags in favour of large paper garden waste bags. With our rainy weather conditions the paper bags do not work. They tend to disintegrate leaving more waste that litters and drifts away. Either insist on clear plastic bags for garden waste or better still opt for large netting bags which I'm told do exist. Some of these even biodegrade! "

NEW LANDFILL

Comments:

1. "Begin siting a new landfill (or solid waste management) site NOW. Take the required time to do it properly and apply your "evolutions" to its design and operation."

2. "HRM should be using this time and money to look for the next landfill site in the municipality, and ways to improve the systems we have now, so that they will be even better in the new landfill campus site, wherever that may be. The agreement for Otter Lake to host the landfill will end in 2024, that gives HRM 10 years to site and build the new campus style facility in a new location. Good luck."
3. "Focus on geographically locating the next landfill site, and planning how this new facility will be operated."
4. "My take away from the public CMC meeting I attended was that it takes about 10 years to properly site a new landfill and Otter Lake is meant to close in 2023, so I think the focus should be on siting a new landfill and making improvements to processing, operation and design of it."

FRONT-END PROCESSING AND WASTE STABILIZATION FACILITY

Comments:

1. "I appreciate most that we continue to Front end process our waste and Stabilize organics for 21 days prior to disposal in landfill. I appreciate that we already have the perfect system which is working diligently to see that all environmental safeguards that were negotiated and contracted back in 1998 are continually met."
2. "Don't get rid of the FEP and WSF UNTIL we improve source separation. Diverting items from Otter Lake is a must. Recycle, reuse. Tax manufacturers whose products are not recyclable but currently end up at our landfill costing more taxpayers dollars to pick up at curb and deliver to the landfill. Think of the savings if we had Zero Waste!"
3. "None of the protections at Otter Lake to include but not limited to : FEP, WSF, Cell Liners, Cell Height, geographical footprint, operation permits, environmental permits, contracts and agreements with all stake holders (especially those to the immediate communities) must remain in place as is."

IMPROVE OPERATIONS

Comments:

1. "Next to protection of the environment (which I feel should be paramount), innovative ideas and concepts that are proven elsewhere need to be explored. Sometimes, little things can make substantial differences at little or no cost. Other innovations can actually save money. For example, Ottawa uses a sliding calendar for garbage collection days that eliminates significant overtime and enables the collection workers to enjoy holidays off as well. The concept: if your "normal" collection day is Wednesday and a holiday falls on that day (or has occurred during the previous week), then your new collection day becomes Thursday. This continues throughout the year. Obviously, one has to keep track more closely; however, there were few, if any, complaints."
2. "We need to ensure the same high standards that were set out in the initial Otter Lake agreement are in here as well. There should not even be talk of lowering our standards.
3. "Use, promote and develop the best world practices; demonstrate leadership in waste management. The facility must be a good neighbour, low odor, and offer educational tours. Cost effective and affordable for rate payers - including travel distances for trucks. Consider new innovative technology to generate energy on campus to run the

operation. Develop partnerships with universities & NSCC to incubate new innovative solutions for waste management problems. Continue public education to reuse, recycle and reduce waste - challenge the public to reduce their footprint."

4. "My take away from the public CMC meeting I attended was that it takes about 10 years to properly site a new landfill and Otter Lake is meant to close in 2023, so I think the focus should be on siting a new landfill and making improvements to processing, operation and design of it."

Questions:

1. "I am aware of the drop off depot.....how many of them are there within HRM? Are they scattered throughout the city? What are the hours?"
2. "In the reply, it was noted "As part of the system review process we are looking at ways to expand the availability of this service". What specifically is being proposed - how many new hazardous waste depots? Expanded hours? Has this been costed?"

TRUST IN OUR GOVERNMENT

Comments:

1. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment. Until recently I was proud that my community worked VERY hard to come to an agreement with HRM that ensured the above. The Stantec report is being touted as gospel by HRM staff and they are giving the signed agreement with citizens no weight at all. I now feel betrayed by HRM."
2. "That agreements between HRM and the host communities are honoured. If we want to come up with some new innovations in waste diversion and management you need to take the recommendations from the Stantec report in regards to Otter Lake, the removal of FEP & WSP, increasing cell height, removing the leachate detector liners, extending the life and activity at Otter Lake off the table. No one seems to be able to get past the betrayal that community feels to have no negotiables become negotiable."
3. "There has to be trust in our elected officials and staff. Even in meetings outside the host community, residents are saying there has to be integrity and commitments/agreements need to be honored. Time will tell if staff and Council is listening."
4. "I would like to know why it is that after someone presents at these "Public Consultation" meetings that we as citizens are not permitted to ask these presenters questions? I am of the opinion if the person who is presenting is educated enough on the topic to present, they should be educated enough to answer our questions on their presentations. This "Public Consultation" process does not seem as though it is really consulting the community, it seems as though it is more of a dictation of incorrect facts from HRM."

WORLD CLASS SYSTEM

Comments:

1. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment."

2. "I appreciate most that we continue to front end process our waste and stabilize organics for 21 days prior to disposal in landfill. I appreciate that we already have the perfect system which is working diligently to see that all environmental safeguards that were negotiated and contracted back in 1998 are continually met. If anyone has any legitimate questions that they want honest answers too about how the facility operates and what is accomplished, I have been employed there for 8 years and have seen the evolution and changes to the waste stream and can provide you with straight non-technical answers."

PLAN FOR THE LONG-TERM

Comments:

1. "We should be refocusing our strategic plan for the future of waste management to adding to these components and taking nothing away. Increased source separation so less goes to the facility and diverted elsewhere is the way of the future. Until such time as we embrace new technology and practices eliminate the need to ever bury another piece of trash."

PLASTIC BAGS

Comments:

1. "I think we should get away from plastic bags altogether. We have a green bin, and we should have a blue bin for recyclables. No Bags anymore."

APPENDIX E: PHASE 2 ONLINE COMMENTS AND QUESTIONS

LET'S TALK: LANDFILL SITE CHANGES

1. "Honour your commitments to the community first and for most. Otter Lake is a model of waste management across North America, why do we want to go back in time to the old Sackville Dump days, with birds, rodents and smells?? The FEP and WSF are critical to maintaining a first class system. If it's not broken don't mess with it!"

2. "I posted this in another discussion group but it clearly applies here as well. The bottom line is to consult with the public in an open and transparent manner. Lay all the cards on the table. Have a frank & open discussion, and develop multiple scenarios by including any members of the public who wish to participate. There are many bright and intelligent people out in the public domain and everyone should have an opportunity to put forward their ideas and have them considered respectfully with an open mind. Determine through a public consensus method what the next solid waste management solution should be. Experts can sit at the table, but experts do not have the only good ideas. Consolidating HRM's landfill with one or more other municipalities; or perhaps a provincial solution, just to name a couple that have not been looked at. But in the end we must respect the values of the communities that surround the landfill location, because we are asking them to take ALL the risks and accept everyone's garbage to be processed and stored in their backyard. This is not a small concession we are asking of these communities. And once we have a consensus and the Municipality (one or more) has signed an Agreement with the local communities who will host the new solid waste management solution, the Municipality (s) had better have the integrity to honour that agreement, or any future agreements will never be trusted. The most cost effective solution is not always the one that is best for the public. We live in a fragile environment and one does not have to look far to find mistakes that were caused by being too frugal or short-sighted, rather than being somewhat over protective. It costs what it costs to do the job right, and it can cost more than we can pay if we do the job badly. There is an existing set of Agreements on the table at this time, and they must first be honoured for this process to work effectively with public consent."
3. "What the heck is a consolidated waste campus model?"

LET'S TALK: CHANGES AT YOUR CURB

1. "All great ideals, but what does it cost, new trucks, source separating via trucks, I would like to see cost and numbers not random thoughts, ideals are great but back it up with actually cost!
2. **REPLY**: I agree. This exercise and these questions lack context, business models and costs. I don't see how council could possibly vote on changing something when there is no vision, plan or operational model. Take, for example, closing the FEP and WSF. It's conceivable the actual costs of replacing these components will, in fact, be higher than the original process. It has been suggested (in the presentation and in the Q&A) that using clay cover, for example, is the type of measure that would be put in place should the decision be made to close the FEP and WSF. Well, there is no clay in Nova Scotia which means this would need to be shipped in and at what cost? The literature says this and other necessary alternatives, like increasing gas and leachate management would be "far less expensive," but without actual figures and a plan, how can one be sure? The reports only cited the reduction in operational costs but didn't factor in the cost of replacing these important components as far as I could tell.

LET'S TALK: INCREASING DIVERSION (REDUCE, REUSE, RECYCLE)

1. "Glad that I have negotiated through your complex website to this page, since I will be unable to make any of your open-house meetings. Although, as a senior, I am well under the 6 limit, please do not reduce bag limits to 4 because families need the 6 limit. If you reduce the bag number people will only dump the other bags by roads, highways and empty fields. Clear bags might well help us all separate our waste more carefully-- go for it! Definitely increase education and rules for apartment buildings and commercial properties. We should all get involves in waste management. If we hope to build up the population within the city we must attach responsibilities to the developers and the occupants-- waste management is an area that they should be a part of. You will, of course, need to expand the household hazardous waste depots if you move to clear garbage bags. Regarding garden waste please note that even double paper bags do not work in our rainy environment-- clear plastic bags are the answer. You could do well to investigate 'decomposable mesh' bags which are often used by nurseries who ship plants and bulbs by mail. That might well be the best compromise. Keep the 20 bag limit here. Many of us do deep compost heaps however even a city property often needs this limit at 2-3 times every season. Do not limit green bin contents to food wastes. Garden wastes actually help in this area. More often and better advertised 'give-away' weekends would be invaluable. Perhaps some to co-ordinate with the beginning and end of the university terms and of course after Christmas. encouraging people to harvest neighbourhood discarded Christmas trees (cutting their branches to cover flowerbeds and vulnerable plants) lessen the Christmas tree pick up by the waste management trucks."

WHAT ARE YOU MOST EXCITED ABOUT REGARDING POTENTIAL CHANGES TO YOUR CURB ON COLLECTION DAY? WHAT DO YOU SUPPORT?

1. "I think there should be periodic pickup for batteries, toxic and e-waste; perhaps a couple of times a year like the old spring & fall cleanup days. A lot of this stuff is dumped in the woods, poured down the sink or tossed with regular garbage because the current process is inconvenient. Some will consider clear garbage bags an invasion of privacy - go for translucent, like most current blue bags. You can see what's in them but only if you're close. Weekly green cart pickup in the summer is useful because kitchen waste spoils quickly but it's unnecessary the rest of the year. Blue carts? By all means, and consider the black carts for regular garbage. A four bag average is reasonable for two weeks but not a 4 bag maximum, there will be times when you have more. Maybe special bags that can be purchased from local retailers for a premium price would work."
   REPLY: "I've pondered the idea of no plastic bags.....I like the idea of no plastic and personally am trying to move away from using and purchasing plastics in my life for various reasons..... (one of the reasons being they are not reusable).....but have questions about contamination of material. So if people didn't rinse their cans or containers and then stuff got on paper or cardboard as an example.....would those products no longer be marketable and have to be tossed anyway? I'm not opposed to blue recyclable bins though and will have to consider it further and understand it more. My like of the clear bags is for GARBAGE. I think they really are an opportunity for enforcement and education. My husband and I after watching a documentary called the Clean Bin Project, decided to do our own little family challenge and look at reducing our waste. We did it a little differently than the film though. We used the book The Zero Waste Lifestyle as a reference. We had 2 buckets and put our daily waste in them (everything but compost). Then at the end of the day (or every couple of days) we spread out our garbage and recyclables and analyzed them. If we questioned anything about where it went, I made a call to one of the Waste Educators at HRM who were a tremendous help. We then came up with solutions on how to reduce our waste. I think clear bags can act like those buckets.....they perhaps will make people more conscious about it and

can teach people how to separate. If not, then a "yellow" sticker rejecting the bag with the reason why can help educate."

2. "Instead of limiting bags every week, we should be given stickers for the year. That way if one time you have more you can put your garbage out. Often we miss garbage when we go away and have extra when we get back. The 4 bag limit every two weeks is too low. I am for weekly green cart pick up in the summer months. I DO NOT support clear bags."
   REPLY: "The sticker idea is interesting, but my parents lived in Niagara Falls for a period and strict bag limits were in place. Every week they saw neighbours running over to put their "extra" bags in front of other neighbours houses that had not put out the maximum bags. So it may not have as great an effect as desired, but as long as the 4 bag limit works out to be a reasonable quantity for most households, I see no real problem. On the other hand, there are a few house holds that house very large families. Also some single family residences are being modified with in-law suites. So there will need to be some process for allowing single family residences that are housing more than one family to put out an adequate number of garbage bags. And some zones allow for home businesses, which likewise may generate more waste than is expected, perhaps additional stickers could be purchased for these business households since they could defray the cost as a business expense. But for large families and in-law suites what is the fair solution?"
   REPLY: "Curious.....why you do not support clear bags? Here is a link to an article on CBC news about recycling - http://www.cbc.ca/news/canada/nova-scotia/household-waste-down-recycling-up-across-nova-scotia-1.1415245.There are municipalities in NS who are already using clear bags and it seems to be working. From speaking with people in these communities it was just a matter of being more conscious and changing habits.....which is difficult for people, including myself I admit. To me.....it's everyone being part of the solution. That's my belief."
   REPLY: "It is not that I do not support clear bags, it i just that I do not think the clear bags will cause people do a better job of at source separation than education and willing compliance. Bags are bags but if you get people to adhere willingly, then you can have them put their waste in any colour bag. So bring on the policy to use clear bags, but do not reduce educational initiatives. "
   REPLY:" Fair enough. I agree - do not reduce educational initiatives. Just think the bag can be one of those educational initiatives too."
3. "The following recommendations will break the Agreements with the Public & the Landfill Operator:
   • Removal of the Front End Processor (FEP)
   • Removal or repurposing the Waste Stabilization Facility (WSF)
   • Implementing a Centralized Waste Resource Campus at Otter Lake
   • Extending the operations past 2024 by raising the waste storage cell heights
   • Changing the Waste Cell Liner Specification to remove leak detection capability
   Removing the FEP & WSF does lower environmental protection & puts unprocessed organics in the landfill."
4. "Closing the Otter Lake landfill has been planned to occur in 2024, since the Closure Plan was submitted to the Nova Scotia Department of Environment (NSDOE), now Nova Scotia Environment (NSE), as a regulatory requirement in 1996 when the proposal to create the Otter Lake facility was submitted. In the Agreement with the Landfill Operator, that is why it says the Operational Term for the landfill will cease 25 years after the acceptance date 1 Jan 1999 (the date the landfill opened to receive garbage on a daily basis). Simple math gives rise to the 2024 closure date for the Otter Lake facility. The plan was always to close the facility in 2024, why does HRM Staff not acknowledge and present these facts? Whoever disagreed should say why. Since the statements made above can be found in hard text with no options given for extension. There also are no approved HRM policy documents other than a mistake in the 2006 Regional Plan that even hint that an extension might be considered. The Regional Plan cannot supersede the contents of a legal Agreement. The closure of the Otter Lake facility is even written into

HRM's annual budgetary planning process. So you show me an official document and maybe I will agree with your disagreement above."

5. "I am very, very much against the clear bag idea. It is nobody's business what I throw out and I don't want my neighbours seeing it! I also don't want to see the neighbours' feminine hygiene products and dirty disposable diapers. Bad, bad idea. Green cart pickup should be extended to, at least, May through October. Not only do we have warm days in those months that can really smell things up, but in the spring, there is a lot of post-winter cleanup that fills the cart quickly, and in the fall there are lots and lots of leaves that I don't want sitting around for two weeks! I question the sense of limiting bags. If you make it too hard for people to get rid of trash, you increase the likelihood of roadside dumping. If you do limit the number of containers, at least have a (free) permitting system to allow for more under special circumstances, like clearing out a house when moving, or following a fire or flood or something. Single blue cart? I don't know. If it would cut down on the problems stemming from blue bag theft, then go for it! The other thing I would like to see is the expansion of recyclable items to include styrofoam and hard plastics (including CDs and their cases) and general metals, like old pluming parts and other hardware, like screws and nails, old metal toys, appliances, etc.
   REPLY: "I think the last time the clear bag discussion was brought up, there was also the suggestion of one black bag for "private" items....if you want to call them that. Curious, would that make a difference to you? Here is a link to a CBC news article on recycling. There are municipalities in NS who are already using clear bags - http://www.cbc.ca/news/canada/nova-scotia/household-waste-down-recycling-up-across-nova-scotia-1.1415245. From chatting with people in communities with clear bags, at first they questioned it, but now it makes sense to them.....and it was just a matter of changing habits and being more conscious. If bag limits are reduced, I agree there should be special circumstances (moving, fire or flood as noted)."
   REPLY: "I reluctantly agree, but only because I am not sure how much better household residents will do when given one black bag. The Front End Processor will still be needed obviously for black bags, but also because one cannot see into the very center area of a clear bag. I think adherence to the at source separation initiative is still the best way to achieve the best waste diversion rates. Trying fear enforcement policies or to embarrass people into doing it correctly in my opinion will be less successful. We need residents to understand why at source separation is important, and to have them participate fully as willing partners. Also the Industrial-Commercial-Institutional (ICI) stakeholders need to have special solutions developed to get their diversion rates up to par with single family residences."
6. "No problem with clear garbage bags. If there are socially "embarrassing " items they can be wrapped in paper if necessary. Blue cart OK but is yet another cart to have to store somewhere so am on the fence for this one. Weekly green cart Summer ONLY is fine. Strongly OPPOSE decreasing the bag limit. This will encourage people to dump stuff illegally. Besides this, people will then cram too much into fewer bags with increased likelihood of spillage. As has been mentioned already, woe betide you if you have been away and missed the garbage day or made a mistake and put out green cart on the wrong day. You may not be able to dispose of all your garbage in the next cycle. A better way to decrease the bags is to insist on different packaging in the stores. There is so much waste here. And on this topic, why not package meat on biodegradable trays with a degradable cellulose liner??? When one disposes of the polystyrene trays used currently, they cause the garbage to stink. So much better if we could put degradable ones in the green bin."
   REPLY: "Re: "A better way to decrease the bags is to insist on different packaging in the stores. There is so much waste here". Totally agree. The biggest R in our household is REFUSE.....and let companies know why we are refusing."
   REPLY: "I agree with Swanvil that it is risky to try to reduce bag limits per household. I just can't see the average person (especially busy working folks, single moms, fun-loving students) being able to think that far ahead - they will buy what they will buy, and then they will create waste, and then they will have to deal with that waste. I too am very afraid that if we put the squeeze on folks at the curb, they will simply find other ways to get rid of their

garbage - putting it on the neighbour's curb or worse, dumping it in the woods or in local parks- which is a horrifying idea. Perhaps stricter bag limits on businesses would be good - they can be more strategic about how to reduce waste in a systematic manner? But what I (strongly!) believe is that the government (ideally federal, but if we have to do it provincially then fine!) should implement a packaging tax. Charge 25 cents per gram of packaging sold with every item. Charge more if the packaging is made using toxic materials, or toxic processes. Charge less if it is efficiently recyclable or biodegradable. If this tax were applied fairly to every item across the board, I guarantee that companies would very quickly become competitive in finding ways to reduce it or eliminate it entirely. Consumers are bombarded with advertising every day telling them to buy this and that product. If they get to the store and all the products they want have excessive packaging, they're still going to buy it, because they want it!! But if they get to the store and brand X is $20 cheaper because it doesn,t have packaging, they will be much more likely to buy that one. Soon the other companies will panic and all will find a way to reduce their packaging. We totally have the technology to come up with innovative solutions to packaging excess - the only reason companies produce so much packaging today is they have pretty much zero incentive to do otherwise!"

7. "I think there should be a black bin for garbage, a green bin for compost and a blue bin for recycling. The black bin is not allowed to have any more waste outside it. If someone wants to have something else taken away they can have a private company come pick it up or they can call the city and get it paid to taken away. The city can have reduced fees for this garbage taken away but it must come at the owners expense. They must pay ahead of pick up and then place the brightly colored orange sticker on the item. This tells the waste people that you paid to have it removed by the city and it is guaranteed to go if no one else takes it away. You do not pay for what fits in the black bin. The blue bin will save people money on bags. All bottles, cans, tin, and others will go in as they do now. This helps with plastic bags usage and will limit the amount of recycling people do as they will only take the bin nothing extra. Green bin stays the same. Pick ups should be every week to encourage more to use it and market it more. All new city bins for the home could offer advertising for social programs, or things to better the home. No alcohol ads or things of that nature. The city should write on all new bins made out to the HRM phone #s that are free for people to use on these bins so it is easier for the public to find and remember. Such #s could be 311, 411, & 911. Reason is you have to use these bins every day of your life and when you look at them the ads could help people understand the city better and they would make them want to go to them and learn and get better at using the bins."

   REPLY: "I agree with almost everything said above, and my response is more of an enhancement than a criticism. Not everything will always fit in a black bin so a phone number should be on the side of the black bin for those items that are approved for alternate pick up (appliances, furniture, etc.), perhaps a once a month pick up schedule, and extra charges need only apply for non-approved items. For the blue bin I would prefer glass to not go in the bin, but have a separate blue box for glass. An auto-dumper for a bin would cause a lot of glass breakage which would cause cross contamination which can be problematic when final sorting at the recycling facility takes place. Otherwise a very nice write up, you really put a lot of thought into your submission."

8. "Clear Garbage Bags - this is an area where more education (in terms most people can understand) before we can rush to a decision; I'm not sure I fully understand the benefits; and we are asking everyone to incur further costs in order to participate. Weekly Green Cart Pick Up - the better option I believe is to expand the months but not 12 months; May to October has been suggested and would appear to be a reasonable alternative to the 12 month option; our weather patterns have been changing and we need to adjust this schedule to those patterns. Single Blue Cart - need to be have a big picture financial analysis on this one; cost of carts, where do you put them, impact on recyclers, fund raising - what's the net impact? Garbage Bag Limits - what is the current average now? Any alternatives to those times when you might need to exceed that limit? (moving, house cleaning, company/visitors, hosting a party or special event? Education - if we can improve on how we use our existing recycling options and have more people involved doing the right thing then I believe we can do better and this in turn can positively impact attitudes; some examples: - have a website where you add your item in question and it

tells you Green Bin, clear bag, garbage bag, etc; the current information is a list but often you find yourself with something you don't use very often and you're not sure where it belongs; keep the list current and build up the data base (I know I can call but it's more convenient and more educational if I do it myself); use this site for educational purposes as well (Tip of the Week - take a common item that the folks are finding is being put in the wrong place) - enforcement: maybe have students or full time folks randomly check the garbage bags and present the findings to the home owner (or leave a report at their door); if they don't know the difference, they will continue to do the same thing; and a better way to handle the reject information stickers - happened to me once and I had to guess and then ended calling in; is there tracking to see if home owners are using their green cart? - keep it simple: while there are lots of numbers, acronyms and scientific jargon in play (not to say that most aren't necessary), what's the bottom line so that we all can understand the message. Thank you."
REPLY: "" have a website where you add your item in question and it tells you Green Bin, clear bag, garbage bag, etc; the current information is a list but often you find yourself with something you don't use very often and you're not sure where it belongs; keep the list current and build up the data base (I know I can call but it's more convenient and more educational if I do it myself); use this site for educational purposes as well (Tip of the Week - take a common item that the folks are finding is being put in the wrong place)" -- What a TERRIFIC idea! I love it. So often I'm looking at a package and wondering where to put it. I'd bet a lot of people give up and file it under garbage."

9. "The only thing I don't support is the single stream for recyclables. Single stream was introduced in Toronto before I moved to Halifax and it ruined the quality of the paper being recycled. It also blurs the line between garbage and recycling for many people and lots of other crap would get tossed in to the blue bins. Toronto's diversion rate seems higher now but in truth it is lower because the purchasers of the recycled materials are the ones sending improperly sorted bales to landfill. Keep paper separate or it will be really hard to sell it as a raw material. I think a better use of resources would be outreach h and education for residents."
REPLY: "Yes, I think I agree. Going to single stream seems a bit excessive, particularly when we will then (presumably) have to pay more sorters at the depot. We have intelligent humans living in every household, and they might as well put their brains and hands to use to help with the sorting process! But maybe there is a happy medium to be found. I do find HRM's system to be extraordinarily complicated compared to any other city I've lived in (and I've lived in a number, over the years!). The fact that corrugated cardboard is to be separate from paper (one tied and the other bagged) and then boxboard is separate again (in the green bin) is very confusing. I know VERY few people who do this correctly!! Could all paper products be collected in one bin? You could still allow boxboard in the green bin if you want, but I would also allow it in the paper recycling too. And I would also get rid of the "all plastic bags must be separately bagged within one bag and then put in the blue bag" because it's an added complex step that very few people do. Just have one recycling bin for paper and one bin for all other recyclables. Nice and simple but still keeps the streams separate as ArlynneMC points out is important."
10. "A 4 bag limit unfairly impacts larger families. Isn't it reasonable that a family with 3-4 children will make more waste than an empty nest couple for example? One size doesn't fit all."
REPLY: "While it's true that a 2 person family makes less waste than a large family, I don't think 4 bags is out of line. My 2 person family (+pets) puts out less than a bag every garbage day. Even if we multiplied ourselves by 4 (for an 8 person family) we'd still be putting out fewer than 4 bags."
REPLY: "What do you think diapers for twins would add to that equation? 6 seems to be working. I do find it amusing that fear of Illegal dumping is referenced as a strong objection to the clear bag concept. It would be far more likely in a reduced bag allocation scenario."
11. "Clear bags are a must in order to ensure everyone follows the rules of recycling. Or at the very least allow 1 black bag for private waste like " old under wear" but that should be more than enough for an average family if they compost and recycle properly. It is easy to tell the households that do and do not recycle and sort their waste every week when you are driving around your neighbourhood by the absence of blue bags and grocery bags of

paper as well as no green bins. Clear bags will force them to conform and reduce waste disposal cost for us all." REPLY: "You need to realize that a clear garbage bag only displays what is visible on the outside area to the bag, you can still put a lot of bad stuff in the middle of the bag and you would never know it was there by looking through the outer skin of the bag. That is why the Front End Processor is the real gatekeeper, because it disassembles the bag so that the full contents are viewed before allowing anything to be deposited in the landfill. So am I against clear bags, no I can live with them or without them as long as the FEP is operational; but for those who might think clear bags can replace an FEP service, think again. Education and a commitment by the public & ICI sectors to comply with at source separation policies is the best way to achieve our diversion goals. Teach our children well, and they will replace the non-followers in a generation or two, and they tend to keep open-minded parents in line as well."

12. "I support clear garbage bags in hopes that it will shame people into using the green bins and recycling programs. Like others, I don't think we should have to use blue bags for recycling nor grocery bags for our papers. I support reducing the garbage bags limit to 4. I think we should be able to go to 2 one day. For me, weekly green pickup isn't needed since I do backyard composting. However, it is nice in the summer months. An expanded hazardous waste program would be good because the one in Bayer's Lake isn't convenient for me."
13. "Clear garbage bags and limits are a no no period. Most households have a normal bag amount week to week. As soon as you limit and display peoples trash, it will revert to the old days. Some will throw it anywhere and everywhere, back roads dead-end streets etc. Drive around other Municipalities who don't pick up Refrigerators and more and you find them in the woods and the sides of back roads. Do we want to go back to this?"
14. "I would be very happy if the green carts were picked up weekly. At the very least, a month should be added for weekly pick-up. And I wouldn't mind the limit for bags going down to 4. I'm very much against clear garbage bags. And I don't want a blue cart."
15. "Clear garbage bags are must. Some concerned about privacy - but lots of other places manage it. Weekly green cart pickup in the winter is a waste of money. Summer is only time green cart has issues. Don't waste tax dollars through unnecessary level of service. Single blue cart for recyclable sounds fine - saves us buying the bags. Garbage bag limits should be there- but people should have the option to buy more tags to have more bags."
16. "You should list all of the questions presented at the public meetings and the responses to date."

WHAT PRINCIPLES SHOULD GUIDE OUR FUTURE DECISIONS?

1. "Irrespective of the angst over the future of Otter Lake, looking forward cost and simplicity for an aging population should be considered. The population of Nova Scotia is aging rapidly and the % of young residents will continue to decline, and we are headed for rural ghetto status by 2040. Aging people will be too weak, tired and poor to both pay for and have to deal with an increasingly complex operational plan every week for garbage. We need to start pushing back on capricious idealistic regulation and start considering incineration and a more simplified approach to recovering what is valuable and easily recyclable. There were dumps, are dumps and will henceforth be dumps, they will need a decent liner and pollution control system. Those nearby will be angry, move or don't live there."
2. "Honour the contract..."
3. "I can agree with the 4 bag limit BUT there is no way to account for extras which happen from time to time. What if I clear out my basement or a room and some of the stuff is not recyclable. From time to time we go over our 4 bag limit. You could get buy in from residents on the 4 bag limit if you allowed people to pick up "extra" stickers. The first 6 each year are "free" but the rest come at a cost of $5 for 6. This will allow people who need it to have the peace of mind for occasional extras and allow people with too much trash to have to ultimately pay for it...deterring them from having so much trash. So in summary, 4 bag limit unless you have a sticker from the HRM. The first 6 "extra" stickers are free each year but the rest are $5 (or more) for 6 extra bags. The goal is to (a) profit

from those who won't or can't reduce their garbage to help pay for waste reduction programs (2) give people the flexibility they want and need (3) make those who want/need to produce extra garbage go to an HRM office first so they can't do it without planning at any time. Not everyone will agree with me but it's a way to ultimately encourage garbage reduction without restricting people from the occasional extras and making income from those who simply have too much extra to put back into waste management funding."

4. "Honesty and transparency. So far it is lacking, and it doesn't appear that it will improve. For instance, the Q&A that has been posted on this site conveniently leaves things out that do not support staff's agenda, and is downright wrong in some areas. For instance, the answer to Question 2 regarding the contract with the community is, to put it diplomatically, misleading. It says that the contract does not bind HRM to processes, but instead to outcomes with respect to providing community and environmental protection. That is completely untrue. The contract specifically binds HRM to building and operating the FEP/WSF. It is clearly written in black and white, and to say otherwise is to deceive. Unfortunately, in a Council meeting in July, Councillor Mosher asked what commitment to the community was made in the contract. City Solicitor Marty Ward responded to her question with the same deceptive answer, saying that the contract only says HRM must protect the environment, but leaves HRM with the flexibility to do so any way it sees fit. That is completely untrue. This misinformation has never been corrected by the City Solicitor or by staff, even though it was brought to their attention 4 months ago. They continue to mislead Council and HRM residents, and should be sanctioned for doing so. At the very least, they should issue a correction and an apology. There are more examples of misinformation in the Q&A document, and there were many in the public presentation staff made at the public meetings. Until HRM tells the honest truth, this entire waste managent review, including this engagement exercise, is a farce and a waste of over $600,000 in consulting fees alone."

WHAT IS MOST IMPORTANT AS WE EVOLVE OUR CURRENT WASTE SYSTEM?

1. "It's important to encourage businesses to do the same sorting. Separate disposal bins might be available, but I hear all too often that it gets piled back together as trash."
2. "Please honor the agreement in place with the community. There seems to be plenty room for improvement in source separation"
3. "Environmental protection is the number 1 priority, and commitments made to the local community need to be honoured. A Contact is a contract, how can the city mid stream break the commitment to the residents near the Otter Lake land fill and try to change the site to a traditional dump, like Sackville was. Shame on the city! the residents of HRM will remember this next election and vote out the councilors who are attempting to break the commitment to the residents of Tantallon. I don't live there but stand with them in this fight as a resident of HRM."
4. "I think it is about time we made the cost to taxpayers a highest priority. Our cost per ton is out of control. Watching 2 or 3 sets of giant trucks make the rounds is maddening. We do need some degree of environmental responsibility applied to waste management and recovery of valuable materials such as plastic, aluminum,steel, glass and paper, however who wants to be world class in garbage when we are headed for third world in medical care and transportation anyway. If we have to do more our tax bills should be reduced. I have had it with increasing effort, cost and torment, flies, rats, crows, starlings, fruit flies, raccoons and odour. If you want to be green there is a negative cost, to pocketbook and quality of living I guess it is all about what you are willing to pay for the relatively small environmental impact on a large scale. After the converted and willing have been spoken to, and the NIMBY's are successful as per usual on any reasonable and balanced approaches it will be difficult to move much more than that and non compliance will become an increasing problem. Unless we deal with more enlightened approaches such as packaging it will just more and more downloading and increasing cost to taxpayers

and a stratified buy in with early adopters, environmentalists, dutiful citizens, and the rest who really can't or don't care. So reduce the cost to taxpayers it is no sense doing and paying more for less and less benefit. Good luck with it."

5. "I think education is hugely important. And not just for newcomers as M&M suggests below, but for existing residents too! I know almost no residents who have taken the time to understand the many complex particulars of the HRM waste system. Some common misunderstandings/mistakes I see are: Not understanding that boxboard is okay in compost but paper and cardboard is not. Not understanding that boxboard should not be put in with the paper or cardboard recycling. Not understanding that biodegradable coffee cups, biodegradable plastic bags, and biodegradable cutlery can NOT be put in the HRM compost system! Not understanding that plastic bags have to be all bagged together in the blue bag. Not knowing that tin foil can be recycled. I also see all sorts of metal and plastic junk put out for recycling that I'm pretty sure cannot be recycled, as well as a fair bit of broken glass. In particular, I think HRM needs to pay attention to the huge issue with the biodegradable coffee cups and bags, because they SAY "compostable" right on them, and yet HRM'S system cannot handle them! I know so so SO many eco-minded people who buy these thinking they are doing a great favour to the environment, and dutifully put them in the compost bin every week... and I keep trying to tell them that they will not be composted in HRM (And it's even more confusing because JustUs does compost its coffee cups in the valley!). When I moved here, I came from a city where "soiled paper products" that were compostable included dirty kleenex, so I was putting all my kleenex in the compost bin here (and I use handkerchiefs when I can, so I don't even produce that much!). Then someone said "you can'T do that!!". I was surprised to hear it, so I looked at the list of permitted items and forbidden items and nothing was mentioned about dirty kleenex - I assumed it fit under "soiled paper". But I dutifully called HRM, and someone freaked out at me on the phone and said, "oh NO, you can NOT put anything with Bodily Waste in the compost bin!!!" Well, I was mad, and said, "If it's so important, then why don't you list it as a forbidden item"? And she said, "Well, we can't list EVERYTHING, you know". Good grief! What sort of attitude is that? If HRM wants people to know what is and what is not permitted, then they should make the effort to make that absolutely clear. PARTICULARLY when it comes to items that are recyclable in one jurisdiction and not in the next. Here's an idea - if we end up some day with a green cart, a blue cart, a black cart, etc- why not make weather-proof, colourful labels and put them right on the lid of each bin. If people can see clearly what is and what is not allowed, they will be more likely to follow the rules. But it has to be clear - the current "household guide" is way too dense and hard to read. There should be a column for "yes" with green checkmarks, then a column for "no" with red x's. little graphic depictions (i.e. pictures) would really help too. Put the most important items first in big letters - e.g. no coffee cups! and then you can have a detailed list of more obscure forbidden items at the bottom."
6. "Yup, education is important. Some other confusing ones: Tea bag wrappers. These are the individual wrappers that go around a single tea bag (many herbal teas have this). Many are not recyclable as they are mixed material. If you tear the paper, you can see some have a coating of plastic on them. This one irks me and I have written many of these tea companies asking them to get rid of this individual wrapper or at least make it just paper. We stopped buying these brands. Another one is thermal paper receipts.....so just about every receipt you receive from a store. These are not recyclable. They contain BPA (bisphenol A). http://environmentaldefence.ca/issues/banning-bisphenol-bpa
   Next week is Waste Reduction Week. For those interested, the Prospect Road Community Center is having a Free Recycling Workshop (http://centre.prospectcommunities.com/free-recycling-workshop-register-now)."
7. "I am puzzled by the concept of moving landfills around the municipality each time a new one is created. Why not designate a zone longterm and keep it there instead of engaging in this unproductive nimby style debate every two decades? The consensus in these forums seems to be one of stopping at no cost to be as clean and green as possible with our waste. We should ask ourselves a different question: how much more are you willing to pay for all of these "good ideas"? I'm sick of out of control municipal budgets. Although I would love to see my green bin

emptied once per week I know there is a cost and would prefer to switch to once per month to reduce that cost. Clear bags? Why are we even talking about this? It's a no brainer that was endorsed by the rest of Nova Scotia years ago. Perhaps solid waste should be a provincial responsibility so that we can all be on the same page. Want to divert more c and D material? Provide dropoff points closer to the population. Then you will find less of it at otter lake. If you don't want a landfill in your back yard approach incineration with an open mind because it's gotta go somewhere."

8. "The bottom line is to consult with the public in an open and transparent manner. Lay all the cards on the table. Have a frank & open discussion, and develop multiple scenarios by including any members of the public who wish to participate. There are many bright and intelligent people out in the public domain and everyone should have an opportunity to put forward their ideas and have them considered respectfully with an open mind. Determine through a public consensus method what the next solid waste management solution should be. Experts can sit at the table, but experts do not have the only good ideas. Consolidating HRM's landfill with one or more other municipalities; or perhaps a provincial solution, just to name a couple that have not been looked at. But in the end we must respect the values of the communities that surround the landfill location, because we are asking them to take ALL the risks and accept everyone's garbage to be processed and stored in their backyard. This is not a small concession we are asking of these communities. And once we have a consensus and the Municipality (one or more) has signed an Agreement with the local communities who will host the new solid waste management solution, the Municipality (s) had better have the integrity to honour that agreement, or any future agreements will never be trusted. The most cost effective solution is not always the one that is best for the public. We live in a fragile environment and one does not have to look far to find mistakes that were caused by being too frugal or short-sighted, rather than being somewhat over protective. It costs what it costs to do the job right, and it can cost more than we can pay if we do the job badly. There is an existing set of Agreements on the table at this time, and they must first be honoured for this process to work effectively with public consent."

WHAT DO YOU APPRECIATE MOST ABOUT THE WAY WE HANDLE OUR TRASH IN HRM?

1. "There are some HRM Staff who feel that the residents are not smart nor well informed enough to discuss and contribute intelligently with developing the next solid waste management solution. They think we need to be spoon-fed a solution... I greatly disagree. That is why they contracted a 3rd party consultant rather than re-birthing the Community Stakeholders Committee (CSC); the CSC designed the strategy in use in HRM today. A new CSC would have discussed everything the Stantec report delivered, only without the misinterpretations and wrong assumptions. Plus it would not have cost close to $700000 to devise a solution that had the consensus of the public participants who developed it. It is not too late to rebirth the CSC, but it requires the support of the Regional Council."
2. "I love that Nova Scotia is at the forefront of recycling and how we handle trash. I hope that HRM doesn't go back on their contract with the community but instead looks for more ways to help people sort at home."
3. "HRM is known for having the best in class waste management systems in the country. I am proud to be part of this system and this city. But talk of changing this system and breaking commitments to the residents of HRM is wrong. Lets not mess with a system that works, and is the envy of the nation. Keep Otter Lake as is and honour our commitments!!"
4. "The Shape Our City Halifax presentation display card: What We Heard, shows by the size of the bubble where the Presentation Staff thought the attendees focus was most and made "Honour the Agreement" (HTA) the has the largest bubble, with "Source Separation" a close second in size. But these others category bubbles on the display card also mean HTA: Keep the FEP & WSF, Environmental Protection, World Class System, Leave Otter Lake Alone, and Community Protection. If all of those bubbles were to be added into the HTA bubble it would be

unquestionable where the public's focus is; but they spread these categories out instead of consolidating them into the one category they are best represented by. When the public is forced to tell them we like more than one option or concept, they split our emphasis and present our primary focus as in a weaker representation. We need to consolidate our message

REPLY: "Jdcas. You make a logical argument however it is contingent on a bold assumption that all of the 400000 haligonians were proportionally represented at those 4 round one public input sessions. Comments on this forum and my personal observations from the second Bedford session cause me to think otherwise. Looks to me like there is a very well organized group of Otter Lake residents and their supporters who aggressively push their agenda at every opportunity. That's what I would do if it was my back yard. If you ask every haligonian to indicate their highest priority do you really think those bubbles will remain the same size? I don't. I support putting every option on the table to determine the best compromise between cost and environmental protection. Make no mistake. It already is a compromise and will continue to be a compromise unless you want to bury it a mile underground in sealed containers, just like nuclear waste. The debate would be much more productive if we talked about what to do with the estimated savings generated by revising the Otter Lake plan. How much more diversion could you achieve with 4 million per year in new money for compliance and education on waste sorting? That could leave another 4 million each year to hire more teachers or increase recreation program funding. Perhaps the cost to reduce organics at Otter Lake will be lower with a new approach? Why not try? The underwhelming support for clear bags just reinforces my belief that professionals must be entrusted to make these decisions as the average citizen dismisses the 10 percent, or more, increase in organics diversion already PROVEN by other NS municipalities. There is too much self interest here and not enough logic." **REPLY:** "I have attended a number of public meetings and see clearly that most of HRM doesn't really have an opinion and that is kind of sad, really. As a resident of the host community I feel under appreciated for accepting the very personal and environmental risk that is relational to and dependent on all 400,000 residents' compliance and diligence in source separation. It's highly likely that most HRM residents don't even know where their waste goes, so, why are we spending time and money asking them? Why not work with the community at risk first to come to a set of values and vision that seems reasonable and then bring to the broader HRM...we did it before and it worked. I'm glad we agree that this was not an ideal way to seek public input. And, I'm sure there are savings to be had, but we won't know unless we work with the people who have the greatest sense of urgency about any changes. I don't have an opinion on clear bags. I worry people would hate it...there were equally passionate views for both sides at the last meeting. I don't want people dumping their garbage illegally. I'd much sooner it be screened, processed and disposed of in the best way possible."

5. "I offered my thoughts at the public meetings, but I didn't see them entirely captured in the recent staff report to council slated to be brought forward on October 22. Therefore, I'm sharing them here. I hope it's not too late to use this tool. Please let me know if I should include my comments in another section of this PE site so council will be sure to hear my voice. I most appreciate that we have an integrated system that works for residents of the community who have accepted the most risk (personal and environmental) by hosting a regional landfill. And, I appreciate the pride with which HRM has showcased our world-leading system. I deeply appreciate the Community Monitoring Committee (CMC) and the role they have played these past 14 years to ensure what happens at Otter Lake does not negatively affect residents and that they keep us informed when normal operations are interrupted. Like in 2010 and again in 2011 when there was a delay in capping the cell and we had a tremendous amount of rain and there was an over production of leachate and it smelled REALLY bad. I appreciate the pride and passion that employees at Otter Lake have in their daily work as they operate this facility. I appreciate any effort to educate the public on increasing source separation and making diversion sexy. I appreciate the opportunity to review our progress to date and renew our vision going forward, hopefully in a genuine spirit of cooperation with the community (and people) at risk."

APPENDIX F: WRITTEN FEEDBACK FROM THE CMC

IS IT TIME TO SCALE BACK THE FRONT END PROCESSING AT OTTER LAKE?

CMC RESPONSE: According to HRM staff, 50% of the waste going to the Otter Lake Landfill Facility should not be, and should be source-separated and sent to the composting and recycling plants instead.

The total amount of material going to Otter Lake was essentially the same in 2012 as it was in 1999 when the facility opened.

The amount of putrescible organics, which is banned from the landfill and is stabilized by the Waste Stabilization Facility (WSF) is substantially unchanged since the facility opened in 1999. In essence, it made sense to have front-end processing in 1999, and since the same amount of material is arriving today, it makes sense to have front-end processing today.

The contractor that handles the hazardous materials at the landfill reports that the Front-End Processing Facility (FEP) removes many hazardous materials that could have a negative impact on the sensitive environment around Otter Lake. The letter attached describes the materials that are diverted. It is a far cry from what has been described by Stantec and staff as just empty propane cylinders and fire extinguishers.

In 2012, 518 warnings were issued to haulers for loads brought to Otter Lake that contained material that should not be going to the landfill. Only 59 loads were rejected. There needs to be more enforcement of the rules and more rejections of loads containing banned materials. Without the FEP, Otter Lake would become a "trunk and dump" operation and all of this banned and hazardous material would be directly dumped into the landfill without any inspection or opportunity to divert the problematic materials to the proper facilities.

The FEP provides a gatekeeper role. Every bit of waste is examined. It provides a tremendous opportunity to increase proper use by its customers and increased environmental and community protection. HRM staff says that the key to success is source-separation, yet more than 90% of loads containing banned materials are accepted at the landfill. That sends the message to people that it is ok not to source-separate, which is at cross-purposes to education programs, the CSC strategy and the provincial landfill bans.

There may be a time when it makes sense to scale back front-end processing at Otter Lake. The Community Stakeholder Committee envisaged that would happen when diversion from disposal was 88%. As HRM is currently just over 50% diversion, (62% when the C&D material used for daily cover of the landfill is included) it clearly is not time to scale back the FEP and WSF. Instead, it is time to increase emphasis on diversion and enforcement to direct material away from the Otter Lake landfill and to the recycling, composting and hazardous waste facilities where they are supposed to be going.

If that can be done successfully, it will be time to look again at the question of scaling back the FEP and WSF. But not until then.

SHOULD THE FEP AND WSF BE SHUT DOWN?

CMC RESPONSE: See the answer above with respect to scaling back the FEP.

Also, there is a contract between HRM and the Halifax Waste/Resource Society that obliges HRM to build and operate the FEP and WSF, and to ensure that only acceptable wastes are buried at the landfill. The contract is attached, and the reader is directed to Sections 2.01 and 2.03 and the relevant definitions. They are reproduced here:

2.01 It is recognized and understood that HRM will cause the Facilities to be developed and operated at the Site.

1.09 "Facilities" means the FEP/WSF Facilities and the RDF Facilities.

2.03 It is understood and agreed that only Acceptable Waste will be authorized for disposal in the Residual Disposal Cells. It is further understood and agreed that any contract between HRM and the Operator of the RDF Facilities will impose on the Operator the obligation not to dispose of in the Residual Disposal Cells material other that Acceptable Waste.

1.01 "Acceptable Waste" means

(i) Inert Materials;

(ii) Stable Materials; and,

(iii) Residual Materials.

1.26 "Stable Materials" means items of Solid waste that are substantially free of readily putrescible elements after having undergone Biostabilization excluding Unacceptable Waste.

Clearly, HRM has a contractual obligation to operate these facilities. Any desire to shut them down would require an agreement between the two parties that signed the contract. HRM is not able to unilaterally close the facilities without breaching the agreement.

Finally, the FEP and WSF are doing exactly what they were intended to do. According to Dr. Paul Arnold, an internationally recognized expert in composting, the WSF stabilizes the waste as it was designed to do. He also points out that neither Stantec nor SNC Lavalin conducted the scientific analysis required to properly assess the performance of the facility:

The evaluation of the WSF demonstrates the facility is capable of significantly stabilizing the organic content in the residual waste stream delivered to the WSF, reducing the respiration rate (or in other words, the reactiveness or appetite for oxygen) by approximately 67% over the three-week treatment process. This reduction in the rate of oxygen consumption diminishes the subsequent decomposition that inevitably takes place in the Residuals Disposal Facility (RDF), thereby proportionately reducing the odour production potential and the corresponding production of liquid and gaseous by-products of anaerobic digestion.

A review of the Stantec and SNC-Lavalin reports indicates an incomplete and inaccurate assessment of the WSF that minimizes its effectiveness at stabilizing the organic constituents in the residuals waste stream, for both reports lack the scientific rigour necessary to quantify the process performance of the WSF. Until the facility is assessed (at least) in the detail presented in this report, comments such as those in the Stantec and SNC-Lavalin reports are inaccurate at best and unfounded at worst.

SHOULD THE LIFE OF THE OTTER LAKE LANDFILL BE EXTENDED THROUGH VERTICAL CELL EXPANSION?

CMC RESPONSE: One of the Stantec recommendations is to increase the height of the landfill cells by as much as 15 metres in order to extend the life of the landfill to as many as 23 years beyond its original 25 year lifetime.

When the Community Stakeholder Committee resolved the waste management crisis of the early 1990's, it sought to find and establish a landfill facility, with an FEP and WSF, which would operate for 25 years. All of the discussion at the time was for a facility that would last 25 years, from the siting criteria to the contractual agreement with Mirror Nova Scotia and discussions with the Nova Scotia Department of the Environment. When the site was discussed with the people living in the

communities of Beechville, Lakeside, Timberlea and Prospect, the discussion was always about a 25-year operational lifetime.

Before HRM released the Stantec report, there may have been an opportunity to sit down with the local community, through the Community Monitoring Committee, and discuss the expansion of the Otter Lake landfill to extend the life of the facility. After all, the landfill had been operated with very few odour and other nuisance complaints for 14 years. It was apparent that the combination of front-end processing and the operation of the landfill had combined to provide the environmental and community protection that had been promised by HRM in its contract with the local community.

Instead of approaching the community, with which it has a contract, to discuss potential expansion of the landfill, HRM instead released a report that recommends closing the Front-End Processing facility and Waste Stabilization Facility, removing protective liners in the landfill, building more waste management facilities at Otter Lake and developing an outdoor curing pad for compost, produced from the organics collected at curbside and composted at the Miller and New Era Farms composting facilities.

The recommendations to close the FEP and WSF, if accepted, constitute breaking HRM's contract with the Halifax Waste/Resource Society. The local community is very upset that these recommendations were not rejected immediately by HRM. It is felt that the expenditure of more than $600,000 on consultants' reports and public consultation, and the vigorous support of the recommendations by HRM staff, are a strong signal that HRM is not committed to keeping its contractual commitment to the community.

Accordingly, the CMC does not believe that any changes should be made to Otter Lake because the local community cannot be confident that HRM will keep the promises it made when it established the waste management facility.

SHOULD THE NOVA SCOTIA LANDFILL LINER SPECIFICATION BE MODIFIED?

CMC RESPONSE: The Stantec report recommends two changes to the Nova Scotia landfill liner specifications. They recommend the removal of the requirements for the cushion layer and the leak detection layer.

In developing their recommendations, Stantec compared the Nova Scotia landfill liner specifications to other liner requirements in other jurisdictions. They did not do any hydro-geological assessment to understand the conditions at Otter Lake.

Otter Lake was built on fractured bedrock, which is very different from the landfills against which Stantec compared Otter Lake. In other parts of North America, typically, landfills are sited in areas where there is clay, not fractured bedrock. However, clay is not common in many parts of Nova Scotia. The Stantec consultants' limited experience in Nova Scotia is concerning, as is the fact that they have made recommendations on liner containment without assessing the local conditions.

The CMC notes that in arguing for the closure of the FEP and WSF during their presentation at the World Cafe meetings, HRM staff emphasized that because of a good operator and a well-built landfill, the Otter Lake landfill facility has never leaked in the past 14 years. We think that is a good thing, and is not an argument for reducing the protection by reducing the liners. We also note that HRM staff could not have known that the landfill had never leaked if it weren't for the leak detection layer that is now recommended to be eliminated.

SHOULD HRM BUILD A CENTRALIZED WASTE RESOURCE CAMPUS?

CMC RESPONSE: During its deliberations, the Community Stakeholder Committee examined the concept of a centralized waste resource campus and rejected it. At the time, this was for three main reasons:

1. The members of the CSC felt that there was merit in having the waste management facilities spread around, so that people in HRM had a better sense of their waste management program, rather than have it all in one place;

2. There was concern that the operators of the facilities might be less rigorous in diverting recyclables, organics and hazardous waste if the disposal facility was close at hand; and,

3. It was felt that it was enough to ask the local community to host the landfill facility, and that other areas of the municipality should be asked to do their part as well.

There is a lot to consider about a waste resource campus at Otter Lake. While at first blush it may seem to make sense to have all of the waste management facilities in one place, it is not necessarily true that would be more efficient, especially when consideration is being given to changing collection infrastructure to include split-vehicles, a transfer station, etcetera. Whether or not a campus system makes sense cannot be determined in isolation of the other elements of the system.

On the other hand, there are two reasons not to create a centralized waste resource campus at Otter Lake. The first is that the development of new facilities at Otter Lake makes it a waste/resource destination for much longer than the original 25 year term for the landfill, and takes the facility well into the second half of this century and, according to HRM staff, into the next. That is something that should not be considered without discussion with the local community, as was stated by Minister of the Environment Stirling Belliveau.

The second reason not to create a centralized waste resource campus at Otter Lake is because it would include an outdoor windrow compost aging facility. The Otter Lake facility was built close to the communities of Beechville, Lakeside, Timberlea and Prospect. In the early days of the design of the facility, there was consideration of having the compost material produced by the WSF aged outside. That was rejected because of the risk of having odour issues at the landfill. That risk would be introduced if a compost aging plant was built at Otter Lake.

APPENDIX G: SURVEY CARD COMMENTS

CLEAR BAGS

"Educate people instead of clear bags."

"Use clear bags for garbage, if 7 not implemented." (7. Introduce black carts for garbage)

"Do NOT honour contract in full. As a 27 yr. old planning to be in HRM for 60 years, please cut cost and introduce more cost-effective means of diverting waste.(ie. Clear bags, increased accountability."

COMMUNITY PROTECTION

"Not enough information to make a proper decision."

"Honour the contract + commitment to the community! If its not broke, don't fix it! Maintain current protection."

"Honour the contract. Community protection. Source Separation emphasis."

"Honour contract. Re-affirm specific commitments to the community. Re-establish trust."

"Honour the community around the landfill- they agreed to take our waste with conditions. Honour those commitments!"

"Honour the contract with the community."

"As a municipality we have entered an agreement/contract with the communities of Timberlea/Beechville and I believe their agreement should be honoured as I would expect the same if/when a landfill was in my community."

"Meetings hijacked by Otter Lake area residents. Not an open discussion with them."

"Honour the contract, keep FEP + WSF! Communicate to council not staff the communities' message."

"Don't reneg on agreement w/ Timberlea."

"Honour the contract! Respect the community."

"Honour the agreement with the local community!!"

"Keep the promise to the host community."

"Honour the agreements + contracts with the community around the landfill."

ENVIRONMENTAL PROTECTION

"Honour contract. Maintain environmental standards. Leave Otter Lake alone."

"Honour the contract. Ensure environmental protection."

"Don't change the current agreement. Maintain current infrastructure. No campus at Otter Lake. No one will allow a site by them if the agreement is changed."

"Honour contract. Cost savings does not supersede environmental safety."

Honour the contract!! Huge environmental impact if Stantec proposals are implemented."

HONOUR THE AGREEMENT

"Honour the contract!"

"Honour the contract. If its not broke, don't fix it."

"Honour the contract and start looking for a new site so we can close Otter Lake as outlined."

"Cost implications of many of the suggested options are unclear/undefined...making selection of "yes/no" difficult. Most critical considering to allow for the siting of future contentious infrastructure; honour the agreement."

"Honour the greement."

"Maintain agreement at Otter Lake. Trust issue."

"Honour the contract."

"Honour the contract + commitment to the community! If its not broke, don't fix it! Maintain current protection."

"Leave Otter Lake alone. Please honour the agreement!"

"It seems that the intent is to break an agreement previously signed in good faith- what does this say about the people wanting to put an end to a world-class operation?"

"Honour contract. Maintain environmental standards. Leave Otter Lake alone."

"Honour the agreement. Close Otter Lake in 2023."

"Honour the existing contract and community agreement. Stop this nonsense. How could council start this review of Stantec/staff options w/o discussing possible changes with the cmc??"

"Honour the contract + the agreement with community. Start finding new site for landfill to open 2023. Campus idea will ned at least 2 sites- just like Metro Transit- HPX + Dart. Sides."

"Honour the agreement. Increase source separation and enforcement."

"Honour the contract. Community protection. Source Separation emphasis."

"Honour the intent of the contract with the community. 25 years/FEP/WSF/Liners. Provide financials on costing of additional environmental and community protections if FEP/WSF didn't exist. I'm not convinced there is money to be saved."

"Honour the contract. Environmental protection (2nd liner), Keep FEP + WSF open. Get back our trust!"

"Questions are leading + not able to give variance in answers. For example yard waste only problem in spring/fall usually. Honour your agreement."

"Honour the agreements. Close Otter Lake in 2024. Find new site now. New technology only for new site."

"Leave landfill alone. Quit wasting taxpayers money on these foolish meetings. Honour the agreements!"

"Willing to give additional ideas for diversion for FREE. Shame on HRM for spending our money on this façade. Honour the contract."

"Honour the contract to community."

"Honour the contract. Find a new landfill site. Close Otter Lake in 2024. Redo this process for the new site. New site local communities should have an iron clad agreement that council affirm will be honoured in the future."

"Honour contract. Re-affirm specific commitments to the community. Re-establish trust."

"Honour the contract"

"Honour the community around the landfill- they agreed to take our waste with conditions. Honour those commitments!"

"Honour agreements. Keep FEP + WSF"

"Honour the contract with the community."

"As a municipality we have entered an agreement/contract with the communities of Timberlea/Beechville and I believe their agreement should be honoured as I would expect the same if/when a landfill was in my community."

"Honour the contract as it is now. Make condos + apartments do what residential homeowners must do."

"Honour the commitments to the community. Why change a good system."

"Honour the contract. Ensure environmental protection."

"Honour the contract with the public. Don't fix something that isn't broke."

"Honour the contract with the public. Don't fix something that is not broken."

"Honour the agreement. If its not broken, don't fix it!"

"Honour the contract, if its not broken, don't fix it."

"honour the contract with the community."

"Don't change the current agreement. Maintain current infrastructure. No campus at Otter Lake. No one will allow a site by them if the agreement is changed."

"Honour the contract, Honour the contract, Honour the contract!"

"Should be a 5th option... leave Otter Lake alone! Same term (25 years), same parameters, FEP & WSF need to stay! Anything else is breaking the agreement."

"Honour contract between HRM & the community. Let's keep a world class waste management program. The process is working well, lets not change something that works."

"For 22, new technology would need to be as good as/ better than existing service, and it must honour the existing contract with the community."

"Honour your agreement."

" None of the above. No choice here. FEP/WSF stays. Honour agreement!"

"Honour the contract; stop the HRM spin."

"Maintain the FEP/WSF. Leave the landfill height as promised. Close landfill in 2023 as promised."

"Honour the contract, keep FEP + WSF! Communicate to council not staff the communities' message."

"Need primary focus on backyard composting. Make category R compost from WSF product. Perfect existing system & CSC strategy first. Use consensus building, ,multi-stakeholder, citizen-led process to design perfection of existing system and the next system. Honour the contract."

"Honour contracts today. Honour Contracts in the future. No unprocessed organics to go directly into the RDF. Close Otter Lake 2024. No common landfill for the future. Change building codes so ICI sector can source separate easier.

"Honour the agreement. Education, Education, education!!"

"Honour the contract"

"HRM must honour the contract to the community by keeping the FEP/WSF open and close the facility when it is supposed to (2024)."

"Honour the agreement"

"Honour the agreements!!!"

"Lack of clarity on cost implications of identified options makes selection difficult. Foundation item; honour the terms of the agreement with the host community."

Honour the contract."

"Honour the contract. Listen to the people. Education."

"Honour the contract."

"Don't reneg on agreement w/ Timberlea."

"Honour contract. Keep Otter Lake open."

"Honour the agreement. Keep WSF/FEP open."

"Education!! The public. Honour the contract."

"Honour contract."

"Explore new site immediately. Honour the contract!!! Do not lessen current practices!"

"Keep the FEP/WSF. Close the landfill. Honour the contract."

"Honour the contracts."

"Do NOT honour contract in full. As a 27 yr. old planning to be in HRM for 60 years, please cut cost and introduce more cost-effective means of diverting waste.(ie. Clear bags, increased accountability."

"Honour the contract."

"Honour the contract to keep FEP/WSF to support landfill. Don't trust this process- HRM staff is not listening!"

"Honour the agreement with the local community!!"

"Honour the contract!"

"If the city counsel made a promise, commitment or led the community believe they would have FEP/WSF only for 25 years, the city/counsel should keep its word."

"Honour the contract."

"Honour the contract- no changes at Otter Lake."

"Honour the contracts!"

"Honour the contracts (agreements)."

"Honour the contract."

"Honour the contract"

"Honour the contract. Only extend (operations at existing site) to completion of cell 9 at existing height."

"Honour the contract. Start over."

"Honour the contract."

"Honour contract. Cost savings does not supersede environmental safety."

"Leave Otter Lake alone- honour the contract!!! Have some integrity!"

"Honour the contract!! Huge environmental impact if Stantec proposals are implemented."

"Honour the contract."

"Leave Otter Lake alone! Do not break the commitment. Honour the contract!"

"Honour all parts of the agreement with the host communities (HFX Waste). Keep the FEP/WSF."

"Honour contracts!"

IMPROVE OPERATIONS

"Re: #15, this will only encourage people to garbage more, #12 encourages organics collection."

"Should be based on size of household." (Re: Reduce bag limits from 6 to 4)

"Improve Otter Lake tech without removing any existing tech at Otter Lake."

"No glass in common bag." Re: All recyclables mixed together in 1 bag

"Waste campus needs to be better defined."

"Take all changes to Otter Lake off the table so we can focus on finding a new site and then talk about changes for improvement. No campus anywhere."

"Not broke, don't fix it."

"Increase frequency of organics collection to weekly, year round for all of HRM not just South End Halifax. Should have a few choices than all of HRM should have a vote on the choices not just the few."

"Need CSC (Community stakeholder committee) process to: 1) decide how to perfect present system, 2) decide what the next system should be, 3) site the next system."

"Future development should focus on education, increasing diversion and recycling, not changes to the Otter Lake facility."

"Allow pick up of waste at night and early morning."

More education very important."

"Daily cover- new hydroseed membrane as an alternative."

"Need primary focus on backyard composting. Make category R compost from WSF product. Perfect existing system & CSC strategy first. Use consensus building, ,multi-stakeholder, citizen-led process to design perfection of existing system and the next system. Honour the contract."

"Education re: recycling and backyard composting."

"Honour contracts today. Honour Contracts in the future. No unprocessed organics to go directly into the RDF. Close Otter Lake 2024. No common landfill for the future. Change building codes so ICI sector can source separate easier.

"Honour the agreement. Education, Education, education!!"

"Costs? Education. Bylaws, policies for new developments."

"Explore new technology- not @ Otter Lake."

"Change bylaws to require all rental properties + commercial properties to separate waste."

"Do NOT honour contract in full. As a 27 yr. old planning to be in HRM for 60 years, please cut cost and introduce more cost-effective means of diverting waste.(ie. Clear bags, increased accountability."

"These changes should be made in a trial basis before even thinking of closing Otter Lake."

"Educate regarding backyard composting. Educate waste reduction with waste sorting second priority. Keep FEP, get rid of WSF."

"Encourage waste reduction. Work w/ manufacturing/ product stewardship to reduce. Work w/ companies to reduce waste. Improve illegal dumping enforcement as it will there are to be more aggressive if enforcement is increased."

"Leave Otter Lake alone. Spend the resources needed to promote + enforce source separation, particularly more education officers."

"There should be a separate C & D landfill. Close Otter Lake 2024. Require CSC reviews to develop a true SWM solution."

"Don't go to single stream recycling, it would be a step back."

"Balance the haulers loads. Eliminate flow control for ICI waste."

"No single stream recyclables. Bag limit from 6 to 5 and later 5 to 4. Education and time for household. Compost- should be 6 months yearly. Paper bags for leaf and yard good thing.

KEEP FEP WSF

"Leave Otter Lake as is. Increase source separation, use FEP as "gate keeper."

"Maintain the FEP/WSF. Leave the landfill height as promised. Close landfill in 2023 as promised."

"HRM must honour the contract to the community by keeping the FEP/WSF open and close the facility when it is supposed to (2024)."

"Honour the agreement. Keep WSF/FEP open."

"Keep the FEP/WSF. Close the landfill. Honour the contract."

"Don't ever take away the safe guard."

"Do not close FEP-WSF"

"Honour the contract to keep FEP/WSF to support landfill. Don't trust this process- HRM staff is not listening!"

"If the city counsel made a promise, commitment or led the community believe they would have FEP/WSF only for 25 years, the city/counsel should keep its word."

"Honour the contract- no changes at Otter Lake."

"Educate regarding backyard composting. Educate waste reduction with waste sorting second priority. Keep FEP, get rid of WSF."

"Honour all parts of the agreement with the host communities (HFX Waste). Keep the FEP/WSF."

LEAVE OTTER LAKE ALONE

"Leave Otter Lake alone. Please honour the agreement!"

"Honour contract. Maintain environmental standards. Leave Otter Lake alone."

"Leave Otter Lake as is. Increase source separation, use FEP as "gate keeper."

"Should be a 5th option... leave Otter Lake alone! Same term (25 years), same parameters, FEP & WSF need to stay! Anything else is breaking the agreement."

"Honour contract. Keep Otter Lake open."

"Do not close Otter Lake site. This would be a waste of taxpayers money."

"Honour the contract- no changes at Otter Lake."

"No change to Otter Lake."

"Snarl. Staff is not listening. Leave Otter Lake alone."

"Don't change Otter Lake."

"Leave Otter Lake alone! Do not break the commitment. Honour the contract!"

"Leave Otter Lake alone. Spend the resources needed to promote + enforce source separation, particularly more education officers."

LOOK AT BEST PRACTICES

"Once you change one thing, the damage that this will cause is not yet proven or it had not been asked. Need more info on topics."

"Burn it."

NEW LANDFILL

"Honour the contract and start looking for a new site so we can close Otter Lake as outlined."

"Take all changes to Otter Lake off the table so we can focus on finding a new site and then talk about changes for improvement. No campus anywhere."

"Honour the contract + the agreement with community. Start finding new site for landfill to open 2023. Campus idea will ned at least 2 sites- just like Metro Transit- HPX + Dart. Sides."

"Honour the agreements. Close Otter Lake in 2024. Find new site now. New technology only for new site."

"Honour the contract. Find a new landfill site. Close Otter Lake in 2024. Redo this process for the new site. New site local communities should have an iron clad agreement that council affirm will be honoured in the future."

"Separate campus + new site (on questionnaire). I agree witrh new site, but not a campus."

"Need CSC (Community stakeholder committee) process to: 1) decide how to perfect present system, 2) decide what the next system should be, 3) site the next system."

"Start site selection process asap!"

"Explore new site immediately. Honour the contract!!! Do not lessen current practices!"

PLAN FOR LONG TERM

"Option 17 is only option." (17. Extend operations at existing site (Otter Lake)

"Cost implications of many of the suggested options are unclear/undefined...making selection of "yes/no" difficult. Most critical considering to allow for the siting of future contentious infrastructure; honour the agreement."

"Honour the contract. Find a new landfill site. Close Otter Lake in 2024. Redo this process for the new site. New site local communities should have an iron clad agreement that council affirm will be honoured in the future."

"My hope is council makes long-term fiscal prudent decisions and does not only listen to vocal minorities."

SOURCE SEPERATION

"Deal with fast food sorting. I have been told by managers that they sort for perception."

"Blue bag status quo, blue cart for paper product. Glass at grocery store in the future (German model)"

"KISS method is a must. Where does it go? Put a green dot on an item & put that item in a green bin. Black dot goes into a black bin."

"Leave Otter Lake as is. Increase source separation, use FEP as "gate keeper."

"Honour the agreement. Increase source separation and enforcement."

"Honour the contract. Community protection. Source Separation emphasis."

"Honour contracts today. Honour Contracts in the future. No unprocessed organics to go directly into the RDF. Close Otter Lake 2024. No common landfill for the future. Change building codes so ICI sector can source separate easier.

"Educate regarding backyard composting. Educate waste reduction with waste sorting second priority. Keep FEP, get rid of WSF."

"Leave Otter Lake alone. Spend the resources needed to promote + enforce source separation, particularly more education officers."

TRANSPARENCY AND INTEGRITY

"Maintain agreement at Otter Lake. Trust issue."

"Breakdown of impact of these "options". Options too vague."

"What are the costs?"

"Need to start from scratch with a citizen-led process with an open agenda."

"Honour the intent of the contract with the community. 25 years/FEP/WSF/Liners. Provide financials on costing of additional environmental and community protections if FEP/WSF didn't exist. I'm not convinced there is money to be saved."

"Honour the contract. Environmental protection (2nd liner), Keep FEP + WSF open. Get back our trust!"

"Honour the contract. Find a new landfill site. Close Otter Lake in 2024. Redo this process for the new site. New site local communities should have an iron clad agreement that council affirm will be honoured in the future."

"Should obtain household income stats on all responses. Are the low income rep heard?"

"Need CSC (Community stakeholder committee) process to: 1) decide how to perfect present system, 2) decide what the next system should be, 3) site the next system."

"Honour contract. Re-affirm specific commitments to the community. Re-establish trust."

"Answering questions with little education & info seems irrelevant on such important issues."

"Only #17-22 relate to the real topic HRM is pushing. Those relate to the current landfill. That's the real issue."

"Not enough info on cost of some of these options. Need education!!"

"But need financial business plan information. These answers are my behavioural responses only, need $'s info."

"The risks associated with changes @ Otter Lake are too severe to be blending into a bigger discussion on items that don't carry the same level of personal risk."

"Questionnaire is poorly written making choices difficult w/o adequate info."

"These options require a complete business plan relating to other programs. There is no financials given to any recommendations."

"Honour contract. Cost savings does not supersede environmental safety."

TRUST IN OUR GOVERNMENT

"Maintain agreement at Otter Lake. Trust issue."

"It seems that the intent is to break an agreement previously signed in good faith- what does this say about the people wanting to put an end to a world-class operation?"

"Honour the existing contract and community agreement. Stop this nonsense. How could council start this review of Stantec/staff options w/o discussing possible changes with the cmc??"

"Willing to give additional ideas for diversion for FREE. Shame on HRm for spending our money on this façade. Honour the contract."

"Honour the contract. Find a new landfill site. Close Otter Lake in 2024. Redo this process for the new site. New site local communities should have an iron clad agreement that council affirm will be honoured in the future."

"I think "HRM" is doing a good job on their solid waste program system and I feel landfills can be a thing of the past."

"Honour the contract; stop the HRM spin."

"Honour the contract, keep FEP + WSF! Communicate to council not staff the communities' message."

"Honour the contract to keep FEP/WSF to support landfill. Don't trust this process- HRM staff is not listening!"

"If the city counsel made a promise, commitment or led the community believe they would have FEP/WSF only for 25 years, the city/counsel should keep its word."

"Snarl. Staff is not listening. Leave Otter Lake alone."

"My hope is council makes long-term fiscal prudent decisions and does not only listen to vocal minorities."

WORLD CLASS SYSTEM

"It seems that the intent is to break an agreement previously signed in good faith- what does this say about the people wanting to put an end to a world-class operation?"

"Leave the existing ' best in class' 'world-class' system in place."

"Honour the commitments to the community. Why change a good system."

"Honour contract between HRM & the community. Let's keep a world class waste management program. The process is working well, lets not change something that works."

"For 22, new technology would need to be as good as/ better than existing service, and it must honour the existing contract with the community."

Canadian Restaurant
and Foodservices
Association

Association canadienne
des restaurateurs
et des services
alimentaires

5121 Sackville Street
Suite 201
Halifax, Nova Scotia
B3J 1K1

Tel: (902) 425-0061
or 1-877-755-1938
Fax: (902) 422-1161
www.crfa.ca

November 18, 2013

Chrystiane Mallaley
NATIONAL Public Relations
Founders Square
1701 Hollis Street, Suite L101
Halifax, Nova Scotia B3J 3M8

Dear Ms. Mallaley,

I am writing to you on behalf of the Canadian Restaurant and Foodservices Association (CRFA) and I appreciate the opportunity to provide comment on the review of solid waste management in Halifax Regional Municipality (HRM)

The Canadian Restaurant and Foodservices Association (CRFA) represents the owner/operators of Nova Scotia's restaurants, bars, caterers and pubs. Foodservice operators and our employees are an integral part of Nova Scotia's social and economic fabric. In financial terms, our industry is made up of more than 2,000 small business operators doing over $1.6 billion in sales. On top of this, for every dollar spent in a restaurant, an additional $1.85 is spent in the rest of the economy. With 32,000 employees, we are the third-largest, private-sector employer in the province. While this review is specific to HRM, the municipality accounts for the majority of provincial foodservice activity.

Foodservice operators in HRM face a tough economic environment due to the downturn in the economy and at the same time have seen significant increasing costs for food, labour and energy. At a municipal level, operators have seen their municipal tax bill soar, a substantial increase in water rates and a new fire inspection fee. With razor thin pre-tax margins of just 5.0% it is little wonder that over half of the establishments surveyed in HRM have decided to scale back their renovation or expansion plans. The same survey found that 79% of restaurateurs believe they do not get good value for their municipal tax dollars and fewer than 2 in 10 believed City Hall understand the challenges faced by small business.

Solid waste is an important issue for foodservice operators. Since the vast majority of waste is generated back of house, foodservice operators as a whole have managed to achieve a significant diversion rate from their kitchens with a low contamination rate. This success has come at a high cost to small business operators and HRM must take action to reduce the high cost burden of garbage removal on small businesses. Foodservice establishments already

subsidize the garbage removal for residential ratepayers through the disproportionate amount of tax (3 times the rate) they pay. On top of the high tax rate, unlike residents or many small businesses restaurateurs also must pay thousands of dollars per year for their own garbage removal.

It is clear from the Stantec report that **solid waste costs in HRM are completely out of line with other jurisdictions and the primary goal of this review should be to reduce costs on both businesses and ratepayers.** Unless there is a real and serious environmental downside, all recommendations that could reduce costs should be explored and implemented.

The continued control over the flow of waste in HRM has resulted in a disproportionately expensive waste management system when compared to other jurisdictions. By controlling the flow of waste and containing it within the City's boundaries, the waste management system has been deprived of competition and limited the types of materials that can be sent to be composted by the institutional, commercial, and industrial sector (IC&I). Not only has this resulted in unnecessarily high costs for businesses, the Stantec report has determined it has also resulted in exacerbated costs for HRM and hence small business owners.

Organic waste processing technologies such as anaerobic digestion have the potential to allow the IC&I sector to divert a greater range of compostable materials from the waste stream and generate more revenue over the long term. Combined with the ability to produce biogas to generate electricity or heat, fuel for vehicles, and liquid or solid fertilizer, this is an option that should be evaluated by HRM in conjunction with neighbouring municipalities. Serious consideration must also be given to eliminating the FEP and consolidating waste facilities if cost reductions can be realized. More flexibility is needed in the HRM system and across Nova Scotia to create the economies of scale necessary in the waste management system to halt the rise of waste management costs, with the goal of reducing them in the future.

One topic raised during the consultation process is the use of clear garbage bags. CRFA opposes this measure. Permitting haulers to determine what level of contamination is too high, without any accountability or providing the IC&I sector with alternative disposal options outside HRM, is costly and ineffective incentive to increase waste diversion.

To be environmentally sustainable and increase waste diversion, a waste management system must also be economically sustainable throughout the supply chain. By controlling the costs of operating the system, HRM would provide increased incentives for businesses to divert more materials without continuing to escalate the costs to their businesses.

I trust you will give the views of this important industry due consideration.

Sincerely,

[redacted]

Luc Erjavec, P.Eng.
Vice President, Atlantic Canada

IPOANS
INVESTMENT PROPERTY OWNERS ASSOCIATION OF NOVA SCOTIA

Sovereign Place Suite 603 • 5121 Sackville Street • Halifax, Nova Scotia B3J 1K1
Telephone (902) 425-3572 • Fax (902) 422-0700 • E-mail association@ipoans.ns.ca

November 21, 2013

Mr. Gordon Helm, Manager
HRM Transportation & Public Works
Solid Waste Resources
PO Box 1749
Halifax, Nova Scotia
B3J 3A5

Dear Mr. Helm:

On behalf of IPOANS I'd like to thank you for meeting with us recently and providing the sub-committee with further insights on solid waste management in HRM, beyond the public meetings and consultations.

We share a similar vision as your department to enhance environmental stewardship through increased diversion and reduced negative environmental impacts. Consequently, we undertook a considered review of the information made available to us through your department, in forms of workshops, consulting reports, websites, and various meetings. In addition, we visited apartment properties, the Otter Lake facility, participated in solid waste route collection and opened dialogue with a selection of our members and residents.

Outlined below are eight key points we'd like to make with respect to the HRM Waste Management Review.

1. <u>Current classification is discriminatory against apartment owners and residents.</u>

   IPOANS represents the interests of apartment building owners and-tens of thousands of apartment residents in HRM. With current housing starts clearly indicating that the majority of new housing starts in HRM are new apartment residences, the importance of the apartment sector in HRM's Solid Waste management plan increases daily.

   While apartment structures greater than six units are categorized by HRM as being part of the ICI grouping, **IPOANS contention is that apartment structures greater than six units are members of the residential property assessment classification and should be treated the same as Condos or any other HRM resident that receives solid waste management services delivered by HRM.**

   Apartment residents in buildings greater than six units are essentially the same and generate the same amounts and types of solid waste as all other residential forms and therefore the same rate structure should apply to landlords. Residents who live in apartments should not be discriminated against just because they chose to live in apartment structures greater than six units that are not registered as condominium structures.

HRM's policy to exclude "non-condominium" registered apartment structures greater than six units from the provision of solid waste management services is an arbitrary and illogical decision that does not stand up to the most cursory review.

HRM's current solid waste management review is timely as IPOANS has recently secured a legal opinion from one of Halifax's most established law practices which severely criticizes HRM's discriminatory practices with respect to solid waste management services for non-condominium registered apartment structures greater than six units.

As stated by our lawyer "But for condos and apartments the uses are essentially the same and will generate the same amounts and types of solid waste. Distinguishing the two is no less objectionable than choosing which residences obtain garbage pickup on the basis of the race, religion or eye colour of the occupants" Clearly, the city is opening itself up to liability if a court challenge was to be pursued.

Therefore, and to better align associated costs to be borne by our residents, **HRM must revisit the ICI categorization to separate apartment buildings from institutional and commercial establishments.**

2. Current HRM Waste Business Model is not sustainable.

The current business model, as contracted by HRM, is not seemingly sustainable. The data provided in Figure 2 of Richard Butts' (CAO, HRM) February 5, 2013 Staff Report to Council, supports this statement. In effect, we are experiencing a cost of $170/tonne in comparison to a tipping fee of $125/tonne. Furthermore, the original cost estimate was for $67/tonne (FY96) or $90/tonne (FY12). It is not reasonable to assume that HRM will continue to be able to provide the funding necessary to maintain this negative variance.

If the same model continues, including a continuation of the same contracted services in a separate site, it would be reasonable to expect the cost to the city remain the same. The only logical conclusion is that "our" costs, therefore, would have to increase, "or" material change in HRM's cost structure would need to be changed.

3. Solid Waste Management practices affects housing affordability.
Insofar as cost structures are concerned, we considered regulatory trends affecting other utilities. If we can expect Waste Management Resources cost recovery directives to trend other services (e.g., electricity and water), any increases in costs will be passed along to the end users; meaning that we can expect an increase in tipping fees to match landfill operating costs with a status quo agreement. These adjusted rates would not be in line with national standards (see Waste Management Industry Survey: Business and Government Sectors, Statistic Canada, 2008). Clearly, the contract that is in place today, with an expectation to enter into the same agreement when this contract expires, is not sustainable from a cost perspective for end users in HRM and will affect housing affordability.

In February of 2013, IPOANS commissioned a report from a nationally recognized housing economist, Will Dunning, to detail the effects of government policy on affordability of housing. One of facts coming out of the report clearly pointed to policies relating to such things as utilities, including energy, water, sewerage "and" garbage disposal have a direct effect on housing affordability. (See Will Dunning report attached)

4. Other waste management options should be explored:

   Given that the current financial model is not sustainable without increased costs to users, a new model needs to be explored. According to what we have learned thus far, three options, alone or in combination, present themselves:

   a. Investigate a different technical solution to waste management, as a lower cost option to landfill; for example, incineration. Recognizing that technology has advanced since 1996, HRM may benefit from a better understanding of technical options to solid waste management, beyond landfill.
   b. Allow for increased cell height of the Otter Lake landfill site, which has the impact of deferring the capital costs for a new landfill site and extending the life of the Otter Lake facility thus allowing time for the development of new and acceptable technologies.
   c. Allow for transportation of waste accumulated in HRM to leave HRM, meaning that Council will need to revisit HRM by-law No. S-600.

   We are not limiting HRM to these three options and encourage HRM staff, whether through contracted means or with their own experts, to further explore any options that will meet the two fold objective of being both 1) cost effective and 2) environmentally conscience.

5. Solid Waste Management regulations have created unregulated monopolies resulting in excessive costs.

   HRM has created a solid waste management monopoly under the current program, with a sole source available for solid waste management disposal in HRM, and a prohibition on solid waste being trucked out of HRM. In some cases, monopolies make sense as the best way to provide an essential service that would not be otherwise possible due to some physical restriction – e.g. not feasible to run 3 sets of power lines on a street. A monopoly is not required to ensure that solid waste management services are available by achieving some sort of critical mass or scale of operations. Solid waste management disposal is available in neighbouring jurisdictions at prices far less than those imposed by the HRM monopoly situation.

   Monopolies in Nova Scotia come with regulation – with a requirement to report to the Nova Scotia utility and Review Board. The NSUARB requires monopolies to operate as efficiently and effectively as possible to deliver the good or service to the vulnerable masses at the lowest cost. In the case of HRM Solid Waste Management, there is no independent body scrutinizing the costs and fee schedule – there is no pressure to be efficient or to meet normal market forces. There is something very fundamentally wrong with this situation and it must be dealt with – either by having a body that HRM Solid Waste Management must report to ensure that costs are being minimized, or preferably, by breaking the monopoly, to allow for the free movement of goods to suppliers of solid waste management services outside of HRM.

6. Joint Education and Marketing Programs for the Multi-Res sector needs to be enhanced and delivered by HRM Waste in partnership with IPOANS.

   HRM's education and marketing programs are appreciated and, moving forward, we recommend additional programs targeting multi-unit residential buildings are undertaken. In fact, this initiative is underway currently with a joint workshop scheduled for Dec 17th.

7. Illegal Dumping must be proactively dealt with.

   Likewise, illegal dumping should be incorporated in future discussions. Illegal dumping was clearly identified as a major issue for a large number of our members and in the October 16th ICI Engagement Session. We believe illegal dumping should be aggressively enforced and penalized by HRM. Apartment waste diversions are failing with illegal dumping being a large component of the fail rate. IPOANS is open to any meaningful dialogue with HRM and its partners aimed at providing a solution.

8. **IPOANS will not support any by laws or policy changes that place penalties on landlords for lack of participation/support in waste diversion efforts by their residents.**

   We believe the solution to increasing waste diversion at apartments is through education, and changes to procedures and policies to encourage and facilitate diversion and must be a shared responsibility of both landlords and HRM.

IPOANS, through this letter, speaks for the member organizations in the association, representing approximately 40,000 apartments in HRM. Our member companies have invested considerable resources in understanding the issues discussed in this letter and are hopeful that you will take into consideration our observations and recommendations for each of the eight points presented.

Thank you for the opportunity to contribute to this important initiative.

Sincerely,

[redacted]

Jeremy Jackson
President, IPOA[redacted]

APPENDIX I: LETTERS SUBMITTED BY WASTE INDUSTRY STAKEHOLDERS

21 Simmonds Drive
Dartmouth, Nova Scotia
1-902-468-9111

25 November, 2013

Chrystiane Mallaley
Consultant, NATIONAL Public Relations
Founders Square, 1701 Hollis Street, Suite L101
Halifax, Nova Scotia B3J 3M8

RE: Halifax Regional Municipality - Waste Strategy Review

Dear Ms. Mallaley,

I am writing you today to ensure that the critical points I tabled during the Waste Industry Stakeholder Meeting are documented. Certain participants at the meeting, those with direct interest in maintaining the status quo, insisted upon interrupting and monopolizing discussions to the detriment of others.

Recommendation:
I underlined to Mr. Gord Helm, Manager Solid Waste Resources, the importance of considering the redirecting of HRM's waste to regional landfill operations as one of the potential methodologies for reducing the cost and extending the life of the Otter Lake Facility. Regional landfills are available to service HRM's disposal needs at a significantly lower cost than current operating rates at Otter Lake. At the same time, HRM can realize savings in capital costs for cell development at Otter Lake. As stated in Stantec's report to HRM, "Opportunities exist for a more collaborative use of resources with other waste management regions in NS". Total operating cost reductions over a ten-year period could approach $25 million and capital cost reductions could exceed $100 million.

Breakout Session:
During the breakout session for Landfill Operations, I stated that the simplest and most immediate win available to all stakeholders would be to redirect Industrial, Commercial and Institutional (ICI) waste from Otter Lake to regional landfill operations. Disposal costs would be reduced and, at the same time, the life of the Otter Lake landfill would be extended for residential waste.

Additional Benefits:
Neighbouring municipalities have not yet developed a suitable organics processing solution. Therefore, a real possibility exists for using transfer trailer backhauls from selected regional landfills to advantage, should HRM find itself able to profit from incremental tonnages added to its own composting operations.

I am willing to discuss and explore any of the opportunities described above with HRM. Please do not hesitate to contact me.

Yours truly,

[redacted]

Timothy White, MBA P.Log
District Manager
Waste Management of Canada
902-468 5025

cc. Mr. Gord Helm, Manager Solid Waste Resources, HRM

From everyday collection to Environmental protection, Think Green®, Think Waste Management

HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 4
Halifax Regional Council
November 12, 2013

TO: Mayor Savage and Members of Halifax Regional Council

SUBMITTED BY: Original Signed
Cathy Mellett, Municipal Clerk

DATE: October 29, 2013

SUBJECT: HRM Solid Waste Strategy Review Community Engagement Program
National Public Relations Midterm Project Report

INFORMATION REPORT

ORIGIN

Request of Deputy Mayor Rankin at the Halifax Regional Council meeting of October 22, 2013 for this report to come forward as an information item at the Halifax Regional Council meeting of November 12, 2013.

LEGISLATIVE AUTHORITY

Administrative Order No. 1 Section 25 Order of Proceedings– clauses 4, 5 & 6 Added item request by members of Council.

BACKGROUND

National Public Relations was engaged by HRM to undertake a portion of the public consultation process related to the community engagement program entitled "Building a Better Waste System, Together" in regard to the HRM Solid Waste Strategy Review.

DISCUSSION

The midterm report from Phase 1 of the consultation process entitled "Building a Better Waste System Together" was provided to Halifax Regional Council on October 21, 2013 and posted on the HRM website on October 22, 2013.

FINANCIAL IMPLICATIONS

None.

COMMUNITY ENGAGEMENT

The midterm report entitled "Building a Better Waste System, Together" from NATIONAL public relations is available on HRM's Shape Your City community engagement hub regarding the Solid Waste Strategy Review at (http://shapeyourcityhalifax.ca/solid-waste-management).

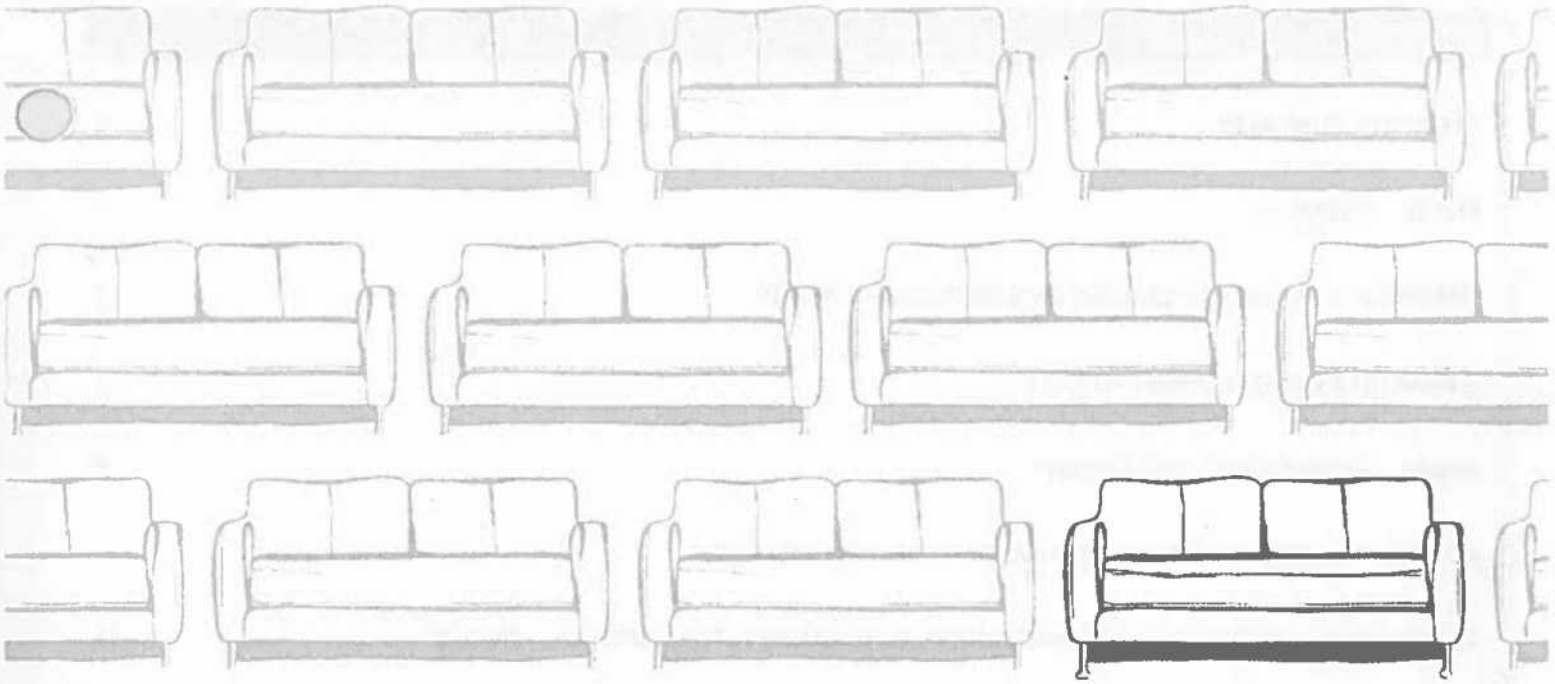
ATTACHMENTS

Attachment 1 - "Building a Better Waste System, Together" HRM Solid Waste Strategy Review Community Engagement Program Midterm Project Report

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A copy of this report can be obtained online at http://www.halifax.ca/council/agendasc/cagenda.html then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Laura Lewis, Agenda & Council Coordinator, 490-6525



BUILDING A BETTER WASTE SYSTEM, TOGETHER

HRM Solid Waste Strategy Review
Community Engagement Program
Midterm Project Report

October 21, 2013

PREPARED BY: NATIONAL PUBLIC RELATIONS

Halifax
Founders Square
1701 Hollis Street, Suite L101
Halifax, NS B3J 3M8
Tel. 902.420.1860

New Brunswick
75 Prince William Street, Suite 210
Saint John, NB E2L 2B2
Tel. 506.672.1860

Newfoundland and Labrador
448 Water Street
St. John's, Newfoundland and Labrador A1E 1B1
Tel. 709.754.9614

www.RedCouch.ca

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EXECUTIVE SUMMARY

Phase 1 of the solid waste strategy review community engagement program consisted of consultations with industry stakeholders, residents of the communities in nearest proximity to the Otter Lake landfill, and members of the general public across all of HRM.

Since the beginning of the project, the engagement team has been in close communication and collaboration with representatives of the Community Monitoring Committee (CMC) to ensure that the voices and interests of the residents that live closest to the Otter Lake landfill are heard throughout this process. The engagement team consulted with the CMC on event design for the Town Halls and regional public events, provided a speaking and presentation role at the public events, and made requested resource materials and supplemental information available for the public's consideration via the Shape Your City Halifax online engagement portal.

The engagement strategy included utilizing the recently launched Shape Your City Halifax website to provide background information and gather feedback in a manner that mirrored the methodology used for in-person events.

The first phase of engagement included the following events:

- Two town hall sessions for residents of Beechville, Lakeside, Timberlea and Prospect Road (BLTP), on September 18 and 19
- Two sessions for ICI (industrial/commercial/institutional) and waste industry stakeholders on September 23 and 30
- Four engagement sessions for members of the general public across HRM, including:
  - Dartmouth and vicinity on September 25
  - Bedford and vicinity on September 26
  - Halifax and vicinity on October 2
  - Eastern Shore and vicinity on October 3

A summary of key themes that have arisen in the engagement process thus far and the relative weight of each category of feedback is presented in **Figure 1**. Overall feedback from comment cards suggests that participants have found the engagement sessions held to date to be valuable (**Figure 2**).

We estimate that a total of approximately 650 to 700 people have engaged in the conversation on evolving our waste system thus far. While we have welcomed a number of new people to the conversation at every event hosted, it has been apparent that those with a direct interest in the operations of the Otter Lake landfill (e.g. through residential proximity or employment) are well organized and vocal in presenting their opposition to any and all changes under consideration for operations at Otter Lake. This had an impact on the quality and quantity of conversation had about system needs and/or opportunities unrelated to the landfill.

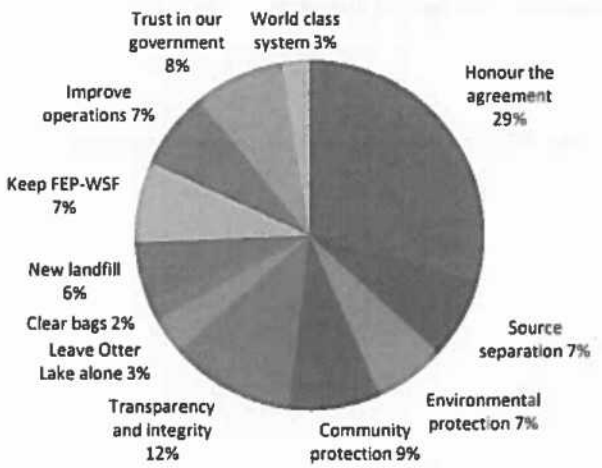


Figure 1. Summary of key themes arising in phase 1 of the engagement program and percentage weights.

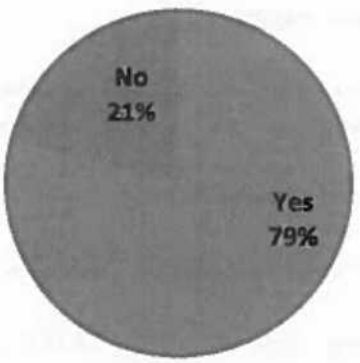


Figure 2. Responses to comment card question of "Was this event valuable to you?" during phase 1 of the engagement program.

PHASE 1 OVERVIEW

The objective of phase 1 of the public engagement program was to provide HRM residents with the background information necessary to provide informed feedback on options to evolve the HRM waste management system, while continuing to protect the environment and community.

Throughout this process, the engagement team has been mindful of the requirement for participants to have an authentic opportunity to influence Regional Council's decision making and have their voices heard. In order to achieve this, we have been diligent in creating a wide variety of opportunities for participants to provide feedback at the in-person events and online.

In Person:

- Small group discussions (world café format)
- Harvest of key themes
- Harvest of all questions and comments (including comment cards)

Online:

- Discussion forums mirroring the questions asked during in-person events
- Polls/surveys
- Invitation to submit questions for response

SUMMARY OF COMMUNICATIONS AND INVITATION EFFORTS

With the goal of informing and inviting a broad cross-section of citizens to participate in the engagement program, we executed multiple promotional tactics through a variety of traditional and online channels.

Our invitation process began with a stakeholder mapping exercise, expanding upon lists of individuals, organizations, and communities already identified as likely to have an interest in the process and its outcomes. We also targeted key influencers whom we expected may have a general interest in the process from the perspectives of civic engagement, responsible city management, environmental stewardship, sustainability, and quality of life. This included business development organizations, environmental and relevant industry associations, and educational institutions to name a few.

Our tactics for reaching out to these audiences with our invitation to participate in the process included:

- Mass e-mail invitations
- Follow up phone calls to key stakeholders and those identified as influencers in their communities and organizations, requesting that they assist in extending the invitation
- Grand Parade newsletter
- Spotlight in Halifax.ca main page gallery
- Request to members of Council to extend the invitation to their networks
- Posters

- Social media outreach
    - Tweets via @hfxgov
    - Facebook posts (regular and promoted) through the Halifax Recycles Facebook page
    - YouTube advertising

- Print media placements (including: the Chronicle Herald, Bedford-Sackville Weekly News, Dartmouth – Cole Harbour Weekly News, Shop the Shore, Masthead News)

- Direct mail invitation to residents of Beechville, Lakeside, Timberlea and Prospect Road

SUMMARY OF ENGAGEMENT TO DATE

HOST COMMUNITIES: BEECHVILLE, LAKESIDE, TIMBERLEA AND PROSPECT ROAD (BLTP) TOWN HALLS

Prior to engaging the general public and as mandated by Regional Council, we hosted two town hall meetings with a specific invitation to residents of the communities in closest proximity to the Otter Lake landfill site. These events provided an open forum to hear directly from the residents who are most likely to be affected by potential changes at the Otter Lake landfill.

The town hall sessions consisted of the following:

- Welcome - HRM Deputy Chief Administrative Officer, Mike Labrecque

- Introduction to the engagement program, event agenda, guidelines for the evening and overall facilitation - NATIONAL Public Relations

- Remarks - Community Monitoring Committee, represented by Ken Donnelly and Jack Mitchell

- Presentation – HRM Solid Waste Resources, represented by Laurie Lewis

- Open mic/question and answer period with HRM representatives - Mike Labrecque (Deputy CAO), Gord Helm (Manager, Solid Waste Resources), and Richard MacLellan (Manager, Energy & Environment)

- Closing – invitation to participate in further engagement in-person at future events and online

We estimate that the two town hall meetings were attended by a total of approximately 500 community members. The majority of comments and questions expressed were focused on the community's desire to maintain the status quo at the Otter Lake landfill.

The strongest themes that arose in both town hall sessions can be summarized as follows:

- HRM's agreement with (and commitments made to) the Otter Lake host communities and concerns that proposed changes to the operations are inconsistent with those commitments

- Opposition to recommendations of the Stantec report regarding closure of the Front End Processor and Waste Stabilization Facility (FEP and SWF)

- Concerns regarding potential changes to environmental and community protections
- Concerns regarding the intent and integrity of the Stantec report

- Emphasis on source separation, diversion, and education efforts as most important to continued success

During the events, all town hall attendees were asked to write down their most important questions/concerns. Those questions were themed onsite, and attendees highlighted their three most important areas of concern through a "Dot-mocracy" exercise.

All of the questions identified in the town hall sessions were transcribed, and a full list of them can be found in the **Appendix A**. HRM representatives committed to providing responses to these questions over the course of the engagement process. Those responses have been posted to the engagement portal as they are developed.






INDUSTRY STAKEHOLDERS

The implications of some of the options for changes to the waste system under consideration could be significant for ICI sector and waste industry stakeholders.

The design of the session with ICI sector stakeholders was comparable in content to the general public events, and incorporated open discussion with HRM Solid Waste Resources staff regarding the options under consideration.

The ICI sector event was not well attended, which has led the engagement team to hypothesize two things: 1) the sector may lack awareness of the potential impacts the options under consideration for the waste system might have on their organizations should they be implemented (e.g. service level, cost), and 2) a more direct outreach and engagement approach could be more effective in terms of educating and gathering feedback from ICI stakeholders on the options under consideration. This assessment has informed and shaped our approach to Phase 2 of engagement with this audience, which will include more one-on-one meetings and an online survey option for stakeholder convenience.

The waste industry session was attended by more than 20 stakeholders, which was a strong turnout and considered representative of the businesses that play a direct role in waste management services in HRM. Given the existing expertise of this group of stakeholders, the format of the consultation was focused on gathering specific feedback on the recommendations of the Stantec report, falling into four broad categories:

1) Co-location of facilities
2) Collection options
3) Automated collection
4) Compost plant capacity and regulations

GENERAL PUBLIC

The general public events in phase 1 were held in central locations in different parts of HRM (including Dartmouth, Bedford, Halifax and Porters Lake) and designed to focus on information sharing and the capture of high level feedback. This approach acknowledged that a number of individuals in attendance would be entirely new to the conversation about our waste management system, and would need to establish a baseline understanding of the system and options under consideration, in order to provide informed feedback.

The content presented in the public session included an educational presentation by HRM on the waste management system and options under consideration, and a presentation by the CMC articulating the key concerns of the host communities of the Otter Lake landfill. Discussions were then hosted in a world café format, and framed by the following questions:

1. "What do you appreciate most about the way we handle our trash in HRM?"
2. "What is most important to you as we evolve our waste system?"
3. "What values and principles should guide our future decisions?"

Please see **Figure 3** for a summary of the key themes and topics that arose from those discussions. A complete, categorized list of verbatim priorities is provided in **Appendix B**.



Figure 3. What we heard: key themes from phase 1 of community engagement.

Comment cards were also made available to participants at all events. They have been transcribed, categorized and are presented verbatim in **Appendix C.**

We estimate that approximately 200 community members participated in the general public events. It is worth noting that many individuals from the host communities of the Otter Lake landfill were repeat attendees at events across HRM and brought the voice and concerns of those communities into the broader general public conversation about how the waste system should/could evolve. This had an impact on the quality and quantity of conversation had about system needs and/or opportunities unrelated to the landfill.

The approximate breakdown of participants by event is as follows:

- Dartmouth and vicinity: 50 people
- Bedford and vicinity: 60 people
- Halifax and vicinity: 90 people
- Eastern Shore and vicinity: 30 people







SHAPE YOUR CITY PORTAL

Working in conjunction with the in-person sessions, we have executed the engagement process online through the Shape Your City Halifax website. As the online hub for the engagement program, the portal is intended to be a space populated with clear content on an ongoing basis that is easy to understand, engage with, and share.

Content on the portal includes:

- Educational videos
- Background information (presentations, reports, regulations, etc.)
- Frequently asked questions and answers
- Event summaries
- Event schedule

The engagement functionality of the portal consists of:

- Discussion forums
- Question submission form
- Quick polls and surveys



To truly take advantage of the convenience of online engagement, we encouraged discussion between events so residents could participate remotely and on their own time, at any point throughout the engagement program.

Key engagement statistics from the portal include:

- Site visits: 4,044
- Page views: 9,112
- Document downloads: 1,153
- Video views: 4,960
- Survey responses: 550
- Forum posts: 41

A full list of comments made on the portal can be found in **Appendix D.**

The greatest level of engagement online is in the form of survey and quick poll responses (**Figures 4 and 5**). This has proven the most efficient and preferred way for a resident to express their opinion on the subject matter when they visit the portal. Knowing this, phase 2 of the engagement process will feature survey methodology prominently – both in person and online.

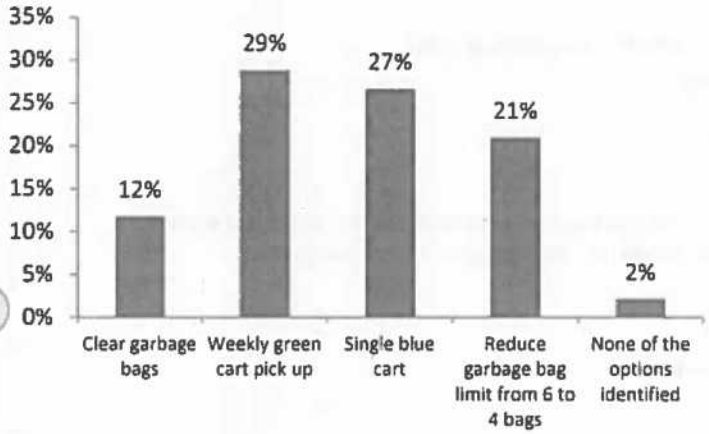


Figure 4. Results from the quick poll that asked, "Which of the following changes at your curb do you support?"

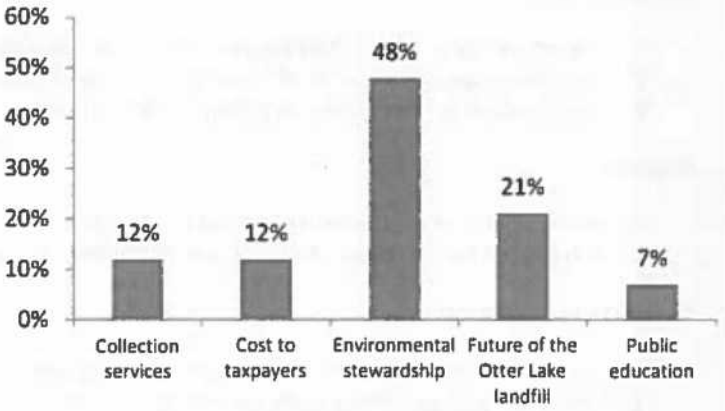


Figure 5. Results from the quick poll that asked, "When it comes to solid waste management, what is most important to you?"

PHASE 2 – COMMUNITY ENGAGMENT

The intent of the next round of engagement will be to seek specific feedback on options under consideration for changes to the waste management system. In addition to gathering feedback on recommendations in the Stantec report, we also seek to gather the input of residents on ways to increase reuse/reduce behaviours and opportunities to make enhancing diversion simpler and more efficient.

As with the phase 1 of engagement, we will seek to maximize the quantity and quality of citizen input to the process, through the channels of their preference – online or in person.

To allow all participants to engage in the discussions that most interest them, in person events and discussion forums on the engagement portal will be segmented by subject area as follows:

1) Increasing diversion (reduce, reuse, recycle)
2) Changes at your curb
3) Recycling
4) Organics and composting
5) Landfill site changes

Resident feedback on the system options falling in the aforementioned categories will be captured both qualitatively and quantitatively to inform Regional Council's future decision making by using a survey form that lists specific options and asks the stakeholder to select "Yes, "No", or "Unsure". Options on which we will gather feedback include:

Increasing Diversion (Reduce, Reuse, Recycle)

1. Reduce bag limits from 6 to 4
2. Use clear bags for garbage
3. Increase inspections at the curb
4. Increase education at high rise apartments and commercial properties
5. Increase inspections and rejections of material when it arrives at the landfill
6. Expand the Household Hazardous Waste program with new depot(s)

Changes at Your Curb

7. Introduce black carts for garbage (with or without user pay model for different size cart)
8. Separate large appliance metal collection from regular garbage
9. Co-collection of multiple waste streams in split trucks

Recycling

10. All recyclables mixed together in 1 bag (plastic, glass, cans, paper, cardboard) instead of the current 2-bag system
11. Introduce blue carts instead of blue bags (including split cart option for existing 2-stream recycling)

Organics & Composting

12. Increase frequency of organics collection to weekly, year-round
13. Collect leaf and yard waste separate from green cart
14. Accept only paper bags for collection of leaf and yard waste
15. Smaller green carts for food waste only
16. Make HRM compost available for purchase

Landfill Site Changes

17. Extend operations at existing site
18. Discontinue garbage processing at FEP/WSF and repurpose for organics processing
19. Construct consolidated waste campus model at Otter Lake
20. Construct consolidated waste campus model at new site
21. Increase cell height (5, 10 or 15 metres higher)
22. Explore new technology options

APPENDIX A: VERBATIM QUESTIONS FROM TOWN HALL MEETINGS

Responses to these questions continue to be developed and posted to the Shape Your City engagement portal.

1. If there's a contract, why is this even being considered?
2. Why push to void contract with the communities? Not a good use of our tax dollars
3. Is the contract being broken because the city wants to use the savings for a stadium?
4. If HRM breaks this contract, how can they be trusted to uphold future contracts?
5. The community agreed to host the landfill for 25 years. How is it fair of HRM to extend the life beyond 2023?
6. Why are we here when there is a contract in place. Why not just leave Otter Lake alone? Why 14 meetings?
7. Is it legal for the contract to be broken?
8. Why did council decide they should break the contract? What did they see wrong with it?
9. Why was the agreement with the community (contract between HRM and residents) not taken into account in the Stantec consultation?
10. If HRM has no legal jurisdiction to make changes, why is all this money and time being wasted here and now to strong arm the citizens of this area to accept the Stantec report?
11. What gives you the right to break our trust and contract signed in good faith?
12. How can HRM justify talking about extending the life of the landfill when the community agreed to only 25 years?
13. "Government: of the people, for the people, by the people." Who changed the definition?
14. If HRM is going against their word to the community, how are we supposed to trust them again?
15. Politicians should work for us, not for them. What has changed?
16. Why do HRM staff continue to misrepresent the operations of FEP and WSF?
17. What plan does HRM have to repair and restore the relationship with our community? We feel dishonoured.
18. What will the effect of the increased cell height be?
19. How high will the landfill cells be raised to if the proposed changes are made?
20. What is the status of extending the life of the landfill?
21. Where would an alternative landfill be located? Are there proposed options?
22. Why won't HRM council start looking for a new site? Our community did our part. It took 10 years to settle Otter Lake, why not start looking now?
23. If there is no new site, what is the length of time HRM wants to extend the life of this landfill?
24. Why are we not discussing the replacement to Otter Lake? This is our chance to take what we've learned and improve?
25. Beside alleged savings, what is the other benefit to making the facility a dump?
26. Is it true that only 3% of the waste is prevented by the facility?
27. How will property values be affected?
28. How much will my property value go down?
29. The concern to me is the proposal to bring all compost to Goodwood area to "try" compost. This area experiences a high putrid smell on many days as it is – will this not increase the problem?
30. Why would we agree to having a landfill that smells, attracts birds in our neighbourhood and have it for another 100 years?

31. Will there be foul odors?
32. Will the smell increase at the landfill, making homeowner value go down?
33. How are you going to deal with the rodents like the ones near my parents' house, they live in a rural area with a dump a few kms away?
34. Currently, several times a year there are strong odours from the landfill. What guarantee is there this would not become worse with the proposed changes?
35. The landfill did smell without sorting 1-2 years ago. Why do you think it didn't?
36. How will a waste campus reduce odors at Otter Lake?
37. How does closing the landfill gatekeeper (FEP/WSF) possibly "enhance" or "evolve" the waste system?
38. Laurie Lewis stated that the WSF does not work as intended. Then why aren't we researching how to make it work better instead of scrapping it?
39. Are you saying that the state of the art waste management facility is mostly due to the cells and not the front end processer?
40. How are the proposed options going to protect the environment in a facility that was not designed for these extra years of operation?
41. What changes if HRM keeps the Otter Lake landfill site open?
42. If the province has already said they won't close or change the facility, why are we here? How can these changes still be made?
43. If the province is refusing to okay these changes what is the point of HRM continuing this process?
44. Is this a ploy to force the province to contribute more money to the city for waste processing?
45. How do you plan to overcome the province's objection to your proposed unilateral action?
46. Why is HRM proceeding in the face of opposition from the province?
47. Why is HRM doing this if different levels of government oppose the change? What is the percentage chance of HRM succeeding?
48. Why are we wasting the time and money if the province isn't going to change what is in place?
49. If Otter Lake is world renowned, why are we discussing change?
50. Why are you changing a system that works?
51. Why not leave the present system in place and treat those "new" green house gases as a new project, or extension of present system?
52. Why are there town hall meetings in areas that don't have anything to lose?
53. Has this decision already been made, or are we really going to be listened to? Does our opinion count?
54. Why are we here? Who started this idea? The deal was 25 years – was it working too well?
55. What triggered the desire to change the agreement since you indicated it wasn't for money?
56. What happens to the current employees at Otter Lake?
57. How many jobs will be lost?
58. What would the proposed increased employment mentioned by HRM look like?
59. Why would anyone reduce recycling to save money and cut jobs?
60. How will non source separated items be flagged without the FEP?
61. If cells are built higher, will noise of trucks and equipment be more of a nuisance?
62. What are the dangers of increasing cell heights? What is the environmental impact of the vertical cell increase?
63. If cells are built higher, will noise of trucks and equipment be more of a nuisance?

64. If this is an effort to save money? Has the city done an analysis of the cost of defending a class action lawsuit and the payments to the community for damages and diminished property values? Have this estimated the cost of reporting the environmental damage?
65. How do we know that the environment will be protected with the proposed changes?
66. Without a sorting facility, will hazardous waste go into the landfill?
67. We know harmful material is diverted on-site so why shut those safe-guards down?
68. Are there any environmental issues or laws to protect this from happening?
69. Why are some environmental checks and balances being raised in some areas but lowered at site A (Otter Lake)?
70. Does WSF/FEP produce more GHG or the same amount but faster? How much GHG produced without? How can we improve?
71. Without the FEP/WSF protections in place, would all organic material go to landfill site?
72. Why can you not produce useable compost?
73. What is the future of HRM composting and garbage?
74. Where will the organics go?
75. Where does the raw potato peel go if it gets to Otter Lake?
76. What model of landfill will Otter Lake be if these changes are implemented? What is the vision?
77. Why are we looking to save money short term? Not looking to make more ethical environmentally responsible choices?
78. Is there any truth to the statement that millions can be saved and no harm to the environment by closing the FEP?
79. The cost per year of the FEP is about $10 million, but did you know that if you divide by the number of households (near 200,000) the cost per household would be minimal? About $60.
80. Local businesses will suffer. Home owners will suffer. How does anyone think this will be okay?
81. Is HRM embracing bad/incorrect consulting reports?
82. Why did HRM take it upon themselves to approach Stantec?
83. Which version of the scientific evaluation is correct? The rosy view presented by HRM or; the contrary perspective voiced by CMC and the scientist mentioned vis-à-vis the Stantec report?
84. What does HRM (major and councillors) plan to do about the Stantec report? What do they want to implement?
85. What happens if you change the landfill and it doesn't work?
86. Is there a guarantee that there will be no leachate?
87. If you want to pick up everything in one truck to take it to Otter Lake to dump into one hole, do we stop using green bins?
88. If organics end up in the landfill (from restaurants/workplaces) are they separated and collected for composting, or treated on-site?
89. Was the FEP/WSF designed to separate the waste, or to process it to make the material inert?
90. If a large amount of items arriving at Otter Lake have not been separated should we not be looking at how we could reduce this amount?
91. How can removing one of the two barrier layers in the liner system provide the same level of protection? By definition it can't.
92. Will the liner be reduced from double to single? What happens when that change is made?

APPENDIX B: VERBATIM "VALUES AND PRINCIPLES TO GUIDE FUTURE DECISION-MAKING"

DARTMOUTH & VICINITY (SEPTEMBER 25)

"What do you appreciate most about the way we handle our trash in HRM?"

- Front end process
- Public consensus
- Improve without tearing it all apart
- Ahead of the curve
- Education of children
- Input from the public
- Proud! (we want clear bags)

"What is most important to you as we evolve our current waste system?"

Honor the Contract

- Honor the agreement created by host community for protection
- Simple principle- honor the commitment to host community
- The promise to the people
- Honor the existing agreement and permits without change and no extension for Otter Lake operational term past 25 years
- Honor agreements with community
- The same values and principles that were evident when the agreement between HRM and the host community for Otter Lake
- HRM must honor their contract
- Honor the contracts
- Keep promises made
- Honesty and support from HRM government

Education, Source Separation and Diversion

- Focus on education and source separation
- Public responsibility to separate at the source
- Work to increase source separation. Education, awareness, enforcement, accountability
- Diversion/ Source separation
- Improve source separation through education and enforcement
- Source separation- commercial building (especially new). Build better source separation in the design and through permit
- Education- commercial, institutional, general public
- Focus on diverting more from ICI sector- apartments, businesses, commercial
- Use waste audits to tackle recyclables and organics not diverted
- Collect organics from restaurants and apartments
- Increase diversion at source including businesses

Environmental Protection

- Environment over dollars and cents. Willing to pay more for state of the art.
- Environment- do not reduce liner, keep processes at Otter Lake and look at how to enhance
- Environmental protection
- Environmental and community protection

- Don't reduce existing environmental protections
- Reliable data and environmental assessment

Community Protection

- Community commitment and protection (now at Otter Lake and future site)
- Ensuring that the citizens understand the ramifications both financially and environmentally, especially those citizens who host the landfill in their area

Not Listening

- I thought the listening meant that HRM would listen to us. Instead, we got a sales job and we did the listening
- I do not see any demonstration of values and principle in the way this meeting is being conducted

Plan for the Long Term

Celebrate our World Class Landfill

Trust in our Government

Look at Best Practices

Improve Operations

Leave Otter Lake Alone

Use Clear Bags

BEDFORD & VICINITY (SEPTEMBER 26)

"What do you appreciate most about the way we handle our trash in HRM?"

- Way ahead, state of the art
- % of things put in recycling and compost
- Diversion and source separation
- Transient population- FEP and WSF protect us
- They pick it up! (the trash)

"What is most important to you as we evolve our waste system?"

- Honor the agreement and take care of the people
- Move towards a zero waste system
- Otter Lake remains the same
- Maintain or improve- education, operation and protection
- Stantec report is false
- Problem- no green bins for apartments
- Truth about GHG? How much?
- Keep the commitment to the community
- Review and consider all information and transparency
- Clear bags
- More processing will not increase methane production

"What principles should guide our future decisions?"

Honor the Contract

- Honor the contracts
- Honor contracts- Respect host community
- Integrity- live up to your commitments HRM
- Honoring commitments
- Trust- a deal is a deal
- Honor contracts and commitments
- A deal is a deal- LOLA!
- A deal is a dead- the local community
- Moral imperative to honor existing contract
- Respect CSC commitment, original strategy was brilliant
- Honor agreement
- Honor the agreement
- Honor commitments made to community around landfill
- Respect the CSC decision and commitment
- Honor commitment
- Honor past commitments
- The city made a commitment, let's keep it

Education, Source Separation and Diversion

- Improve education, enforcement and communication
- More education in regards to source separation
- Apartment building owners should be held responsible for waste management
- Provide tenants with tools to recycle and compost with as much ease as home owners
- Emphasize source separation- education, enforcement, clear bags
- Citizen driven strategy to increase diversion and establish waste system
- Perfect source seperation

Environmental Protection

- Environmental protection for everyone- host community should not suffer; they did not ask to be compensated
- Environmental protections
- Increase environmental responsibility and protection
- Environmental protection- liner + FEP + WSF + no organics
- Environmental protection

Transparency

- Transparency
- Give all points of view information from ALL reports
- Transparency! Equal time for all reports and executive summaries
- Transparency and consider equal footing for all information
- Full disclosure- focus on all reports Re: Otter Lake

Community Protection

- Community protection (FEP and WSF)
- Have some respect for your partners: the people of Beechville, Lakeside, Timberlea and Prospect

Leave Otter Lake Alone

- Leave the landfill and Otter Lake alone
- We are not interested in changing Otter Lake

Use Clear Bags

- Clear bags
- Use clear bags

Trust

Ban Plastic Bags- Use paper- Not about money

Extension past 25 years not supported

Get on with site selection

Make category B compost from WSF organics and use it beneficially

HALIFAX & VICINITY (OCTOBER 2)

"What do you appreciate most about the way we handle our trash in HRM?"

- FEP and WSF stay in place
- Not everything gets seperated at source
- HRM is a leader as a whole
- Why fix what is not broken
- World class waste facility- NS is not always so ahead
- Community process
- Proud of the state of the art system
- HRM doesn't seem to be listening- Is the respect still there?
- Where is the Dillon report?
- Community protection
- Community driven process
- Can't take the FEP out and have the system still work

"What is most important to you as we evolve our waste system?"

- GHG unintended? It is intended
- We need reality to the facts being brought forward
- WSF and FEP keep the community safe- helps us meet our diversion goals
- What about reducing waste?
- Lack of education about sorting
- We should go above and beyond
- We need another gatekeeper if people don't comply. FEP is a double check
- No food waste to landfill
- Go to zero waste
- Source separation
- Reduce bag limits? People will get bigger bags
- Environment priority
- Add protection, not take it away
- Education source separation at home- apartments and condos
- FEP and WSF are the best protection
- Landfill without a condom

- Most important environmental protection-Lakes- they affect us all
- Keep the system the way it is

"What principles should guide our future decisions?"

Honor the Contract

- Honor the contracts
- Honor contracts- Respect the agreements
- You should honor the agreement to close Otter Lake
- Don't make promises you can't keep
- Keep promise to community
- Honor contracts with host community
- Honor your commitments to the contract and the host community
- Honor the contract
- Honor commitment including CSE strategy
- Honor the contract with community
- Keep your word
- Keep the trust of the people by honoring your word
- Honor commitment
- Honor the contracts and agreements
- Keeping your word- to the community, no manipulations/bribes/ buy outs
- Honor the contract
- Honor your commitments

Education, Source Separation and Diversion

- Source separation
- Source separation and education
- Reduction and source separation, education
- More diversion, more education, more enforcement= less waste
- Educate the public- homeowners, businesses, apartments, condos
- Improving source separation which will reduce what ends up at Otter Lake. There by reducing what ends up at OL we reduce cost and the number of employees
- Source separation needs to be promoted and marketed to the residents (commercial, restaurants, elementary schools, apartments) Focus on education.
- More educational resources

Environmental Protection

- Commitment to environment
- Environment commitments
- Environment
- Environmental protection- protect environment, keep FEP and WSF till 2023 and close the landfill
- Environmental protection of all systems

Community Protection

- Community commitment -2023 closure focus on new options
- Respect community
- Keep commitment to community

- Treat Otter Lake community with dignity. We should be celebrating this community
- Our community is priceless

Integrity

- More truthfulness and facts instead of spin
- Openness, collaboration, sharing factual info
- Listening would be a great start
- No manipulation, speak truth

Leave Otter Lake Alone

- Leave the landfill and Otter Lake alone
- Leave the system alone

Keep the FEP and WSF

- Safeguarding our WSF and FEP

Get on with site selection

- Start process for another landfill

EASTERN SHORE & VICINITY (OCTOBER 3)

"What do you appreciate most about the way we handle our trash in HRM?"

- Look to other places when improving the system
- Proud of the system
- The way the system is currently working
- Exporting expertise
- Citizen design
- FEP and WSF
- Large item picked up at the curb
- No smelly landfill
- Recycle, compost and diversion
- Compost and organics don't go to the landfill
- Household hazardous waste facility
- World class leader

"What is most important to you as we evolve our waste system?"

- Residents are paying for green carts-tax dollars
- Campus model- trucks will fill too fast
- Clear bags
- Protection of the environment
- Don't save pennies by taking things away instead of growing the system
- Lack of trust- betrayal
- Only 10 years left at Otter Lake- Find new Landfill
- Stantec- what's their background?
- Limit on bags
- Cost recovery?

"What principles should guide our future decisions?"

Honor the Contract

- Honor the agreements
- Honor existing agreements
- Honor agreement- keep public trust

Education, Source Separation and Diversion

- Enhance source separation
- Concentrate on more source separation
- Improve source separation

Environmental Protection

- Protection of environment and community
- Future decisions need to be guided by environmental security- current and future

Community Protection

- Respect Otter Lake community
- Community must be partners. We must all work together for the success. We all live here and should do it together

Original Principles

- Stick to original principles- non-campus, non-direct dump
- Keep what we have and make it better- take nothing away

Keep the FEP and WSF

- Leave the FEP and WSF in place- they perform an important process

Get on with site selection

- Find a new landfill site

APPENDIX C: TRANSCRIPTION OF COMMENT CARDS

HONOUR THE AGREEMENT

1. "Why is it since the release of the Stantec Report has the regional plan in particular in the "solid waste resource management section being re-written that appears to almost eliminate the original intent of SU-22?"
2. "Council should keep their Word!"
3. "We learn the most by listening to people talk- by not letting us go longer this evening & have more people speak indicates we are not going to be heard. I/we don't want the landfill extended past 2023. Trust. Truth. Integrity. Keeping your word."
4. "Your memory is foggy!! No way would the landfill have been accepted in the Timberlea area without an end. You are traitors. Shame on you."
5. "Honor the contract."
6. "Our environment is priceless, money is not enough. Respect the people and commitments. Trust."
7. "Honour the agreements between HRM and the public & the landfill operator."
8. "Keep the promise. HRM staff need to improve their education program & better explain their goals honestly."

9. "A deal is a deal. It was reached after years of consultation. Now HRM is trying to undermine the agreement with the community by a false "consultation" process. No trust for HRM. Fire the arrogant fat staffers who have no respect for the people. They were laughing at the participants- makes me sick that HRM mayor and councilors allow this."
10. "Honouring the existing contract. Maximizing environmental protection. Repetitive, misleading, irresponsible on HRM. "
11. "Let HRM respect their promise to the community. Keep the FEP + WSP in place."
12. "Honour the contract. Keep commitment to community & environment. If it's not broke, don't fix it."
13. "Honour commitment. "
14. "Honor your contract to the people of HRM!"
15. "Keep commitments that have been made."
16. "Keep your word and honour your signed contract."
17. "Do NOT break the agreement with the host communities."
18. "You had asked the community how they felt about a landfill, we agree to host based on trust. We expect it to stay that way."
19. "Honour the commitment you made to the community."
20. "Stop wasting money on this process- honour your commitments!"
21. "Do you understand the tree trunk example? Please consider the long-term costs related to an unstable landfill. Odors, environments, leaks, long cycle of stabilization= decades. And, honour the contract with the community. The FEP/WAP are an important component of our accomplishments. Education about diversion, source separation and ways to improve the current process are the way to go forward. Removing protections are not the answer."
22. "The suspected cost savings suggested is not a sufficient goal for changing a system mid-stream and breaking a commitment to the community and maintain the WSF/FEP."
23. "No change to the contract."
24. "Uphold the contract & do not make proposed changes."
25. "Why are you not standing behind the original agreement?"
26. "The people need to be certain that contracts & promises made will be kept. No! No! No!"
27. "I can't believe that my city leaders would even consider going back on its word- an agreement with the community. How can you expect anyone to trust you again? It's a total betrayal."
28. "I do not support any of the Stantec recommends. The flawed Stantec reports should be shelved."
29. "They have a commitment to the city to keep their word. Why turn back time and reverse all the good we have done by having this facility? We have been recognized for it across the country/world and show them how to do the same, why stop now. "
30. "I am embarrassed as a citizen that council would ever even consider going back on their PROMISE TO ITS CITIZENS. Please do the right thing and keep this facility open. It's the right choice for the following reasons: Proving councils integrity, Environmental associated long-term benefits, proving that WE ARE LEADERS and that WE ARE STRONG for the rest of our province/country/world. This is an OPPORTUNITY to demonstrate/ lead by examples. Jobs! Think of the people who rely on this facility to feed their families."
31. "Honor the commitment to our community."
32. "Unilaterally breaking a contract is not an option. Honour the agreement, and close it in 8 years."
33. "Close Otter Lake when it was contracted to close 2023."
34. "Stop this bullying! A deal is a deal! "Dismay" "Angry" "Disheartened."
35. "HRM needs to honour its agreement (contract) with the people of BLT, Prospect Road, etc."
36. "When you sign a contract don't you think you should keep up your end of the agreement? Residents work hard to keep their end paying taxes & doing separation. What legal right do you have to break that contract?"

37. "I would like council to remember its promises to the area residents and uphold its agreement with the community."
38. "Keep your word. A deal is a deal!"
39. "Why the big rush to break a contract."
40. "They cannot break the contract, cannot close FEP/WSP and have people lose their jobs. Don't chance ruining a community."
41. "Stop bullying. Follow contract. Listen to the people. Leave Otter Lake alone."
42. "Honor the original contract."
43. "Honour the agreement and start working on the next site. For the future, let us move on."
44. "As a resident of Prospect Bay since 1975 and protested against Otter Lake, I only accepted it with the contract that was presented to the people to protect the environment & thus the community."
45. "To honour the original legal agreement with the community where Otter Lake was sited. Otter Lake should close when the agreement expires after 25 years in 2023."
46. "We want HRM to keep their promises to our community and leave the Otter Lake site alone! Be fair and leave it alone."
47. "I would like to see no changes. Contracts should not be broken because of money."
48. "A contract is made by two parties... but it is being denied by City of HFX."
49. "Honor your contract."
50. "Retain the contract. Height of cell should remain as is."
51. "I want you to keep the agreement. Close landfill in 2023."
52. "No means no!"
53. "Peoples homes, local businesses, our livelihood will all suffer from this. Why should we suffer for, first of all, allowing the facility to come into our community in the first place, and trusting that the contract would be fulfilled, but now a potential break in that contract has/will betray the trust we had in this operation. And it will have a direct effect on us, the people who allowed this to happen in the first place, 13 years ago. Why should we be forced to suffer the consequences?"
54. "It is necessary and honourable to keep the original agreement."
55. "Honour the contract. "Fire" the funkies who continue to try to sell their ideas to our community."
56. "2023 is the contract end date. Is this about extending the life of Otter Lake?"
57. "The environment!! Jobs!! Finish what you/we started!! Engage the people."
58. "That the landfill site not be extended and contracts not change or be broken. Don't fix what's not broken!!"
59. "The intent to break the contract was loud & clear when HRM staff asked for the Stantec Report without the parameters of the existing contract with the community."
60. "A promise/contract was made with the people of Timberlea. Keep the word made by your previous council. NS had had enough closures & families devastated by gov't decisions HRM should not follow this trend."
61. "No means no! A deal is a deal!"
62. "Integrity, keeping a promise. Close landfill on time as agree."
63. " I want HRM to live up to its commitments with the community, not just because I believe it is best environmentally, but also because it is ethically and morally right."
64. "We have a contract, stick to it."
65. "Keep your promise to our community! Since when is a contract so easily broken?"
66. "Honor your contracts and agreements."
67. "The contract with the community needs to be kept."
68. "I am most concerned that commitments made to the area residents for hosting a landfill be respected."
69. "Honour the agreement!"
70. "Do not renig on contract with community."

71. "Ditch the Stantec report. Keep the contract."
72. "Honour the contract!"
73. "Has the Stantec Report done an accurate analysis? Does the amount going through the FEP/WSF even if not 100% matter? How can all residents trust contracts= commitments if this is not honored? Are steps being taken to implement clear bags? Will an EAP be done? ICI waste is flagged at the FEP (this is a huge bulk of waste that goes through the FEP) how will this be addressed? Should energy $$$ go towards siting a new landfill? Energy on education & improving waste diversion & reduction strategies. Will rodents, vermin rise without the FEP/WSF (there will be organics going through)? What about hazardous waste being removed at FEP?"
74. "You've broken trust with this community. We feel betrayed. This process of public consultation should have started with a guarantee that the contract will be honored for the duration. Now is the time to start planning for when the contract expires. That's what good faith looks like. Council- you still have time to save face: Admit this was handled poorly. Honour the contract- restore good faith. Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens."
75. "Trust-honor- your word is your word."
76. "Honour signed agreements & communities."
77. "These meetings should not be necessary. The contract with the community says FEP & WSF are to be part of Otter Lake; since when is a contract not a binding document? The province says it won't allow changes. Why is this even being discussed? In all seriousness, lets save money here in HRM by avoiding wasting money elsewhere. Put together a committee of people like university students, single-moms and seniors. They'll help you figure out where the fault is."
78. "Promises to the host community."
79. "Honor contract."
80. "That changing the agreement will cause citizens to forever distrust any future agreements between citizens & city council. This would be a tragedy. And, why hasn't staff started looking for a post 2023 landfill site?"
81. "Honour the contracts!!"
82. "If this contract is breached and our community is not protected, it would be hard to continue to have faith in/support HRM counsel in the future."
83. "A contract is a contract. Leave our community alone."
84. "Council to honor its commitment to local host community. Honor the 25 year contract and get on with siting a new landfill site."
85. "Honour the contract at Otter Lake."
86. "Honour the contract."
87. "Honour commitments & contracts already made."
88. "Consider reports other than Stantec. Honor commitments made to the community."
89. "Honor your commitment! If you ever want anybody to agree to have a landfill in HRM again, you must honor your commitment. Consider all expert sources, not just one. Use facts and not conjecture."
90. "A deal is a deal. Honour the contract. Honour the spirit of the contract."
91. "A deal is a deal. Honour the contract. Honour the intent of the contract. Don't waste more tax payers money on legal technicalities. You made a deal HONOUR IT!"
92. "Honour the agreements."
93. "Please consider the past commitments and look to future success through increased diversion and source separation."
94. "Honour the agreement that is now in place with the hosting communities. Fire the flunkies who are trying to push this idea down our throat. Before we make changes to the system we now have in place, let's

concentrate on the agreement that was put in place before. The communities have spoke loud about the proposed changes. They are not prepared to the ..... changes or the extended life of the present site. "

95. "You will have more citizen apathy if you break a promise."
96. "Honour the commitment to the host communities."
97. "Separation at curb side needs to improve before anything else. Keep your word to residents. Perhaps cost should not be most important thing."
98. "Keep your word! We have a contract! You are elected! We can change that."
99. "Why bother to sign a contract? HRM can't be trusted!!!"
100. "I do not support any of the recommendations put forward from the Stantec report. No extension past the 25 year term. The science supports that the FEP $ WSF do work as detailed in the initial build spec. Stop this public engagement process and restart the CSC process as occurred pre-1995."
101. "Do not interfere with this current contract!!"
102. "HRM must honor the agreements and contracts that were made at the time of the community voluntarily agreed to host the landfill."
103. "The agreement contract."
104. "Do not change a contract that has been working well. Honour what has signed. Spend our tax money in an area that needs it or planning on the next Otter Lake in 2023."
105. "It is not ethical to change a contract that was made. Our property values and quality of life will plummet."
106. "Honesty and keeping promises. We teach our children to keep their promises. As adults and politicians we need to model honesty by honoring our promises. It is amazing to me that $600,000 of taxpayer money has been spent studying this subject. If there is a contract, and there is, why are considering/wasting money trying to break the contract?"
107. "Just to honor your commitments."
108. "It is morally, ethically, and legally wrong to unilaterally change the terms of a contract."
109. "Do not change the agreement!! Citizen revolt will occur!! Even for councilors in other areas of HRM!"
110. "Do not break the contract!!! Bring in stricter rules around source separation like: clear bags, reduce the # of bags collected, recycle more products like Styrofoam, stricter rules for commercial institutions (ICI). Get a better sorter for the WSFE. Educate, educate, educate for organic waste separation. Why have we spent $600,000 on this review to date and will end up over $1 million. That would have paid of inspectors, educators, purchased new sorters."
111. "No breaking the contract!"
112. "Contract= no changes. Honour contract. New site in 10 years."
113. "Honor the contract."
114. "A contract exists between the citizens and HRM. It must not be broken. Citizens are proud to be the guardians of a leading North American waste management system."
115. "Keep the process that the community was promised and created."
116. "Keep your word. Turn this around to be a positive process. Shame on HRM. How much have be spent on this process? Continue to spend? If you wanted ideas on diversion, happy to give for free if asked!"
117. "Honour the contract."
118. "HRM has changed their story through this process. First the Otter Lake site didn't do what it was supposed to, then it did. The WSF didn't work but now it does! The liner was supposed to be reduced, now it isn't. HRM doesn't understand their own system. Honour the commitment!"
119. "The commitment must be honoured before moving forward with new systems and changes to the existing facility. Campus style is breaking the contract!!"
120. "Honor the agreement & find new site for the next landfill- you have 10 years."

121. "Honour agreements and commitments to the local group. If you want to make changes, that's fine but negotiate in good faith with the local organization."
122. "You made a commitment, you need to honour it- this planning needs to be implemented after current agreement expires."
123. "If you break one contract, how can we trust that you can be trusted to make any other contracts. They won't be worth the paper it is written on."
124. "Stand up and honour the contract you signed with the Timberlea, Lakeside, Beechville, Prospect area."
125. "HRM should honour agreements they made with residents. When they don't it diminishes trust in the HRM."
126. "To move forward first answer this: Will you honour the agreements & find new site? You cannot move forward without an answer."
127. "Why are you not standing behind the original agreement?!"

SOURCE SEPARATION

Education

Recycling, Composting

Enforcement

Apartments

1. "More education is needed."
2. "Promote more separation at residents. The $$$ spent on Stantec and useless consultation should have gone to public education for source separation. Better use of our $ than biased studies and fake "consultation"! How much were consultants paid?"
3. "Education 1st then go forward."
4. "When coming to a decision on this topic, please base it on facts, science and evidence rather than on opinions, spin doctoring and personal agendas. I also think adding bluecarts to the program is a great idea."
5. "Education about diversion, source separation and ways to improve the current process are the way to go forward."
6. "There needs to be more education for people on how powerful it is to recycle & compost! So important. Perhaps a video on Top 10 recycling crimes!"
7. "Consider improving collection/ recycling & reducing garbage to start with."
8. "Why are new apartment not built to facilitate at source separation?"
9. "Reject Stantec report recommendations. Perfect source-separation without delay and with determined courage & vision. Bag limits, cost per bag after 1st bag weekly, clear bags, fines for non-compliance for ICI & residential, enforcement. Need a real Zero Waste Solutions Citizens Task Force- a permanent, funded, official body with full HRM & provincial cooperation."
10. "Educate the population of the ramifications of not recycling properly. "
11. "How could any individual in charge of our tax funds make a decision to spend almost 1 million dollars without being sure if the province would amend the law or source separation?
12. "Embrace clear bag for garbage and increase enforcement to weed out all of those that are not separating at source. "
13. "More education on source separation."
14. "Develop strategies to up recycling/composting/sorting at source especially in apartment buildings & commercial businesses."

15. "Energy on education & improving waste diversion & reduction strategies."
16. "Why is there no source separation in apartment buildings? Where does that garbage get separated?"
17. "Make source separation/ front end processing facility."
18. "Please consider the past commitments and look to future success through increased diversion and source separation."
19. "Separation at curb side needs to improve before anything else."
20. "Let's promote source separation."
21. "Bring in stricter rules around source separation like: clear bags, reduce the # of bags collected, recycle more products like Styrofoam, stricter rules for commercial institutions (ICI)."
22. "Why if something works so well (FEP & WSF) would you want to change it, when other systems need to be improved (source separation in apartments & business). Work with the operator & community as a team, not against as opposition."
23. "Keep it as is. Improve source separation."
24. "Develop strategies to up recycling/composting/sorting at source especially in apartment buildings & commercial businesses."
25. "Other systems need to be improved (source separation in apartments & business)."
26. "When you sign a contract don't you think you should keep up your end of the agreement? Residents work hard to keep their end paying taxes & doing separation."
27. "It's important to continually educate all newcomers to the city on how the waste system works, promote compliance and discourage littering. New renters and students seem misinformed on arrival. We need to promote waste reduction to help make the whole system more sustainable. There is an opportunity to promote frequent messages that link the importance of having a good waste system so that all residents take pride and responsibility for living in a clean city."

Questions:

1. "Monitoring and warnings for ICI loads not properly sorted is done at the FEP to my understanding; how will this be monitored and enforced if the FEP is closed? What is being proposed and has this been costed?"
2. "Why are some residents not separating?"

ENVIRONMENTAL PROTECTION

1. "Protect our Lakes for Future Needs"
2. "Please consider that the environment assessment was waived because the FEP/WSF were in place. What happens if the FEP/WSF are taken away, will there be a new environmental assessment? "
3. "Our environment is priceless, money is not enough. Respect the people and commitments. Trust."
4. "Original construction liner only engineered for 25 years or less when cells get full. Need to protect surrounding lakes in case all of HRM need water in future. Only 60% of waste is diverted, need FEP & WSF to protect what goes into cells."
5. "Honoring the existing contract. Maximizing environmental protection. Repetitive, misleading, irresponsible on HRM. "
6. "Keep commitment to community & environment. If it's not broke, don't fix it."
7. "When coming to a decision on this topic, please base it on facts, science and evidence rather than on opinions, spin doctoring and personal agendas. I also think adding bluecarts to the program is a great idea."

8. "Do you understand the tree trunk example? Please consider the long-term costs related to an unstable landfill. Odors, environments, leaks, long cycle of stabilization= decades."
9. "That the communities are not uneducated homeowners. Many are experts & are informed, dedicated & committed to ensure that we will not have a disaster on our lands which HRM will be baffled & not in any position to pay cost of environmental damage plus homes losing worth."
10. "Should we not look for ways to improve environment protection than decrease protection? How many other places are proud of their garbage dump?"
11. "As a resident of Prospect Bay since 1975 and protested against Otter Lake, I only accepted it with the contract that was presented to the people to protect the environment & thus the community."
12. "If the liners should fail, and matter leaks into the water system, who is responsible for the clean-up and associated costs? Not the little taxpayer surely! Who will supply water to my home forever and ever? Not me!"
13. "How will the increased Height and weight of the garbage affect the liner and gas recovery system at the base of the cell?"
14. "It is most advisable to go on in perfecting ways to dispose of community waste while causing the least environmental impact. Priority is to protect the Nine Mile River system."
15. "I want HRM to strengthen environmental protections at Otter Lake, and I'm willing to pay higher taxes to make that happen."
16. "What is HRM doing to reduce waste?"
17. "Are you working with manufacturers to get them to make items that will not end up in the landfill or the curb?"
18. "Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens. "
19. "How can you claim there will be no environmental consequences when an environmental assessment has not been completed?"
20. "Protect our environments and do not reduce specs."
21. "Our lakes and rivers. Fires from clumping in a cell without being sorted first."
22. "Enviro safety. Life expectancy of Otter Lake."
23. "What is the reclamation plan for site after closure?"

Questions:

1. "Please consider that the environment assessment was waived because the FEP/WSF were in place. What happens if the FEP/WSF are taken away, will there be a new environmental assessment?"
2. "Structurally, what if the structure of the landfill fails, then what will be done? Is there an action plan in place in case of this occurrence?"
3. "What is the recovery procedure to deal with a breach/failure in the cell liners? What is the lifespan of the cell liners?
4. "Will an environmental impact assessment be required if changes are made?"
5. "How does allowing hazardous & banned materials into the landfill maintain the same level of environment?
6. "What is the reclamation plan for site after closure?"
7. "ICI waste is flagged at the FEP (this is a huge bulk of waste that goes through the FEP) how will this be addressed?"
8. "Will rodents, vermin rise without the FEP/WSF (there will be organics going through)."
9. "What about hazardous waste being removed at FEP?"
10. "Without FEP how will we ensure hazardous materials are not put into our landfill?"

COMMUNITY PROTECTION

1. "Your memory is foggy!! No way would the landfill have been accepted in the Timberlea area without an end. You are traitors. Shame on you."
2. "The fact that this process is even taking place is a total breach of trust. The only community that has an interest in this (or at least an overwhelmingly more significant interest) is the one near Otter Lake. No one will ever trust HRM again for a project they view as a nuisance."
3. "This is a waste of money & time. You will not get new innovative ideas of ways to improve the system unless you stop trying to reneg on community commitment."
4. "Our environment is priceless, money is not enough. Respect the people and commitments. Trust."
5. "The process for consultation is questionable. Someone filling the summary sheet based on HRM speakers- not enough from people from community."
6. "Now HRM is trying to undermine the agreement with the community by a false "consultation" process. No trust for HRM."
7. "Only 3 table discussions were brought forth- don't want to hear community input."
8. "Keep commitment to community & environment. If it's not broke, don't fix it."
9. "Keep promise to community."
10. "Do NOT break the agreement with the host communities."
11. "You had asked the community how they felt about a landfill, we agree to host based on trust. We expect it to stay that way."
12. "Honour the commitment you made to the community."
13. "That the decision to even revisit the HRM proposal is not valid & breaks community trust."
14. "You will never get another community to agree to a landfill. Never. Best bet, leave HRM & become a town. "
15. "That the communities are not uneducated homeowners. Many are experts & are informed, dedicated & committed to ensure that we will not have a disaster on our lands which HRM will be baffled & not in any position to pay cost of environmental damage plus homes losing worth."
16. "It is time to start looking at other sites. Please respect the CMC. You have a legal agreement with the community."
17. "Have you considered the people who will lose their jobs if you close WSP-FEP? DON'T IGNORE THE COMMUNITY. They stated their terms in the 1990's. We have not changed our minds about protecting our environment and our community. Leave Otter Lake alone!"
18. "They cannot break the contract, cannot close FEP/WSP and have people lose their jobs. Don't chance ruining a community."
19. "As a resident of Prospect Bay since 1975 and protested against Otter Lake, I only accepted it with the contract that was presented to the people to protect the environment & thus the community."
20. "SMELL- I live in middle Sackville. At times the smell of an open dump was sickening. RODENTS- It was in the Sackville dump. There were rats everywhere."
21. "People's homes, local businesses, our livelihood will all suffer from this. Why should we suffer for, first of all, allowing the facility to come into our community in the first place, and trusting that the contract would be fulfilled, but now a potential break in that contract has/will betray the trust we had in this operation. And it will have a direct effect on us, the people who allowed this to happen in the first place, 13 years ago. Why should we be forced to suffer the consequences?"
22. "You have ignored the community except for this controlled consultation."
23. "Please listen to the people from the communities close to the Otter Lake site!!"
24. "The contract with the community needs to be kept."
25. "I am most concerned that commitments made to the area residents for hosting a landfill be respected."
26. "Very much concerned about our communities & our province."

27. "Consider the community & their wishes. Consider all info available (i.e. Dillon, Stantec etc.) Honour commitments & contracts already made. Protect our environments and do not reduce specs."
28. "It is not ethical to change a contract that was made. Our property values and quality of life will plummet."
29. "Job losses due to closure both directly and sub-directly."
30. "What is the reclamation plan for site after closure?"
31. "HRM should maintain the FEP-WSF which was a condition of the host community accepting the landfill."
32. "Why if something works so well (FEP & WSF) would you want to change it, when other systems need to be improved (source separation in apartments & business) Work with the operator & community as a team, not against as opposition."

Questions:

1. "What is going to happen to the staff? What compensation will we have to pay to Mirror?"
2. "Why back to back in affected community but spread out in other communities for consultation?"

TRANSPARENCY AND INTEGRITY

1. "We learn the most by listening to people talk- by not letting us go longer this evening & have more people speak indicates we are not going to be heard. I/we don't want the landfill extended past 2023. Trust. Truth. Integrity. Keeping your word."
2. "They are wasting our taxpayers money. Many councilors have not visited Otter Lake- yet they vote on a topic they do not have first hand experience on. Keep the promise. HRM staff need to improve their education program & better explain their goals honestly."
3. "Study the fact & know the science behind the Otter Lake facility. Show where the MONEY is going i.e. - community meetings/ reports."
4. "The process for consultation is questionable. Someone filling the summary sheet based on HRM speakers- not enough from people from community."
5. "You had asked the community how they felt about a landfill, we agree to host based on trust. We expect it to stay that way."
6. "HRM image is suffering due to dishonesty & lack of transparency."
7. "The people need to be certain that contracts & promises made will be kept. No! No! No!"
8. "The agreement that protects the districts surrounding Otter Lake if broken by HRM staff will be a betrayal of our trust we have in HRM administrators. When HRM are searching for a new location for the next landfill, no one will want to sign an agreement with HRM only to be broken."
9. "TRUST."
10. "NO NO NO NO NO NO NO NO NO What don't you understand, what a bunch of crooks."
11. "Where is the useless mayor? The 3 HRM staff sitting on the stage should be ashamed- fire the bozos. The consultation process will not stand in court. Your day of reckoning is coming. The consultants ignore the people, rude, biased, fire them! The consultants organizing this discussion process are not worth the $200K! Sticky notes & dots- seriously! On this day & age there are far more fair, equitable and effective ways to do this ridiculous process."
12. "How can council be trusted on any contract if they are going to break a legal contract here?"
13. "How could any individual in charge of our tax funds make a decision to spend almost 1 million dollars without being sure if the province would amend the law or source separation?

14. "Why didn't anyone at least attend a site tour, even put on a pair of coveralls, talk to people who work there prior to commissioning such an expensive and rather weak assessment (to say the least) of the facility?"
15. "You have killed your credibility by moving in a direction that breaks a contract."
16. "There needs to be a choice, I know that no community wants a landfill in their area, but we need to have one somewhere."
17. "This was a waste of my time, I feel the decision was already made."
18. "This is not an open process. This is not a fair process. This is not a well publicized or accessible. You idiots have already decided the outcome."
19. "How does HRM staff have the ability to spend $600K without council knowing? Who runs this city? HRM staff needs a cap on how much they can spend. Council was elected to look after my tax dollars."
20. "Integrity, keeping a promise. Close landfill on time as agree."
21. "Why? No one wants this. There are more pressing issues that should be considered. The mayor & council need to listen to the people. It has been a waste of our money. Do not base comments on a lot of people who don't care because it is not in their backyard. The trust is gone."
22. "I appreciate the efforts made by the HRM staff in carrying out these consultations but I feel that using stickies and dots diminish my concerns- is this kindergarten?"
23. "You are wasting our time & money because the decision was already made when you made the large hole needed to do this in the city plan that was made the other year. None of you can be trusted."
24. "Breaking a contract with residents is illegal and immoral."
25. "That I filled out the post it notes and they weren't pasted on the white board. Another example of democracy???"
26. "Why was consultation started if the province says no, why are we still discussing the changes?"
27. "Stop the entire process, listen to the people."
28. "You've broken trust with this community. We feel betrayed. This process of public consultation should have started with a guarantee that the contract will be honored for the duration. Now is the time to start planning for when the contract expires. That's what good faith looks like. Council- you still have time to save face: Admit this was handled poorly. Honour the contract- restore good faith. Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens. "
29. "The unauthorized extension of Otter Lake with blatant disregard for legal contracts while undermining the due process and power of the monitoring committee by changing the "deal"/agreements that were to be binding. We shouldn't have to be here!! After the 2 meetings here where the people are stakeholders/residents in the area, you are going to "consult" with other districts in HRM, "spin" the data, they will be relieved they wont have to deal with the problem if Otter Lake is extended (NIMBY) and you will distort and get your majority of HRM to agree with your ultimate DONE DEAL. SHAME on you!!"
30. "Waste of HRM taxpayers money doing these consultations."
31. "I believe HRM council is not getting full information from Council's advisors, staff & consultants. Stantec spent 1.5 hours at Otter Lake & wrote a 180 page landfill report on the visit."
32. "Cost of reverse cleaning up & permanent damage."
33. "Height off the cells. Why we are being lied to for 10 million dollars. The Stantec report is wrong."
34. "What will it cost to clean if it is stopped?"
35. "Can we stop this stupid consultation? How much do the consultants make with this flawed process? Shows how stupid the city staff are."
36. "If this contract is breached and our community is not protected, it would be hard to continue to have faith in/support HRM counsel in the future."
37. "Property values."
38. "It is probably easier to show respect for the people, contracts and procedures than to carry on campaigns aimed to mislead or based on the assumption people are complacent/stupid. In this age, information gets around.

Develop trust and maybe people will trust government officials and opinions. You will feel better, you won't come across as shady bureaucrats and people will be inclined to work with you."

39. "Stantac-Stantac-Stantec... although it was mentioned that there was actually 5 reports on the landfill operation only 1 (Stantac) was mentioned continuously during (lady's) presentation.
40. "A deal is a deal. Honour the contract. Honour the spirit of the contract,"
41. "Put provincial regulatory documents on the website. After 4 engagements they still are missing."
42. "You will have more citizen apathy if you break a promise."
43. "Please treat the public who speak with respect. It is not very professional. I learned you are not listeners!"
44. "It is not ethical to change a contract that was made. Our property values and quality of life will plummet."
45. "Honesty and keeping promises. We teach our children to keep their promises. As adults and politicians we need to model honesty by honoring our promises. It is amazing to me that $600,000 of taxpayer money has been spent studying this subject. If there is a contract, and there is, why are you considering/wasting money trying to break the contract?"
46. "It is morally, ethically, and legally wrong to unilaterally change the terms of a contract."
47. "Keep your word. Turn this around to be a positive process. Shame on HRM. How much have be spent on this process? Continue to spend? If you wanted ideas on diversion, happy to give for free if asked!"
48. "Incompleteness of report, in regards to organic waste engineered report, need more social science and biology input (psychology of participation/education)."
49. "When a new landfill site is needed it is imperative to keep commitments to the community OR it will be impossible to find a new site in the future."
50. "Why aren't all reports getting equal billing. Moral imperative- contract is sacred!"

Questions:

1. "Why isn't there another meeting in Otter Lake are when all public consultations are finished? More education is needed. "
2. "How much were consultants paid?"
3. "Who will be the scapegoat if this project fails to go ahead? What would be the cost of importing clay if it came from Shubie?"
4. "Beyond Stantec, how much as the PR consultants now costing?"
5. "2023 is the contract end date. Is this about extending the life of Otter Lake?"
6. "Why hasn't HRM senior staff explained to the residents of Otter Lake area why they recommend the changes contained in the Santec Report?"
7. "If the landfill leaches out and pollutes well water does the city have to supply water lines to these households?"
8. "HRM does not have the authority to stop FEP & WSF. Authority to close FEP is provincial. How is HRM getting around that? "
9. "If we're assuming Otter Lake completes its cycle in 2023 as expected, is HRM currently looking for a new site or is the evolution of Otter Lake planned to eliminate the need to go through this process with another community?"
10. "Why hasn't staff started looking for a post 2023 landfill site?"
11. "Has the Stantec Report done an accurate analysis?"
12. "Why has HRM not addressed flaws identified in the Stantec report before proceeding to public consultations?"
13. "Will an EAP be done?"

LEAVE OTTER LAKE ALONE

1. "If it ain't broke don't fix it."
2. "Leave Otter Lake alone."
3. "I support Leave Otter Lake Alone."
4. "Stop bullying. Follow contract. Listen to the people. Leave Otter Lake alone."
5. "Maintain Otter Lake as is. Close site at end of the contract in July 2022."
6. "We want HRM to keep their promises to our community and leave the Otter Lake site alone! Be fair and leave it alone."
7. "Keep the landfill as it is. At the end of its life cycle, close the landfill & start a new one somewhere else."
8. "I would like to see no changes. Contracts should not be broken because of money."
9. "Leave Otter Lake alone."
10. "Keep Otter Lake open. It is time to move forward not backward."
11. "I am against changes to Otter Lake."
12. "Leave us alone. Do the right thing."
13. "Do not change the setup of Otter Lake."
14. "Why change something that is working not like Sackville landfill."
15. "Leave things alone."
16. "Leave Otter Lake and the landfill alone. HRM needs to learn to be honest."

CLEAR BAGS

1. "Bag limits, cost per bag after 1st bag weekly, clear bags, fines for non-compliance for ICI & residential, enforcement. Need a real Zero Waste Solutions Citizens Task Force- a permanent, funded, official body with full HRM & provincial cooperation."
2. "Clear bags for recycling, deny mistakes."
3. "Embrace clear bag for garbage and increase enforcement to weed out all of those that are not separating at source. "
4. "Use clear bag approach."
5. "Should we be looking at clear bags to help front end sorting."
6. "Are steps being taken to implement clear bags?"
7. "Please HRM- bring in the clear bag policy to force residents who aren't separating to get on board."
8. "Bring in stricter rules around source separation like: clear bags, reduce the # of bags collected, recycle more products like Styrofoam, stricter rules for commercial institutions (ICI)."

NEW LANDFILL

1. "Use this time to find a new site for landfill due to open 2023"
2. "Close Otter Lake facility no later than 2024."
3. "Locate new landfill site & rebirth the CSC."
4. "It is time to evolve in 2023 Take everything that is good that we have now & add to it but at another site where it is planned- 10 years."
5. "Close Otter Lake."
6. "Begin to look for new site. It will take 10 years to site new location."

7. "It is time to start looking at other sites. Please respect the CMC. You have a legal agreement with the community."
8. "It makes me realize that landfill in Otter Lake must be closed."
9. "We do not want the landfill!!"
10. "Honour the agreement and start working on the next site. For the future, let us move on."
11. "The Otter Lake facility should close in 2023. So get on with finding new site."
12. "Also, at the end of this contract, the Otter Lake site must close as promised to us."
13. "I want HRM to start finding new landfill sites and to at the end of 25 years to close the Otter Lake site and turn it over to the community for recreational purposes."
14. "And, why hasn't staff started looking for a post 2023 landfill site?"
15. "Honor the 25 year contract and get on with siting a new landfill site."
16. "Look for new site."
17. "Find a new site and have it operating by the agreed closing date."
18. "Spend our tax money in an area that needs it or planning on the next Otter Lake in 2023."
19. "Let's look for the next facility."
20. "Contract= no changes. Honour contract. New site in 10 years."
21. "Honor the agreement & find new site for the next landfill- you have 10 years."
22. "To move forward first answer this: Will you honour the agreements & find new site? You cannot move forward without an answer."

FRONT END PROCESSING & WASTE STABILIZATION FACILITY

1. "Leave Otter Lake alone. Leave FSP & W (FEP-WSF) "
2. "Keep FEP, WSF, Enhanced liner and CMC."
3. "Why fix a process that is not broken? The FEP/WSF helps so do not remove it."
4. "Keep the FEP & WSF. "
5. "Original construction liner only engineered for 25 years or less when cells get full. Need to protect surrounding lakes in case all of HRM need water in future. Only 60% of waste is diverted, need FEP & WSF to protect what goes into cells."
6. "Please consider the long-term costs related to an unstable landfill. Odors, environments, leaks, long cycle of stabilization= decades. And, honour the contract with the community. The FEP/WAP are an important component of our accomplishments. Education about diversion, source separation and ways to improve the current process are the way to go forward. Removing protections are not the answer."
7. "If it ain't broke don't fix it."
8. "Let HRM respect their promise to the community. Keep the FEP + WSP in place."
9. "Keep FEP & WSF."
10. "Have you considered the people who will lose their jobs if you close WSP-FEP? DON'T IGNORE THE COMMUNITY. They stated their terms in the 1990's. We have not changed our minds about protecting our environment and our community. Leave Otter Lake alone!"
11. "They cannot break the contract, cannot close FEP/WSP and have people lose their jobs. Don't chance ruining a community."
12. "Keep the same if it works."
13. We have a facility that is top notch with dedicated employees. The fact that closure is an issue is ridiculous."
14. "I want the FEP/WSF maintained, and, if possible, expanded."
15. "Maintain the integrity of the system. Develop strategies to up recycling/composting/sorting at source especially in apartment buildings & commercial businesses. Honor the agreement!"

16. "Do not close the FEP & WSF."
17. "HRM does not have the authority to stop FEP & WSF. Authority to close FEP is provincial. How is HRM getting around that? "
18. "The WSF and FEF must remain. It is in the agreement."
19. "The science supports that the FEP $ WSF do work as detailed in the initial build spec."
20. "Do not close the FEP or the WSF!!"
21. "Keep the WSF & FEP open."
22. "We don't want to changes to the current facility. "
23. "Keep the process that the community was promised and created."
24. "HRM should maintain the FEP-WSF which was a condition of the host community accepting the landfill."
25. "Why if something works so well (FEP & WSF) would you want to change it, when other systems need to be improved (source separation in apartments & business)"
26. "Keep the process that the community was promised and created."
27. "A contract exists between the citizens and HRM. It must not be broken. Citizens are proud to be the guardians of a leading North American waste management system."
28. "Do not interfere with this current contract!!"
29. "HRM must honor the agreements and contracts that were made at the time of the community voluntarily agreed to host the landfill."
30. "The contract with the community says FEP & WSF are to be part of Otter Lake; since when is a contract not a binding document? The province says it won't allow changes. Why is this even being discussed?"
31. "Has the Stantec Report done an accurate analysis? Does the amount going through the FEP/WSF even if not 100% matter? How can all residents trust contrasts= commitments if this is not honored? Are steps being taken to implement clear bags? Will an EAP be done? ICI waste is flagged at the FEP (this is a huge bulk of waste that goes through the FEP) how will this be addressed? Should energy $$$ go towards siting a new landfill? Energy on education & improving waste diversion & reduction strategies. Will rodents, vermin rise without the FEP/WSF (there will be organics going through). What about hazardous waste being removed at FEP?"
32. "I do not support any of the recommendations put forward from the Stantec report. No extension past the 25 year term. The science supports that the FEP $ WSF do work as detailed in the initial build spec. Stop this public engagement process and restart the CSC process as occurred pre-1995."

IMPROVE OPERATIONS

1. "This is a waste of money & time. You will not get new innovative ideas of ways to improve the system unless you stop trying to reneg on community commitment."
2. "It is time to evolve in 2023 Take everything that is good that we have now & add to it but at another site where it is planned- 10 yrs."
3. "Changes to the next landfill."
4. "Don't regress."
5. "Why back to back in affected community but spread out in other communities for consultation? Why has HRM not addressed flaws identified in the Stantec report before proceeding to public consultations? Where are recommendations to improve effectiveness? Without FEP how will we ensure hazardous materials are not put into our landfill?
6. "It's time to start planning future waste management and learn how to continue to improve. "
7. "Consider the data that is supplied by Mirror daily of what goes in the landfill & ask the people who run it how the landfill is working. Stantec does not have all or correct info. Consider the community stakeholders."

8. "Reconvene the CSC process, participants of the CSC- to examine if the present system fulfills their integrated resource management strategy. And to propose and champion ways to fulfill any remaining parts- and to save money, build community equity & happiness and to benefit the environment."
9. "That an elected council would make a decision to change a system that is not broken!"
10. "This process has been flawed since staff took it upon themselves. Open your eyes and stop this nonsense!"
11. "Improve composting & recycling programs & hazardous waste collection i.e. include CFL bulbs."
12. "The downstream costs of removing FEP/WSF in 1) environmental cleanup of Nine Mile River and community downstream, 2) loss of tax revenue due to loss of property values, 3) loss of tourism (e.g. The Bluff Wilderness Hiking Trail lies within sight of the landfill and will be ruined by the cell tower that is proposed), 4) legal costs, no matter which side wins, paid by all who are paying now for FEP/WSF, the public."
13. "Better separation."
14. "Term organics- 8K tons of paper- why not recycled, why include it in term organics- when you just asked for it not to be included. "
15. "Make improvements with city input & agreements only."
16. "Rather than just looking @ saving $$ by putting "more" in the landfill, explore saving money by putting "less" in landfill. E.g. Support cloth diapers. 5% of your landfill is disposable @ a cost of savings of $500 per child that uses cloth."
17. "Monitor commercial waste."
18. "Can FEP & WSF become more efficient in order to decrease costs?"
19. "HRM has changed their story through this process. First the Otter Lake site didn't do what it was supposed to, then it did. The WSF didn't work but now it does! The liner was supposed to be reduced, now it isn't. HRM doesn't understand their own system."
20. "Why if something works so well (FEP & WSF) would you want to change it, when other systems need to be improved (source separation in apartments & business) Work with the operator & community as a team, not against as opposition."
21. "Keep it as is. Improve source separation."
22. "I would like to see 3 coloured bins for collection. This would simplify and take many garbage bags out of the system."

Questions:

1. "What will be the negative effects if HRM proceeds with the intended plans of change to the present system?"
2. "What is the alternative to the system we now have?"
3. "What is HRM doing to reduce waste?"
4. "Are you working with manufacturers to get them to make items that will not end up in the landfill or the curb?"
5. "I also understand HRM is considering outside curing pads to allow compost to rot into compost, my question is wouldn't this cause odors & draw seagulls & rats?"
6. "What is the plan after 25 year life of landfill; next location/ new technology etc."
7. "Can FEP & WSF become more efficient in order to decrease costs?
8. "What is the reclamation plan for site after closure?"
9. "ICI waste is flagged at the FEP (this is a huge bulk of waste that goes through the FEP) how will this be addressed?"
10. "Will rodents, vermin rise without the FEP/WSF (there will be organics going through)."
11. "What about hazardous waste being removed at FEP?"
12. "Where are recommendations to improve effectiveness?"

LOOK AT BEST PRACTICES

1. "Complete the mandate of no-organics to the landfill by a little more processing of the composted/stabilized facility to make a Class 2 compost and use that material for final top cover (&similar uses). The Paul Arnold, PhD report correctly identifies that as possible to produce the class 2 compost and thus have a usable product- so this will save money, create equity and benefit the environment. This could virtually eliminate methane production. Invite Paul Connett, PhD, to keynote a conference starting a Zero waste Solutions Citizens Task Force."
2. "It is most advisable to go on in perfecting ways to dispose of community waste while causing the least environmental impact. Priority is to protect the Nine Mile River system."

TRUST IN OUR GOVERNMENT

1. "Council should keep their Word! Council should consider the job loss! Council should be shamed!"
2. "Trust. Truth. Integrity. Keeping your word."
3. "The fact that this process is even taking place is a total breach of trust. The only community that has an interest in this (or at least an overwhelmingly more significant interest) is the one near Otter Lake. No one will ever trust HRM again for a project they view as a nuisance."
4. "Our environment is priceless, money is not enough. Respect the people and commitments. Trust."
5. "The money required to operate Otter Lake comes from the public through HRM. The public is willing to pay the price and HRM has no mandate to effect changes detailed in the Stantec report."
6. "Citizens of HRM are not happy with members of council who would consider breaking promises to a community."
7. "They are wasting our taxpayers money. Many councilors have not visited Otter Lake- yet they vote on a topic they do not have first hand experience on. Keep the promise. HRM staff needs to improve their education program & better explain their goals honestly."
8. "Now HRM is trying to undermine the agreement with the community by a false "consultation" process. No trust for HRM. Fire the arrogant fat staffers who have no respect for the people. They were laughing at the participants- makes me sick that HRM mayor and councilors allows this."
9. "Honouring the existing contract. Maximizing environmental protection. Repetitive, misleading, irresponsible on HRM. "
10. "Let HRM respect their promise to the community. Keep the FEP + WSP in place."
11. "That the decision to even revisit the HRM proposal is not valid & breaks community trust."
12. "I can't believe that my city leaders would even consider going back on its word- an agreement with the community. How can you expect anyone to trust you again? It's a total betrayal."
13. "The agreement that protects the districts surrounding Otter Lake if broken by HRM staff will be a betrayal of our trust we have in HRM administrators. When HRM are searching for a new location for the next landfill, no one will want to sign an agreement with HRM only to be broken."
14. "You did not need to hire Stantec when you have the CMC. HRM should have included CMC at the outset not after receiving the Stantec report."
15. "I am embarrassed as a citizen that council would ever even consider going back on their PROMISE TO ITS CITIZENS. Please do the right thing and keep this facility open. It's the right choice for the following reasons: Proving council's integrity...proving that WE ARE LEADERS and that WE ARE STRONG for the rest of our province/country/world. This is an OPPORTUNITY to demonstrate/ lead by examples. Jobs! Think of the people who rely on this facility to feed their families."
16. "Where is the useless mayor? The 3 HRM staff sitting on the stage should be ashamed- fire the bozos."
17. "How will people be able to trust their government?

18. "How can council be trusted on any contract if they are going to break a legal contract here? No questions answered by HRM."
19. "Fire the consultants. No means no."
20. "No trust in city management."
21. "We have an agreement with HRM, do not try to break it!"
22. "They've said a lot without saying anything. I highly expect the lawyers to filter all answers before they reach the website. It helped show that as usual the decision as already been made."
23. "If our safeguards are taken away, who pays when it doesn't work? If HRM breaks the contract how can they be trusted in the future?"
24. "Honor your contracts and agreements. Show some leadership for once."
25. "Why hasn't HRM senior staff explained to the residents of Otter Lake area why they recommend the changes contained in the Santec Report?"
26. "Now is the time to start planning for when the contract expires. That's what good faith looks like. Council- you still have time to save face: Admit this was handled poorly. Honour the contract- restore good faith. Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens. "
27. "Concerned about the will of the HRM council to have a top notch landfill process & waste stabilization facility."
28. "That changing the agreement will cause citizens to forever distrust any future agreements between citizens & city council."
29. "If this contract is breached and our community is not protected, it would be hard to continue to have faith in/support HRM counsel in the future."
30. Develop trust and maybe people will trust government officials and opinions. You will feel better, you won't come across as shady bureaucrats and people will be inclined to work with you."
31. "Keep your word! We have a contract! You are elected! We can change that."
32. "Why bother to sign a contract? HRM can't be trusted!!!"
33. "If the levels of government will not support this why are HRM continuing with this cause."
34. "I am disappointed with the mayor and council for considering change."
35. "If you break one contract, how can we trust that you can be trusted to make any other contracts. They won't be worth the paper it is written on."

Questions:

1. "HRM does not have the authority to stop FEP & WSF. Authority to close FEP is provincial. How is HRM getting around that? "
2. "Why hasn't HRM senior staff explained to the residents of Otter Lake area why they recommend the changes contained in the Santec Report?"
3. "If we're assuming Otter Lake completes its cycle in 2023 as expected, is HRM currently looking for a new site or is the evolution of Otter Lake planned to eliminate the need to go through this process with another community?"
4. "Why hasn't staff started looking for a post 2023 landfill site?"
5. "Why has HRM not addressed flaws identified in the Stantec report before proceeding to public consultations?"

WORLD CLASS SYSTEM

1. "Our pride around our extensive recycling capabilities undermines awareness & engagement around reduction- people should be educated that recycling also uses resources/energy."
2. "Why turn back time and reverse all the good we have done by having this facility? We have been recognized for it across the country/world and show them how to do the same, why stop now. "
3. "When you have a facility leading the way, why go backward?"
4. "We have a facility that is top notch with dedicated employees. The fact that closure is an issue is ridiculous."
5. "Our landfill is world class, leave it alone."
6. "Maintain world class waste management program."
7. "Keep present system- let's not go back to the Dark Ages. I'm willing to pay more for this system."
8. "Citizens are proud to be the guardians of a leading North American waste management system."
9. "We are proud of the strides that have been made in the recycling. Why take a step backwards. If it isn't broken why fix it with backwards changes."

PLAN FOR LONG-TERM

1. "Original construction liner only engineered for 25 years or less when cells get full. Need to protect surrounding lakes in case all of HRM need water in future. Only 60% of waste is diverted, need FEP & WSF to protect what goes into cells."
2. "It is time to evolve in 2023. Take everything that is good that we have now & add to it but at another site where it is planned- 10 yrs."
3. "The future needs to be considered, preventative measures need to be in place now to prepare for environmental disasters if they occur. No matter how much preparation is done prior to construction & maintenance, nothing is perfect! There needs to be a choice, I know that no community wants a landfill in their area, but we need to have one somewhere. "
4. "Please consider the past commitments and look to future success through increased diversion and source separation."
5. "Please do the right thing and keep this facility open. It's the right choice for the following reasons: Proving councils integrity, Environmental associated long-term benefits, proving that WE ARE LEADERS and that WE ARE STRONG for the rest of our province/country/world."
6. "Use a public planning approach to long term waste planning that is open, enviro-centric and respectful of our citizens."

BAN PLASTIC BAGS

1. "Give up all plastic bags & use paper bags. The paper will demonstrate if organics are hidden!

Questions:

1. "Are steps being taken to implement clear bags?"

APPENDIX D: ONLINE COMMENTS AND QUESTIONS

HONOUR THE AGREEMENT

Comments:

1. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment. Until recently I was proud that my community worked VERY hard to come to an agreement with HRM that ensured the above. The Stantec report is being touted as gospel by HRM staff and they are giving the signed agreement with citizens no weight at all. I now feel betrayed by HRM."
2. "That agreements between HRM and the host communities are honoured. If we want to come up with some new innovations in waste diversion and management you need to take the recommendations from the Stantec report in regards to Otter Lake, the removal of FEP & WSP, increasing cell height, removing the leachate detector liners, extending the life and activity at Otter Lake off the table. No one seems to be able to get past the betrayal that community feels to have no negotiables become negotiable."
3. "Honor the contracts and agreements already in place. Focus more on education. You cannot get rid of the gatekeeper when the majority of people do not source separate properly."
4. "We need to ensure the same high standards that were set out in the initial Otter Lake agreement are in here as well. There should not even be talk of lowering our standards."
5. "Honoring the commitments made to surrounding communities for the operation of Otter Lake."
6. "Honouring commitment is obviously HUGE. If HRM renege on commitments to communities surrounding the Otter Lake facility how could any other community expect to trust our Municipal government in the future."
7. "The commitments made by previous council must be continued and honored otherwise it is inevitable that money will be spent on legal challenges, and the HRM reputation sullied if contract is altered unilaterally. It is morally offensive to contemplate altering the agreement."
8. "It's very sad really. HRM seems to also be developing a reputation for not honouring existing contacts and policies that it has...What affects one area of HRM affects us all. It may not be in my backyard this time but it could be next time. Isn't the government for and of the people? It's starting to feel like it's us against them and that's not good for anyone."
9. "After two Town Hall and four Public Engagement meetings, it MUST be recognized that at every event the following held true: Honouring the Agreements between the Public and the Landfill Operator as well as retiring the Otter Lake solid waste management facility after its 25 year Operational Term (Dec 31, 2023 or Jan 1, 2024) was the priority message which the Public desired to articulate to HRM and the National presentation staff. In fact I doubt if any would disagree that if the Public had been asked directly what was the main reason for them attending, the message would have been even clearer...I am once again recommending that HRM Regional Council take exceptional action, but this time, I recommend that you direct HRM Staff to recognize that honouring the Agreements and retiring the Otter Lake facility is the pivotal concept that is essential in order to move ahead. Please direct HRM Staff to take those options off the table and focus on the next solution."
10. "Environmental responsibility should be first and foremost. Maintaining the commitments made for the operation of Otter Lake. My take away from the public CMC meeting I attended was that it takes about 10 years to properly site a new landfill and Otter Lake is meant to close in 2023, so I think the focus should be on siting a new landfill and making improvements to processing, operation and design of it."

SOURCE SEPARATION

Comments:

1. "Source separation and enforcement. Education, education, education.....at all levels – ICI (Industrial, Commercial and Institutional, including all school - let's discuss waste with the kids regularly) and households. Why are some residents not separating?"

2. "Continue your present ad campaign to encourage correct sorting in residences. Get apartment buildings to participate fully!"
3. "Honor the contracts and agreements already in place. Focus more on education. You cannot get rid of the gatekeeper when the majority of people do not source separate properly."
4. "Continue public education to reuse, recycle and reduce waste - challenge the public to reduce their footprint. "
5. "In fact the only secondary options that almost every attendee could substantially agree on was that more "at source separation" educational initiatives are required for the public & ICI sectors, and finding a real solution to the obstacles that thwart achieving acceptable "at source separation" levels in the ICI sector should be a high priority."
6. "HRM WM should concentrate on educating the public on 'source separation'. By developing a new program to handle waste separation at apartments, condos and other multi purpose buildings, commercial outlets including restaurants, we could reduce what goes to Otter Lake meaning less to sort and reducing the dependency on the FEP and WSF at Otter Lake."
7. "I feel that HRM should keep focus on enhancing source separation and education. Improving the efficiencies without taking away any of the environmental protections in place. None of the protections at Otter Lake to include but not limited to : FEP, WSF, Cell Liners, Cell Height, geographical footprint, operation permits, environmental permits, contracts and agreements with all stake holders (especially those to the immediate communities) must remain in place as is. We should be refocusing our strategic plan for the future of waste management to adding to these components and taking nothing away. Increased source separation so less goes to the facility and diverted elsewhere is the way of the future. Until such time as we embrace new technology and practices eliminate the need to ever bury another piece of trash.
8. "We should be refocusing our strategic plan for the future of waste management to adding to these components and taking nothing away. Increased source separation so less goes to the facility and diverted elsewhere is the way of the future. Until such time as we embrace new technology and practices eliminate the need to ever bury another piece of trash."
9. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment."
10. "I really appreciate the weekly green bin collection in the summer but it ends too soon in September when the days are still warm and the green carts have a foul odor. Similarly, leaf collection starts too late and storm drains and gutters get clogged and cause flooding on rainy days."
11. "It's important to continually educate all newcomers to the city on how the waste system works, promote compliance and discourage littering. New renters and students seem misinformed on arrival. We need to promote waste reduction to help make the whole system more sustainable. There is an opportunity to promote frequent messages that link the importance of having a good waste system so that all residents take pride and responsibility for living in a clean city."

12. "If there are improvements that can be implemented at the Otter Lake facility that are cost effective for the remaining 10 or so years, and do not remove or change the essential components of the existing Agreements, then

you can be sure that the Public will be interested in exploring those options. Focus on geographically locating the next landfill site, and planning how this new facility will be operated. HRM Staff have a number of other interesting solid waste management initiatives that do not directly affect operations and infrastructure at the Otter Lake landfill facility, and they should all be duly considered; but the existing public engagement process has been woefully ineffective thus far in actually focusing on these options. In fact the only secondary options that almost every attendee could substantially agree on was that more "at source separation" educational initiatives are required for the public & ICI sectors, and finding a real solution to the obstacles that thwart achieving acceptable "at source separation" levels in the ICI sector should be a high priority."

13. "HRM WM should concentrate on educating the public on 'source separation'. By developing a new program to handle waste separation at apartments, condos and other multi-purpose buildings, commercial outlets including restaurants, we could reduce what goes to Otter Lake meaning less to sort and reducing the dependency on the FEP and WSF at Otter Lake."
14. "Throughout our city we have different coloured bins into which we throw our waste. HRM should develop a standard number of boxes, say 4, with the same colour scheme. If you have a recyclable item then it is thrown into the green box. Non-recyclable items goes into the black box. How do you know what to throw into each box? It's simple. Have manufacturers apply a black dot on the bottom of the coffee cup, for instance, so we know it would go into the BLACK box. If the item is recyclable then apply a green dot to this item so it can properly be put into the Green box. People, customers don't know which box to throw their item into so they toss it into any box. Take the guess work out and make it simple, then we will improve source separation."

ENVIRONMENTAL PROTECTION

Comments:

1. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment."
2. "I appreciate most that we continue to front end process our waste and stabilize organics for 21 days prior to disposal in landfill. I appreciate that we already have the perfect system which is working diligently to see that all environmental safeguards that were negotiated and contracted back in 1998 are continually met."
3. "Our world class system was born and developed with the environment and communities in mind. Community consultation must continue and be given priority."
4. "Environmental and Community Protection. As one example, hazardous waste is a concern, particularly under the Stantec recommendations to remove the FEP, reduce the cell liners and increase height."
5. "The NUMBER 1 priority is environmental safeguards and to not even consider back peddling there. Number 2 removal of Hazardous materials and Waste stabilization prior to landfill disposal to control vectors. Number 3 Contractual obligations to the surrounding communities."
6. "Next to protection of the environment (which I feel should be paramount), innovative ideas and concepts that are proven elsewhere need to be explored. "
7. "Environmental responsibility."
8. "Environmental responsibility should be first and foremost. Maintaining the commitments made for the operation of Otter Lake. My take away from the public CMC meeting I attended was that it takes about 10 years to properly site a new landfill and Otter Lake is meant to close in 2023, so I think the focus should be on siting a new landfill and making improvements to processing, operation and design of it."

COMMUNITY PROTECTION

Comments:

1. "I appreciate that we already have the perfect system which is working diligently to see that all environmental safeguards that were negotiated and contracted back in 1998 are continually met. If anyone has any legitimate questions that they want honest answers too about how the facility operates and what is accomplished, I have been employed there for 8 years and have seen the evolution and changes to the waste stream and can provide you with straight non-technical answers."
2. "Our world class system was born and developed with the environment and communities in mind. Community consultation must continue and be given priority."
3. "That agreements between HRM and the host communities are honoured. If we want to come up with some new innovations in waste diversion and management you need to take the recommendations from the Stantec report in regards to Otter Lake, the removal of FEP & WSP, increasing cell height, removing the leachate detector liners, extending the life and activity at Otter Lake off the table. No one seems to be able to get past the betrayal that community feels to have no negotiables become negotiable."
4. "Commitment to communities and trust in the community engagement process. The community accepted Otter Lake, without an Environmental Impact Assessment, based on certain safeguards and commitments. I believe these commitments should be honored. And when a future site is determined commitments to that host community need to be honored and respected as well. Listen to residents in the public engagement process. This has not been done or this engagement process would look very different. There has to be trust in our elected officials and staff. Even in meetings outside the host community, residents are saying there has to be integrity and commitments/agreements need to be honored. Time will tell if staff and Council is listening. "
5. "The NUMBER 1 priority is environmental safeguards and to not even consider back peddling there. Number 2, removal of Hazardous materials and Waste stabilization prior to landfill disposal to control vectors. Number 3 Contractual obligations to the surrounding communities."
6. "It's very sad really. HRM seems to also be developing a reputation for not honouring existing contracts and policies that it has. I just attended my local HRM waste management meeting tonight in Porters Lake. There were approx. 6 residents from the Porters Lake Area and the rest were from the Timberlea area. The Timberlea area residents were basically told to sit down and shut up by one of the HRM staff. I was a bit shocked by that. What I should have said was no, I as a resident of the local area want to hear what they have to say. What affects one area of HRM affects us all. It may not be in my backyard this time but it could be next time. Isn't the government for and of the people? It's starting to feel like it's us against them and that's not good for anyone."
7. "I would like to know why it is that after someone presents at these "Public Consultation" meetings that we as citizens are not permitted to ask these presenters questions? I am of the opinion if the person who is presenting is educated enough on the topic to present, they should be educated enough to answer our questions on their presentations. This "Public Consultation" process does not seem as though it is really consulting the community, it seems as though it is more of a dictation of incorrect facts from HRM."
8. "There has to be trust in our elected officials and staff. Even in meetings outside the host community, residents are saying there has to be integrity and commitments/agreements need to be honored. Time will tell if staff and Council is listening."

TRANSPARENCY AND INTEGRITY

Comments:

1. "Commitment to communities and trust in the community engagement process. The community accepted Otter Lake, without an Environmental Impact Assessment, based on certain safeguards and commitments. I believe these commitments should be honored. And when a future site is determined commitments to that host community need to be honored and respected as well. Listen to residents in the public engagement process. This has not been done or this engagement process would look very different. There has to be trust in our elected officials and staff. Even in meetings outside the host community, residents are saying there has to be integrity and commitments/agreements need to be honored. Time will tell if staff and Council is listening."
2. "It's very sad really. HRM seems to also be developing a reputation for not honouring existing contacts and policies that it has. I just attended my local HRM waste management meeting tonight in Porters Lake. There were approx. 6 residents from the Porters Lake Area and the rest were from the Timberlea area. The Timberlea area residents were basically told to sit down and shut up by one of the HRM staff. I was a bit shocked by that. What I should have said was no, I as a resident of the local area want to hear what they have to say. What affects one area of HRM affects us all. It may not be in my backyard this time but it could be next time. Isn't the government for and of the people. It's starting to feel like it's us against them and that's not good for anyone."
3. "Be bold, be proactive, be open and transparent. HRM Regional Council has allowed this public engagement evolution to proceed unchecked thus far; but Council can give HRM Staff essential guidance at this stage which could turn a public relations disaster into a potential policy making solution. If HRM and National Staff require some additional time to rework their public engagement process in order to achieve a solution that should be acceptable to the Public, then give them the option to delay the next round of events until they are ready. The goal should be to truly accomplish something."
4. "I would like to know why it is that after someone presents at these "Public Consultation" meetings that we as citizens are not permitted to ask these presenters questions? I am of the opinion if the person who is presenting is educated enough on the topic to present, they should be educated enough to answer our questions on their presentations. This "Public Consultation" process does not seem as though it is really consulting the community, it seems as though it is more of a dictation of incorrect facts from HRM."

Questions:

1. "I would like to know why it is that after someone presents at these "Public Consultation" meetings that we as citizens are not permitted to ask these presenters questions?"

CLEAR BAGS

Comments:

1. "Do not ban plastic refuse bags in favour of large paper garden waste bags. With our rainy weather conditions the paper bags do not work. They tend to disintegrate leaving more waste that litters and drifts away. Either insist on clear plastic bags for garden waste or better still opt for large netting bags which I'm told do exist. Some of these even biodegrade! "

NEW LANDFILL

Comments:

1. "Begin siting a new landfill (or solid waste management) site NOW. Take the required time to do it properly and apply your "evolutions" to its design and operation."

2. "HRM should be using this time and money to look for the next landfill site in the municipality, and ways to improve the systems we have now, so that they will be even better in the new landfill campus site, wherever that may be. The agreement for Otter Lake to host the landfill will end in 2024, that gives HRM 10 years to site and build the new campus style facility in a new location. Good luck."
3. "Focus on geographically locating the next landfill site, and planning how this new facility will be operated."
4. "My take away from the public CMC meeting I attended was that it takes about 10 years to properly site a new landfill and Otter Lake is meant to close in 2023, so I think the focus should be on siting a new landfill and making improvements to processing, operation and design of it."

FRONT-END PROCESSING AND WASTE STABILIZATION FACILITY

Comments:

1. "I appreciate most that we continue to Front end process our waste and Stabilize organics for 21 days prior to disposal in landfill. I appreciate that we already have the perfect system which is working diligently to see that all environmental safeguards that were negotiated and contracted back in 1998 are continually met."
2. "Don't get rid of the FEP and WSF UNTIL we improve source separation. Diverting items from Otter Lake is a must. Recycle, reuse. Tax manufacturers whose products are not recyclable but currently end up at our landfill costing more taxpayers dollars to pick up at curb and deliver to the landfill. Think of the savings if we had Zero Waste!"
3. "None of the protections at Otter Lake to include but not limited to : FEP, WSF, Cell Liners, Cell Height, geographical footprint, operation permits, environmental permits, contracts and agreements with all stake holders (especially those to the immediate communities) must remain in place as is."

IMPROVE OPERATIONS

Comments:

1. "Next to protection of the environment (which I feel should be paramount), innovative ideas and concepts that are proven elsewhere need to be explored. Sometimes, little things can make substantial differences at little or no cost. Other innovations can actually save money. For example, Ottawa uses a sliding calendar for garbage collection days that eliminates significant overtime and enables the collection workers to enjoy holidays off as well. The concept: if your "normal" collection day is Wednesday and a holiday falls on that day (or has occurred during the previous week), then your new collection day becomes Thursday. This continues throughout the year. Obviously, one has to keep track more closely; however, there were few, if any, complaints."
2. "We need to ensure the same high standards that were set out in the initial Otter Lake agreement are in here as well. There should not even be talk of lowering our standards.
3. "Use, promote and develop the best world practices; demonstrate leadership in waste management. The facility must be a good neighbour, low odor, and offer educational tours. Cost effective and affordable for rate payers - including travel distances for trucks. Consider new innovative technology to generate energy on campus to run the

operation. Develop partnerships with universities & NSCC to incubate new innovative solutions for waste management problems. Continue public education to reuse, recycle and reduce waste - challenge the public to reduce their footprint."

4. "My take away from the public CMC meeting I attended was that it takes about 10 years to properly site a new landfill and Otter Lake is meant to close in 2023, so I think the focus should be on siting a new landfill and making improvements to processing, operation and design of it."

Questions:

1. "I am aware of the drop off depot.....how many of them are there within HRM? Are they scattered throughout the city? What are the hours?"
2. "In the reply, it was noted "As part of the system review process we are looking at ways to expand the availability of this service". What specifically is being proposed - how many new hazardous waste depots? Expanded hours? Has this been costed?"

TRUST IN OUR GOVERNMENT

Comments:

1. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment. Until recently I was proud that my community worked VERY hard to come to an agreement with HRM that ensured the above. The Stantec report is being touted as gospel by HRM staff and they are giving the signed agreement with citizens no weight at all. I now feel betrayed by HRM."
2. "That agreements between HRM and the host communities are honoured. If we want to come up with some new innovations in waste diversion and management you need to take the recommendations from the Stantec report in regards to Otter Lake, the removal of FEP & WSP, increasing cell height, removing the leachate detector liners, extending the life and activity at Otter Lake off the table. No one seems to be able to get past the betrayal that community feels to have no negotiables become negotiable."
3. "There has to be trust in our elected officials and staff. Even in meetings outside the host community, residents are saying there has to be integrity and commitments/agreements need to be honored. Time will tell if staff and Council is listening."
4. "I would like to know why it is that after someone presents at these "Public Consultation" meetings that we as citizens are not permitted to ask these presenters questions? I am of the opinion if the person who is presenting is educated enough on the topic to present, they should be educated enough to answer our questions on their presentations. This "Public Consultation" process does not seem as though it is really consulting the community, it seems as though it is more of a dictation of incorrect facts from HRM."

WORLD CLASS SYSTEM

Comments:

1. "I appreciate that we have a world class facility that came out of true citizen engagement. We should be proud of our level of diversion, but we need to continue making investments and improvements to increase diversion and protection for the environment."

2. "I appreciate most that we continue to front end process our waste and stabilize organics for 21 days prior to disposal in landfill. I appreciate that we already have the perfect system which is working diligently to see that all environmental safeguards that were negotiated and contracted back in 1998 are continually met. If anyone has any legitimate questions that they want honest answers too about how the facility operates and what is accomplished, I have been employed there for 8 years and have seen the evolution and changes to the waste stream and can provide you with straight non-technical answers."

PLAN FOR THE LONG-TERM

Comments:

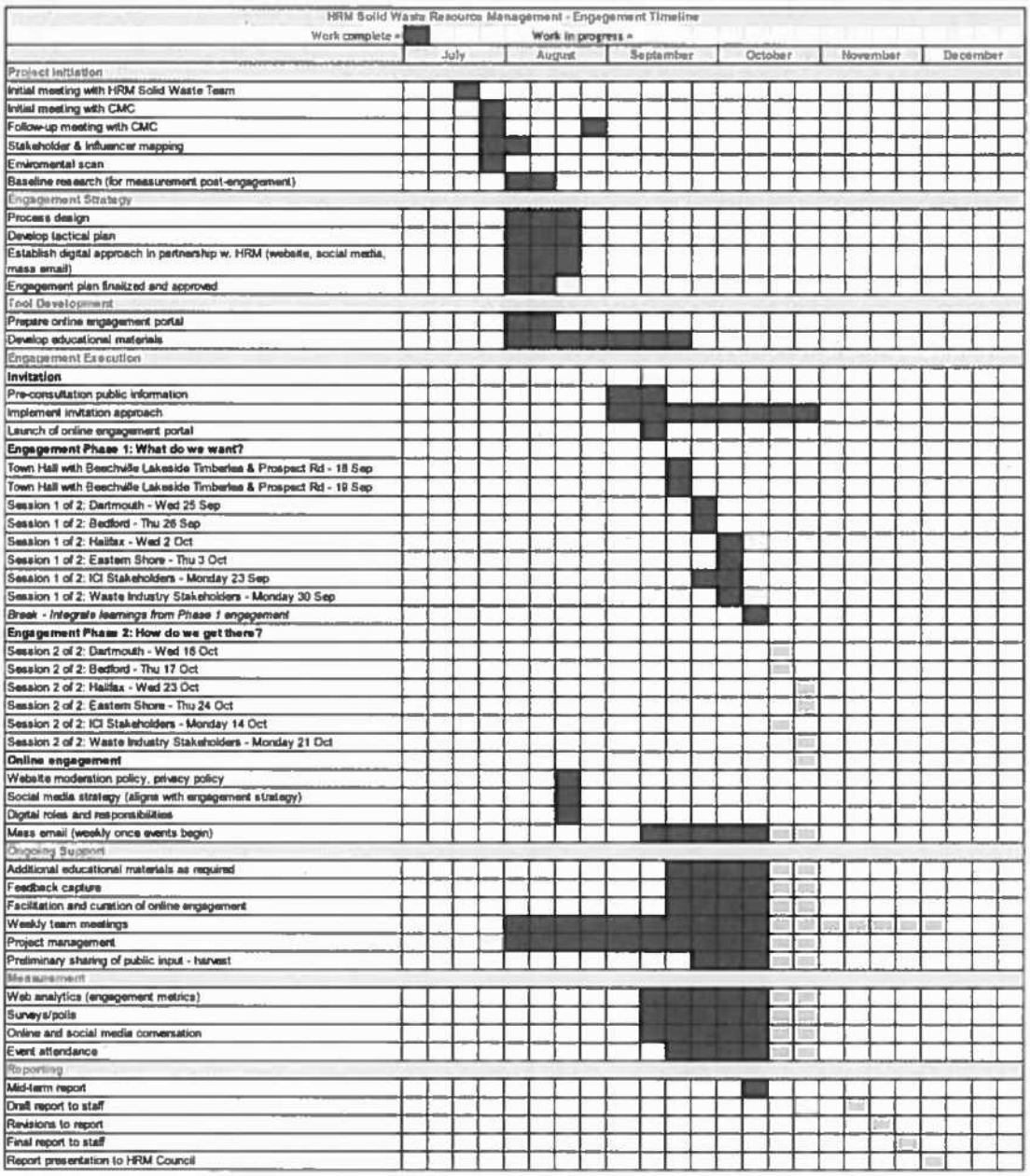
1. "We should be refocusing our strategic plan for the future of waste management to adding to these components and taking nothing away. Increased source separation so less goes to the facility and diverted elsewhere is the way of the future. Until such time as we embrace new technology and practices eliminate the need to ever bury another piece of trash."

PLASTIC BAGS

Comments:

1. "I think we should get away from plastic bags altogether. We have a green bin, and we should have a blue bin for recyclables. No Bags anymore."

APPENDIX E: TIMELINE



HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 3
Halifax Regional Council
October 22, 2013

TO: Mayor Savage and Members of Halifax Regional Council

Original Signed

SUBMITTED BY: Dave Hubley, P.Eng., Acting Director, Transportation & Public Works

DATE: October 2, 2013

SUBJECT: Solid Waste Strategy Review Community Engagement Update Report #2

INFORMATION REPORT

ORIGIN

During the July 23, 2013, session of Regional Council, Halifax Regional Council requested that staff provide a monthly update to Council on the status of the Solid Waste Strategy Review consultation process.

LEGISLATIVE AUTHORITY

HRM Charter, Part XIII, Solid Waste Resource Management

BACKGROUND

Phase I of the community engagement process is complete. As directed by Regional Council, HRM hosted two town hall meetings with a specific invitation to residents in the adjacent communities (Beechville, Lakeside, Timberlea, Prospect Road—BLTPR) to provide an open forum and hear directly from the residents who are most interested by the proposed changes at Otter Lake. Four regional public information sessions (Dartmouth and vicinity, Bedford and vicinity, Halifax and vicinity and Eastern Shore and vicinity), and two commercial and industry (ICI) stakeholder information sessions followed the town hall events to gather public and stakeholders' comments on their priorities for a renewed waste management system. NATIONAL Public Relations continues to collate the feedback for their report.

The town hall events attracted several hundred people during both events for the BLTPR communities. The four regional public events were also well attended, largely by the same people who had been at the town halls. HRM staff has conducted direct outreach to individual

organizations, such as the Investment Property Owners Association of Nova Scotia (IPOANS), to encourage greater participation from the business sector stakeholders.

The following key messages came from the town hall sessions:

- **HRM is breaking its promise to leave the Otter Lake site in 2024 after 25 years. Make no changes at Otter Lake.**
    - There currently is no defined date to vacate the site in any document, Council report or the contract with the operator or the CMC agreement. The existing contract with the operator, the only document that cites a time frame, refers to "9 cells or 25 years, whichever comes first" as the duration for the operating agreement. However, the contract is not close ended and remains open in terms of what happens after the 9 cells are constructed, which is supported by 2006 Regional Plan, Policy SU-22.
- **HRM is taking away environmental protections to save money and breaking its promise to keep the protections in place.**
    - Regional Council continues to maintain its commitment to environmental and community protection throughout the Solid Waste Strategy Review process and any future recommendations will reflect this mandate.
- **Keep the FEP/WSF. Closing the FEP/WSF will turn Otter Lake into a 'Sackville dump'.**
    - As previously discussed in Regional Council, any changes to solid waste processing at the Otter Lake site will not create the environmental and social challenges that the Sackville landfill experienced given the improvements in landfill liner specifications, source separation, waste stream changes and current/future activities of the landfill operator, all which provide the environmental and community protections expected in the agreement with the nearby communities.
- **HRM did not complete an Environmental Assessment to site the landfill at Otter Lake, because it promised to use the FEP/WSF to protect the site. The site is unsafe because it is on fractured bedrock and close to a water way.**
    - The Provincial regulations and legislation do not require an Environmental Assessment for siting a landfill. Geological surveys completed at the time of siting indicated that the site is safe for landfill operations; 15 years of monitoring confirms the initial assessment that the site and associated operations are safe for the rivers and water courses in the area. Closing the FEP/WSF has no bearing on environmental and water protection. The environmental in-ground and water course protection comes from the liner, not the FEP/WSF. No other provincially regulated, monitored and permitted landfill in Nova Scotia requires an FEP/WSF to protect the environment or any water sources.

To date, HRM provided responses to more than 100 questions from the various community engagement events, all of which can be viewed at www.shapeyourcityhalifax.ca/solid-waste-management. Event overviews and key themes are also available for all Phase I sessions.

The following additional messages came from the public engagement sessions and are generating additional system performance analysis:

- Maintain the strategy objective and commitment of environmental and community protection through increased efforts for source separation and diversion from landfill;
- Find new ways to improve source separation and increase diversion from Otter Lake, such as clear bags and lower bag limits;
- Explore changes to policies and programs for sectors not effectively source separating, such as high rise apartments and commercial properties and businesses; and
- Evolve system policies to increase accountability and compliance for those who are not effectively source separating

DISCUSSION

With Phase I community engagement activities complete, NATIONAL Public Relations focused next on making the sessions more interactive for Phase II to encourage residents and members of the business and commercial sectors to participate in small groups that examined specific issues and options to improve the solid waste program outcomes.

Phase II sessions commenced on October 16, 2013 with six more public sessions (four community events and two industry/commercial events). Phase II sessions, which will be complete on October 24, are designed to identify program and policy change options and initiatives to improve diversion and source separation. This approach intends to identify ways to improve outcomes by implementing options oriented to the specific circumstances of a given sector (e.g. restaurant or retail) rather than adapting the entire system to address a specific issue. This focus is consistent Regional Council's direction to evolve the overall system to achieve the original strategy objectives.

FINANCIAL IMPLICATIONS

The Community Engagement expenses are available from the operating account R333-6916, Communication & Education. The budget availability has been confirmed by Finance.

COMMUNITY ENGAGEMENT

The community engagement (CE) program is compliant with HRM's Engagement Strategy. The program is designed to promote and facilitate broad citizen and stakeholder participation in a process that will provide the necessary information to help Regional Council determine options to evolve the solid waste program.

The CE program evolved through public meetings of the Environment and Sustainability Standing Committee and Regional Council. On various occasions, the program adapted to specific concerns of the Community Monitoring Committee, which has been regularly and directly engaged by NATIONAL Public Relations to ensure a mutual understanding with a key representative of the BLTPR communities.

The program was purpose-built to identify and engage specific and broad audiences who have diverse interests in the outcomes of the community engagement activities and the decisions they will affect. Online engagement tools are deployed and regularly monitored to ensure those who cannot or would not attend engagement events have every opportunity to:

- review the presentations, background information, and consultants' reports
- review reports to Regional Council and committees
- review comments, questions and responses from both the events and online participants, and
- ask questions or post comments on all of the above

Given the scope and duration of the CE program, HRM retained NATIONAL Public Relations to design, conduct, and collect all feedback from the program into a comprehensive CE report that will form part of staff's final report to Regional Council. The program continues to be promoted and supported through traditional print/broadcast media and diverse social media channels.

All feedback and associated responses will continue to be shared with CE program participants and the public at large through Council reports and updates on the online engagement hub.

ATTACHMENTS

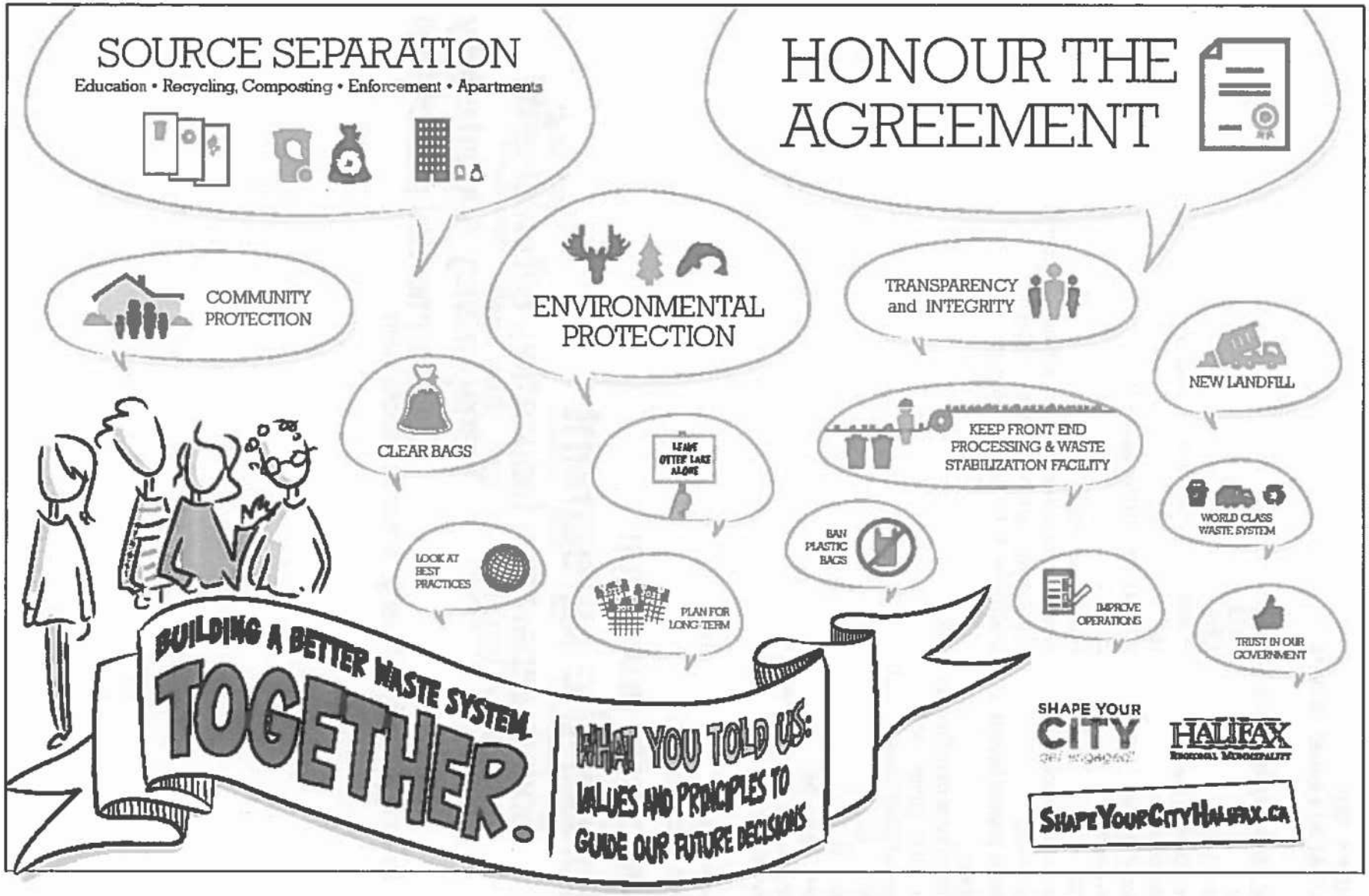
Appendix A - Graphic from National – Phase One Session's Harvest
Appendix B - Statistics from Phase one engagement

A copy of this report can be obtained online at http://www.halifax.ca/council/agendasc/cagenda.html then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Gord Helm, Manager, Solid Waste Resources, 490-6606

Bruce DeBaie, Managing Director, Corporate Communications, 490-6787

Appendix A


SOURCE SEPARATION
Education • Recycling, Composting • Enforcement • Apartments
HONOUR THE AGREEMENT
COMMUNITY PROTECTION
ENVIRONMENTAL PROTECTION
TRANSPARENCY and INTEGRITY
NEW LANDFILL
CLEAR BAGS
LEAVE OTTER LAKE ALONE
KEEP FRONT END PROCESSING & WASTE STABILIZATION FACILITY
WORLD CLASS WASTE SYSTEM
LOOK AT BEST PRACTICES
BAN PLASTIC BAGS
PLAN FOR LONG TERM
IMPROVE OPERATIONS
TRUST IN OUR GOVERNMENT
BUILDING A BETTER WASTE SYSTEM TOGETHER.
WHAT YOU TOLD US: VALUES AND PRINCIPLES TO GUIDE OUR FUTURE DECISIONS
SHAPE YOUR CITY
HALIFAX
SHAPEYOURCITYHALIFAX.CA

Appendix B

OCTOBER 9, 2013
ENGAGEMENT FIGURES TO DATE

Portal – Solid Waste Strategy Review:

Visits:	3,228
Unique visitors:	1,620
Visitors coming from:	1) Halifax.ca, 2) Facebook, 3) Twitter
Registered users:	160
Survey responses:	150/142/13 (~10% of visitors)
Forum posts:	28
Q&A's:	9 public, 5 private
Document downloads:	850 (mostly overview CoW presentation & reports)
Video views:	4,800 (4,100 from YouTube advertising)
Facebook promoted post:	18 clicks each, for 2 promoted posts

In-Person:

Estimated total participants: 625

Town hall meetings – 400
Dartmouth/Cole Harbour – 40
Bedford – 60
Halifax – 90
Eastern Shore – 35
Waste industry stakeholders – 17
ICI stakeholders – 2

Comment cards: 220

From In-Person Harvest:



Local Community Town Hall Meetings:
Beachville, Lakeside, Timberlea and Prospect

September 18 & 19, 2013

Join the conversation.

Find a greeter and register for ShapeYourCityHalifax.ca

SHAPE YOUR CITY
get engaged!



Beechville, Lakeside, Timberlea and Prospect Road Community Town Hall

- September 18th, 2013

SHAPE YOUR CITY

get engaged!

Welcome

- Mike Labrecque
- Deputy CAO
- Halifax Regional Municipality

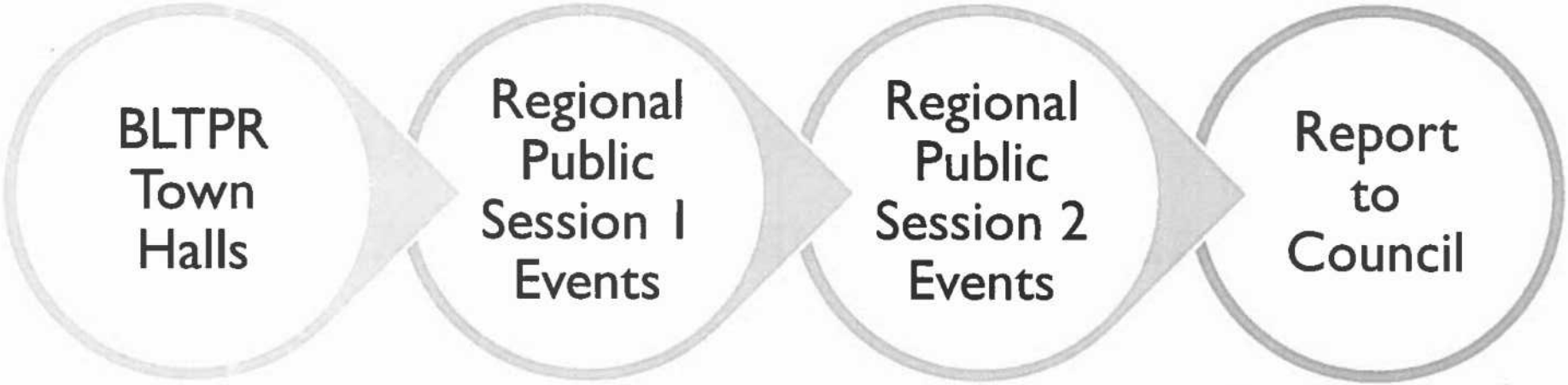
Solid Waste Resources Public Engagement

- Sera Thompson & Leo Artalejo
- Engagement Hosts

Why Are We Here?

- Regional Council wants to hear from residents on options to evolve the waste system, while maintaining important community and environmental protections

Engagement Approach



- What do we know and where do we want to go?

- How do we get there?

- Identification of major themes and areas of concerns
- Community's guidance to Council on the way forward

Ways to Participate

- In person
  - Two BLTPR Town Hall Meetings
  - Eight public sessions
  - Four stakeholder sessions
- Online
  - www.ShapeYourCityHalifax.ca

Tonight

- Community Monitoring Committee
- Consultant findings on Otter Lake operations
- Hearing from you
  - Questions & perspectives from everyone here
  - Open Mic
  - Dot-mocracy
  - Feedback Forms
- Guidelines

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Why are you here tonight?

Community Monitoring Committee

- Jack Mitchell, Chair
- Ken Donnelly, Consultant

Contract

This Agreement for Community Monitoring of Solid Waste Facilities made this _____ day of February, 1999.

BETWEEN:

HALIFAX REGIONAL MUNICIPALITY, a body corporate pursuant to the *Halifax Regional Municipality Act*

(hereinafter called "HRM")

- and -

HALIFAX WASTE/RESOURCE SOCIETY, a body corporate incorporated pursuant to the *Societies Act*

(hereinafter called "the Society")

MONITORING AGREEMENT

Robert W. Carmichael
Cox Hanson O'Reilly Matheson
Barristers and Solicitors
1100 - 1959 Upper Water Street
Halifax NS B3J 3E5

Contract

2.01 It is recognized and understood that HRM will cause the Facilities to be developed and operated at the Site.

1.09 "Facilities" means the FEP/WSF Facilities and the RDF Facilities.;

Contract

2.03 It is understood and agreed that only Acceptable Waste will be authorized for disposal in the Residual Disposal Cells. It is further understood and agreed that any contract between HRM and an Operator of the RDF Facilities will impose on the Operator the obligation not to dispose of in the Residual Disposal Cells material other than Acceptable Waste.

1.01 "Acceptable Waste" means

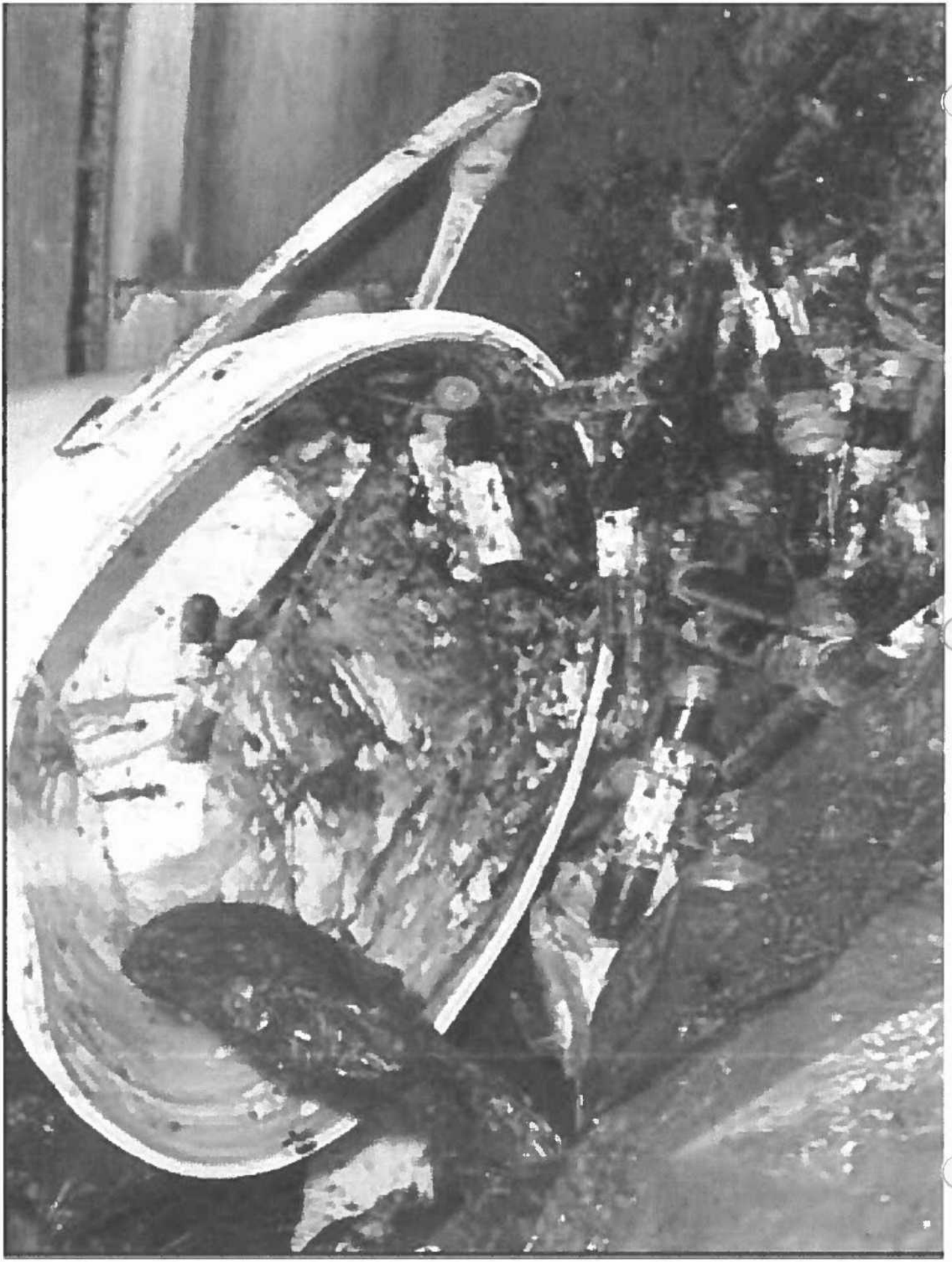
(i) Inert Materials;

(ii) Stable Materials; and

(iii) Residual Materials.

2 Questions

* We would like the HRM panel to address 2 questions



Question #1

* We heard in Laurie Lewis's presentation yesterday that 50% of what goes to Otter Lake should not be going there.
* Why doesn't the recommendation identify specific ideas to increase source separation? Clearly it is not time to close or scale back facilities.

Question #2

* Stantec says FEP/WSF do not do what they were intended to do because they don't divert waste and create a marketable compost product
* Staff presentation at COW acknowledges that Council approved operations plan includes "Diversion at site would be minimal"
* Why is HRM still pushing Stantec recommendations, and why is an uncorrected report now on the consultation website, with HRM presenting the conclusion as valid when staff knows it is not?

Otter Lake Operations

- Laurie Lewis
- Solid Waste Resources, HRM

What questions does this raise for you?

Let's talk

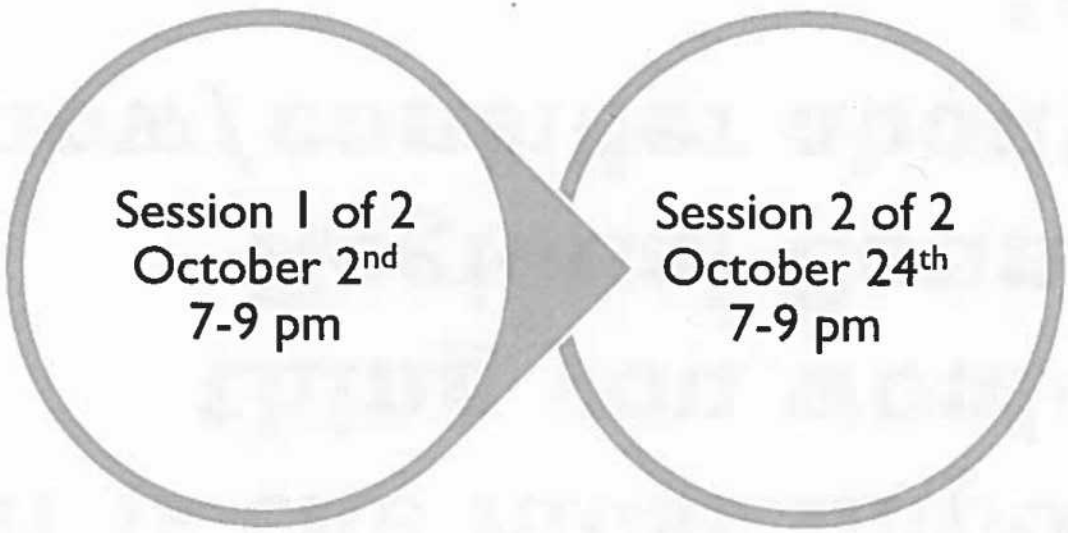
- Mike Labrecque - Deputy CAO
- Gord Helm - Manager, Solid Waste Resources
- Richard MacLellan - Manager, Energy & Environment

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Regional Public Sessions



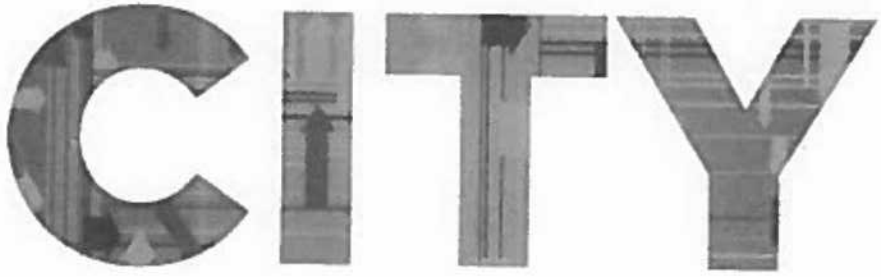
- Both events at the Halifax Forum, Maritime Hall, 2901 Windsor Street, Halifax

Feedback Form & Dot-mocracy

What is the most important thing you would like Regional Council to know/consider about this topic?

Thank you.

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Building a Better Waste System, Together
Questions and Answers

HALIFAX REGIONAL MUNICIPALITY

Last updated on October 15, 2013

1. Why are you changing a system that works?

Our ultimate goal here is to continue protecting the environment and the community. This will drive all decisions on how we go about improving our solid waste management system.

The current system isn't as efficient or cost effective as it should be. And we need to identify and adopt better ways of investing taxpayers' dollars to achieve our goal of upholding, and ideally enhancing, environmental and community protections.

2. Why is HRM breaking its agreement with the community?

The community agreement was created to clearly reflect our collective commitment to protect the community and the environment. These are outcomes, not processes, which are still the priority for everyone. Our commitment to these outcomes remains unchanged.

We know that the solid waste management system isn't as efficient or cost-effective as it should be. And we need to consider changes to improve the system including, but not limited to, changes at Otter Lake.

We've learned that the processing of waste through the Front End Processor (FEP) and Waste Stabilization Facility (WSF) at Otter Lake doesn't contribute to effective waste management and it does not safeguard environmental and community protection. This protection comes from advancements in four areas:

1. Environmental regulations
2. Technology – most notably, improvements to landfill liners
3. Operations at the landfill
4. Behaviour by residents and businesses – specifically, source separation at the curb

With this in mind, we must give due consideration to any option that can contribute significantly to improving the system.

3. If operations were to change, or stop, at Otter Lake wouldn't this cost jobs?

We recognize any potential change in operations at the Front End Processor (FEP) and Waste Stabilization Facility (WSF) has a real impact on the livelihoods of those working at these facilities.

Yes, if the FEP and WSF were to be closed this would impact jobs. Implementing this option could only be done as part of a revised operations plan – a plan that would require proper staffing.

One option presented in the Stantec report would see the Waste Stabilization Facility re-purposed into a traditional composting plant for organics. Other considerations include converting the Otter Lake facility into a regional waste resource campus. These types of operational changes at the landfill would result in the creation of some new, different jobs. However, at this stage, it's too early to determine the overall impact on jobs.

4. If you increase the height of the cells, won't I be able to see the landfill from my backyard?

To ensure that increasing the height of the cells doesn't mean more people will see the landfill, we completed what's called a 'balloon test'. This involved anchoring six very large balloons on the landfill so that they were floating 15 meters above the current height of the cells. Then we drove around and looked at the landfill from many locations in community neighbourhoods – to confirm where we might be able to see the balloons. Results confirmed that those who can't see the landfill now, won't see the landfill if the cell heights were increased by 15 meters. However, raising the height of the landfill does significantly reduce costs down the road and enables us to delay siting a new landfill for a much longer time.

5. If you shut down the Front End Processor (FEP) and Waste Stabilization Facility (WSF), aren't I going to notice a lot of issues with odour?

For eight months in 2010, operations ceased at the Waste Stabilization Facility* while the roof was being replaced. During that time, from May to December, there were no issues with birds and the operator reported no complaints about odour.

***Note:** *This response was revised on October 2, 2013. The original response incorrectly stated that both the FEP and WSF were closed while the roof was being replaced. The WSF was closed at this time, the FEP was not.*

6. If the province says that it won't approve any changes at Otter Lake until the end of the contract why are you even going through this community engagement exercise?

Regional Council has authority over the solid waste management system and has asked that staff complete a thorough review of the Solid Waste Resources Strategy. This includes seeking expert advice about options to improve the system, discussing these options with residents, and presenting recommendations to Council.

No recommendations have been put forward by staff and no decisions have yet been made by Council.

The community engagement process is about helping residents gain a clear understanding of the information available and getting their feedback about the entire system – including, but not limited to, operations at Otter Lake. We want to hear about what's working, what isn't, and how HRM can deliver the best system possible for many years to come.

7. So if the Front End Processor (FEP) and Waste Stabilization Facility (WSF) were to be shut down, wouldn't we just have another Sackville landfill issue on our hands?

In the years since Sackville landfill was operational, much has changed. There are four major reasons why Otter Lake cannot become another Sackville landfill:

1. Enhanced environmental regulations
2. Advances in technology – most notably, improvements to landfill liners
3. Improvements in operations at the landfill
4. Changes in citizen behaviour has resulted in better source separation

8. Rather than extend the life of this landfill, why don't you just build another one somewhere else?

It took more than a decade to site the Otter Lake landfill which comprises more than 800 hectares. Extending the life of the existing site has far less environmental and financial impact than creating an entirely new landfill.



9. How will property values of homes near the landfill be affected?

We can't address all the many factors that affect property value, but we do understand that how we operate the landfill is important to current and prospective residents in the community.

Our commitment to protecting the environment and community above all else remains unchanged and will stay that way. Moving forward, the Otter Lake landfill will be operated in a manner that continues to maintain, or enhance, protections.

10. Why is HRM going to public consultation now?

In 2012, Regional Council directed staff to outline steps to achieve a more efficient delivery of the HRM Solid Waste Strategy, starting with a review of the current system and future options - without compromising environmental or community protections. As part of this review, Stantec Consulting was commissioned to undertake system performance analysis including the operation and viability of the Otter Lake Facility. The proposed next steps are to solicit public and stakeholder input on the report and findings. Regional Council will not make any decisions until all the facts from the review are provided to the public and they have the opportunity to give their feedback through an extensive consultation process.

11. Why was the Stantec Report commissioned?

Regional Council directed HRM staff to undertake a strategy review of diversion success achieved to date. This review was to include an industry best practice and professional examination of the existing systems to ensure an efficient and sustainable program was being delivered. In July, 2012, Regional Council approved the staff recommendation to issue an RFP to assess the system. This RFP was awarded to Stantec Consulting through a competitive process. A key requirement of that project was for Stantec to examine processes and then propose options and make recommendations which would both maintain or enhance environmental protection and improve program delivery performance. Stantec's, January 2013, report outlines their assessment of the system based on both of those criteria.

12. Why was the SNC Lavalin Peer Review Report commissioned?

Due to the significance of the recommendations in the Stantec report, it was felt an independent peer review, with an environmental focus on the options, was warranted. The SNC Lavalin Environmental Division included their review and comment on the conclusions and options being recommended. Also included was their assessment of the validity and use of demonstrated methodology by Stantec in developing the report recommendations related to the current Otter Lake facilities.

13. Does the Stantec Report propose lowering environmental protection standards in order to save money?

HRM has no intention of reducing environmental or community protection standards. Maintaining and/or enhancing environmental stewardship and community protections was the basis for the conclusions and recommendations of both the Stantec Analysis and the SNC Lavalin Peer Review. Provincial regulations govern standards for environmental monitoring and protection which remain a part of the mandate and operation of all components of the Solid Waste System facilities and sites. No reduction of environmental or community protection has ever been contemplated.



14. Why is HRM willing to reduce environmental and community protection to save a little money?

HRM takes environmental protection at the Otter Lake Facility very seriously. The evaluation of the solid waste system was part of an HRM wide review of all operations seeking program efficiencies and ways to spend tax payer funds more wisely. This is about program delivery review and finding ways to stop wasting tax dollars, not saving money at the expense of environmental or community protections.

15. What changes to the operations at the Otter Lake Facility are being considered?

Specifically, the Stantec Report suggests we scrutinize the processing of garbage at Otter Lake:

- What are the actual outcomes from the current operations?
- What are the environmental impacts of the current operations?
- What if any changes would make sense given the current outcomes and impacts?
- How much does the current processing cost?
- Are there are more effective or efficient ways to keep recyclable and organic material from arriving at Otter Lake in the first place?

In 2012, residential diversion of recyclables and organics from the landfill was 52%, which is on par with many municipalities. Landfill waste diversion by the commercial sector was just over 66%. It is in part as a result of this success that the Stantec Report recommends changes to the operations at the Otter Lake Facility. Diverting materials was one of the original goals of the citizen strategy for this processing system. However, currently, less than 1% of the material arriving at Otter Lake is removed and diverted from the landfill as a result of the Front End Processing (FEP) processing system.

The cost per tonne to divert 350 tonnes is over $26,000/tonne, which is simply not justifiable. If the FEP is maintained, it will cost HRM taxpayers more than $100 million dollars over the next decade. Keeping recyclable and compostable materials from ever reaching the Otter Lake facility through proactive outreach and continued education has proven much more effective in achieving the Strategy goals and provincial objectives.

In addition to the high cost of diversion, the SNC Lavalin Peer Review agrees with the original Stantec Report conclusion; the current processing and shredding of materials at the Otter Lake Facility has an avoidable, costly, negative environmental impact - more rapidly released gas odours.

Both the Stantec and SNC Lavalin reports agree that costly additional gas management operations and manpower at the landfill are currently necessary to protect the community from odours. Without this extra greenhouse gas management, some of the more rapidly released gas odours would impact the community, instead of being contained and managed in a sealed landfill cell. SNC Lavalin assesses that this extra operational gas management requirement would be reduced with the closure of the FEP and WSF without compromising current environmental protection for the community from odours.



16. The Stantec Report recommends decommissioning the Front End Processing (FEP) unit. Won't this harm the environment and turn Otter Lake into a dump?

The Front End Processing facility is a garbage sorting facility. After the garbage is dumped on the floor, crews separate large items (wood, appliances, metal) and then send the garbage up a conveyer system where the bags get broken and garbage gets spread out along the conveyer belt. The garbage then goes through a large turning cylinder with holes where smaller materials drop through and get directed to the WSF. Larger materials go straight out to the landfill, and some medium size materials get shredded and then go to the WSF. About 25% of materials that go to Otter Lake end up going through the WSF. The rest just goes out to the landfill.

The FEP processing removes approximately 350 tonnes of recyclable material (50 tonnes of pop bottles + 250 tonnes of paper + 50 tonnes of household hazardous waste), which, on the surface seems useful. However, these materials should not be in the garbage in the first place. The cost to HRM residents to recover this 350 tonnes of recyclables and other material is $7.2 million annually, or $26,000/tonne to divert this material from the landfill. This is simply not sustainable.

Diversion of this material can and is being done more effectively through education and compliance initiatives before the material even arrives at the landfill facility through promoting recycling/composting at home and work. HRM citizens have shown very strong support for source separation. Those that are source separating are doing a great job. For example, a recent composter sale sold nearly 1,100 units. It is the residents and businesses that are not source separating who can improve.

17. If the Front End Processor were to close how would unacceptable/ banned/ hazardous items such as propane tanks be removed?

These materials should not be going to the landfill in the first place. Cost savings from system changes could be used to enhance access to new or expanded disposal options for special waste materials and increasing education on the importance of keeping these materials out of landfill. We are examining expanding the special handling and hazardous waste depot program to improve access for residents. Easier access to proper drop-off locations for unacceptable/ banned/hazardous materials would help keep them out of the landfill.

18. How would metal appliances be separated for recycling if the FEP were closed?

Separate collection programs for appliances at curbside are considered to be more efficient than dealing with them at the landfill. Then there would be no need to remove them from the other waste materials at the landfill. This service would be delivered with no impact to current service levels.

19. The Stantec Report also mentions decommissioning the Waste Stabilization Facility (WSF). What is the WSF? Doesn't it protect the environment and community?

As outlined in the operating plan, the WSF is intended to processes the more highly organic material arriving at the Otter Lake Facility. Small materials (including inorganics material like plastic bottle caps and broken glass), less than 2 inches, get processed through to the WSF where they are partially dried in large channels, just like composting, moving from one end to the other over 18 to 21 days. When the material reaches the back end, it is loaded into trailers and sent to the landfill.

The result of this process is to partially dry (stabilize) the material to lessen the amount of gas, odours, and leachate that may be released, and to lessen the material's attractiveness to vectors (birds and rodents). After being placed in the

landfill, this partially dried (not inert) material, will get wet again. As a result greenhouse gases are produced while the cells are being filled requiring additional costly gas management operations to avoid community impact odours.

Both Stantec and SNC Lavalin have concluded the shredding and drying of waste would result in a negative environmental impact, if it were not being addressed (which it has been since 2002) by additional costly gas and odour management systems. Closing down the FEP/WSF operations would not create more environmental issues or odours. Both independent reports agree the need for extra gas management efforts would likely be reduced with the closure of the FEP/WSF.

> "The front-end processing (FEP) and waste stabilization facility (WSF) do not function in a manner envisioned in the 1995 (CSC) strategy. ....the multiple shredding of waste prior to disposal may actually increase the generation of landfill gas over the short term.....This may contribute to additional odours from the site." – *Stantec, Waste Resource Strategy Update, page iii, January 2013*

As a point of interest, when the WSF roof was replaced in 2010, the facility was closed for more than 8 months. During that time, no impacts resulted, no odours were reported and the site did not turn into a dump attracting birds and rodents. HRM remains fully committed to protecting both the environment and the community near the Otter Lake site. One of the major advantages of the site is that it is over 3 km's distance from the nearest home.

20. Would closing the Waste Stabilization Facility mean unstable organic material would be disposed in the landfill?

The WSF does not fully stabilize the waste as originally envisioned. There was an original anticipation of no gases based on the WSF process. However, this proved incorrect and, since 2001, HRM has been funding gas and odour management operations at the landfill. The WSF only partially stabilizes or dries the organics until it goes back out to the landfill where it gets re-saturated through rain and snow and other garbage.

> "It may be more accurate to describe the waste leaving the WSF as being drier, rather than being more physically or chemically stabilized." – *SNC Lavalin, A Peer Review of the January 2013 Stantec Report for HRM entitled Waste Resource Strategy Update, page 21, April 2013*

In addition, fully 1/3 of the organic material (e.g. food scraps, box board, leaf and yard waste) that arrives at Otter Lake by- passes the WSF and is disposed of directly into the landfill. Closing the WSF will not change this. Source separation of waste (sorting at home and work) remains the only way to ensure organics do not go to the landfill. HRM's diversion program success reflects that program guidance and education, pro-active outreach activities, and business visits are more successful in changing behaviour to improve composting and recycling.

21. If it is being recommended that the Front End Processor and Waste Stabilization Facility be closed, why were they implemented in the first place?

When the new landfill strategy was being envisioned by citizens and then designed by the operator, more than 15 years ago, it was very important this site be different from its predecessor. Also at that time, comprehensive recycling and composting programs were not in place - meaning that a lot of organic material made its way into the landfill. The FEP & WSF system did address and support the strategy objectives in the beginning, as envisioned. They did keep vectors, birds and rodents, from living at the landfill. But they also unexpectedly released more gases and odours quicker than traditional unprocessed waste landfills, which had to be dealt with through an additional costly gas/ odour management process. The composting and recycling efforts of HRM citizens since then have contributed to reduced waste generation and led to a functional reassessment of the benefits of the FEP/WSF. The two reports indicate the outcomes from the current FEP and WSF operations are no longer consistent with or needed in the HRM system.



"In our opinion, the WSF process contribution to minimizing the number of reported annual community odour incidents is such that if it did not exist, it would not be missed, due to the demonstrated gas management infrastructure, capacity, and operations at the RDF." – *SNC Lavalin, A Peer Review of the January 2013 Stantec Report for HRM entitled Waste Resource Strategy Update, page 58, April 2013*

22. What controls are in place to ensure environmental standards at the landfill are maintained?

HRM does not set the provincially regulated Nova Scotia environmental standards to which all municipal landfills in Nova Scotia must comply. Complying with these provincial regulations works to prevent odours from impacting the community and protects the environment. This will not change.

Closing the Front End Processor (FEP) and Waste Stabilization Facility (WSF) won't change what ends up at the landfill. We are planning new initiatives and programs to expand education, outreach and monitoring of materials to improve diversion and increase the removal of unwanted materials from the garbage stream. The current high standards and community protection will continue to be maintained at the landfill to protect against odours, rodents and birds.

SNC Lavalin states that the closing of the FEP and WSF would not negatively impact the environment. "In our opinion, implementing this recommendation can be done in such a manner that the demonstrated environmental performance trends of the overall system would continue." – *SNC Lavalin, A Peer Review of the January 2013 Stantec Report for HRM entitled Waste Resource Strategy Update, page 7, April 2013*

23. The Stantec Report recommends modification to the liner (the membrane that separates the garbage in the "cell" from the environment). Would modifying the liner system reduce the protection from leachate entering the waterway?

We requested Stantec review the landfill liner specification and they did, providing their recommendations on how the liner could be modified to be more consistent with other Provincial and State guidelines for landfill liners. Stantec recommended certain components of the liner system could be modified/ removed while still providing the necessary protection to the environment. SNC Lavalin's Environmental Division reviewed the proposed changes, noted some concerns and offered an alternative approach, again with the objective of continuing to provide the necessary levels of environmental protection.

No decisions have been made or recommendations advanced in terms of the liner system. We simply asked if the liner was working properly and if there were any ways to provide the necessary protection more efficiently. The requirement for a new cell is still many years away, possibly almost two decades, depending on what changes Council decides to implement to evolve the system. So the option to change the liner is only just an idea advanced by two professional engineering and environmental consulting firms. It is not an option being proposed or recommended by HRM staff.

24. Another recommendation in the Stantec Report suggests the Otter Lake Facility is suited to become a regional waste resource campus. Why should this facility host compost and recycling facilities as well?

The decision to extend the life of the landfill site is an important part of the consultation and discussion about the waste system. A campus operation would benefit from existing infrastructure and reduced system costs. The campus concept allows for changes in the collection program, in terms of frequency, containers and trucks which could improve service and reduce costs. The centralized location of all facilities as a campus operation would also provide new employment opportunities if the FEP and WSF are closed. Ultimately, the decision to stay or leave Otter Lake needs to be made before any decision on the campus concept can be made.



25. How would traffic be affected by a campus?

The exit ramp to the landfill site is on a Series 100 highway with steady truck traffic. The development of a campus operation would not significantly affect current traffic conditions.

26. What about the unsightly litter on Highway 103?

Regardless of the outcome of these recommendations, an increase in truck monitoring has been identified as a priority to address litter which results from improperly secured loads on trucks heading to the Otter Lake facility. We will be partnering with the Province's Transportation and Infrastructure Renewal Department, the RCMP and Provincial Vehicle Compliance division to ensure loads of materials entering the facility are properly contained. There will also be more frequent clean-up operations to ensure the highway and routes leading into the Otter Lake facility are kept reasonably clear of litter.

27. It's been suggested that the processing of waste through the Front End Processor (FEP) and Waste Stabilization Facility (WSF) at Otter Lake doesn't contribute to effective waste management. If the facilities are operating properly, why aren't they contributing effectively?

To be clear, the Front End Processor (FEP) and Waste Stabilization Facility (WSF) contribute to waste management. The issue is that these facilities, as well as other elements of the broader waste management system, are not efficient and cost-effective enough – particularly in light of the significant program investment of taxpayer dollars.

These facilities are operating as contracted in that they do screen out much of the unacceptable waste and organics. They allow for the diversion of 350 tonnes of recyclables, paper and cardboard as well as reduce the gas potential of organics processed through the WSF through shredding and drying. These are all real results from an environmental stewardship perspective.

However, these facilities are not delivering the outcomes that were originally envisioned. The FEP is sorting approximately 140,000 tonnes of waste to address a relatively small quantity of unacceptable waste such as hazardous materials and appliances (i.e. 0.03% of the total tonnage of waste sent to the facility). Fully 1/3 of the organic material (e.g. food scraps, box board, leaf and yard waste) that arrives at Otter Lake by- passes the WSF and is disposed of directly into the landfill. Also, the WSF has an unanticipated, negative environmental impact - more rapidly released gases and odours – which costs approximately $750,000 a year to manage.

If the FEP were closed, we would need to increase efforts to address the recyclables, hazardous materials, and other unacceptable waste that – to date – has still been arriving at the Otter Lake facilities. However, these additional practices cost significantly less than operating the FEP.

If the WSF was closed as a garbage composting plant, we can address gas management and odour at the landfill through other options that are likewise far less expensive than operating the WSF. Also, if it was not composting garbage-laced organics, the WSF could be used to compost green cart organics to save on the cost of developing more composting capacity. This is a prudent re-use of a municipal asset.

During this strategy review process it is important for HRM to consider alternative, more efficient and cost-effective ways to not only achieve our previous results in environmental stewardship but surpass them.



28. Isn't it true that clay was used as a daily cover material during the Waste Stabilization Facility shutdown in 2010 to supress potential odours?

A closure of the Waste Stabilization Facility was required between May and December 2010 to allow for replacement of the building's roof. Based on Otter Lake facilities' annual report, 54,180.89 tonnes of what's called "construction and demolition matrix" daily cover materials was used in 2010. No clay cover was reported used in the 2010 reporting period, though extra C&D matrix was applied. – *Otter Lake Waste Processing and Disposal Facilities, Site Development and Operations Plan, Annual Report 2010* (See Table 2)

*Subsequent clarification from the operator confirms that just under 2,000 tonnes total of clay was used during the closure period as an additional measure on the active area of the landfill. This is an example of the type of measure that would be put in place should the decision be made to close the WSF.

***Note:** *This response was revised on October 8, 2013 to reflect information from the operator verifying the use of clay during the WSF closure.*

29. Were there any odour complaints during the timeframe of the Waste Stabilization Facilities shutdown?

MIRROR NS 2010 annual operations report Section 5.0 "Public Complaints and Concerns" indicates that no complaints were received in regards to odours generated at the site in 2010. Also, HRM has no record of receiving any odour complaints associated with the WSF during that timeframe.

30. Why is HRM suggesting that hazardous materials are not sold on store shelves?

To be clear, we are not suggesting that there are not any hazardous materials sold commercially. In recent years, the province of Nova Scotia has banned for sale many pesticides and herbicides, thereby reducing availability and use of some types of hazardous materials. Other products have also changed such as paint which is now predominantly latex and water soluble.

31. What types of hazardous materials are pulled out of the garbage on the sorting line? Why would we remove this safeguard that prevents this material from entering the landfill?

Approximately 50 tonnes of material designated as 'hazardous' is pulled from the line each year. The majority of this weight is made up from fire extinguishers, propane cylinders (i.e. for camp stoves) and batteries. No pesticides or paint liquids were included in the materials list recovered from the line.

We are committed to looking for ways to increase accessibility of drop-off sites for these materials, as well as encouraging Extended Producer Responsibility programs to provide additional options for residents.

Also see Q&A #17 and #27.

32. The Stantec report doesn't identify ways to increase source separation. Why isn't HRM focusing on education, especially at businesses and in apartment buildings?

There are several recommendations throughout the report that identify opportunities to increase source separation, including enhanced education, diversion compliance inspections and reducing bags limits.

We're planning new initiatives and programs to expand education, outreach and monitoring of materials to improve diversion and increase the removal of unwanted materials from the garbage stream.

33. Otter Lake is recognized as a 'world class' facility. Why would we change that?

Otter Lake is certainly recognized, however it is our system as a whole that commands the 'world class' status. Delegations from around the world have visited the municipality and the Otter Lake facility. While they are interested and intrigued by the site, no jurisdiction has implemented this system of processing garbage. Many have replicated our source separation programs and we frequently receive calls and requests asking how we implemented our curbside green cart collection program. Green carts and source separation were the innovation, not processing garbage.

34. Why are the reports commissioned by MIRROR NS not being addressed in the public meetings?

HRM staff have been directed by Regional Council to consult with the public specifically on the options and recommendations outlined by Stantec. However, all information collected, developed, submitted and presented by all stakeholders will be included in the final analysis and ultimate development of recommendations on evolving the waste program, for Council's consideration. This includes both the Dillon Report and Arnold Report commissioned by MIRROR NS.

35. HRM Staff have already decided to close the Front End Processor (FEP) and Waste Stabilization Facility (WSF). Why are we wasting our time with these public meetings?

No recommendations have yet been put forward by staff to Regional Council. The public meetings we're hosting are about getting community input that will help Council make an informed decision about how to improve the solid waste system.

The community engagement process is designed to help residents gain a clear understanding of the information available and what is at stake. Then the public can provide feedback on what's working, what isn't, and how HRM can deliver the best system possible for many years to come.

36. The recommended changes are contrary to the Environment Act. Why bother?

There are no regulations or legislation requiring the current operating model at Otter Lake. All options being assessed are permitted under the Environment Act.

The sites' permit includes the use of the Front End Processor and Waste Stabilization Facility because they are included in the existing operations plan. However, they are not required under the landfill guidelines or legislation (Environment Act) and no other landfill in Nova Scotia have them. The CMC agreement specifically identifies how changes in the operations, facilities and landfill cells can be made. (Articles 6.02 and 6.05)

37. Didn't HRM sign a contract with the community and the operator stating the Otter Lake site will only be in operation for 25 years?

There is no specified end date in the contract with the operator or the community agreement in terms of leaving the site. The contract and community agreement outline the initial operating period of 9 cells or 25 years, whichever comes first. HRM's regional plan, adopted and approved by Regional Council includes the option of extending use of the Otter Lake site beyond the initial operating agreement with the current operator.

38. Does HRM have jurisdiction to make changes at the Otter Lake Facility?

The Halifax Regional Municipality Charter gives the municipal government legislative authority over our solid waste, providing it complies with the Environment Act – which sets uniform criteria across Nova Scotia. All of HRM's solid waste facilities (landfill, compost and recycling) have permits which are issued by the Province. Any proposed changes to the operations at the Otter Lake Facility would have to be submitted to Nova Scotia Environment (NSE) for review. The Province must consider any request for change that is made based on the criteria. The Environment Act does not require a Front End Processor or Waste Stabilization Facility.

39. What are the new requirements being referenced with regards to compost?

The Canadian Council of Ministers of the Environment (CCME) has implemented requirements for the maturity of compost based on new regulations which were enacted in 2006. HRM must submit a plan to the Province in January, 2014 on how it intends for our program to meet those guidelines. Mature compost is material where biological activity has slowed, leaving the material more stable. The guidelines stipulate that ownership cannot be changed unless the immature compost remains under management at a controlled and monitored site.

40. What do the terms 'wet landfill' vs 'dry landfill' mean?

If organic matter is readily decomposable some people refer to it as wet. If it is not decomposable, then it is often referred to as dry. When all active composting processes are complete it is considered stabilized. Whatever type of food waste/brush, etc. is not inert within a month will take much longer to stabilize in a landfill.

Material that is dry is not necessarily stable. Once the material is moistened (i.e. rain) the organics component can be re-activated.

41. How is organic material getting in to the landfill?

There are still some people who are not properly separating their organics at home or work, placing that material in the garbage. The current processes at the facility screens material based on size, not content. Data shows that fully 1/3 of organic material (e.g. food scraps, box board, leaf and yard waste) reaches the landfill cell without being processed through the Waste Stabilization Facility.

42. Will closing the Front End Processor and Waste Stabilization Facility increase the amount of leachate?

Closing the Front End Processor and Waste Stabilization Facility will not increase the amount of leachate. In fact, any changes in the mechanical processing of garbage will not affect leachate. The liner system collects and treats rain that falls on the garbage. This leachate volume is collected and treated off site.

43. What would the implications be of increasing the height of the landfill cells?

It's been determined that those residents who can't see the landfill now, won't see the landfill if the cell heights were increased by 15 meters. Higher elevation may increase exposure to the wind, however litter can be controlled as it currently is at Otter Lake and every landfill. The key consideration here is that, by raising the height of the landfill we will significantly reduce costs while also enabling us to delay siting a new landfill for a much longer time.

44. How would Otter Lake operate if there were no Front End Processor and Waste Stabilization Facility?

There is no definitive answer to this question at this time as there are several scenarios that could be considered. One option presented in the Stantec report would see the Waste Stabilization Facility re-purposed into a traditional composting plant for organics (as they have the same design and functionality). Other considerations include converting the Otter Lake facility into a regional waste resource campus. Of course, any final decision would need to be discussed with the contracted site operator.

There are a number of operational changes which would be made at the active face to manage odours just like when the WSF was closed in 2010. Collection changes and load screening at the active face would also be implemented. These changes will need to be worked out with the operator once final decisions are made.

45. How has the waste stream changed over the past 17 years?

The waste stream has changed significantly as we now have comprehensive organics diversion programs (with 92% participation in curbside green cart collection and over 70% diversion of organics from the landfill), hazardous waste depots, stewardship programs for tires, oil, paint and batteries and provincial bans on certain types of products. Over 73% of recyclables diverted from the black bag through an expanded blue bag program. Construction and demolitions materials, renovation materials has reached 93% diversion. Prior to these programs being put in place most of these materials were being disposed in the Sackville Landfill.

46. Do other municipalities have a Front End Processor and/ or Waste Stabilization Facility?

To our knowledge, no other municipal waste landfill in North America operates a Front End Processor (FEP) and/ or Waste Stabilization Facility (WSF) to pre-process garbage prior to putting it in the landfill. No other landfill in Nova Scotia has the requirement for an FEP/WSF in their operating permit. Many jurisdictions – regionally, nationally and internationally – have come to HRM to learn from our source separation approach to solid waste management and, as part of these tours, they have visited the facilities at Otter Lake. While they've been interested and intrigued by the site, no jurisdiction has implemented this system of processing garbage. Many have replicated our source separation programs and we frequently receive calls and requests asking how we implemented our curbside green cart collection program.

47. What is single-stream recycling?

Single-stream recycling is where recyclable materials are all mixed together. Containers, plastics, cans and bottles can be placed together with newspaper and cardboard. The sorting is done at the Recycling Facility. While this model makes recycling easier for residents, it also results in higher contamination of materials as glass breaks in collection and paper and cardboard get soiled.

In HRM we currently have two-stream recycling where residents separate containers, plastics, bottles/cans from the paper materials in separate blue bags. This model better protects the materials but takes more effort to collect and the bags require more handling and sorting at the Recycling Facility.

48. What are the pros/cons of single-stream recycling? Will it increase or decrease my taxes?

PROS	CONS
• Simplified sorting – all in one bag or cart • May encourage higher participation • Less indoor storage required when using carts • Allows for automation of collection – lower cost	• Potential storage issue for carts outside of some homes • Higher contamination rates (material that has to be disposed at landfill) • Potential increase in cost to sort at facility – more labour required • Lower market value of material which reduces revenues to pay for the system.

49. Could we start using blue carts instead of bags?

There are potential efficiencies to be gained in using a cart-based recycling system including the use of blue carts for collection. This would eliminate the need for blue bags. However, this also means having two large carts at every home.

50. If boxboard is moved to the paper recycling stream, can I still use it to line my container for organics?

Boxboard is the packaging used for crackers, cereal, granola bars and other products we commonly find on the grocery and retail store shelf. It is currently included in the HRM green cart program to help deal with the keep green carts cleaner and absorb wet food waste residue in the cart. Since plastic liners are not acceptable in our green cart collection program the use of boxboard will likely continue.

The reason to consider moving boxboard to the paper recycling program would be to reduce materials currently received at the composting plants which are operating at capacity. It also allows residents another option to recycle the paper. Residents could still use boxboard to contain wet food waste in their green cart, and then also put their loose boxboard into their paper collection bags.

51. How would a cart program for collection of recyclables work, and who would pay for it?

A cart for collection of recyclables would work similar to how our green carts are collected. The difference would be that everything would go into a provided blue cart and residents would not use blue bags.

If Regional Council were to proceed with procuring new blue carts for recyclables, several options would be presented to Council regarding payment considerations. Some options might include a one-time payment by residents, it could be incorporated into the tax bill or perhaps it could be dealt with through capital purchase.

52. Would using the Waste Stabilization Facility as a compost facility create odours?

Much of the process at a centralized composting facility actually happens indoors (see video). Through best management practices odours are minimized.

A secondary curing pad for processed compost – which comes out of processing plants like the ones in Burnside and Goodwood – still needs to be managed well, like all phases of composting. However, if managed properly, there is minimal odour from this process as the compost has already completed the initial decomposition which occurs during the composting plant processing phase.

53. Why can't residents buy compost made from the HRM green cart program?

Due to the volume of material we currently process at our facilities it's necessary for all of the compost to be shipped off to a private sector site for the final curing stage. The company that looks after the material uses the cured product on commercial landscaping projects (e.g. sod farming) and blends the compost with other soil products for sale at greenhouse operations across the province. HRM does not own the final compost product, therefore cannot provide the material back to residents for use.

HRM is looking to improve the quality of the compost produced and hopes to eventually have some available for residents to use in their gardens.

54. Will the frequency of schedule of garbage collection change?

HRM is looking to evolve the existing collection program to make it easier and more convenient for residents to participate in recycling and composting programs. Changes to the collection system will be made by Regional Council as part of the overall waste management system review. If changes are made to collection days and/or frequency they will be communicated well in advance to allow residents time to adjust their routine.

55. Is HRM considering changes to the frequency of organics collection?

The Stantec report has recommended that we increase the frequency of organics collection across HRM to weekly (urban, suburban and rural areas). This requires a re-think of the existing collection model because the same trucks are used for both garbage and organics collection. The collection models would need to be changed to provide weekly organics collection.

56. Will HRM be introducing lower bag limits?

Bag limits are a way to ensure people are doing proper source separation of their materials and sending organics and recyclables to the proper processing plants.

Recent audits conducted show that most HRM households are placing fewer than four bags of garbage curbside for collection. Any decision regarding the introduction of new, lower bag limits would be made by Regional Council.

57. What is the advantage of collecting leaf and yard waste separate from the green cart?

The separate collection of leaf and yard waste reduces the amount of material being sent to the compost processing plants – which are currently operating above their capacity.

Leaf and yard waste materials do not need to go in the green cart. This material can be managed more cost effectively if it was not in the green carts. Residents are also encouraged to manage their leaves on site by backyard composting or mulch mowing. This will help reduce the need for collection.

58. What is the benefit of banning the use of plastic bags for leaf and yard waste?

Each plastic bag that arrives at the compost processing plant has to be split open and emptied. This adds time and labour cost to the process. Plastic does not compost and it is difficult to remove all of the pieces of plastic bags from the final compost product. Paper bags are organic and will break down in the compost.

Paper leaf and yard waste bags are designed for all climates and by simply rolling the top shut you can prevent rain from getting inside. These bags are in use in other jurisdictions in the Maritimes and have proved to function well.



59. How much do paper leaf bags cost and where can I buy them?

The price of bags varies but they are available at most hardware, department and grocery stores.

60. Can I get a smaller green cart?

One of the reasons we chose 240 litre capacity carts was to accommodate leaf and yard waste. If we were to collect leaf and yard waste separately there could be an opportunity for residents to choose a smaller green cart for their food waste.

61. What is the advantage of using carts for collection of garbage?

There are some collection efficiencies to be had by using carts for garbage. There are different models for use of garbage carts, including a flat rate system where the cost is built in to taxes as well as user pay models where households who use a smaller cart pay less.

62. Will HRM start using clear bags for garbage?

Clear bag programs have been proven to reduce the amount of garbage and increase the amount of recyclables and compost diverted away from landfill. In the first six months of the clear bag program being introduced, Cape Breton Regional Municipality (CBRM) experienced a 16% decrease in garbage collected for landfilling. In the Valley Region, recycling and compost increased by 10% and 18% respectively in year one of implementation. Clear bags could be an option to promote participation in recycling and composting programs.

SHAPE YOUR CITY get engaged!

HRM Solid Waste Resources Strategy Review
Questions from Community Engagement Events

HALIFAX REGIONAL MUNICIPALITY

Last updated on October 8, 2013

Questions submitted or raised at community engagement events held September 18-October 24, 2013 – including Town Halls and Regional Public Event Sessions – will be listed below. In an effort to ensure information is provided in a timely manner, questions and answers (Q&As) will be posted online that address common topics, issues and concerns. The Q&As can be accessed here via the online community engagement portal (www.shapeyourcityhalifax.ca). Notes beside each question below indicate the corresponding Q&A to reference.

Questions from Town Halls

1. If there's a contract, why is this even being considered? (see Q&A #2, #37)
2. Why push to void contract with the communities? Not a good use of our tax dollars. (see Q&A #2, #6, #37)
3. Is the contract being broken because the city wants to use the savings for a stadium? (see Q&A #2)
4. If HRM breaks this contract, how can they be trusted to uphold future contracts? (see Q&A #2, #6)
5. The community agreed to host the landfill for 25 years. How is it fair of HRM to extend the life beyond 2023? (see Q&A #2, #8, #24, #37)
6. Why are we here when there is a contract in place. Why not just leave Otter Lake alone? Why 14 meetings? (see Q&A #1, #2, #6, #37)
7. Is it legal for the contract to be broken? (see Q&A #2, #6, #37)
8. Why did council decide they should break the contract? What did they see wrong with it? (see Q&A #1, #2, #6)
9. Why was the agreement with the community (contract between HRM and residents) not taken into account in the Stantec consultation? (see Q&A #2, #11, #12)
10. If HRM has no legal jurisdiction to make changes, why is all this money and time being wasted here and now to strong arm the citizens of this area to accept the Stantec report? (see Q&A #1, #2, #6, #37, #38)
11. What gives you the right to break our trust and contract signed in good faith? (see Q&A #2, #6)
12. How can HRM justify talking about extending the life of the landfill when the community agreed to only 25 years? (see Q&A #8, #37)
13. "Government: of the people, for the people, by the people." Who changed the definition? (see Q&A #1, #2, #6)
14. If HRM is going against their word to the community, how are we supposed to trust them again? (see Q&A #1, #2, #6)
15. Politicians should work for us, not for them. What has changed? (see Q&A #1, #6)
16. Why do HRM staff continue to misrepresent the operations of FEP and WSF? (see Q&A #2, #5, #16, #27)
17. What plan does HRM have to repair and restore the relationship with our community? We feel dishonoured. (see Q&A #1, #6)
18. What will the effect of the increased cell height be? (see Q&A #4)
19. How high will the landfill cells be raised to if the proposed changes are made? (see Q&A #4, #15)
20. What is the status of extending the life of the landfill?(see Q&A #1, #6)
21. Where would an alternative landfill be located? Are there proposed options? (see Q&A #8)
22. Why won't HRM council start looking for a new site? Our community did our part. It took 10 years to settle Otter Lake, why not start looking now? (see Q&A #8, #6, #15)
23. If there is no new site, what is the length of time HRM wants to extend the life of this landfill? (see Q&A #8, #24, #37)
24. Why are we not discussing the replacement to Otter Lake? This is our chance to take what we've learned and improve? (see Q&A #8, #15)
25. Beside alleged savings, what is the other benefit to making the facility a dump?(see Q&A #7)
26. Is it true that only 3% of the waste is prevented by the facility?(see Q&A)
27. How will property values be affected? (see Q&A #9)
28. How much will my property value go down?(see Q&A #9)
29. The concern to me is the proposal to bring all compost to Goodwood area to "try" compost. This area experiences a high putrid smell on many days as it is – will this not increase the problem?(see Q&A #5)
30. Why would we agree to having a landfill that smells, attracts birds in our neighbourhood and have it for another 100 years? (see Q&A #5, #29)
31. Will there be foul odors? (see Q&A #5)
32. Will the smell increase at the landfill, making homeowner value go down? (see Q&A #5, #9, #29)
33. How are you going to deal with the rodents like the ones near my parents' house, they live in a rural area with a dump a few kms away? (see Q&A #5)
34. Currently, several times a year there are strong odours from the landfill. What guarantee is there this would not become worse with the proposed changes? (see Q&A #5, #29)
35. The landfill did smell without sorting 1-2 years ago. Why do you think it didn't? (see Q&A #5, #29)
36. How will a waste campus reduce odors at Otter Lake? (see Q&A #5, #15, #24, #25, #26)
37. How does closing the landfill gatekeeper (FEP/WSF) possibly "enhance" or "evolve" the waste system? (see Q&A #1, #5, #7, #16, #22, #27)
38. Laurie Lewis stated that the WSF does not work as intended. Then why aren't we researching how to make it work better instead of scrapping it? (see Q&A #2, #19)

39. Are you saying that the state of the art waste management facility is mostly due to the cells and not the front end processer? (see Q&A #2, #16, #27)
40. How are the proposed options going to protect the environment in a facility that was not designed for these extra years of operation? (see Q&A #4, #8, #22, #24, #37, #43)
41. What changes if HRM keeps the Otter Lake landfill site open? (see Q&A #6)
42. If the province has already said they won't close or change the facility, why are we here? How can these changes still be made? (see Q&A #6, #38)
43. If the province is refusing to okay these changes what is the point of HRM continuing this process? (see Q&A #6, #38)
44. Is this a ploy to force the province to contribute more money to the city for waste processing? (see Q&A #6)
45. How do you plan to overcome the province's objection to your proposed unilateral action? (see Q&A #6, #38)
46. Why is HRM proceeding in the face of opposition from the province? (see Q&A #6, #38)
47. Why is HRM doing this if different levels of government oppose the change? What is the percentage chance of HRM succeeding? (see Q&A #6, #38)
48. Why are we wasting the time and money if the province isn't going to change what is in place? (see Q&A #6, #38)
49. If Otter Lake is world renowned, why are we discussing change? (see Q&A #1, #33)
50. Why are you changing a system that works? (see Q&A #1)
51. Why not leave the present system in place and treat those "new" green house gases as a new project, or extension of present system? (see Q&A #1, #6)
52. Why are there town hall meetings in areas that don't have anything to lose? (see Q&A #6, #10)
53. Has this decision already been made, or are we really going to be listened to? Does our opinion count? (see Q&A #6, #10, #35)
54. Why are we here? Who started this idea? The deal was 25 years – was it working too well? (see Q&A #6, #10, #11, #12, #37)
55. What triggered the desire to change the agreement since you indicated it wasn't for money? (see Q&A #1, #2)
56. What happens to the current employees at Otter Lake? (see Q&A #3)
57. How many jobs will be lost? (see Q&A #3)
58. What would the proposed increased employment mentioned by HRM look like? (see Q&A #3)
59. Why would anyone reduce recycling to save money and cut jobs? (see Q&A #3, #13, #15, #27)
60. How will non source separated items be flagged without the FEP? (see Q&A #15, #16, #18, #22, #27)
61. If cells are built higher, will noise of trucks and equipment be more of a nuisance? (see Q&A #43)
62. What are the dangers of increasing cell heights? What is the environmental impact of the vertical cell increase. (see Q&A #43)
63. If cells are built higher, will noise of trucks and equipment be more of a nuisance? (see Q&A #43)
64. If this is an effort to save money? Has the city done an analysis of the cost of defending a class action lawsuit and the payments to the community for damages and diminished property values? Have this estimated the cost of reporting the environmental damage? (see Q&A #13, #14, #15, #22, #27)
65. How do we know that the environment will be protected with the proposed changes? (see Q&A #15)
66. Without a sorting facility, will hazardous waste go into the landfill? (see Q&A #17, #18, #31, #45)
67. We know harmful material is diverted on-site so why shut those safe-guards down? (see Q&A #17, #22, #45)
68. Are there any environmental issues or laws to protect this from happening? (see Q&A #36, #38)
69. Why are some environmental checks and balances being raised in some areas but lowered at site A (otter Lake)? (see Q&A #15)
70. Does WSF/FEP produce more GHG or the same amount but faster? How much GHG produced without? How can we improve? (see Q&A #16, #19, #27)
71. Without the FEP/WSF protections in place, would all organic material go to landfill site? (see Q&A #15, #19, #20, #22, #27)
72. Why can you not produce useable compost? (see Q&A #43)
73. What is the future of HRM composting and garbage? (see Q&A #39)
74. Where will the organics go? (see Q&A #20, #41)
75. Where does the raw potato peel go if it gets to Otter Lake? (see Q&A #20, #41)
76. What model of landfill will Otter Lake be if these changes are implemented? What is the vision? (see Q&A #15, #44)
77. Why are we looking to save money short term? Not looking to make more ethical environmentally responsible choices? (see Q&A #13, #14, #15, #27)
78. Is there any truth to the statement that millions can be saved and no harm to the environment by closing the FEP? (see Q&A #14, #15, #22, #27)
79. The cost per year of the FEP is about $10 million, but did you know that if you divide by the number of households (near 200,000) the cost per household would be minimal? About $60. (see Q&A #16, #27)
80. Local businesses will suffer. Home owners will suffer. How does anyone think this will be okay?
81. Is HRM embracing bad/incorrect consulting reports? (see Q&A #11, #12)
82. Why did HRM take it upon themselves to approach Stantec? (see Q&A #11)
83. Which version of the scientific evaluation is correct? The rosy view presented by HRM or; the contrary perspective voiced by CMC and the scientist mentioned vis-à-vis the Stantec report? (see Q&A #11, #12)
84. What does HRM (major and councillors) plan to do about the Stantec report? What do they want to implement? (see Q&A #6, #10, #11, #12, #35)
85. What happens if you change the landfill and it doesn't work? (see Q&A #22)
86. Is there a guarantee that there will be no leachate? (see Q&A #42)

87. If you want to pick up everything in one truck to take it to Otter Lake to dump into one hole, do we stop using green bins? (see Q&A #15)
88. If organics end up in the landfill (from restaurants/workplaces) are they separated and collected for composting, or treated on-site? (see Q&A #20)
89. Was the FEP/WSF designed to separate the waste, or to process it to make the material inert? (see Q&A #16, #19)
90. If a large amount of items arriving at Otter Lake have not been separated should we not be looking at how we could reduce this amount? (see Q&A #15)
91. How can removing one of the two barrier layers in the liner system provide the same level of protection. By definition it can't. (see Q&A #23)
92. Will the liner be reduced from double to single? What happens when that change is made? (see Q&A #23)

Questions from Regional Public Event Sessions

1. Isn't this all just a waste of time since HRM staff has already made up their minds to close the FEP/WSF? (see Q&A #35)
2. How can HRM break the contract it signed with the community and the operator stating the Otter Lake site will only be in operation for 25 years? (see Q&A #37)
3. The recommended changes are contrary to the Environment Act. Why bother? (see Q&A #36, #38)
4. People come from around the world to see the Otter Lake facilities so why would we ever consider stopping what we're doing if everybody says we're the best? (see Q&A #33)
5. Isn't it true that clay was used as a daily cover material during the WSF shutdown in 2010 to supress potential odours? (see Q&A #28)
6. The Stantec report doesn't identify ways to increase source separation. Why isn't HRM focusing on education, especially at businesses and in apartment buildings? (see Q&A #22, #32)
7. Were there any odour complaints during the timeframe of the WSF shutdown? (see Q&A #29)
8. What types of hazardous materials are pulled out of the garbage on the sorting line? Why would we remove this safeguard that prevents this material from entering the landfill? (see Q&A #16, #17, #27, #31, #45)
9. Why is HRM suggesting that hazardous materials are not sold on store shelves? (see Q&A #30)
10. Why are the reports commissioned by MIRROR NS not being addressed in the public meetings? (see Q&A #10, #11, #12, #34)

HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 3
Halifax Regional Council
September 17, 2013

TO: Mayor Savage and Members of Halifax Regional Council

Original Signed by Director

SUBMITTED BY: Ken Reashor, P.Eng., Director, Transportation & Public Works

DATE: August 26, 2013

SUBJECT: Solid Waste Strategy Review Community Engagement Update Report #1

INFORMATION REPORT

ORIGIN

During the July 23, 2013, session of Regional Council, Halifax Regional Council requested that staff provide a monthly update to Council on the status of the Solid Waste Strategy Review consultation process.

LEGISLATIVE AUTHORITY

HRM Charter, Part XIII, Solid Waste Resource Management

BACKGROUND

HRM has contracted the services of NATIONAL Public Relations, the largest public relations consultancy in Canada, to design, program and facilitate the public consultation process for the Solid Waste Strategy Review Community Engagement (CE) Program. At the July 23, 2013 Regional Council session, Council endorsed the framework as outlined in the April 23, 2013 report and the CE RFP. Staff has since engaged with National on the development of the program and materials for the CE sessions and online efforts.

HRM staff and National have conducted meetings with CMC to establish a relationship with the committee and consult with them on the development of the CE program and design. The initial CMC meeting took place on July 30 following the initial project kick-off meeting between HRM and National's project team. Planning and design of the CE program commenced following the initial meeting with CMC. National and HRM staff have since undertaken additional

coordination sessions with CMC, in person and by phone and email to coordinate on the consultation process and program.

DISCUSSION

HRM staff has worked closely with National in supporting their development of the plan, and expanding on their understanding and background of the Strategy Review Project and history of HRM's Solid Waste Resource System.

Appendix A is National's engagement plan update report outlining meetings and activities to date and an overview of the engagement program plan.

FINANCIAL IMPLICATIONS

The Community Engagement expenses are available from the operating account R333-6916, Communication & Education. The budget availability has been confirmed by Finance.

COMMUNITY ENGAGEMENT

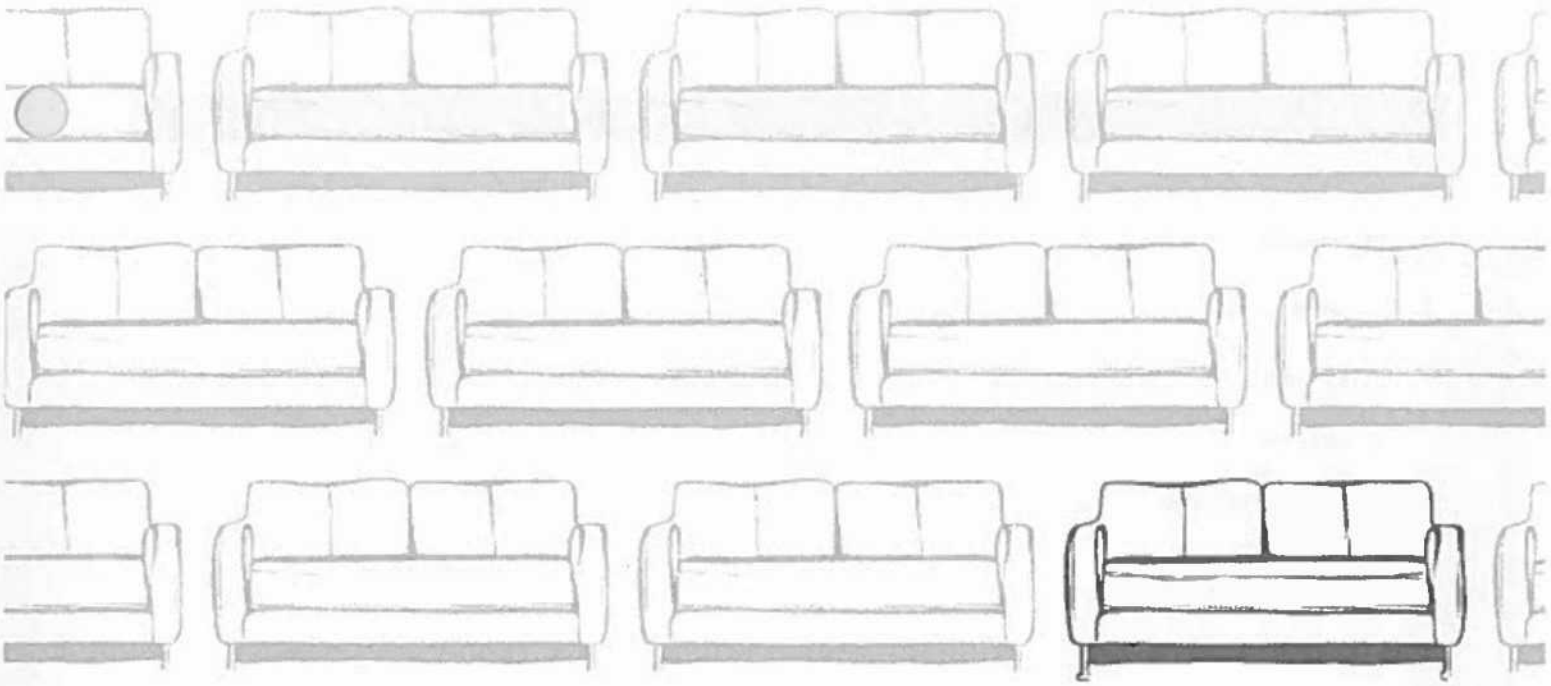
The community engagement plan is complaint with HRM's Engagement Strategy.

ATTACHMENTS

Attachment A - National's Community Engagement Plan

A copy of this report can be obtained online at http://www.halifax.ca/council/agendasc/cagenda.html then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Gord Helm, Manager, Solid Waste Resources, 490-6606
Bruce DeBaie, Managing Director, Corporate Communications, 490-6787



BUILDING A BETTER WASTE SYSTEM, TOGETHER

HRM Solid Waste Strategy Review

Community Engagement Strategy

PREPARED BY: NATIONAL PUBLIC RELATIONS

Halifax
Founders Square
1701 Hollis Street, Suite L101
Halifax, NS B3J 3M8
Tel. 902.420.1860

New Brunswick
75 Prince William Street, Suite 210
Saint John, NB E2L 2B2
Tel. 506.672.1860

Newfoundland and Labrador
448 Water Street
St. John's, Newfoundland and Labrador A1E 1B1
Tel. 709.754.9614

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ENGAGEMENT OVERVIEW

OVERALL PROJECT GOAL

- To educate HRM residents about the HRM solid waste system and have a balanced conversation about how to evolve the overall system, while continuing to protect the environment and community

PRINCIPLES OF THE ENGAGEMENT

- Develop a compelling invitation that entices the community to learn more about the options and opportunity
- Clearly articulate the parameters of engagement and what the community can influence
- Engage a broad and representative cross-section of citizens in meaningful conversation
- Lead an authentic and transparent engagement program that allows residents to feel that the process is legitimate and will influence decision making

HRM CORPORATE OBJECTIVES FOR COMMUNITY ENGAGEMENT

- Engage citizens in the decision making process in order to assist Regional Council in making informed decisions that reflect a broad and representative sample of citizen voices
- Create a culture of civic engagement at the heart of the way the municipal government operates
- Roll-out a successful program that opens the door for strong participation and enthusiasm around future engagement sessions

OBJECTIVES FOR SOLID WASTE ENGAGEMENT

- Host a broad community conversation about the entire solid waste management system. Including how residents would like to see it evolve in a manner that maintains protections of our environment and our communities, and what will be necessary to get there
- Motivate HRM citizens to care about a topic that they may not think about but affects us all
- Enhance understanding reinvigorate community pride in our role as leaders in waste resource management and diversion
- Create clarity around how the current system and how it works

STAKEHOLDER AUDIENCES

- Community Monitoring Committee (CMC) and Beechville, Lakeside, Timberlea and Prospect Road (BLTP) community
- Industrial/commercial/institutional (ICI) waste system users
- Waste industry members
- General public

PROJECT APPROACH

BACKGROUND

Over the past 15 years, HRM and residents have worked together to achieve and surpass targets set for the diversion of waste from the landfill. This success is a point of pride, as HRM currently outperforms all cities of comparable size in Canada on this important environmental indicator.

This success has been the result of regulatory and policy levers, but also significant public education and awareness efforts that have driven behavioural change. From households to businesses and institutions, the citizens of HRM have embraced a change in attitude and behaviour with respect to the responsible management of solid waste.

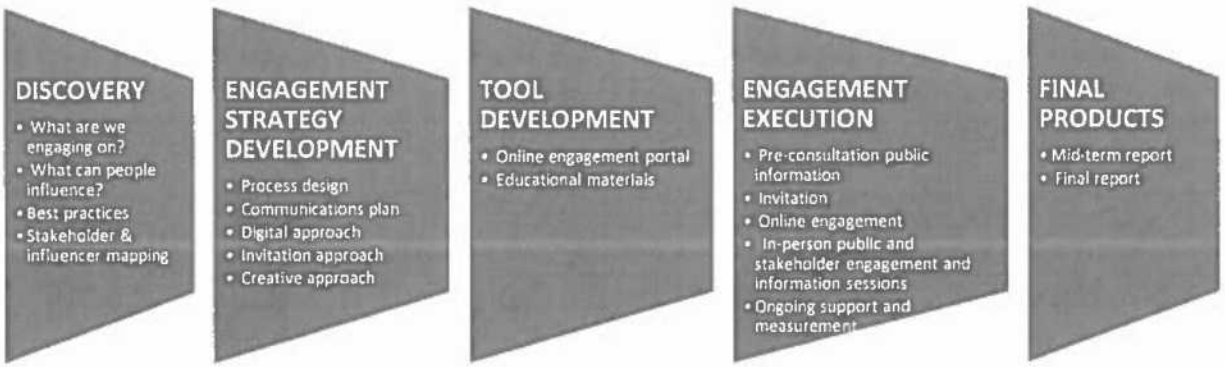
Now HRM seeks to shape the future of the municipality's waste management system as part of the next chapter. This next phase will be achieved by focusing on efforts to continue to increase diversion and advance environmental priorities, while also operating efficiently and in a financially responsible and sustainable manner.

PROJECT PHASES

The objective of the public engagement program is to provide residents with factual information in order to have a balanced conversation about evolving the HRM waste management system while continuing to protect the environment and community.

As we design this public engagement project, we are ever mindful of the requirement for participants to have an authentic opportunity to influence Regional Council's decision making. This return on participation will reinforce the integrity of the process and encourage residents to maintain involvement in this project, while also encouraging their participation in future engagement programs.

NATIONAL's work can be categorized as follows:



ENGAGEMENT STRATEGY

The engagement strategy consists of five phases:



1. PRE-ENGAGEMENT COMMUNICATIONS

In keeping with HRM's desire to engage a broad cross-section of citizens, we have begun a stakeholder and invitation opportunity mapping exercise that will guide efforts to extend the engagement invitation to people who stand to care about the issues at hand from across the municipality.

By engaging important stakeholders directly and making the case for why citizen participation will be meaningful, we hope to encourage these individuals to share the invitation with their extensive local networks – which will include the stakeholders that HRM has identified as priorities for targeted outreach, as well as a larger representation of citizens who may have more general interest in the process from the perspectives of civic engagement, responsible city management, environmental stewardship, sustainability, and quality of life.

2. BEECHVILLE, LAKESIDE, TIMBERLEA AND PROSPECT ROAD (BLTP) TOWN HALLS

Prior to the formal engagement sessions, and as mandated by Regional Council, we will host two town hall meetings with a specific invitation to residents of the communities neighbouring the Otter Lake landfill site. These events will provide an open forum and chance to hear directly from the residents who are most affected by the proposed changes at Otter Lake. By prioritizing these meetings as the first public engagement events, we wish to acknowledge the important role of the local community as hosts of the landfill site, and provide those residents with the first opportunity to provide their input.

The town hall sessions will flow as follows:

- Welcome - HRM Deputy Chief Administrative Officer
- Introduction to the engagement program, event agenda, guidelines for the evening and overall facilitation - NATIONAL Public Relations

- Remarks - Community Monitoring Committee (CMC)
- Presentation – HRM Solid Waste Resources
- Open mic with real time harvest/transcription of commentary
- Closing – invitation to participate in further engagement in-person and online

3. BUILDING A BETTER WASTE SYSTEM, TOGETHER (PHASE 1)

The intent of the first phase of general public events is to gather the input of the public and stakeholders on their priorities for a renewed waste management system that we can continue to be proud of for the next 20 years.

This phase of engagement will consist of four community-based events and two of a more technical nature with ICI and waste industry stakeholders. Residents will also be actively engaged on the same content and questions, as well as access resources and educational materials via the Shape Your City engagement portal, before, during and between the in-person events.

Discussions will be hosted in world café format. The draft questions to be considered during this phase of engagement are:

- HRM waste system now: What's working? What's not?
- Vision: What are the things you care about? What are your priorities for the future?

4. BUILDING A BETTER WASTE SYSTEM, TOGETHER (PHASE 2)

The intent of this round of engagement is to share more specific, technical information about the waste system, and to gather feedback from citizens on the critical issues and decisions facing the waste system – particularly relating to the recommendations of the Stantec review.

The event is anticipated to consist of a technical presentation on the waste strategy review and related recommendations, followed by discussions will be hosted in world café format on the recommendations and the community's advice to Regional Council on how to move forward.

As with the previous phase of engagement, this round will be supplemented with a robust and transparent information sharing and engagement approach via the Shape Your City portal that invites and nurtures dialogue about the future of our waste system before, during and after in-person events to maximize the quantity and quality of citizen input to our process.

5. HARVEST AND REPORTING

In order to ensure that participants feel heard and that their contributions are meaningful, our harvest process will be robust and gather insights from online and in-person engagement activities. Our approach will include transcription of what is heard during events, graphic harvest of key themes/concerns that arise, quantitative and qualitative analysis of interaction and submissions via the Shape Your City portal, and consideration of related discussion in social media. For transparency and/or archival purposes, HRM may also wish to video record the in-person sessions or a representative sample thereof.

NATIONAL will produce two reports reflecting the input of citizens to this engagement program:

1) Mid-term report – reflecting the key themes and content arising from the "What do you care about and where do you want to go?" phase.

2) Final report – reflecting the engagement process in its entirety and the guidance/priorities citizens wish to share with Regional Council to inform their decision making regarding the evolution of the solid waste system.

DIGITAL APPROACH

Working in conjunction with the in-person sessions, a successful digital approach to the public engagement process will rely on the following pillars:

- Online engagement portal – Shape Your City
- Mass email
- Social media

The online engagement portal will serve as a two-way communications platform. As the online hub it will serve to create awareness and engagement by being highly accessible, with clear content that is easily sharable.

To truly take advantage of the Web, discussion should be encouraged between events so people can participate remotely and on their own time, at any point throughout the engagement program.

Even the most compelling and well-designed website does not ensure interaction or visitors. In order to drive awareness and interest, the engagement program must be presented in the context of civic responsibility and pride. An invitation approach and content strategy including social media and mass email will play a role in driving traffic to and engagement on the portal.

RESEARCH & MEASUREMENT FRAMEWORK

To develop a strategic and effective engagement program, it would be informative to conduct public opinion research to gauge what residents currently know or care about when it comes to solid waste management and the strategy review. In addition to informing the design of the engagement program, this research will provide a baseline against which we would have the ability to measure our success in increasing residents' awareness and understanding of, and engagement in the subject matter.

Measurement of the overall effectiveness of the engagement strategy will also include: event attendance and feedback, online engagement, and social media conversation.

TIMELINE

Complete:

- **BangTheTable/SustaiNET introduction, orientation and training**
  2/3 Jul

- **Kick-off meeting with NATIONAL and HRM staff (purpose and principles of engagement)**
  Tues 23 Jul

- **Process and option mapping exercise with NATIONAL and HRM staff**
  Thurs 25 Jul

- **Meetings among CMC, NATIONAL, and HRM staff**
  Tues 30 Jul
  Mon Aug 26

- **Weekly engagement planning/project management meetings with NATIONAL and HRM staff (weekly meeting)**
  Wed 7 Aug
  Wed 14 Aug
  Wed 21 Aug
  Wed 28 Aug
  Wed 3 Sept

Engagement Sessions:

Town Halls with Beechville Lakeside Timberlea, and Prospect Road Communities
Wed 18 Sept 7-9p
Thurs 19 Sept 7-9p

Region 1: Halifax & vicinity
Halifax, Sambro, St Margaret's Bay, Prospect, Herring Cove, Beechville, Goodwood, Peggy's Cove, Harrietsfield, Hubbards, Tantallon, Timberlea

Session 1 of 2: Wed 2 Oct 7-9p
Session 2 of 2: Wed 23 Oct 7-9p

Region 2: Dartmouth and vicinity
Dartmouth, Cole Harbour, Eastern Passage

Session 1 of 2: Wed 25 Sep 7-9p
Session 2 of 2: Wed 16 Oct 7-9p

Region 3: Bedford and vicinity
Bedford, Hammonds Plains, Sackville, Beaverbank, Fall River, Waverley to Dutch Settlement & area

Session 1 of 2: Thu 26 Sep 7-9p
Session 2 of 2: Thu 17 Oct 7-9p

Region 4: Eastern Shore and vicinity
Porter's Lake, Lake Echo, Preston, Chezzetcook, Lawrencetown, Sheet Harbour, Musquodoboit Valley, Musquodoboit Harbour

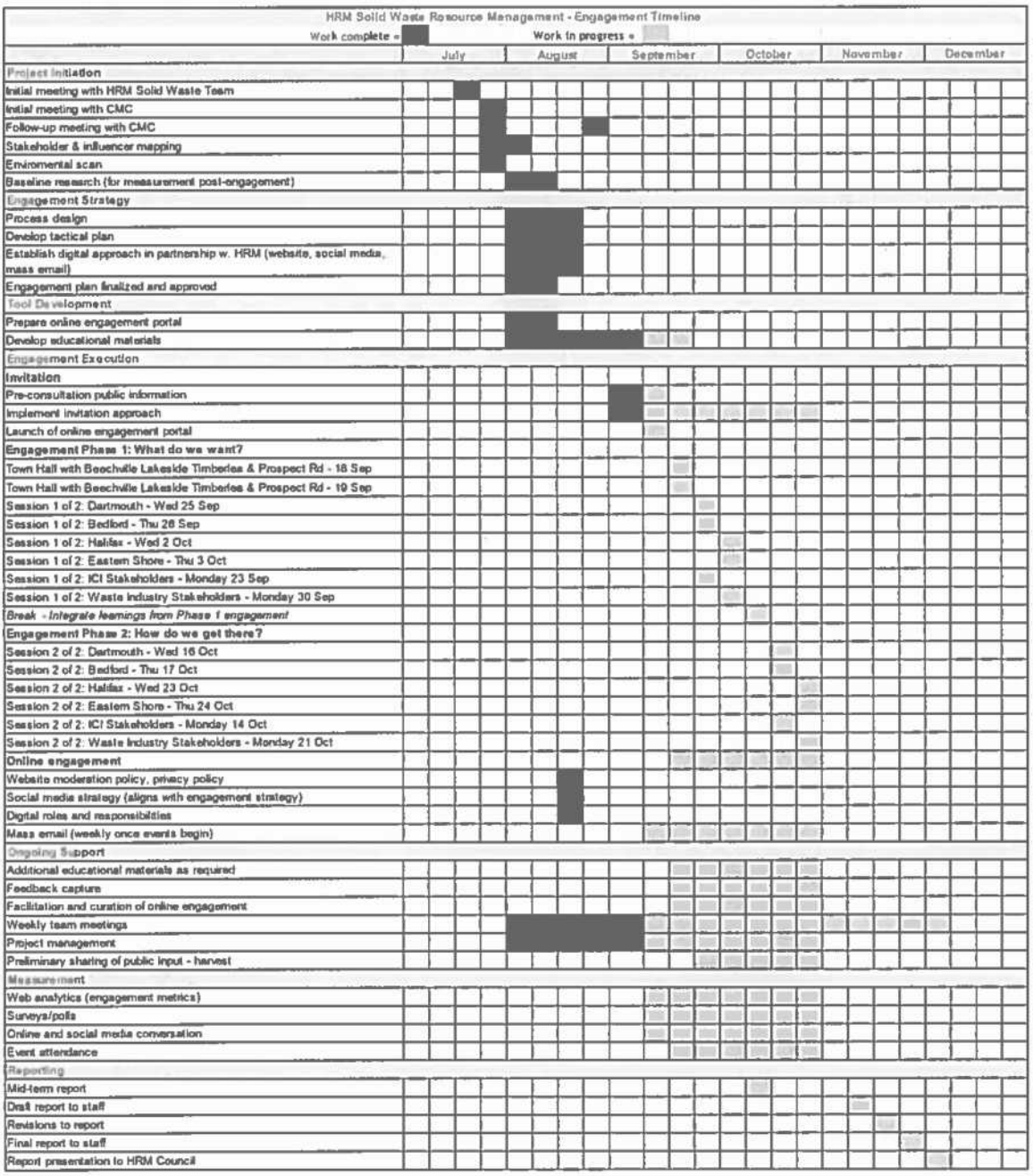
Session 1 of 2: Thu 3 Oct 7-9p
Session 2 of 2: Thu 24 Oct 7-9p

Stakeholder Group 1: ICI (Institutional Commercial Industrial) Stakeholders

Session 1 of 2: Monday 23 Sep 2-4p
Session 2 of 2: Tuesday Oct 15 2-4p

Stakeholder Group 2: Waste Industry Stakeholders

Session 1 of 2: Monday 30 Sep 2-4p
Session 2 of 2: Monday 21 Oct 2-4p


HRM Solid Waste Resource Management - Engagement Timeline
Work complete =
Work in progress =
July
August
September
October
November
December
Project Initiation
Initial meeting with HRM Solid Waste Team
Initial meeting with CMC
Follow-up meeting with CMC
Stakeholder & influencer mapping
Enviromental scan
Baseline research (for measurement post-engagement)
Engagement Strategy
Process design
Develop tactical plan
Establish digital approach in partnership w. HRM (website, social media, mass email)
Engagement plan finalized and approved
Tool Development
Prepare online engagement portal
Develop educational materials
Engagement Execution
Invitation
Pre-consultation public information
Implement invitation approach
Launch of online engagement portal
Engagement Phase 1: What do we want?
Town Hall with Beechville Lakeside Timberlea & Prospect Rd - 18 Sep
Town Hall with Beechville Lakeside Timberlea & Prospect Rd - 19 Sep
Session 1 of 2: Dartmouth - Wed 25 Sep
Session 1 of 2: Bedford - Thu 26 Sep
Session 1 of 2: Halifax - Wed 2 Oct
Session 1 of 2: Eastern Shore - Thu 3 Oct
Session 1 of 2: ICI Stakeholders - Monday 23 Sep
Session 1 of 2: Waste Industry Stakeholders - Monday 30 Sep
Break - Integrate learnings from Phase 1 engagement
Engagement Phase 2: How do we get there?
Session 2 of 2: Dartmouth - Wed 16 Oct
Session 2 of 2: Bedford - Thu 17 Oct
Session 2 of 2: Halifax - Wed 23 Oct
Session 2 of 2: Eastern Shore - Thu 24 Oct
Session 2 of 2: ICI Stakeholders - Monday 14 Oct
Session 2 of 2: Waste Industry Stakeholders - Monday 21 Oct
Online engagement
Website moderation policy, privacy policy
Social media strategy (aligns with engagement strategy)
Digital roles and responsibilities
Mass email (weekly once events begin)
Ongoing Support
Additional educational materials as required
Feedback capture
Facilitation and curation of online engagement
Weekly team meetings
Project management
Preliminary sharing of public input - harvest
Measurement
Web analytics (engagement metrics)
Surveys/polls
Online and social media conversation
Event attendance
Reporting
Mid-term report
Draft report to staff
Revisions to report
Final report to staff
Report presentation to HRM Council

Community Monitoring Committee
Presentation to Regional Council

June 18, 2013

HALIFAX REGIONAL MUNICIPALITY

HALIFAX REGIONAL COUNCIL

COMMITTEE OF THE WHOLE

MINUTES

June 18, 2013

Session 2

PRESENT: Mayor Mike Savage
Deputy Mayor Reg Rankin
Councillors: Barry Dalrymple
David Hendsbee
Bill Karsten
Lorelei Nicoll
Gloria McCluskey
Darren Fisher
Waye Mason
Jennifer Watts
Russell Walker
Stephen Adams
Matt Whitman
Steve Craig
Tim Outhit

REGRETS: Councillors: Linda Mosher
Brad Johns

STAFF: Mr. Richard Butts, Chief Administrative Officer
Mr. Martin Ward, Municipal Solicitor
Ms. Cathy Mellett, Municipal Clerk
Mr. Ted Aubut, Legislative Assistant

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4. Adjournment 8

1. CALL TO ORDER

Mayor Savage called the meeting to order at 12:05 pm. in the Council Chamber at City Hall, 1841 Argyle Street, Halifax.

2. APPROVAL OF MINUTES - NONE

3. PRESENTATION FROM COMMUNITY MONITORING COMMITTEE – Stantec Waste Resource Strategy

The following documents were before Regional Council:

- An information binder from the Community Monitoring Committee including:
  - A presentation outline
  - HRM-Halifax Waste-Resource Society Agreement of February 1999
  - Nova Scotia Environment approval to operate the Otter Lake site dated October 18, 2012
  - Staff report dated July 2, 1996 regarding a revised solid waste-resource management strategy cost projection
  - Dillon Consulting peer review report dated May 2013 regarding Stantec Waste Resource Strategy Report
  - HRM presentation on increasing diversion
  - Excerpts from HRM website regarding Front End Processor and other technologies in operation at Otter Lake
- A presentation with graphics prepared by staff and Stantec dated January 2013
- Stantec Waste Resource Strategy Report dated January 2013
- A declassified Staff Report dated February 5, 2013
- SNC-Lavalin Peer Review of Stantec Report dated April 17, 2013
- Correspondence from John Cascadden dated June 8 & 13, 2013
- Correspondence from Tom Musial dated June 4& 18, 2013
- Correspondence from Ken Donnelly dated June 17, 2013
- Correspondence from Dr. Pamela Ritchie dated June 18, 2013

Mr. Jack Mitchell, Chair of the Community Monitoring Committee (CMC) thanked Council for the opportunity to present. He introduced his colleagues, Mr. Ken Donnelly, a communications consultant, Mr. Scott Kyle, an engineer with Dillon Consulting and Mr. Ken Meech, Executive Director of the CMC.

Mr. Mitchell provided a brief overview of the process leading up to the siting of Otter Lake, including the more than 400 meetings held. He noted that residents of the area eventually supported hosting the landfill in large part because of environmental and community safeguards guaranteed by HRM. He called on Mr. Donnelly to take over the presentation.

Mr. Donnelly indicated that important information was missing from the Stantec Report and the peer review conducted by SNC Lavalin. Neither addressed the written agreement between the host community and HRM. The reports also failed to mention

that HRM committed to having a Front End Processor (FEP) and Waste Stabilization Facility (WSF) at Otter Lake. Moreover, he believed Stantec's recommendations to be flawed because, ultimately, it is the Province that can authorize changes at Otter Lake, not HRM.

He asked that Council refuse Stantec's recommendation to close the FEP and WSF because it would undermine the agreement HRM signed with the host community.

Mr. Donnelly noted that two years ago HRM discussed the possibility of turning the Otter Lake site into a park. However, since the release of the Stantec Report, there is talk of extending the life of the facility by 20 years and creating a waste resource campus around the current facility. He wished to know why HRM had changed its position and why the local community had not being sufficiently consulted on this matter.

Mr. Donnelly believed that many of the problems in the Stantec Report could have been avoided if CMC had helped develop the terms of reference for the report. He also noted that HRM denied the CMC's request to hire a consulting firm to conduct a peer review of Stantec's Report. Fortunately, Mirror NS, the operator of Otter Lake hired Dillon Consulting to comment on the report. He invited Scott Kyle to outline his findings.

Mr. Kyle of Dillon Consulting noted that he was asked by Mirror NS to review the Stantec Report as well as the peer review document prepared by SNC Lavalin. Over the course of their review, they identified a number of areas of concern:

- *FEP/WSF*: Stantec relied on a dated definition of the intended role of the FEP and WSF. Until 1995, their role was to convert compostables and recyclables to a useful and valuable resource. However, in 1996, the intended goal was modified. Since that time, the goal has been to achieve specific processing requirements rather than to generate revenue through diversion. This important revision was not taken into account. The SNC Lavalin peer review also inaccurately described the role of the WSF.
- *Waste stream:* Stantec rightly notes that there are fewer recyclables and compostables in the waste reaching Otter Lake. However, the waste stream remains mixed and the FEP/WSF, necessary.
- *Gatekeeper effect*: Stantec failed to recognize that the FEP helps HRM scrutinize loads. This means that contractors must be rigorous when they collect waste at the curb.
- *Blowing debris and birds*: Stantec failed to recognize that there are fewer birds and less blowing garbage at Otter Lake because of the FEP/WSF.
- *Comparative cost analysis:* Stantec used an unrepresentative sample of North American landfills in their cost analysis. Many of the sites deemed comparable do not have the same high standards as HRM, especially in terms of liners. Moreover, five (5) of the sites support cities with (five) 5 to nineteen (19) times larger populations.

- *Liner standard*: Having a high-quality liner is important because it offers peace of mind to residents and because Otter Lake sits on fractured bedrock. Replacing the current liner with one of a lesser quality, which Stantec recommends, would be a mistake.
- *Waste-resource campus:* Stantec provided unsubstantiated scheduling and cost estimates for the establishment of a waste resource campus at Otter Lake. The project could very well exceed $10 million and take more than two (2) years to develop. SNC Lavalin similarly provided costs with limited detail and explanation.
- *Cost per tonne:* Stantec estimates that it costs HRM $170 to treat one tonne of waste. However, they did not provide sufficient detail as to how they came to this figure. Mr. Kyle noted that cost per tonne fluctuates between $90 and $170 based on the data sample used.

Mr. Donnelly, elaborating on many of these points, noted the following:

- The percentage of organic and recyclable material entering the landfill has not changed, as evidenced by data collected by HRM. Given this, the FEP/WSF remains important. Eliminating them would be to digress to a 1980s landfill model.
- Waste management technology has not significantly changed in the last 17 years. While new technologies are entering the market, they are unreliable and under-tested.
- HRM pays more to divert waste than other municipalities because its waste treatment system is more robust.

Mr. Donnelly noted that the Otter Lake landfill, unlike the Sackville landfill, processes waste. It also controls odours, birds and potential leachate problems. He noted that the landfill outside of St. Thomas, Ontario, which contains waste from Toronto, has received more than 400 odour complaints since 2010. This is not the case at Otter Lake.

He called on Mr. Meech to conclude the presentation.

Mr. Meech reminded Council that residents of the host community and industry stakeholders developed HRM's waste diversion strategy. The FEP is at the core of the strategy, providing a level of environmental and community protection. It is on these grounds that the community accepted to host the landfill without compensation. Mr. Meech then listed other levels of protection, which included:

- The creation of a Community Monitoring Committee
- The operating permit process managed by the Province
- The contract negotiated with landfill operator, Mirror NS

HRM, he continued, should have involved the CMC in setting the terms of reference of the Stantec Report. The municipality should also ensure that upcoming consultations target the communities with the most at stake.

Mr. Meech asked HRM to confirm its commitment to the host community. To do this, HRM should vote down Stantec's recommendation to close the FEP/WSF and not include it as part of upcoming public consultations.

The Mayor thanked the CMC for their presentation and opened the floor to discussion.

Councillor Whitman moved a motion rejecting the changes recommended by Stantec and SNC Lavalin and amending the scope of upcoming public hearings such that they do not touch on Stantec's recommendations.

Mr. Martin Ward, Municipal Solicitor ruled the motion out of order because it partially rescinds an existing resolution of Council directing staff to initiate a public consultation process based on the findings of the Stantec Report. He noted that Committee of the Whole cannot rescind a motion of Council.

Councillor Adams observed that highly-respectable firms, Stantec and SNC Lavalin on one hand and Dillon Consulting on the other, reached very different conclusions about the value of the FEP/WSF. He wished to know how Otter Lake would operate if the FEP/WSF are removed.

Mr Kyle replied that many landfills in Nova Scotia do not have an FEP or WSF. Waste is simply placed in the landfill and covered with clay or another material. At Otter Lake, waste is covered with construction debris. While this is not a particularly effective odour barrier, it diverts industrial, commercial and institutional waste from the landfill, thereby improving HRM's overall diversion rate. One of the advantages of having an FEP/WSP, he continued, is that it reduces blowing debris.

Councillor Adams asked for confirmation that the Minister of Environment has the authority to approve/deny changes to the landfill.

Mr. Donnelly replied that every waste management facility in Nova Scotia is approved by Nova Scotia Environment. Changing the Otter Lake facility would therefore require the Minister's sign-off.

Councillor Dalrymple left the meeting at 1:15 pm.

Councillor Adams, in light of this response, suggested that HRM ask the Minister about the implications of removing the FEP/WSF. He did not see the point of going through a public consultation process only to find that one of the recommendations cannot be implemented.

Councillor Watts was surprised to hear that the CMC only wanted the local community to be consulted. She felt this was inconsistent with CMC's mandate, which is to bring together stakeholders from the local and wider community. She then asked Mr. Kyle to comment on:

- The 8,400 tonnes of unprocessed organics going to landfill

- The eight month period in 2010 during which the WSF was not operational.
- The proposed increase in the height of the landfill.

Mr. Kyle felt that the estimated tonnage of organics entering the landfill was irrelevant respective to the operating criteria defined for the facility. As for the temporary closure of the WSF, staff used clay instead of demolition debris for cover and relied on a hawk to scare birds.

Mr. Donnelly acknowledged that the CMC did not discuss the matter of height in their presentation. This is because their primary concern is the potential closure of the FEP/WSF and the swapping of the liner for one of lower quality. He believed that these recommendations undermined the spirit of trust that HRM and CMC have worked hard to build.

Deputy Mayor Rankin noted that community stakeholders, like the CMC, neither requested the review nor were solicited for input on its scope. He felt that this exercise had needlessly divided the community and put HRM on a collision course with the Minister of the Environment, which has instructed staff not to amend the operating permit for Otter Lake. The FEP and WSF were part of the original agreement between HRM and the host community and must be respected. He found it strange that Stantec, which in the 1990s expressed support for the FEP/WSF, now found it was poor value for money.

Councillor McCluskey observed that Stantec and the CMC have differing views on whether the waste stream has changed in the last 17 years. She asked staff to comment on this.

Mr. Gord Helm, Manager of Solid Waste Resources, Transportation & Public Works, replied that the content of waste has indeed changed. For instance, many hazardous paints and solvents no longer enter the waste stream because they are banned from shelves. Those that remain on the market are sent to hazardous materials depots. This means that materials previously sent to the landfill no longer enter the normal waste stream.

Councillor McCluskey wished to know if large quantities of recyclables and compostables are going to Otter Lake.

Mr. Helm noted that studies undertaken in 2010 and 2013 showed that a percentage of both materials are going to the landfill instead of being diverted.

Councillor Karsten, referencing Mr. Kyle's extensive waste management experience, wished to know if he had ever recommended that another municipality purchase a FEP/WSF.

Mr. Kyle replied that the FEP/WSF is not commonly requested by municipalities. HRM is unique in this regard.

Councillor Karsten noted that the Otter Lake landfill and the former Sackville landfill have nothing in common. He asked that stakeholders stop comparing the two.

Mr. Donnelly clarified that Otter Lake, even without the FEP/WSF would not be the like the former Sackville landfill because HRM has a different leachate system and runs parallel organics and recycling systems. However, in the absence of the FEP/WSF, waste will simply be dumped into the landfill and covered. In this respect, the comparison is justified.

Councillor Craig noted that he chaired the Sackville landfill close-up committee and can therefore appreciate the difference between the previous and existing landfills. He asked the CMC to confirm that the agreement HRM signed was with the Waste Resource Society, whose mandate is to work in the interest of all residents, not just local residents.

Mr. Mitchell replied that the CMC is an off-shoot of the Waste-Resource Society.

Mr. Donnelly noted his commitment to fulsome consultation, noting that the CMC represents residents from the local and wider communities. However, he was concerned that if the public consultation process favoured the wider community over the local community, then cost savings – which he agreed were enticing – would carry the day, to the detriment of residents most affected by the landfill.

Councillor Nicoll noted that the process underway is an opportunity to talk about what HRM wants the landfill to look like, and what technologies could be used to achieve to meet this vision. Referring to an earlier comment from Mr. Donnelly, she wished to know what the CMC would have told HRM staff had they been invited to the table earlier.

Mr. Donnelly replied that the CMC wanted to help HRM staff shape the terms of reference for the Stantec study. Had they been at the table, they would have asked that the Stantec Report not investigate the extension of the facility.

Councillor Fisher noted that staff moved forward on this file because they were asked to do so by Council. Like Councillor Karsten, he found Otter Lake/Sackville landfill comparisons to be misleading.

The Mayor thanked everyone for their comments.

4. Adjournment

The meeting adjourned at 1:56 pm.

Cathy J. Mellett
Municipal Clerk

Community Monitoring Committee
Presentation to Regional Council

June 18, 2013


Otter Lake Landfill
A World-Class Waste
Management Facility
sundancerphoto

Presentation Purpose

* Ensure you have all information
* Seek support to stop consideration of closure of FEP/WSF at Otter Lake
* Accordingly, remove issue from consultation process

On HRM Website

Front End Processor (FEP)

The FEP facility is where garbage arrives and bags are opened and inspected. It consists of a system of conveyors, bag breaker, sorting platforms and mechanical screening operations.

The FEP allows for identification and removal of material that should not be going to landfill.

Clean recyclable paper, metals and containers are removed during the sorting process. However, the majority is disposed due to contamination.

Scrap metal (ie appliances) is separated for recycling.

On HRM Website

Waste Stabilization Facility (WSF)

Screened material from the FEP is transferred to the WSF where it moves by agitator in channels to be decomposed in 18 to 21 days.

The material left at the end of this process is a dryer like fluff which then goes to the landfill. This process lessens the amount of leachate produced by material in the cell, and as there is no food residue it doesn't attract vectors (ie birds).

On HRM Website

Diversion from Landfill

The processing/stabilizing of waste comes at a cost, however it is done for the protections of the local community and the environment.

Recycling and composting programs maximize recovery of resources and positively impacts our environment.

Mixed waste in landfills generates about 38% of Canada's total methane (a greenhouse gas) emissions. Diverting organics from landfill can have a significant impact on climate change.

On HRM Website

Citizens' Developed Solid Waste Resource Management Strategy

Fundamental Community Commitment

- Keep organics & other banned materials out of the landfill
- Development of the Otter Lake Front End Processing (FEP) and Waste Stabilization Facility (WSF) to eliminate organics from landfill

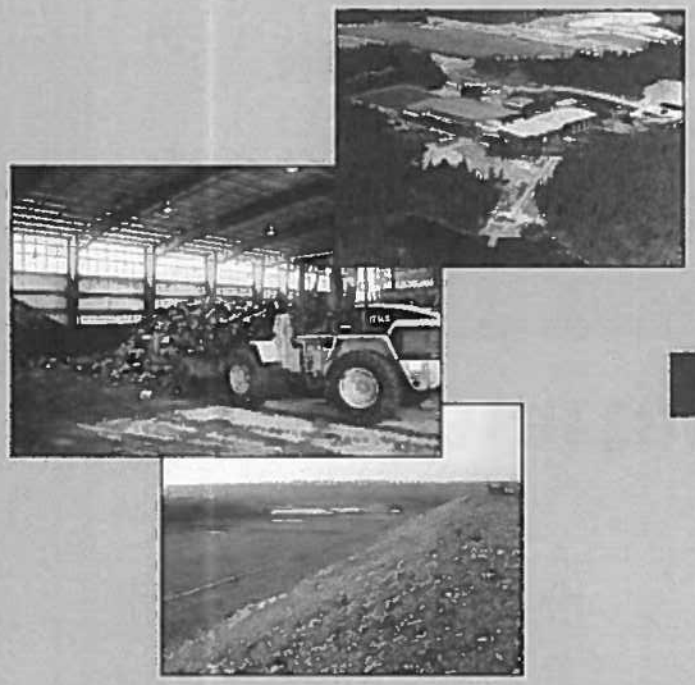
Where Has The Commitment Gone?

* Only 2-3 years ago, discussion on wilderness park at end of 25 year agreement – now discussion is keeping facility open into 2nd half of this Century
* Recommendation is to walk away from commitment and ask community to embrace extension of Otter Lake facility
* Community engagement on Otter Lake should concentrate on surrounding, most affected communities

Stantec Report and Staff Recommendations

* Stantec process flawed
  * TOR should have been developed jointly with CMC
  * CMC requested involvement, was rebuffed

Review of HRM's Waste Resource Strategy Update Report



Scott Kyle, P.Eng., LEED AP
Dillon Consulting Ltd.

June 18, 2013

DILLON
CONSULTING

To get started…

- **Dillon Consulting Limited**
  - Founded in 1946, 650 employees, 17 offices
  - NS roots; HJ Porter & Associates
  - Extensive waste management experience in HRM, Nova Scotia and Canada
- **Scott Kyle, P.Eng., LEED AP**
  - Civil engineer, Partner with Dillon
  - 25 years with a focus on the waste management sector – public & private
  - Involvement at Otter Lake since the original identification of the site in the mid 90s

To get started…

- **Dillon's Engagement**
  - Conducted on behalf of MIRROR NS
  - Review Stantec's *Waste Resource Strategy Update* report (Jan 2013)
  - Initial review of SNC Lavalin's Peer Review of the Stantec report (Apr 2013)

Today's Presentation

- Highlights of Dillon's review of the Stantec document
- Including references to initial SNC Lavalin Peer Review findings where applicable
- Nine "Issues of Concern"
  - Common issues of concern between the two documents are noted with an asterisk *
  - Plus two new items specific to the Peer Review
- Have not discussed comments with Stantec or SNC Lavalin report authors

Review of the Jan 2013 Stantec Report

- **Focus on:**
  - Section 3 (Otter Lake Waste Processing and Disposal Facility)
  - Section 4 (Landfill Design)
  - Section 5 (Opportunity to Create a Regional Waste Resource Campus)

- **Now on to the 9 items…**

Review of the Jan 2013 Stantec Report

1. Incorrect definition of the intended role of the FEP/WSF *

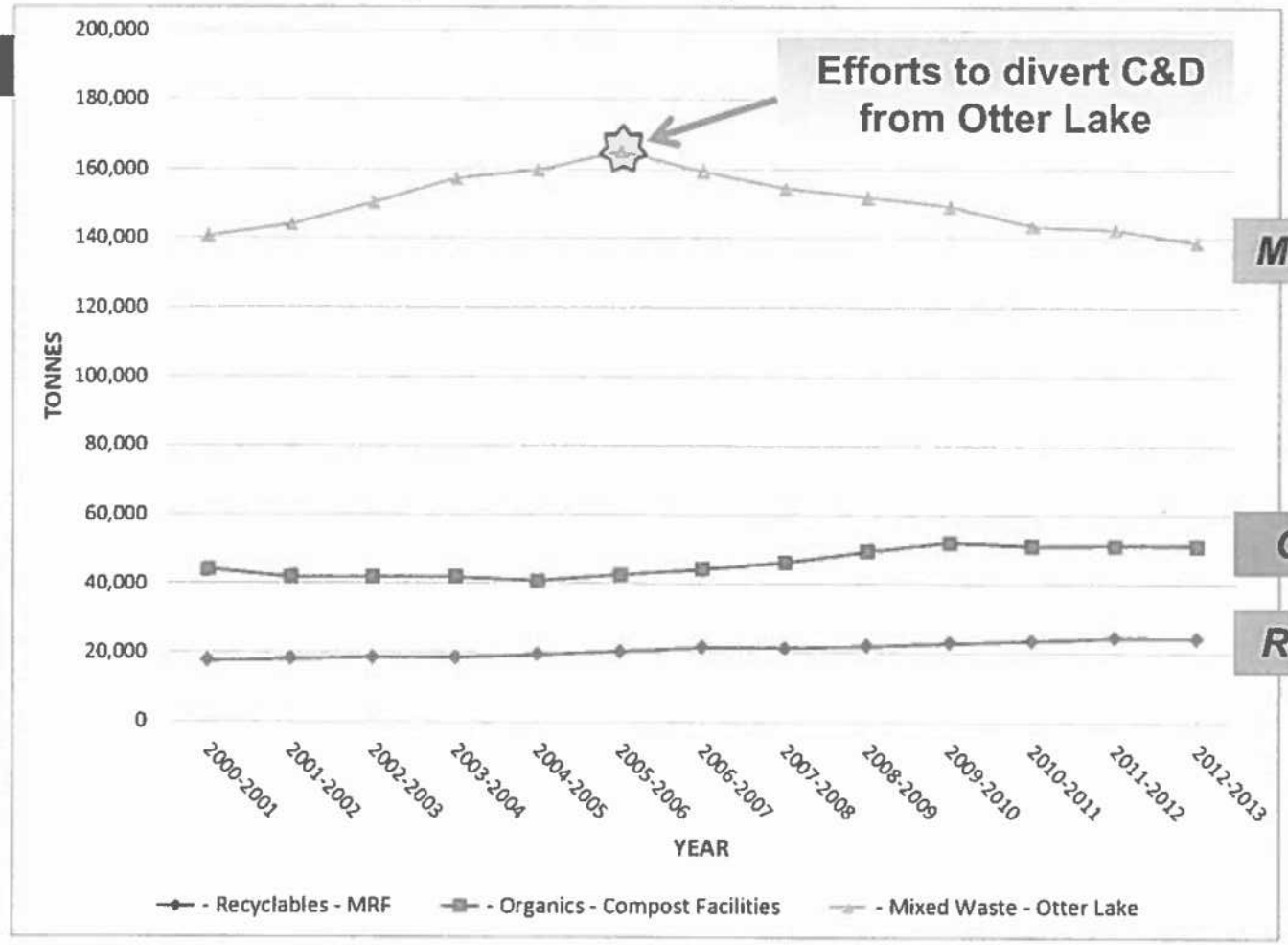
- **Reliance on a superseded 1995 definition**
  - to provide *"a return on investment"*, marketable recyclables and compost
- **May 1996 - Revised Annual Cost Profile Assumptions**
  - *"Unlike the previous version, this facility will not generate revenue and related expenses through additional diversion. Its system role is limited to sorting inert material that can go directly to the RDF and stabilizing the remaining compostable material in the WSF."*
- **Consistent with 1997 HRM/MIRROR NS contract,1999 CMC Agreement & HRM's NSE Approval to Operate**
  - Only <u>processed waste</u> to be delivered to the RDF

Review of the Jan 2013 Stantec Report

2. Inconsistent characterization of the current mixed waste stream *

- **Stantec; significant changes to the waste stream since Otter Lake was commissioned**
  - Less recyclables and compostables in mixed waste stream
  - FEP/WSF no longer necessary
- **2010/11 HRM Staff Reports; in support of Clear Bags**
  - Large quantities of recyclables/organics arriving at the FEP
  - Tipping floor photographs, estimate of 62,000 tonnes/year
- **HRM Tonnage Data**
  - Modest changes in Otter Lake, MRF and Composting Facility tonnages since 2000/01

HRM Facility Tonnage Data



HRM Staff FEP Photos



Review of the Jan 2013 Stantec Report

3. Failure to acknowledge the "gatekeeper" effect of the FEP *

- **NS Environment – Materials banned from landfills**
- **Load checking and rejection**
  - From 2008-2012, average of 612 warnings and 40 rejections per year
- **An incentive for source separation**
  - Rejected loads have to be taken off site and resorted – expensive and time consuming for collection contractors
  - An encouragement for collectors to educate their clients
- **Without the gatekeeper role…**
  - An increase in recyclables, organics, hazardous materials and other banned items in mixed loads

Review of the Jan 2013 Stantec Report

***4. Failure to acknowledge the reduction in bird and blowing litter concerns as a key community benefit of the FEP/WSF** **

- **Lessons from Highway 101 Landfill**
  - Resident seagull population, blowing litter, visible putrescible waste
- **A commitment to process prior to disposal; FEP/WSF**
  - Reduced attractiveness to birds
  - Reduced amounts of blowing litter/debris
  - No visible putrescible organics to attract pests and insects

Review of the Jan 2013 Stantec Report

5. Selection of unrepresentative landfill sites as a basis for an analysis of RDF operating costs *

- **11 landfill sites from across Canada and the US**
- **Reduced liner standards**
  - Five Ontario sites with "clay only" liners (NS before 1992)
  - Four US sites with single composite liners (vs. NS double composite standard)
- **Five "mega-sites"**
  - Four in the US, one in Ontario
  - Five to over 19 times the waste received at the RDF in 2012
- **Lower capital costs, significant economy of scale advantages**

Review of the Jan 2013 Stantec Report

6. Failure to recognize the local and provincial commitment implications of reducing the current RDF liner standard *

- **Six landfill sites developed based on the NS liner standard**
  - "Double composite" liner; first specified by NS Environment in 1992
  - Very beneficial when addressing host community concerns regarding potential groundwater impacts
- **Implications to reducing existing standard**
  - Reneging on previous community commitments; in HRM and five other NS communities
  - Otter Lake RDF; fractured bedrock adjacent to Nine Mile River

Review of the Jan 2013 Stantec Report

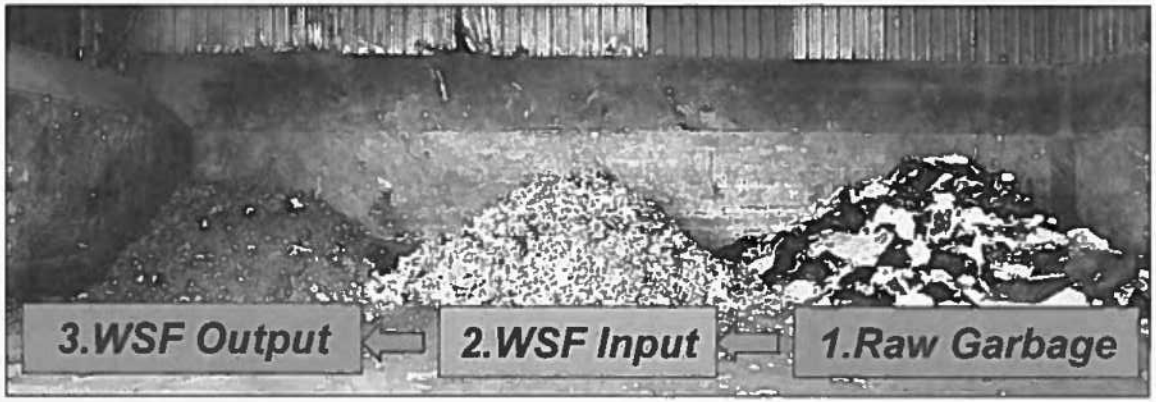
7. Unrealistic & unsubstantiated estimate of schedule and costs to establish a waste resource campus

- ***Campus* = Composting, Anaerobic Digester, MRF at one location**
- **Very limited information**
  - No assumptions, details or conceptual layouts to support the site size or cost estimate for a $10 million, 40 hectare regional campus
- **Very ambitious development schedule**
  - Less than two years to identify, purchase, design, permit, tender and construct a site to host regional waste management infrastructure
- **Lack of appreciation of the issues**
  - Lessons learned in HRM during the 90s
  - Significant technical, regulatory, social and political complexities to establish waste management facilities

Plus Two Additional SNC Lavalin Items

8. Inaccurate description of WSF process

- **SNC Lavalin conclusion;**
  - *"…accurate to describe the waste leaving the WSF as being drier, rather than being more physically or chemically stabilized"*
- **Sorting, shredding, 15-18 days in the WSF = stabilized**
- **Consistent with 1997 HRM/MIRROR NS contract,1999 CMC Agreement & HRM's NSE Approval to Operate**



Plus Two Additional SNC Lavalin Items

9. Extensive use of "Soft Data"

- **Presentation of costs with limited detail or explanation**
  - A concern carried forward from the Stantec document
  - A number of unsubstantiated cost estimates
  - Good example; Table on Page viii of the Executive Summary
- **Use of a 40 year Otter Lake projection period**
  - Otter Lake contract ends in 2023; uncertainty after that
  - *Soft costs x a long period = a big number*
  - $12,000,000 x 40 years = $480,000,000 (Section 5.3)
  - The need for a rigorous, defendable financial analysis prior to selecting any potential changes

Plus Two Additional SNC Lavalin Items

9. Extensive use of "Soft Data" (cont.)

- **The "$170/tonne" value**
  - Using the same (apparent) methodology:
    - 2011/12 = **$90/tonne**; 2010/11 = **$200/tonne**; 2009/10 = **$116/tonne**
  - *Highly variable*, linked to reserve fund requirements for RDF liner and cap construction
  - Were the other referenced LF costs ($75) calculated the same way?
- **The FEP/WSF Mass Balance (as just presented)**
  - Not included in Stantec/SNC Lavalin reports; some noted math errors
  - Unclear how new tonnage numbers were calculated (or if they are relevant)
  - Not an accurate representation of what occurs at the FEP/WSF
  - No previous concerns brought forward by HRM staff

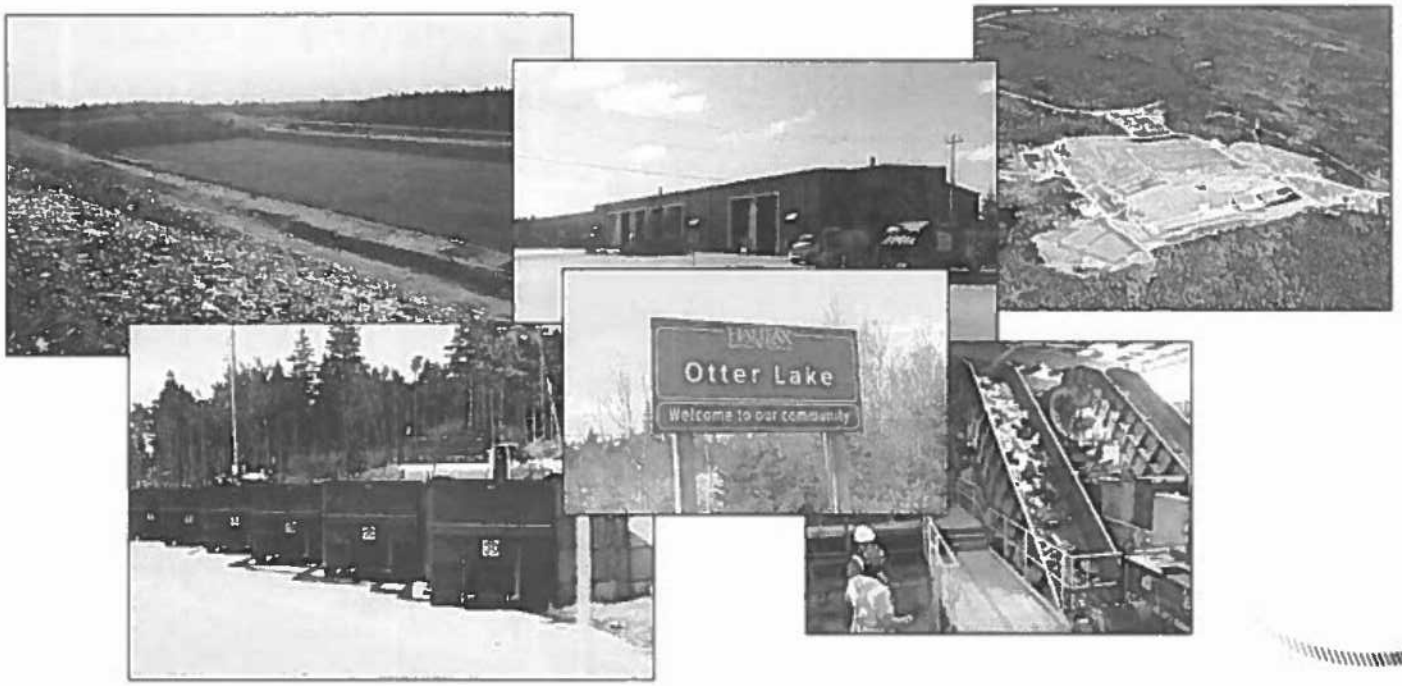
In Summary - 9 Items of Concern

1. *Incorrect definition of the intended role of the FEP/WSF**
2. *Inconsistent characterization of the current mixed waste stream**
3. *Failure to acknowledge the "gatekeeper" effect of the FEP**
4. *Failure to acknowledge the reduction in bird and blowing litter concerns as a key community benefit of the FEP/WSF**
5. *Selection of unrepresentative landfill sites as a basis for an analysis of RDF operating costs**

In Summary - 9 Items of Concern

6. *Failure to recognize the local and provincial commitment implications of reducing the current RDF liner standard**
7. *Unrealistic & unsubstantiated estimate of schedule and costs to establish a waste resource campus*
8. *Inaccurate description of WSF process*
9. *Extensive use of "Soft Data"*

Thank you



DILLON
CONSULTING

Misconceptions vs. Truths

Misconception	Truth
Waste Stream has changed	Waste Stream At Otter Lake has not changed
Technology has changed, like cell phones have	Waste technology has changed little, Stantec says so
Landfill costs are 3x higher	Landfill operating costs similar, processing, regulations adds costs
Closing FEP and WSF is "evolving" the waste management system	Would roll system back to 1980's style landfill
The WSF just "partially dries organics"	You have seen the output for yourself

Why We Are Here

Sackville Landfill Photo



Toronto garbage stinks in Southwold Township, locals complain

Toronto's trash, dumped at the Green Lane landfill, has been greeted by protests from First Nations youth and complaints from residents. The city says it's trying its best.

Text size: Reset Report an Error + save to mystar



DAVE CHIDLEY / FOR THE TORONTO STAR

Protesters from the nearby Oneida First Nation march at the entrance to Toronto's Green Lane landfill site near London.

By: Katie Daubs GTA, Published on Fri Jun 07 2013

SOUTHWOLD TOWNSHIP, ONT.—There was a time when Monica Pennings could plan a barbecue free from fear of stench.

EXPLORE THIS STORY

4 PHOTOS

History

- Halifax County took on waste management in 1994
  - After failure of Metropolitan Authority process
- Pure form of public policy development (CSC)
  - Citizens developed diversion strategy and sited landfill
  - Tertiary treatment at landfill for added community protection
  - 25 year agreement
  - Landfill close to generation, increased environment/community protection
- Endorsed by County and HRM Councils
- Public embraced program

Host Community Commitment

* 3 instruments provide guarantee
  * Community Monitoring Committee Partnership
  * Nova Scotia Environment Operating Permit
  * Contract with Operator
* Intended to ensure commitment kept
* Otter Lake operation has proven to be successful
* Local communities have kept their side of deal, expect HRM to keep their side

Key Objective - Financial

* Elephant in the Room
  * Save $ while increase risk of local property devaluation, odour, birds, nuisance issues
  * Look at staff report projections - 40 years = $400 million, designed to get attention
  * Focus should be on impacts to the local community

Provincial Authority

* Minister of Environment has authority
* Required support from Province is not there
* Community engagement will not change this
* Risk significant harm to your relationship with the host community and HRM's overall credibility

Closing Comments

* Confirm commitment to host community for balance of 10 years, consistent with provincial decision
* Reject recommendations for closure of FEP/WSF and other proposed changes at Otter Lake
* Remove issue of closure of FEP/WSF from consultation process
* Interest by the wider community in saving $ does not justify reneging on an agreement with the local community

HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 10.3.1
Halifax Regional Council
April 23, 2013

TO: Mayor Savage and Members of Halifax Regional Council

SUBMITTED BY: Original signed
Councillor Dalrymple, Chair, Environment & Sustainability Standing Committee

DATE: April 8, 2013

SUBJECT: Waste Strategy Public Consultation Process

RECOMMENDATION REPORT

ORIGIN

- Regional Council, February 5, 2013 – Item 12.2.1
  Motion: Direct the CAO to report to the Environment and Sustainability Standing Committee the recommendation for the design of a public consultation exercise
- Environment and Sustainability Standing Committee, April 4, 2013 – Item 5.1

LEGISLATIVE AUTHORITY

HRM Charter, Part XIII, Solid Waste Resource Management

RECOMMENDATION

The Environment and Sustainability Standing Committee recommends that Halifax Regional Council:

1. Approve the public engagement plan as outlined in the discussion section of staff report of February 26, 2013 including direct consultation with the local community in the form of town hall meetings;

2. That the scope of the public consultation process include the historical context of the Community Stakeholder Committee (CSC) process that led to the development of

Recommendations Continue on Page 2.....

the waste management strategy, the CSC siting criteria for the Otter Lake facility, including the purpose of the Front End Processing Facility and Waste Stabilization Facility, and commitments to the local as well as the recommendations of the Stantec Report; and

3. That, to support the public consultation process, the In Camera Report of February 5, 2013 be released, with the exception of any legal advice provided in the report.

BACKGROUND

On February 5, 2013 Regional Council, having received the *Solid Waste Resource Strategy Review Report* from Stantec Consulting Limited, directed staff to report back to the Environment and Sustainability Standing Committee with a public consultation plan.

The discussion was deferred at the March 7, 2013 meeting of the Environment & Sustainability Committee to enable more time for review and input by the Community Monitoring Committee.

At the Environment and Sustainability Standing Committee meeting of April 4, 2013 a staff report dated February 26, 2013, outlining the proposed public engagement strategy, was before the Standing Committee.

DISCUSSION

Following written submission and presentation of the Community Monitoring Committee and clarification regarding the proposed public engagement process provided by the Deputy Chief Administrative Officer (DCAO), these three motions were put forward:

1. That the ESSC endorse the public consultation plan and recommend that Halifax Regional Council approve the engagement plan as outlined in the discussion section of the February 26, 2013 staff report including direct consultation with the local community in the form of town hall meetings;

2. That the ESSC recommend to Regional Council that the scope of the public consultation process include the historical context of the Community Stakeholder Committee (CSC) process that led to the development of the waste management strategy, the CSC siting criteria for the Otter Lake facility, including the purpose of the Front End Processing Facility and Waste Stabilization Facility, and commitments to the local community and the recommendations of the Stantec Report of January 2013; and

3. That the ESSC recommend to Halifax Regional Council that, to support the public consultation process, that the In Camera Report of February 5, 2013 be released with the exception of any legal advice provided in the report.

In their deliberations, the Standing Committee was mindful of the direction provided on February 5, 2013 by Halifax Regional Council, namely:

That Halifax Regional Council:

1. Release the Stantec Waste Resource Strategy report of January 2013

2. Direct Staff to initiate public consultation on the Stantec Report options and recommendations beginning with the Community Monitoring Committee and in particular recommendations A1 and A3 that:

    a. The Front End Process (FEP) and Waste Stabilization Facility (WSF) be closed
    b. The life of the Otter Lake Landfill be extended through vertical expansion

3. Direct Staff that as part of the public consultation process to initiate discussions with the operator of the Otter Lake Landfill concerning the implications of the Stantec Report options and recommendations

4. Direct the CAO to report to the Environment and Sustainability Standing Committee with a recommendation for the design of a public consultation exercise.

Motion Put and Passed

It was the position of the majority of the members of the Standing Committee that the proposed motions would provide:

- Necessary clarity to the nature of the public engagement process to be undertaken
- The context for the public engagement process to be undertaken

And, that the release of the Private and Confidential report of February 5, 2013 would provide further information for the public as background and serve to inform the consultation process.

The Standing Committee further requested staff to provide regular updates on the public engagement process to Halifax Regional Council, to which the DCAO agreed.

FINANCIAL IMPLICATIONS

Financial implications are outlined in the staff report dated February 26, 2013.

COMMUNITY ENGAGEMENT

Meetings of the Standing Committee, including that of April 4, 2013 at which the matter was discussed, are held in public.

ENVIRONMENTAL IMPLICATIONS

None were identified.

ALTERNATIVES

None were identified.

ATTACHMENTS

1. Staff Report dated February 26, 2013
2. Correspondence from the Community Monitoring Committee dated April 4, 2013

A copy of this report can be obtained online at http://www.halifax.ca/council/agendasc/cagenda.html then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Ted Aubut, Legislative Assistant, 490-6519

Community Monitoring Committee Presentation to Environment and Sustainability Standing Committee

April 4, 2013

HALIFAX REGIONAL MUNICIPALITY

ENVIRONMENT AND SUSTAINABILITY STANDING COMMITTEE

MINUTES

April 4, 2013

PRESENT: Councillor Barry Dalrymple, Chair
Councillor Jennifer Watts, Vice Chair
Deputy Mayor Reg Rankin
Councillor Lorelei Nicoll
Councillor Darren Fisher
Councillor Bill Karsten
Councillor Steve Craig

STAFF: Mr. Mike Labrecque, Deputy Chief Administrative Officer
Mr. Martin Ward, General Counsel
Mr. Joshua Judah, Solicitor
Mr. Colin Taylor, Solicitor
Mr. Ken Reashor, Director, Transportation & Public Works
Ms Jane Fraser, Director, Planning & Infrastructure
Mr Bruce Debaie, Managing Director, Communications
Mr. Richard MacLellan, Manager, Energy and Environment
Mr. Gord Helm, Manager, Solid Waste Resources
Ms. Cathy Mellett, Municipal Clerk
Mr. Ted Aubut, Legislative Assistant

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1. CALL TO ORDER

The Chair called the meeting to order at 1:05 p.m. in the Council Chamber at 1841 Argyle Street, Halifax. He thanked residents in the gallery for their interest before reviewing the rules of procedure.

2. APPROVAL OF MINUTES – March 7, 2013

MOVED by Councillor Nicoll, seconded by Councillor Karsten that minutes of March 7, 2013 be approved, as presented. MOTION PUT AND PASSED.

3. APPROVAL OF THE ORDER OF BUSINESS AND APPROVAL OF ADDITIONS AND DELETION

Additions:

9.1 Councillor Dalrymple – Correspondence from Councillor Adams regarding Community Consultation on Stantec Report Recommendations

9.2 Deputy Mayor Rankin – Information Report regarding FCM Sustainable Communities Conference held February 13-15, 2013

9.3 Councillor Craig – Information Item 2 – Draft Regional Plan 5 Year Review, Chapter 8 – Municipal Services, Utilities, Solid Waste & Energy

Deletions:

6.3.2 Presentation from Oathill Lake Conservation Society regarding modifications to storm sewer outfall entering Oathill Lake

To be rescheduled.

6.3.3 Presentation from Ecology Action Centre regarding the benefits of managing stormwater through low impact development

To be rescheduled.

The Standing Committee agreed that items 6.3.1 and 9.1 should be dealt with in conjunction with item 5.1.

MOVED by Councillor Watts, seconded by Councillor Craig that the agenda be approved, as amended. MOTION PUT AND PASSED.

4. BUSINESS ARISING OUT OF THE MINUTES

4.1 Status Sheet Update

No updates were requested.

5. CONSIDERATION OF DEFERRED BUSINESS

5.1 Recommendation Report dated February 26, 2013 regarding Waste Strategy – Public Consultation Process

The following documents were before the Standing Committee:

- Recommendation Report dated February 26, 2013
- Stantec's Waste Resource Strategy Update dated January 2013
- Correspondence from the Community Monitoring Committee dated April 4, 2013
- Correspondence from Councillor Adams dated April 2, 2013

The Standing Committee agreed to hear the Community Monitoring Committee's presentation (Item 6.3.1) at this time.

Mr. Ken Donnelly, communications consultant, indicated that he would be speaking on behalf of the Community Monitoring Committee (CMC). He thanked the Standing Committee for deferring discussion of the Waste Strategy Public Consultation Process by one month in order for the CMC to provide input.

Mr. Donnelly explained that the CMC oversees operations at the Otter Lake facility and liaises with the local community to ensure that it is in informed and heard. The CMC also comments on changes to the waste system that would impact the Otter Lake facility. Mr. Donnelly noted that the CMC was established by way of a legal agreement with HRM and includes, among its members, three members of Regional Council.

Mr. Donnelly drew attention to page 2 of the staff report of March 7, 2013 which outlines the 10 principles that guide HRM's community engagement strategy. He believed that the proposal before the Standing Committee did not adequately meet 5 of these 10 principles.

He noted that the proposed consultation process has a number of strengths, including the organization of facilitated cafés and an online engagement tool. However, no meetings with the local community are planned. He believed this to be a mistake, noting that the CMC and the local community are distinct stakeholders and must both be consulted. Mr. Donnelly similarly questioned HRM's approach to soliciting feedback. He observed that public and industry stakeholders won't be invited to the same sessions. Instead, he encouraged HRM to host sessions that bring together varied stakeholders to ensure the input received is not fragmented.

Mr. Donnelly cautioned the Standing Committee about the consultation's narrow scope. He encouraged HRM to provide more information on, among other things, the history of the Otter Lake site and the provincial Operation Permit process. He believed that better informed participants would provide more thoughtful feedback.
Mr. Donnelly offered to work with staff to develop a public consultation plan that is satisfactory both to HRM and to the CMC. He believed this could be done before the next meeting of the Standing Committee, on May 2, 2013.

The Chair thanked Mr. Donnelly for his presentation and invited members of the Standing Committee to ask questions.

Councillor Karsten agreed that the local community must be consulted, and felt that the report clearly addressed this. He pointed to page 4, second column, as an example.

Deputy Mayor Rankin thanked the many residents in attendance, including Bill Estabrooks, MLA for Timberlea-Prospect. He asked Mr. Donnelly to comment on the importance of distinguishing between the local and broader community.

Mr. Donnelly replied that there is a greater sense of urgency within the local community because it will be impacted more deeply than the broader community. Given this, the local community should be consulted, and it should be consulted first.

Deputy Mayor Rankin reminded the Standing Committee that the Front End Processing Facility, the Waste Stabilization Facility and the Residuals Disposal Facility at Otter Lake operate under the watch of Nova Scotia Environment. He did not feel that the Province's role was adequately addressed in the report before them.

Councillor Craig explained that he had lived through the siting of the Sackville landfill and, based on this experience, can appreciate the concerns of residents near the Otter Lake facility.

Deputy Mayor Rankin noted that the Stantec Report of January 2013 recommends that Otter Lake becomes a regional waste resource campus equipped with a composting facility. He objected to this, noting that a campus had not been part of HRM's original agreement with the host community.

There was a brief discussion about the parameters of the debate. The Chair, having consulted with the Solicitor, ruled that the discussion should be limited to the public consultation plan.

Councillor Nicoll noted that HRM is committed to improving its public engagement process. She then asked Mr. Donnelly to explain how the CMC proposes to work with staff in the short-term

Mr. Donnelly suggested that the CMC meet with staff to resolve weaknesses in the current consultation plan, such as its narrow scope. The revised plan could then be forwarded to the Standing Committee for review.

Mr. Mike Labrecque, Deputy Chief Administrative Officer reminded the Standing Committee that the proposed consultation plan is to serve the entire Waste Strategy Review. Otter Lake is one component of this review and, as indicated in the report, both the CMC and the local community will be consulted. He emphasized that HRM's intent, from the beginning, has been to engage the community.

The Chair reminded the Standing Committee that Regional Council is waiting for them to provide input on the draft consultation plan.

MOVED by Councillor Watts, seconded by Councillor Karsten that the Environment and Sustainability Standing Committee:

1. **Endorse the plan and recommend that Halifax Regional Council approve the engagement plan as outlined in the discussion section of the February 26, 2013 staff report including direct consultation with the local community in the form of town hall meetings;**

2. **Recommend to Halifax Regional Council that the scope of the public consultation process include the historical context of the Community Stakeholder Committee (CSC) process that led to the development of the waste management strategy, the CSC siting criteria for the Otter Lake facility, including the purpose of the Front End Processing Facility and Waste Stabilization Facility, and commitments to the local community as well as the recommendations of the Stantec Report; and**

3. **Recommend to Halifax Regional Council that, to support the public consultation process, the in camera report of February 5, 2013 be released with the exception of any legal advice provided in the report.**

Councillor Watts noted the importance of consulting the local community and suggested that a variety of engagement models be used, including facilitated cafés and online tools, as each has its strengths and generates different responses. Moreover, she felt that broadening the scope of the consultations would allow participants to better understand the context of decisions made in the past and of decisions to be made in the future.

Deputy Mayor Rankin reiterated that discussions must focus on the format *and* the content of the public consultations. He expressed concern over the lack of local consultation to date, noting that the host community had not been involved in the Stantec Report. To this, he added that the onus is on Regional Council to ensure that the host community and surrounding environment is sufficiently protected from the Otter

Lake facility. Given this, he wished to know if HRM had solicited input from the Province, which regulates the Otter Lake site.

Mr. Labrecque indicated that HRM consults with the Province on all matters. In these early stages of the review process, it was difficult to stipulate who will be involved and where the discussions will go.

Councillor Craig indicated that he would not be supporting part 1 of the motion because the staff report does not provide the level of detail required. Given this, he thought it was premature for the Standing Committee to endorse the public consultation plan. He agreed that the local community must be consulted, but so too must the broader community; all residents have a stake in how solid waste is managed, those that live close to facilities and those that do not.

Councillor Fisher believed that the motion addressed the weaknesses cited, including the need to consult with the local community. He felt that the staff report implied that local consultations would be held but acknowledged that this should be clearly expressed. He concluded by expressing support for the motion.

Deputy Mayor Rankin indicated that he would not be supporting the motion because it did not sufficiently protect the community from a potential expansion of the facility. Instead, he suggested the following amendment to the motion:

That the Environment and Sustainability Standing Committee request staff to meet with the Community Monitoring Committee to jointly develop a local community public consultation process that allows for the communities around Otter Lake to give meaningful input as a community and includes:

- **The historical context of the Community Stakeholder Committee (CSC) process that led to the development of the waste management strategy, the CSC siting criteria for the Otter Lake facility, including the purpose of the Front End Processing Facility and Waste Stabilization Facility, and commitments to the local community; and**
- **The findings of the Stantec Report**

Mr. Martin Ward, General Counsel noted that the proposed amendment was not friendly. Given this, the Standing Committee would have to defeat the existing motion before voting on that proposed by the Deputy Mayor. He also reminded the Standing Committee that Regional Council had directed staff to design a consultation plan, not to jointly develop a consultation plan with the CMC. For this reason, he believed that the proposed amendment does not follow what Regional Council had asked. The Standing Committee, he added, cannot change a motion of Regional Council.

As there was no seconder, the motion was lost.

Councillor Nicoll requested that part 1of the motion clarify that the Standing Committee endorses *the public consultation plan* rather than *the plan*. To this, the Standing Committee agreed.

Councillor Watts observed that the CMC is listed as the first stakeholder in the report. She wished to know if this meant that it would be consulted first or if many stakeholders would be consulted simultaneously. Regardless of the process, she requested that staff provide regular updates, possibly every month, to the Standing Committee and Regional Council.

Mr. Labrecque replied that the consultation process could take 8 to 12 weeks, with initial recommendations coming back to the Standing Committee in early fall 2013. He indicated that staff would provide regular updates to members of Regional Council during the process.

Mr. Bruce Debaie, Managing Director of Corporate Communications clarified that the online engagement tool would be open for the full 8 to 12 weeks of the consultation period. He also agreed to provide updates to Council on the online component.

Councillor Craig thanked staff for providing these details. He noted that was now comfortable moving forward with the consultation plan.

Deputy Mayor Rankin requested that, at the very least, part 1 of the motion stipulate that the local community will be heard first.

The Standing Committee then voted on each part of the motion separately.

That the Environment and Sustainability Standing Committee endorse the public consultation plan and recommend that Halifax Regional Council approve the engagement plan as outlined in the discussion section of the February 26, 2013 staff report including direct consultation with the local community in the form of town hall meetings

PART 1 PUT AND PASSED.

That the Environment and Sustainability Standing Committee recommend to Halifax Regional Council that the scope of the public consultation process include the historical context of the Community Stakeholder Committee (CSC) process that led to the development of the waste management strategy, the CSC siting criteria for the Otter Lake facility, including the purpose of the Front End Processing Facility and Waste Stabilization Facility, and commitments to the local community as well as the recommendations of the Stantec Report.

PART 2 PUT AND PASSED.

That the Environment and Sustainability Standing Committee recommend to Halifax Regional Council that, to support the public consultation process, that the in camera report of February 5, 2013 be released with the exception of any legal advice provided in the report.

PART 3 PUT AND PASSED.

The Standing Committee recessed at 2:46 pm, at which time Deputy Mayor Rankin left the meeting. Mr. Martin Ward also left the meeting with Mr. Joshua Judah taking his place as Solicitor.

The meeting resumed at 2:53 pm.

6. CORRESPONDENCE, PETITIONS & DELEGATIONS

6.1 Correspondence

6.1.1 Presentation Request from Hefler Forest Products regarding COMFIT program

An Information Report dated March 27, 2013 outlining Hefler Forest Products' request was before the Standing Committee.

The Chair asked staff to comment on the request before them.

Mr. Richard MacLellan, Manager of Energy and Environment, explained that staff have entered into discussions with Hefler Forest Products and, together, they are exploring options to fulfill the requirements of their COMFIT application. Given this, he suggested that this matter be discussed at the next agenda planning meeting.

MOVED by Councillor Watts, seconded by Councillor Nicoll that the request for presentation be discussed at the upcoming agenda planning meeting. MOTION PUT AND PASSED.

6.1.2 Presentation Request from Nova Scotia Power regarding Power Shift Atlantic Research Project

An Information Report dated March 27, 2013 outlining Nova Scotia Power's request was before the Standing Committee.

MOVED by Councillor Watts, seconded by Councillor Nicoll that the Environment and Sustainability Standing Committee invite Nova Scotia Power to the meeting of May 2, 2013. MOTION PUT AND PASSED.

6.2 Petitions - NONE

6.3 Presentations

6.3.1 Community Monitoring Committee regarding Waste Strategy – Public Consultation Process

Presentation held in conjunction with item 5.1.

6.3.2 Oathill Lake Conservation Society regarding modifications to the storm sewer outfall entering Oathill Lake

The presentation was postponed with no date set.

6.3.3 Ecology Action Centre regarding benefits of managing stormwater through low impact development

The presentation was postponed with no date set.

Councillor Fisher exited the meeting at 2:55 pm.

6.3.4 Federation of Canadian Municipalities regarding Municipal Access Agreements

Mr. Daniel Rubinstein, Policy Analyst for the Canadian Federation of Municipalities explained that he is a member of the policy and research team that supports FCM's Standing Committee on Infrastructure and Transportation Policy. He indicated that FCM has been working on rights of way issues since it was founded in 1901.

Mr. Rubinstein noted that work undertaken in the right of way comes at a significant cost to municipalities. Disturbed pavement weakens the integrity of the asset and shortens its lifespan; in many cases equipment must be relocated; and, in most cases, work in the right of way results in lost productivity. To these costs are added risks to municipal works crews, to utilities and contractors, and to the public at large.

Mr. Rubinstein cited a study that found that between 2002 and 2007, municipalities subsidized telecommunications companies through access to rights of way in the amount of $107 million per year.

Managing access to the right of way is also a challenge. Mr. Rubinstein indicated that FCM has developed a number of resources to assist municipalities, including the creation of a technical committee on telecommunications and rights of way, the publication of a Rights of Way Handbook and of a model access agreement, and the creation of a Rights of Way Legal Defence Fund.

Mr. Rubinstein then outlined key legislation and case law that affects the right of way, including the Telecommunications Act of 1993 and Ledcor v. Vancouver of 2001. In the latter, the Canadian Radio-Television and Telecommunications Commission (CRTC)

established the concept of causal costs, ruling that municipalities are only allowed to charge carriers for costs related to rights of way.

Mr. Rubinstein described a number of elements that FCM believed should be part of a Municipal Access Agreement process, including general requirements to obtain a permit, a permit application process and the establishment of a Utility Coordination Committee. To these, he added that an agreement should outline a causal cost framework, which may include some of the following:

- Pavement degradation fees
- Lost productivity costs
- Lost parking meter revenue and miscellaneous charges

He recommended that the Agreement include a fee renegotiation clause, and that the fee structure take into account inflation. The Agreement, he continued, should also address liability and indemnity costs, insurance, termination provisions as well as penalties and remedies.

In his concluding remarks, Mr. Rubinstein reminded the Standing Committee that wireless antennas are not telecommunications infrastructure and therefore cannot be covered under a Municipal Access Agreement. He noted, further, that increasing permit fees may be a way for municipalities to offset lost productivity as a result of work in the right of way.

The Chair thanked Mr. Rubinstein for his presentation and invited members to ask questions.

Councillor Karsten asked staff to comment on HRM's next steps, in terms of bylaw or policy formulation, given the work undertaken by FCM.

Mr. MacLellan indicated that HRM is represented on FCM's Technical Committee on Telecommunications and Rights of Way. He then described HRM's relocation policy, noting that a sliding scale approach would have an impact on HRM's streetscape projects.

Mr. Colin Taylor, Solicitor added that the model municipal access agreement prepared by the CRTC contains some terms that differ from those that HRM has traditionally used, particularly in the area of relocation costs.

7. REPORTS

7.1 Reports from members of the Standing Committee

7.1.1 Councillor Watts - District energy at Cogswell Interchange Redevelopment

A Request for Consideration report prepared by Councillor Watts was before the Standing Committee.

Mr. MacLellan, at the Standing Committee's request, briefly explained the heat potential of the Cogswell Interchange Site, which is the subject of a redevelopment study.

In lieu of requesting a staff report, the Standing Committee requested that staff consider district energy options as part of the redevelopment study and that, in the interim, they be provided with the Cogswell Interchange Fact Sheet that had been prepared for the Strategic Urban Partnership.

7.1.2 Councillor Watts – Natural Gas Installation in HRM

A Request for Consideration report prepared by Councillor Watts was before the Standing Committee.

Councillor Watts outlined a number of issues that she believed were impeding natural gas installation in HRM.

After a brief discussion, the Standing Committee requested that staff, in their upcoming community energy report, consider ways to promote natural gas installation, including in new subdivisions.

8. MOTIONS

8.1 Councillor Watts

That the Environment and Sustainability Standing Committee request staff to implement and recommend a policy to Halifax Regional Council to ensure that all new HRM corporate buildings are "Solar Ready" for the future.

Discussion of this motion was deferred to the next meeting.

9. ADDED ITEMS

9.1 Councillor Dalrymple – Correspondence from Councillor Adams regarding Community Consultation on Stantec Report Recommendations

This was dealt with as part of item 5.1.

9.2 Deputy Mayor Rankin – Information Report regarding FCM Sustainable Communities Conference held February 13-15, 2013

As Deputy Mayor Rankin was not present, there was no discussion of this matter.

9.3 Councillor Craig – Information Item 2 – Draft Regional Plan 5 Year Review, Chapter 8 – Municipal Services, Utilities, Solid Waste & Energy

Discussion of this matter was deferred to the next meeting. In the interim, members were invited to submit their comments on the draft to the Community Design Advisory Committee, which will be meeting on April 17, 2013.

10. NOTICES OF MOTION - NONE

11. NEXT MEETING DATE - May 2, 2013 (Dartmouth Chamber)

12. IN CAMERA - NONE

13. ADJOURNMENT

The meeting adjourned at 3:45 pm.

Ted Aubut
Legislative Assistant

HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Attachment 1

Environment & Sustainability Standing Committee
March 7, 2013

TO: Chair and Members of Environment & Sustainability Standing Committee

SUBMITTED BY: Original Signed
Richard Butts, Chief Administrative Officer

DATE: February 26, 2013

SUBJECT: Waste Strategy Public Consultation Process

ORIGIN

- Regional Council Session February 5, 2013 , Item 12.2.1 Solid Waste Strategy Review
- Motion: Direct the CAO to report to the Environmental and Sustainability Standing Committee (ESSC) the recommendation for the design of a public consultation exercise.

LEGISLATIVE AUTHORITY

HRM Charter, Part XIII, Solid-Waste Resource Management

RECOMMENDATION

It is recommended that ESSC endorse the plan and recommend that Regional Council approve the engagement plan as outlined in the discussion section of this report.

BACKGROUND

On February 5, 2013, Halifax Regional Council approved the distribution of the Stantec Consulting Ltd. Solid Waste Resource Strategy Review Report, January 2013. The report identified options and recommendations to evolve HRM's Integrated Solid Waste Resource Management system to reflect the source separation successes achieved to date, the evolving nature of HRM's waste streams and technological advances of the waste industry since the strategy was implemented in 1997.

Regional Council's adoption in principle of the Community Stakeholders Committee (CSC) "Integrated Solid Waste Resource Strategy," 1995, followed an extensive public process. Community consultation continues to be an important component of the ongoing strategy review by collecting critical feedback for Regional Council to consider in the evolution of the Solid Waste Strategy.

Regional Council's commitment to public consultation is found in HRM's Community Engagement (CE) Strategy, approved in December 2008, which recognizes the need for a process, tools and tactics designed to seek input from stakeholders following HRM's Principles of Community Engagement.

1. Citizen participation is recognized as an asset. It is valued and encouraged;
2. The purpose and the process are clear to all participants;
3. Everyone potentially affected by the process has an opportunity to become involved;
4. Barriers to access are recognized and overcome to ensure diverse, inclusive and balanced participation;
5. The process is respectful, fair, effective and transparent;
6. Communication is clear, timely and effective;
7. Public involvement is adequately resourced;
8. Participants are informed of outcomes of community engagement;
9. The public has an opportunity to provide feedback at the various stages of the process; and,
10. Community engagement will be evaluated and improved.

On February 5, 2013, Regional Council also directed staff to report back to the Environmental Sustainability Standing Committee (ESSC) with the plan for public consultation on the Stantec Report options and recommendations, starting immediately with the Community Monitoring Committee (CMC) and the operator of the Otter Lake landfill and progressing through broad public engagement with HRM citizens and stakeholders.

DISCUSSION

A critical next step in determining options on how to evolve the integrated solid waste resource system is the requirement for a decision around the status of the Otter Lake landfill site. The Stantec report outlines a number of recommendations for changing the operating model and

extending the life of the site. Council has directed staff to undertake consultation on these options and recommendations, with an initial focus on providing the necessary information to help Regional Council determine the future for Otter Lake and the facilities operating model. Stantec has indicated that operating model changes could enhance the environmental, operational and economic efficiency of HRM's integrated waste resource management system while maintaining or enhancing the objectives set out in the CSC 1995 strategy. This fundamental decision is critical because the other system component options and recommendations are intrinsically linked to a decision on the future of the Otter Lake site.

Therefore, the primary purpose of this public engagement consultation is to provide Regional Council with the necessary community and stakeholder feedback to determine the future intentions for the Otter Lake site.

This consultation will be conducted in three components:

1. Consultation with the CMC to gather existing opinions on the options as outlined in the report in order to identify conflicts or issues through feedback to Regional Council;
2. Gather informed and considered options from industry stakeholders in terms of the implications and opportunities represented by the options and recommendations outlined in the report; and,
3. Creating opportunities for the public and other stakeholders to talk to each other and to HRM about the options and recommendations as outlined in the report.

This multi-faceted engagement process is intended to enable Regional Council to make a direct decision on the future intentions for the Otter Lake site.

The general framework for the Community Engagement program will be sub-divided into three parts.

Integrated Solid Waste Resource Management System Consultation Process			
Stakeholder Group	**Consultation Purpose**	**Consultation Process**	**Desired Outcomes**
Community Monitoring Committee	1. Engage CMC in a workshop to jointly review key technical aspects of the report, and gather specific CMC feedback on report recommendations to: • Close the Front End	Third-party moderated discussions between CMC, HRM and Stantec personnel to: • Gather feedback for Regional Council's consideration when it decides the future	Initial feedback is compiled/analyzed and incorporated into the recommendation report to ESSC and Regional Council in July-August 2013.

	Processor and Waste Stabilization Facility • Extend the life of the Otter Lake landfill site through vertical cell expansion • Modify the NS landfill liner specification • Create a centralized waste resource campus	intentions for the Otter Lake site • Discuss opportunities for joint engagement activities with the local communities and stakeholders	
Public	Engage all citizens to gather feedback on the Stantec report and on ways to increase reuse/reduce behaviours and identify new measures to make enhancing diversion simpler and more efficient.	Host third-party facilitated community open house sessions in • The local community with joint participation from CMC • Regional locations that offer reasonable opportunity for interested residents to participate	Feedback on the report and on potential outcomes of evolving the solid waste system is compiled/ analyzed and incorporated into the recommendation report to ESCC and Regional Council in July-August 2013
Online Forum	Engage a wide spectrum of HRM citizens to gather feedback on the report and to seed virtual discussions about what citizens are willing to do to achieve the	Launch online engagement tool (e.g. Bang the Table) that incorporates moderated forums, surveys, story gathering and Q&A tools to share information within the	A summary of community engagement activities and responses to all public input is completed and shared with ESSC/Regional Council and the public as part of the recommendation report

	necessary diversion of organics and recyclables currently going into the landfill.	Stantec report; solicit and share participants' views on the long term future of the overall waste management system in HRM including the potential for a campus.	in July-August 2013. HRM's commitment to evolving the solid waste resource system is affirmed, and a plan to increase education and participation in diversion strategies is approved and implemented.
Waste Industry Stakeholders	Engage contracted and industry partners to gather feedback on the Stantec report and to identify challenges and opportunities between the current dissipated facility systems verses a waste campus environment. Explore issues related to proposed infrastructure development model in relation to capacity and regulatory compliance requirements and the potential development of independent ICI processing capacity.	Host an industry brain storming and idea exchange session to gather feedback on the report and develop more detailed analysis requirements and implications of evolving the system to meet program objectives.	Feedback is compiled/ analyzed and incorporated into the recommendation report to ESSC and Regional Council in July-August 2013 outlining: • Any changes in existing operations or new initiatives needed to increase diversion • Implications of the required future state of composting facilities to meet future provincial regulations • Preliminary business case data on the options related to development of future infrastructure to meet near to mid-term capacity requirements • Factors for

			considering either status quo or a centralized campus model for the future state of the Otter Lake site
ICI stakeholders	Engage ICI sectors in order to gather feedback on the Stantec report and to identify opportunities to improve diversion and enhance program guidelines compliance.	Host a targeted forum for ICI sectors to • Gather feedback on the report • Identify what issues are preventing enhanced ICI source separation • Achieve increases to diversion of organics and recyclables.	Feedback is compiled/ analyzed and incorporated into the recommendation report to ESCC and Regional Council in July-August 2013 Diversion remains the Key Performance Indicator (KPI) for the solid waste program. The report outlines options and recommendations on maintaining strategy outcome objectives through updated program initiatives targeted at specific sector constraints.

Ongoing interactive engagement opportunities are proposed on a go forward basis in the form of a community "conversation" designed to inform and engage discussion of program options as identified in the Stantec report, as well as other suggestions that may come forward during community sessions. Community engagement can also be used to affirm or possibly refine the original Solid Waste Strategy Principles upon which the current system is based.

Sessions will be facilitated by staff and contracted consultants. Consultant services are to include personnel to assist in the design and implementation of communication mechanisms, and facilitate and manage the interactive engagement sessions.

Facilitators will be responsible for planning engagement events including logistics, materials, promotion, presentation and reporting on feedback. Consultant support will assist in analyzing public and stakeholder input, collating and developing written results and summaries of the engagement process and measuring results. Consultant support services will be secured through directed consulting service contracts.

HRM staff will be involved in the engagement program to develop promotional and communication tools, manage media and public relations, and develop content for the program website, Twitter, online surveys, and Facebook mechanisms. Based on environmental mapping, staff will also compile stakeholder lists, existing system data and relevant reports to be shared with the public as part of the engagement conversation.

The 8-12 week period of public consultation will include targeted, café style open house meetings as well as facilitated stakeholder focus group sessions. Broad and sustained online community engagement activities will support consultation goals by using diverse ways to share, listen and learn from many residents and communities across HRM. Participants will engage moderated forums, interactive Q&A's, surveys and quick polls to identify and share interests and concerns.

The public consultation process will be comprehensive and inclusive, and will feature focus group sessions with key community and industry stakeholder groups including:

- CMC
- Otter Lake landfill operators
- Other associations (the Investment Property Owners Association of Nova Scotia (IPOANS), Canadian Restaurant and Food Services Association (CFRA), Restaurant Association of Nova Scotia)
- Waste/Resource facility operators
- Commercial and contracted waste haulers

A stakeholder list will be formulated from the data used in recent HRM CE activities including RP+5 and Regional Planning. Print, broadcast and online promotion of all engagement events and initiatives will be placed in mainstream and community-based media outlets well in advance of scheduled dates.

A summary of community engagement activities and responses to all public input will be completed and shared with the public as part of the recommendation report to ESSC/Regional Council in July-August 2013.

FINANCIAL IMPLICATIONS

Consultant Services will be funded through Solid Waste Resources budget account R333-6303 (Communication and Education, Consulting Fees). Venue bookings, supporting print, visual, advertising, and communication materials will be funded through Solid Waste Resources budget account R333-6916 (Communication and Education, Public Education).

COMMUNITY ENGAGEMENT

This report outlines the community engagement process being advanced for the Solid Waste Resource Management System Review.

ENVIRONMENTAL IMPLICATIONS

Environmental implications of evolution of the Solid Waste Management Strategy are being considered as part of the conversation in the public engagement process.

ALTERNATIVES

N/A

ATTACHMENTS

Nil

A copy of this report can be obtained online at http://www.halifax.ca/commcoun/cc.html then choose the appropriate Community Council and meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Gord Helm, Manager, Solid Waste Resources, 490-6606

Report Approved by: Original Signed
Ken Reashor, P.Eng., Director, Transportation and Public Works, 490-4855

Original Signed

Financial Approval by:
Greg Keefe, Director of Finance and Information Technology/CFO, 490-6308

Attachment 2

TO: Chair and Members of Environment & Sustainability Standing Committee

SUBMITTED BY:

Jack Mitchell, Chair, Otter Lake Community Monitoring Committee

DATE: April 4, 2013

SUBJECT: Waste Strategy Public Consultation Process

Origin:

- ESSC Recommendation Report – Waste Strategy Public Consultation Process
- Deferral of discussion on March 7, 2012 to allow for comment from the Community Monitoring Committee

Recommendation

We have one recommendation for ESSC:

1. Recommend that HRM Council request staff to:
    a. Have Stantec re-evaluate the Otter Lake FEP and WSF facilities with respect to their actual purpose, which is to ensure that only stable, inert and residual materials are buried at Otter Lake, as defined in the Agreement between HRM and the Halifax Waste/Resource Society;
    b. Evaluate and report back to ESSC on the implications of breaking the Agreement between HRM and the Halifax Waste/Resource Society, which represents the community at large and is a founding creator, along with HRM, of the CMC;
    c. Develop a full-cost accounting model to ensure that consultations can consider the true net financial benefits to recommended changes at Otter Lake to the waste management system;
    d. Amend the consultation plan such that it includes elements of direct consultation with local communities around the Otter Lake landfill facility in a direct, open and meaningful manner that allows them to provide input as a collective community.

Background

Halifax Regional Council has released the Stantec Consulting Limited **Solid Waste Resource Strategy Review Report** and has directed staff to report to the Environmental Sustainability Standing Committee (ESSC) with the plan for public consultation on the Stantec Report options and recommendations, starting immediately

with the Community Monitoring Committee (CMC) and the operator of the Otter Lake landfill and progressing through broad public engagement with HRM citizens and stakeholders.

In the mid-1990's a top-down approach by the Metropolitan Authority to develop a waste management solution failed miserably with the proposed incinerator solution being rejected at the environmental assessment stage. With the Highway 101 landfill in Sackville nearing its end-of-life, the municipalities of Halifax, Dartmouth, Bedford and Halifax County were back to square one in developing a solution. With the incineration option taken off the table, the two remaining disposal options were to export the waste to a willing host or to find a landfill within the boundaries of Halifax County. With no communities interested in receiving the waste, Halifax County assumed responsibility for waste disposal and for developing an integrated waste management solution designed by the community.

In only 13 months, a large group of approximately 100 community volunteers from Hubbards to Ecum Secum, known as the Community Stakeholders Committee (CSC), held over 50 meetings across HRM to develop the integrated waste management solution that resolved the crisis. The resultant strategy reached by community consensus comprises a comprehensive diversion regime including expanded recycling, and curbside collection and processing of source-separated organics, and a disposal solution designed to be a good neighbour to the host community by ensuring a high-level of environmental and community protection. This public consultation effort was arguably the most extensive ever held in Nova Scotia in the history of solid waste planning under local government.

The CSC envisioned a landfill that was the antithesis of the Highway 101 landfill in Sackville. It would not have seagulls, odours, leachate problems, and unsightly litter. It would not be a threat to groundwater, surface water nor air quality. It would not require compensation to be paid to the host community. The siting of the landfill was based on a landfill that contained only stable waste. This was a key factor in allowing the landfill to be developed in a space that was relatively close to urban communities, thus saving over the long term, significant transportation and environmental costs.

When Otter Lake was presented as the disposal site, it was on the condition that all elements of the integrated waste management system are present. Halifax Regional Council agreed and built them, and made a commitment to the people of Beechville, Lakeside, Timberlea and Prospect that the protection envisioned by the CSC would be an integral part of the Otter Lake facility. This commitment was formalized in a written agreement between Halifax Regional Municipality and the Halifax Waste/Resource Society.

For 15 years, there has never been a notion that HRM would backtrack on its promise to the local communities that hosted the landfill. That ended in February, with the Stantec report recommending that the environmental and community protections at the Otter Lake landfill be removed to save money.

Discussion

The staff recommendation report submitted to ESSC contains the following description of the purpose of the consultation:

> "A critical next step in determining options on how to evolve the integrated solid waste resource system is the requirement for a decision around the status of the Otter Lake landfill site. The Stantec report outlines a number of recommendations for changing the operating model and extending the life of the site. Council has directed staff to undertake consultation on these options and recommendations, with an initial focus on providing the necessary information to help Regional Council determine the future for Otter Lake and the facilities operating model."

ESSC has received a proposed consultation plan from staff that is flawed as it pertains to discussions about changes at Otter Lake. It is flawed because:

1. Its purpose is to consult with the public on recommended actions that were developed through analysis that conducted performance measurements using an inappropriate yardstick;
2. There is insufficient financial information to proceed to consultation on the Otter Lake elements;
3. It recommends consulting with the public on such things as how to encourage better source separation, rather than the impact of the recommendations at Otter Lake;
4. It does not adequately address consultation with the stakeholders which would be most affected by the Otter Lake recommendations if they were adopted;
5. It recommends consultation techniques, such as world cafés, online discussion forums and focus groups, that preclude the host community from having an opportunity to provide its input to the process directly and as a community;
6. It makes no mention of the agreement between Halifax Regional Municipality and the Halifax Waste/Resource Society to only allow, through processing on site, stabilized, inert waste to be disposed in the landfill.

The following explains each of these flaws, and makes recommendations for effective, straightforward consultation with the affected communities.

<u>The Recommendations to Close the FEP and WSF are Based on Improper Analysis</u>

Halifax Regional Municipality is in receipt of a report from Stantec Consulting Limited that makes recommendations based on flawed evaluations of facilities by using the wrong performance metrics.

The Stantec Report recommends closing the Front-End-Processing Facility (FEP) because it does not divert enough recyclable material to make it economical. It also

recommends closing the Waste Stabilization Facility (WSF) because it does not make valuable, commercial compost. Based on these flawed assessments, they deem the two facilities to have no useful purpose.

The problem with those prominent recommendations in the Stantec report is that diversion of waste was never the primary purpose of the FEP and WSF. The primary purpose of the FEP and WSF is to ensure that the material that is buried at Otter Lake is stable. Yes, recyclable material that makes its way in garbage containers to the Otter Lake landfill are picked off the conveyor belts and sent for recycling. That is done because it makes sense to recover them when they are readily available and accessible as they pass by staff on conveyor belts. But the diversion that occurs at the facilities is secondary to the main purpose: to ensure environmental and community protection.

The FEP was conceived, designed, and built to examine the waste stream and divert organic material to the WSF where it is forced to break down in an accelerated manner through an in-vessel composting system, before it is buried in the landfill. These twin facilities (FEP and WSF) exist to ensure that raw organics do not go into the landfill, as they did in Sackville, where they would otherwise slowly decay and produce methane gas and leachate for decades, as they do in Sackville to this day, 17 years after it was closed. These two facilities exist to ensure that the waste going into the landfill meets the requirement of being only inert material, stable material and residual wastes.

This is a very important clarification. The recommendations to close the FEP and WSF were made based on a measurement of the wrong performance indicator. It is akin to recommending the brakes and airbags on a car should be removed because an assessment has indicated they are making no contribution to the top-end speed of the vehicle and are an unnecessary cost. The recommendations to close the facilities are just as invalid.

This is fundamentally important because the staff plan on public consultation is to solicit input on these flawed recommendations, made from a flawed assessment, as if they were valid, which they are not. To consult on these recommendations is disingenuous at best.

It is recommended that, before consultation begins, HRM conduct a proper assessment of the performance of the FEP and WSF against performance indicators for their intended primary purpose of providing environmental and community protection. With the results of that proper assessment, the integrity of the public consultation will be much improved. Without it, the consultation will be focused on why HRM used a different, and inappropriate, yardstick to reach its conclusions.

<u>There is Insufficient Financial Information to Proceed to Consultation</u>

True, open consultation requires complete information, and this is not available at this time. While the Stantec Report speaks in detail about potential savings at Otter Lake, there are virtually no details when discussing the costs or potential benefits of some of the other recommendations. For instance, there is a reference that increased frequency of recycling collection could increase recycling capture rates, but there is no information on how much that would cost nor how much recycling capture rates might increase in HRM. It is essential that the detailed information is available at the time of consultation in order for people to provide informed input. After all, it is an integrated waste management system, as the Stantec report and staff point out.

For this reason, the CMC recommends that HRM undertake a full-cost accounting of the waste management system options that are being proposed before consulting with the public on proposed changes at Otter Lake.

<u>The Consultations Do Not Address The Effects of The Recommendations on The Local Community</u>

The recommendations for consultation with the public has as its stated purpose:

> "Engage all citizens to gather feedback on the Stantec report and on ways to increase reuse/reduce behaviours and identify new measures to make enhancing diversion simpler and more efficient."

The CMC supports any efforts to increase reuse/reduce behaviours and making diversion simpler, and believes that the consultation on these elements of the Stantec report can proceed without delay.

However, this has nothing to do with the recommendations made by Stantec to close the FEP and WSF, to reduce the landfill liners, to extend the life of the landfill by 23 years by increasing height and establishing more waste management facilities at the site. The public should also be consulted on proposed changes at Otter Lake, but that cannot be properly done until a proper assessment of the facility is made using the proper performance indicators.

<u>The Consultations Do Not Address The Stakeholders Most Affected by the Recommendations</u>

The only recommended consultation actions in this plan that are specific to the local community are to have a mediated consultation with the Community Monitoring Committee. It is essential to understand and respect that the CMC is not the local community. The CMC was created by HRM to provide oversight of the Otter Lake landfill facility and to communicate with the local communities, which it does. However, consulting with the CMC does not equate to consulting with the local communities. HRM must consult directly with the local communities of Beechville, Lakeside, Timberlea and Prospect on any recommended changes at Otter Lake.

The consultation plan is long on details on how it will get input from such "stakeholders" as the general public, waste professionals and the Industrial, Commercial and Institutional sector, but little detail on how it will get direct input from the people most affected by the recommended changes, those that live in the affected communities.

The Consultation Techniques Proposed Are Inappropriate to the Task

The proposed consultation plan employs such techniques as:

- World cafés, where people sit around in small groups and create plans and wish lists;
- Online forums, where people never even see each other, much less have direct interaction;
- Focus groups, where small samples of 8 or 10 people are invited to a facilitated conversation;
- Idea exchange/brainstorming sessions; and,
- Open houses, where people are invited to look at displays and speak one-on-one with project staff.

These techniques are often employed to avoid direct interaction with communities as a whole, and are considered by consultation practitioners as tools to divide and conquer and avoid the discomfort of having to deal with large, organized groups of stakeholders. They can be effective when planning a library, but are not the proper tools for dealing with recommendations that have the potential to have large impacts on the community such as the Stantec recommendations for Otter Lake. None of these techniques will allow the local, collective community voice to be heard. In fact, it appears that the consultation plan may have been designed to ensure that does not happen, and that will be transparent to the local community.

Proper consultation with the people of Beechville, Lakeside, Timberlea and Prospect must include town hall meetings where HRM staff and consultants will present their findings, defend their recommendations, answer questions and directly hear the collective input of the most affected stakeholders.

Similarly, the proposed consultations are for an 8-12 week period, with a report coming to Council in July/August. The timelines are unreasonable and the consultations will most likely extend into the summer, when people are distracted and many are away on summer vacation. Best practices of meaningful, effective consultation avoid summer vacation periods to allow as many people as possible to participate. The people of Beechville, Lakeside, Timberlea and Otter Lake deserve every opportunity to have their say with respect to these proposed changes.

The Consultation Plan Does Not Address the Commitment to the Local Community to Only Bury Acceptable Wastes

The Consultation Plan, and indeed the Stantec report, is silent on the commitment by Halifax Regional Municipality that only:

- Inert Materials;
- Stable Materials; and,
- Residual Waste

will be buried at the Otter Lake landfill. This commitment was made in the agreement between HRM and the Halifax Waste/Resource Society, specifically in Section 2.03. That agreement is attached.

Ignoring this agreement will not make it go away. The agreement is valid and in force, and any action by HRM to remove the facilities that ensure this material is stable and inert would be in contravention of the agreement. This agreement must be a topic of discussion in consultation with the local community. To not deal with this agreement in a straightforward manner would be making a mistake very similar to that made in the sale of St. Pat's Alexander. In fact it would be worse, because this is much more than an internal policy document, it is a written, executed agreement with the local community.

Conclusion

In summary, the CMC believes that, when it comes to the local communities around the Otter Lake landfill, the recommendations of the consultation plan presented to ESSC is inadequate. As it stands, it consults the wrong groups on the wrong topics using the wrong techniques.

CMC urges ESSC to follow our recommendations in order to ensure that the local communities of Beechville, Lakeside, Timberlea and Prospect are:

1. Provided with a proper assessment of the Otter Lake facilities, particularly the FEP and WSF, against the proper performance indicators;
2. Given the opportunity, as a community, to hear presentations on the findings and recommendations about Otter Lake and to have their questions answered in an open, transparent and inclusive forum;
3. Engaged in a discussion about the written agreement between HRM and the Halifax Waste/Resource Society regarding the disposal of acceptable materials at the Otter Lake landfill.

CMC is willing to meet with staff and work to develop a way forward to fix the flaws in the Stantec report with respect to Otter Lake, and to develop an open, transparent

and inclusive consultation process around all of the issues surrounding the facility, including HRM's agreement with the Halifax Waste/Resource Society.

HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Environment & Sustainability Standing Committee
March 7, 2013

TO: Chair and Members of Environment & Sustainability Standing Committee

SUBMITTED BY: Original Signed
Richard Butts, Chief Administrative Officer

DATE: February 26, 2013

SUBJECT: Waste Strategy Public Consultation Process

ORIGIN

- Regional Council Session February 5, 2013 , Item 12.2.1 Solid Waste Strategy Review
- Motion: Direct the CAO to report to the Environmental and Sustainability Standing Committee (ESSC) the recommendation for the design of a public consultation exercise.

LEGISLATIVE AUTHORITY

HRM Charter, Part XIII, Solid-Waste Resource Management

RECOMMENDATION

It is recommended that ESSC endorse the plan and recommend that Regional Council approve the engagement plan as outlined in the discussion section of this report.

BACKGROUND

On February 5, 2013, Halifax Regional Council approved the distribution of the Stantec Consulting Ltd. Solid Waste Resource Strategy Review Report, January 2013. The report identified options and recommendations to evolve HRM's Integrated Solid Waste Resource Management system to reflect the source separation successes achieved to date, the evolving nature of HRM's waste streams and technological advances of the waste industry since the strategy was implemented in 1997.

Regional Council's adoption in principle of the Community Stakeholders Committee (CSC) "Integrated Solid Waste Resource Strategy," 1995, followed an extensive public process. Community consultation continues to be an important component of the ongoing strategy review by collecting critical feedback for Regional Council to consider in the evolution of the Solid Waste Strategy.

Regional Council's commitment to public consultation is found in HRM's Community Engagement (CE) Strategy, approved in December 2008, which recognizes the need for a process, tools and tactics designed to seek input from stakeholders following HRM's Principles of Community Engagement.

1. Citizen participation is recognized as an asset. It is valued and encouraged;
2. The purpose and the process are clear to all participants;
3. Everyone potentially affected by the process has an opportunity to become involved;
4. Barriers to access are recognized and overcome to ensure diverse, inclusive and balanced participation;
5. The process is respectful, fair, effective and transparent;
6. Communication is clear, timely and effective;
7. Public involvement is adequately resourced;
8. Participants are informed of outcomes of community engagement;
9. The public has an opportunity to provide feedback at the various stages of the process; and,
10. Community engagement will be evaluated and improved.

On February 5, 2013, Regional Council also directed staff to report back to the Environmental Sustainability Standing Committee (ESSC) with the plan for public consultation on the Stantec Report options and recommendations, starting immediately with the Community Monitoring Committee (CMC) and the operator of the Otter Lake landfill and progressing through broad public engagement with HRM citizens and stakeholders.

DISCUSSION

A critical next step in determining options on how to evolve the integrated solid waste resource system is the requirement for a decision around the status of the Otter Lake landfill site. The Stantec report outlines a number of recommendations for changing the operating model and

extending the life of the site. Council has directed staff to undertake consultation on these options and recommendations, with an initial focus on providing the necessary information to help Regional Council determine the future for Otter Lake and the facilities operating model. Stantec has indicated that operating model changes could enhance the environmental, operational and economic efficiency of HRM's integrated waste resource management system while maintaining or enhancing the objectives set out in the CSC 1995 strategy. This fundamental decision is critical because the other system component options and recommendations are intrinsically linked to a decision on the future of the Otter Lake site.

Therefore, the primary purpose of this public engagement consultation is to provide Regional Council with the necessary community and stakeholder feedback to determine the future intentions for the Otter Lake site.

This consultation will be conducted in three components:

1. Consultation with the CMC to gather existing opinions on the options as outlined in the report in order to identify conflicts or issues through feedback to Regional Council;
2. Gather informed and considered options from industry stakeholders in terms of the implications and opportunities represented by the options and recommendations outlined in the report; and,
3. Creating opportunities for the public and other stakeholders to talk to each other and to HRM about the options and recommendations as outlined in the report.

This multi-faceted engagement process is intended to enable Regional Council to make a direct decision on the future intentions for the Otter Lake site.

The general framework for the Community Engagement program will be sub-divided into three parts.

Integrated Solid Waste Resource Management System Consultation Process			
Stakeholder Group	**Consultation Purpose**	**Consultation Process**	**Desired Outcomes**
Community Monitoring Committee	1. Engage CMC in a workshop to jointly review key technical aspects of the report, and gather specific CMC feedback on report recommendations to: • Close the Front End	Third-party moderated discussions between CMC, HRM and Stantec personnel to: • Gather feedback for Regional Council's consideration when it decides the future	Initial feedback is compiled/analyzed and incorporated into the recommendation report to ESSC and Regional Council in July-August 2013.

	Processor and Waste Stabilization Facility • Extend the life of the Otter Lake landfill site through vertical cell expansion • Modify the NS landfill liner specification • Create a centralized waste resource campus	intentions for the Otter Lake site • Discuss opportunities for joint engagement activities with the local communities and stakeholders	
Public	Engage all citizens to gather feedback on the Stantec report and on ways to increase reuse/reduce behaviours and identify new measures to make enhancing diversion simpler and more efficient.	Host third-party facilitated community open house sessions in • The local community with joint participation from CMC • Regional locations that offer reasonable opportunity for interested residents to participate	Feedback on the report and on potential outcomes of evolving the solid waste system is compiled/ analyzed and incorporated into the recommendation report to ESCC and Regional Council in July-August 2013
Online Forum	Engage a wide spectrum of HRM citizens to gather feedback on the report and to seed virtual discussions about what citizens are willing to do to achieve the	Launch online engagement tool (e.g. Bang the Table) that incorporates moderated forums, surveys, story gathering and Q&A tools to share information within the	A summary of community engagement activities and responses to all public input is completed and shared with ESSC/Regional Council and the public as part of the recommendation report

	necessary diversion of organics and recyclables currently going into the landfill.	Stantec report; solicit and share participants' views on the long term future of the overall waste management system in HRM including the potential for a campus.	in July-August 2013. HRM's commitment to evolving the solid waste resource system is affirmed, and a plan to increase education and participation in diversion strategies is approved and implemented.
Waste Industry Stakeholders	Engage contracted and industry partners to gather feedback on the Stantec report and to identify challenges and opportunities between the current dissipated facility systems verses a waste campus environment. Explore issues related to proposed infrastructure development model in relation to capacity and regulatory compliance requirements and the potential development of independent ICI processing capacity.	Host an industry brain storming and idea exchange session to gather feedback on the report and develop more detailed analysis requirements and implications of evolving the system to meet program objectives.	Feedback is compiled/ analyzed and incorporated into the recommendation report to ESSC and Regional Council in July-August 2013 outlining: • Any changes in existing operations or new initiatives needed to increase diversion • Implications of the required future state of composting facilities to meet future provincial regulations • Preliminary business case data on the options related to development of future infrastructure to meet near to mid-term capacity requirements • Factors for

			considering either status quo or a centralized campus model for the future state of the Otter Lake site
ICI stakeholders	Engage ICI sectors in order to gather feedback on the Stantec report and to identify opportunities to improve diversion and enhance program guidelines compliance.	Host a targeted forum for ICI sectors to • Gather feedback on the report • Identify what issues are preventing enhanced ICI source separation • Achieve increases to diversion of organics and recyclables.	Feedback is compiled/ analyzed and incorporated into the recommendation report to ESCC and Regional Council in July-August 2013 Diversion remains the Key Performance Indicator (KPI) for the solid waste program. The report outlines options and recommendations on maintaining strategy outcome objectives through updated program initiatives targeted at specific sector constraints.

Ongoing interactive engagement opportunities are proposed on a go forward basis in the form of a community "conversation" designed to inform and engage discussion of program options as identified in the Stantec report, as well as other suggestions that may come forward during community sessions. Community engagement can also be used to affirm or possibly refine the original Solid Waste Strategy Principles upon which the current system is based.

Sessions will be facilitated by staff and contracted consultants. Consultant services are to include personnel to assist in the design and implementation of communication mechanisms, and facilitate and manage the interactive engagement sessions.

Facilitators will be responsible for planning engagement events including logistics, materials, promotion, presentation and reporting on feedback. Consultant support will assist in analyzing public and stakeholder input, collating and developing written results and summaries of the engagement process and measuring results. Consultant support services will be secured through directed consulting service contracts.

HRM staff will be involved in the engagement program to develop promotional and communication tools, manage media and public relations, and develop content for the program website, Twitter, online surveys, and Facebook mechanisms. Based on environmental mapping, staff will also compile stakeholder lists, existing system data and relevant reports to be shared with the public as part of the engagement conversation.

The 8-12 week period of public consultation will include targeted, café style open house meetings as well as facilitated stakeholder focus group sessions. Broad and sustained online community engagement activities will support consultation goals by using diverse ways to share, listen and learn from many residents and communities across HRM. Participants will engage moderated forums, interactive Q&A's, surveys and quick polls to identify and share interests and concerns.

The public consultation process will be comprehensive and inclusive, and will feature focus group sessions with key community and industry stakeholder groups including:

- CMC
- Otter Lake landfill operators
- Other associations (the Investment Property Owners Association of Nova Scotia (IPOANS), Canadian Restaurant and Food Services Association (CFRA), Restaurant Association of Nova Scotia)
- Waste/Resource facility operators
- Commercial and contracted waste haulers

A stakeholder list will be formulated from the data used in recent HRM CE activities including RP+5 and Regional Planning. Print, broadcast and online promotion of all engagement events and initiatives will be placed in mainstream and community-based media outlets well in advance of scheduled dates.

A summary of community engagement activities and responses to all public input will be completed and shared with the public as part of the recommendation report to ESSC/Regional Council in July-August 2013.

FINANCIAL IMPLICATIONS

Consultant Services will be funded through Solid Waste Resources budget account R333-6303 (Communication and Education, Consulting Fees). Venue bookings, supporting print, visual, advertising, and communication materials will be funded through Solid Waste Resources budget account R333-6916 (Communication and Education, Public Education).

COMMUNITY ENGAGEMENT

This report outlines the community engagement process being advanced for the Solid Waste Resource Management System Review.

ENVIRONMENTAL IMPLICATIONS

Environmental implications of evolution of the Solid Waste Management Strategy are being considered as part of the conversation in the public engagement process.

ALTERNATIVES

N/A

ATTACHMENTS

Nil

A copy of this report can be obtained online at http://www.halifax.ca/commcoun/cc.html then choose the appropriate Community Council and meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Gord Helm, Manager, Solid Waste Resources, 490-6606

Original Signed

Report Approved by:

Ken Reashor, P.Eng., Director, Transportation and Public Works, 490-4855

Original Signed

Financial Approval by:

Greg Keefe, Director of Finance and Information Technology/CFO, 490-6308

DECLASSIFIED
FOIPOP Review April 19/2013
Approved to Release [redacted]
Date April 23/2013 Pending Council Decision

HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 12.2.1
Halifax Regional Council
February 5, 2013
In Camera

TO: Mayor Savage and Members of Halifax Regional Council

SUBMITTED BY: Original signed by
Richard Butts, Chief Administrative Officer

Original Signed by
Mike Labrecque, Deputy Chief Administrative Officer

DATE: January 6, 2013

SUBJECT: Solid Waste Strategy Review – Otter Lake Analysis

PRIVATE & CONFIDENTIAL

ORIGIN

- Transportation and Public Works FY 2012/13 Business Plan – Solid Waste Resources Priorities;
- Regional Council Report - Solid Waste Resource Management Strategy System Review - Project Budget Allocation, 10 July, 2012

LEGISLATIVE AUTHORITY

HRM Charter, Part III, Section 60, Power to make policies, Item (b)

RECOMMENDATION

It is recommended that Halifax Regional Council:

1. Release the Stantec Waste Resource Strategy Report, January 2013.
2. Direct staff to initiate public consultation on the Stantec Report options and recommendations beginning with the Community Monitoring Committee concerning recommendations A1 and A3 that:
   i. The Front End Processor (FEP) and Waste Stabilization Facility (WSF) be closed by the end of 2013; and
   ii. The life of the Otter Lake Landfill be extended through vertical expansion.
3. Direct staff to initiate consultation with the operator of the Otter Lake Landfill concerning recommendation A1 and A3 of the Stantec Report and report back to Council.

BACKGROUND

In 1996, Regional Council adopted, in principle, the Citizens Stakeholder Committee (CSC) vision for a new Integrated Solid Waste/Resource Management System (the "Strategy"). The Strategy evolved from a public process to develop a framework for the implementation of an environmentally and fiscally sustainable waste management system for the Region that would be "acceptable for the next 100 years..."[1] The CSC vision for processing the residual {garbage} waste stream was intended to divert materials from landfill and produce marketable compost and recover marketable recyclables. HRM's integrated waste management system also included two composting facilities and an upgrade of the municipality's Materials Recovery Facility (MRF).

The Strategy, as envisioned by the CSC, relied on education and communication to achieve behavioural change and enshrined source separation as the foundation of citizen diversion efforts. The CSC vision introduced green carts which would enable residents and businesses to separate organics from their waste and recyclable materials. These new streams, organics and recyclables, would be resource streams. Resource streams would be collected separately and processed at appropriate facilities other than the landfill. The introduction of the green cart and source separated organics collection was a revolutionary Halifax innovation which has changed the municipal waste stream and been replicated across North America (NA).

As part of CSC's vision for a 100-year solution and maximized diversion from landfill, the Strategy committed to process compostable organics or recyclable materials out of the residual waste stream that had not been properly separated at source. This was to divert valuable resources from landfill, significantly reducing what actually ended up in the landfill and the resulting financial burden landfill operations placed on the municipality. This pre-processing of materials before they were placed in the landfill (RDF) was the origin of the Front End Processor (FEP) and Waste Stabilization Facility (WSF). This concept evolved into what became a different operational model at the Otter Lake site. The consultant was unable to identify another site in NA utilizing an FEP/WSF processing operation as employed at Otter Lake.

The CSC established an ambitious Strategy goal in 1995 of 88% diversion from landfill within two years. Resident and private sector buy-in, participation through behavioural change and effective source separation were critical factors in achieving the 100 year solution. The environmental objective was to dramatically reduce waste delivered to the landfill and achieve significant reductions and long-term sustainability of landfill costs and site life.

The community and environmental impacts resulting from the Sackville Landfill were the catalyst for the resulting public process to identify a new model for HRM. A critical objective of the CSC Strategy was minimizing the negative impacts from gases, odours, leachate and vectors resulting from organic and putrescible materials decomposing in the landfill[2]. CSC envisioned

[1] An Integrated ~~Waste~~/Resource Management Strategy for Halifax County/Halifax/Dartmouth/Bedford, Prepared by The Community Stakeholder Committee (CSC) and Adopted in Principle, page 2, March 25. 1995.
[2] An Integrated ~~Waste~~/Resource Management Strategy, page ii, 1995

Redacted – direct contract reference

that ultimately, in a mature system, source separation would result in organics being sent to compost processing plants. Source separation and green carts were the innovative keys to practically and sustainably minimizing organic materials in the landfill and the negative environmental impact of odorous Greenhouse gases they produce.

The CSC recognized that behavioral change for effective source separation, at home and at work places, would not happen overnight. The FEP/WSF model was intended to bridge the gap while behaviour changed. This new system would address the objective of minimizing the negative impacts from gases, odours, leachate and vectors. It was envisioned that the system would then be "scaled down in a planned manner as source separated centralized composting scaled up."[3]

The existing Otter Lake operating model evolved from the original CSC Strategy vision. Processing of materials to divert organic and recyclable materials from landfill was changed to processing of all materials prior to them being placed in the landfill. Analysis at the time suggested that no marketable compost could be produced through the waste stream. This is an important distinction. The original intent of the FEP/WSF was to increase diversion from landfill, justifying the additional system costs. The implemented operating model at Otter Lake maintained diversion as an objective but was more focused on the environmental and community objectives of minimizing the negative impacts from gases, odours, leachate and vectors. The intent was to create a dry landfill by processing everything through the FEP prior to the RDF.

Council approved the contract with MIRROR on July 15, 1997. The "Agreement For The Design, Construction And Operation Of Components Of The Halifax Regional Municipality's Solid Waste Facilities" dated July 25, 1997. Key considerations for the contract included:

- A 25 year operating contract with MIRROR, with operations to commence no later than January 1, 1999, and expiring December 31, 2024, or when the facility reached capacity, whichever came earlier;
- The contract included the design, construction and operation of the Otter Lake facilities as detailed in the agreement and operating plan;
- The site required a Provincial Operating Approval which currently includes the processing of materials through the Front End Processor (FEP) and Waste Stabilization Facility (WSF). However, there is no legislative requirement for the FEP or WSF and the operating approval can be modified upon submission of a revised operating plan;
- Landfill cells were required to be built to Provincial cell design specifications as per the Nova Scotia Landfill Guidelines. These specifications can be modified upon submission of validating analysis to support design changes which maintain environmental protection;
- Upon completion of construction, all new cells require a Provincial Operating Approval, which is updated as each new cell is developed;
- The MIRROR agreement has subsequently been amended 15 times through supplemental agreements as new price agreements were negotiated and new cells were constructed and closed;

[3] An Integrated ~~Waste~~/Resource Management Strategy, page 7, 1995.

- The last pricing agreement was negotiated and approved by Regional Council September 20, 2011, expiring March 31, 2016; and,
- Cell 6, approved for construction September 20, 2011, commenced operations October 18, 2012. Cell 6 is forecasted to reach capacity in the summer of 2016. Staff are projecting a request of approval for construction of cell 7 from Council in the FY 2015/16 capital budget.

Duration of Operations at the Otter Lake Site

The Regional Plan, approved in 2006, outlines the following in terms of planning for the future at the Otter Lake landfill site and alternative options:

- SU-22 states HRM shall, through a public consultation process as defined by Council, consider all options for a new regional waste processing and disposal facility, including siting a new facility, extending the life of the existing facility, and exploring waste diversion initiatives.

The MIRROR contract outlines details of the process and work which would be undertaken if Council decided to close the Otter Lake site on completion of the contract term, either 2024 or when the site reaches capacity in the original planned nine (9) cells whichever occurs first

Redacted – direct contract Reference

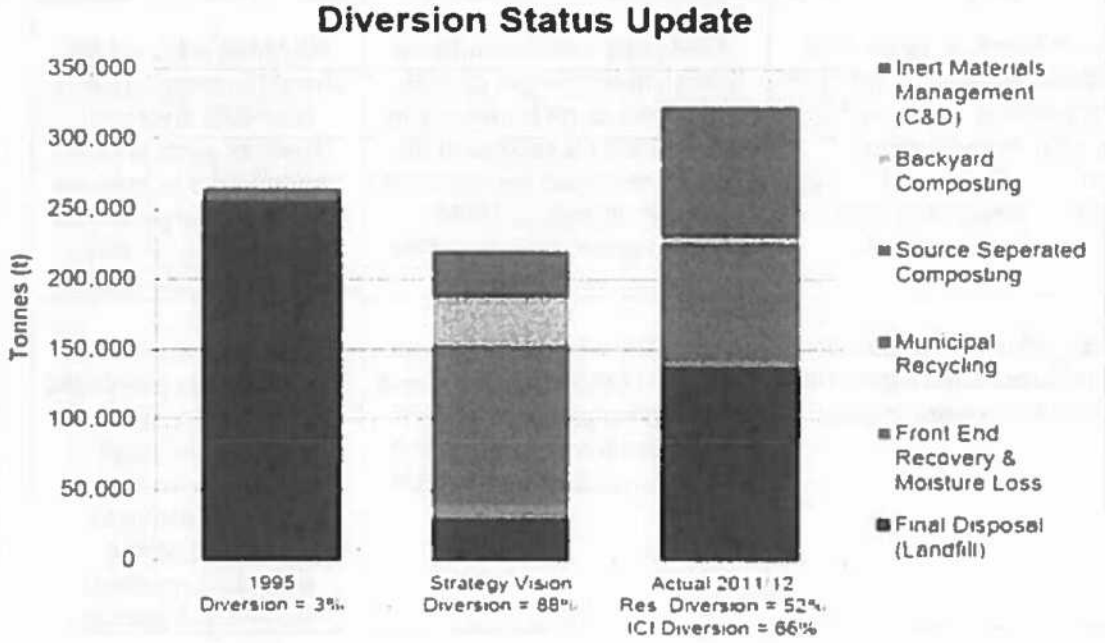
HRM's diversion is comprised of two separate and distinct components. Materials generated within the residential sector, for which HRM has responsibility for collection and disposal, and the Institutional Commercial Industrial (ICI) sector, for which private companies are responsible for collection and disposal. The ICI sector diversion calculation includes materials processed at private facilities including paper and construction and demolition materials. Since the adoption of the Strategy in 1997, HRM has achieved an overall blended diversion rate of 62% (2012). HRM's residential diversion of 52% is one of the highest in the country for similar sized cities. HRM's ICI diversion of 66% is also a significant achievement.

The Province calculates diversion based on a formula using kg/capita and the baseline year of actual tonnage per capita placed in the landfill in 1989. At that time, HRM was over 800kg/capita. In 1996, Nova Scotia established a target of 50% diversion of the total solid waste stream flows in an amendment of the *Environment Act*. In 2006, this target was updated under the Environmental Goals and Sustainable Prosperity Act {EGSPA} to 300kg/capita. HRM is now at 396 kg/capita which is also a significant achievement.

In 2011/12 HRM sent 142,500 tonnes of material to the landfill. This equates to the 396kg/capita. In order for HRM to achieve the Nova Scotia target of 300kg/capita it needs to reduce its total by 96kg/capita. This equates to reducing annual tonnage of materials sent to landfill to 104,832 tonnes. That is a total of 37,668 tonnes of additional diversion needed to reach the Nova Scotia EGSPA target of 300 kg/capita. This would translate into a 70 % blended (residential / ICI) diversion rate.

The following Mass Balance graph (Figure 1) shows three columns. The first illustrates diversion prior to implementation of the current system. The second depicts the CSC's original envisioned target for two years into the Strategy and how the 88% diversion would breakdown by material stream. The third column shows a comparative breakdown of waste and resource stream diversion as it exists today.

Figure 1



Note All graphs exlcude diversion of ICI fibres (43,000 tonnes currently) as that commodity was not included in the 1995 Strategy

[4]

The current integrated waste system established several key objectives for the future of waste management in HRM. The existing system model, including the operating plan at Otter Lake, evolved from the CSC Strategy vision. Figure 2, below, outlines key system objectives in accordance with the plan implemented through the MIRROR agreement, July 1997, and their current status:

[4] Stantec, Waste Resource Strategy Update, page 1.7, January 2013.

The CSC vision identified three strategy objectives:

1. Maximize the 3Rs (reduction, reuse and recycling);
2. Maximize environmental sustainability and minimize costs; and
3. Foster stewardship and conserver society values.[5]

The following table (Figure 2) provides a staff review and status update on the CSC objectives in terms of diversion, education, environmental sustainability, minimizing costs, and the CSC 100-year solution.

Figure 2

HRM Waste System Objectives Status		
Objective	**Status**	**Remarks**
A system based on stewardship and citizens playing the primary role in diverting resources from landfill through source separation. HRM's target was to achieve greater than 60% diversion at Otter Lake.	HRM has a current combined overall diversion rate of 62%. This achievement is noteworthy and reflects the success of the citizen envisioned innovation of source separation. HRM's organics diversion is one of the highest in the country.	HRM has achieved the overall strategy target of over 60% diversion. However, there are still opportunities to improve diversion of organics and recyclables (50,000 tonnes) from the landfill.
A system which used education, communications and monitoring to effect behavioural change.	Since 2006, when diversion was at 53%, HRM's 4 educators and 2 diversion program officers have made formal contact with 23% of businesses across HRM.	Proactive outreach and education have proven the most effective means of gaining increased diversion through implementation of effective source separation programs within the ICI sector.
A system that protected the environment and community from the adverse effects of traditional landfill operations.	Environmental ground and surface water monitoring confirm there have been no adverse environmental impacts in the water table around Otter Lake. There is not a large flock of vectors living off the landfill. Conversely, analysis suggests	In response to odours which presented while still working in cells 1&2 in December of 2002, MIRROR developed a temporary gas management process. This involved plastic

[5] An Integrated ~~Waste~~/Resource Management Strategy, page 4, March 1995.

	that the current FEP/WSF processing model {The shredding of all materials passing through the FEP} generates gas much more rapidly than traditional landfill operations. This outcome is currently managed by a temporary gas management system.	piping installed in the waste and on top of the active cell which drew the gases to a flame to be burned off. This temporary system is then replaced with a permanent gas management system once the cell was sealed as intended in the operating plan.
A system which was economically sustainable and efficient.	The Otter Lake landfill operation is projected to be delivered at $170.00/tonne as of construction and operation of cell 6. This includes operations of the FEP/WSF and RDF, plus gas management, leachate processing and all capital expenditures for cell construction, closure and equipment. When the system costs were originally assessed, analysis indicated that the system would have a projected cost of $67.00/tonne (FY96). This equates to $90/tonne (FY12) based on Canada CPI Inflation.	The projected Otter Lake facility cost per tonne is substantially higher than the inflated system model cost originally assessed as fiscally sustainable.
A long term waste system solution for the Municipality. The CSC strategy envisioned a 100 year solution. Otter Lake site agreement contemplates a 25 year term. However Regional Council has sole discretion to extend operations at the site beyond the current contract with MIRROR.	To be clear, the Strategy is working. Residents have embraced source separation and diversion is at 62% overall. Source separation is a part of behavioural awareness. However, without a system model change, Regional Council will need to direct staff to initiate a project to identify a new landfill site or waste system alternative.	The entire process to site a new landfill at Otter Lake took over 15 years to accomplish before the site became operational. The issue of what the plan is for closing the landfill was previously raised at Regional Council, a motion for public consultation RE: Closure of Otter Lake Landfill, January 11, 2011.

Figures 1 and 2 illustrate that HRM has achieved its 1997 integrated waste system objective of over 60% diversion. HRM's current residential diversion rate is 52% which is among the highest compared to similar sized municipalities in Canada. When measured against the 12 largest municipalities in Ontario, HRM's diversion rate would rank fourth highest. In terms of waste per capita, at 396kg/capita, HRM's waste per resident is less than half the national average of over 800kg/capita. This is a significant achievement in terms of HRM's program goals.

Waste stream content analysis data and system oversight findings indicate there remains an opportunity to increase diversion from landfill through greater participation. HRM needs new programs and system changes to increase adherence to the source separation guidelines.

System data shows the Otter Lake operating model has evolved into a much more costly program than anticipated. The consultant report confirms that the all-inclusive cost per tonne of the Otter Lake landfill is well above industry norms. The analysis identifies that the higher than normal operating cost is directly attributable to the costs associated with the FEP/WSF. As a result of HRM's success with source separation, the FEP/WSF provides a negligible opportunity for diversion. Contrary to the CSC envisioned outcome, the FEP/WSF processing system results in the accelerated production of gases and odours which require a temporary gas management and odour control system which further increases operating costs.

In addition, a situation exists where the cost per tonne for landfill operations is increasing at the same time that diversion in HRM is reducing the annual tonnage being delivered to the landfill. Since 2006, when Otter Lake received 169,000 tonnes and diversion was at 55.3%, waste materials received at the landfill have steadily decreased to the current total of 142,500 (FY2011/12) tonnes at 62% diversion. Given the overall increase in cost and the continuing decline in tonnage, staff developed preliminary system cost comparison data through 2011.

In September 2011, Regional Council approved the latest MIRROR operating agreement. At that time, Regional Council also directed staff to formally review the Strategy. The Solid Waste Resources (SWR) FY2012/13 Business Plan Key Deliverables are noted in Figure 3 below.

Figure 3

5.1	Expand education efforts and develop program initiatives to increase diversion rate.
5.2	Conduct a comprehensive Waste Strategy Review including assessment of alternative options to improve the fiscal sustainability of the program through system enhancements.
5.3	Review and validate cell design specifications with the Province to reduce capital costs.
5.4	Development of a business case assessment for a transfer station to reduce overall residential collection costs and provide strategy contingency options.

On July 10, 2012, Regional Council approved an overarching system performance and industry bench mark analysis study contracted to Stantec, which resulted in the consultant report accompanying this report. {Waste Resource Strategy Update, January, 2013.}

DISCUSSION

Redacted – legal advice

The implementation of some or all of the consultant recommendations enables HRM to maintain or enhance focus on environmental stewardship throughout the integrated waste management system and remain true to the CSC's vision. Equally true and important is that the consultant report recommendations enable achievement of the envisioned fiscally-sustainable solid waste solution for many decades to come.

A fundamental criterion for the consultant's system review was the requirement that all recommendations maintained the focus on environmental stewardship. The consultant's review identified several key findings that have the potential to enhance the system's environmental stewardship through increased diversion and reduced negative environmental impacts from fugitive landfill gases.

In addition, the consultant identified opportunities to significantly increase the cost effectiveness of the integrated waste management system without impacting environmental protection or deviating from the objectives of the Strategy. The review of operations at Otter Lake was conducted in terms of the Regional Council approved MIRROR implementation plan of 1997. The analysis was divided into three specific assessments:

- Is the existing Otter Lake operation performing as designed/intended by the implementation plan and are there any negative outcomes?
- How does HRM's Otter Lake operation compare to industry standards and norms, especially in terms of the Key Performance Indicator (KPI) of cost per tonne?
- Are there opportunities to evolve HRM's system to better achieve the system objectives of environmental stewardship, fiscal sustainability and a long-term solution?

The consultant report provides a number of findings and options. The report outlines recommendations for an updated integrated waste management system to guide program and service implementation over the next 10-20 years. The recommended options introduce some fundamental waste system changes. These recommended changes have interdependencies. Therefore, the following option recommendations cannot necessarily be addressed in isolation:

- Closure of the FEP and WSF;

- Petition Nova Scotia Environment for modifications to the Nova Scotia Landfill Liner Specifications;
- Extend the life of the Otter Lake Landfill site through improved compaction and adding height to the cells;
- Create a centralized waste resource campus to support new infrastructure development;
- When developing the next MRF, move it to the campus site;
- Introduce new organics processing technology and capacity and include final curing processing;
- Increase staff resources dedicated to improving diversion of recyclables and organics through system oversight and education;
- Establish a mechanism of control over the sale of finished compost; and,
- Improve curbside collection and recovery efficiency through model/program changes as the system evolves.

What follows next in this report are the recommendations on increasing cell height as well as the disposition of the FEP and WSF. Once Regional Council has provided their direction, staff will finalize planning for the community engagement process to address these recommendations and the balance of recommendations from the consultant's report. As noted, staff will begin consultation with the CMC on these recommendations. Staff will then return to the Environment & Sustainability Standing Committee with a report incorporating community engagement feedback on the recommendations and options resulting from the strategy review project.

Landfill Cell Height

The current cell height protocol is consistent with original site planning. The nine cell plan for Otter Lake will reach capacity in 2024. However, the existing nine cell plan at Otter Lake could be extended by almost 25 years with an addition of 15 meters in height to each cell. This analysis includes adding additional materials on top of closed cells (1-5) once the current active cell, 6, reaches capacity. Cells 7-9 would subsequently be developed to the new height protocol. Staff is working on a digital representation of what this height increase would look like from various angles.

Industry standard is to build landfill cells as high as practical to realize maximum return on the capital investment in the cell liner construction cost. The vast majority of cost for a landfill cell is in the construction of the cell liner mold. Cell 6 cost $16.1 million as approved by Regional Council. This figure does not include the cost of the Borrow Pit Road ($ 944 K) project associated with the construction of cell 6.

Programmed capacity for cell 6 is approximately 500,000 tonnes for a $32.20/tonne capital investment expense. Increasing cell 6 height by 15m doubles the cell's capacity to approximately one million tonnes. This results in a reduced capital investment cost of $16.10/tonne. Current amortization is based on a cell life of 3.5 years on a projection of approximately 140,000 tonnes/year. The additional cell height doubles the cell life and doubles the amortization period to 7 years.

The only Provincial legislative criterion for siting cells at the Otter Lake site relates to distance from a well servicing a residence. According to Provincial legislation, cells must be a minimum of 1000m from the nearest well servicing a residence. The cells at Otter Lake exceed this Provincial regulation by over 2000m as per the CSC strategy recommendation that cells be no closer than 3000m from the nearest well servicing a residence. This is depicted in Appendix B.

The environmental consideration of the recommended increase in cell height would be a drumlin mound 15m higher than the existing drumlin mound at the site. The current site plan requires remedial restoration through the planting of trees, shrubs and other local vegetation. The intent of the remedial work would be to return the site topography to be consistent with local surroundings. Given the topography of the area and the existence of hills and ridges, the increased height of the resulting drumlin mound is assessed to have limited impact on this objective.

The consultant assesses that current cell height protocols impose higher than industry standard capital cost/tonne investment on HRM with no quantifiable environmental benefit. There are no identified environmental impacts resulting from increasing cell height. Based on current industry practices, and the effectiveness of remedial site restoration practices employed today, the consultant recommends that an increase in height across all existing and future cells be implemented at the Otter Lake site.

The recommendation to increase cell height is further supported when the capital investment already made in the existing cells on site is taken into consideration. Cells 1 through 5 are already built and paid for. Each cell which is added to in terms of 15m of additional materials has the ability to push out the requirement to build the next cell by several years. Each extension of time before the next cell is required also extends the life of the site, should Regional Council so choose.

Implementation of these operational site model changes will require development of a new operating plan to build on existing closed cell. Preliminary analysis from the consultant in terms of a draft operating plan indicates that this option is entirely practical when compared to existing and ongoing site management.

The addition of added height on cells with no identifiable environmental impact increases the economic sustainability of the development of cells at Otter Lake. This change also introduces over 20 years of projected annual capital budget savings as noted below in Figure 4. The key point in this representation is that these are not discretionary potential budget avoidance savings. These capital dollars would have to be spent to fund future cells which are already in the long range forecast budget to support cells 7-9.

Figure 4

Cell Height Scenario's Projected Capital Budget Cost Avoidance		
Cell Height Increase	**Resulting Year The Next Cell Would Need to be Built**	**Projected Budget Savings / Cost Avoidance**
15m	2034 - 2036	$ 114M - $ 117M
10m	2029 - 2031	$ 74M - $ 82M
5m	2023 - 2024	$ 36M - $ 43M
Current	2016	$0

In addition, using a conservative range of 145,000/tonnes/year to 160,000/tonnes/year, {which represents Regional growth} at the new cell height, with an additional nine cells adjacent to the current planned nine cells, the Otter Lake site represents an opportunity to achieve the CSC vision of a 100 year solution. As illustrated in Figure 4, increased cell height allows for maximizing the cost benefit of capital investment for landfill cells. The addition of another nine cells, which are easily accommodated within the site footprint and distance from residence criterion, can extend the life of the site into the 22nd century. A projection of a cell development timeline is detailed in Appendix C.

It should be noted that this site extension is based on the technological situation as it exists today. The waste management industry is evolving very quickly with new technologies. The implementation of this option to extend cell height and site capacity gives Regional Council the opportunity to have a secure, fiscally sustainable solution well beyond the planning horizon when other waste industry technology options may dictate alternatives to landfilling.

The site extension discussion was included in order to explain the order of magnitude of the opportunity the Otter Lake site represents to the region for HRM's waste management system. Regional Council is the sole authority in terms of approving cell height. The current protocol is a product of the initial site plan. As previously noted, there are no Provincial legislative or regulatory restrictions on cell height. The recommended height change poses no increased risk to the environment. The increase in height supports the achievement of the original CSC vision objective of a fiscally sustainable 100 year waste management solution for the region.

Operation of the FEP and WSF

The following bullet point summary outlines the rationale to close down FEP/WSF processing at Otter Lake. This is followed by a more comprehensive explanation of each assessment. The closure of the FEP/WSF represents an opportunity related to environmental stewardship, system functionality and a financial capability to save funds which more than represents the assessed costs to evolve the integrated waste management system as outlined in the consultant report.

FEP/WSF Discussion Summary

- The FEP/WSF process introduces an unintended environmental/community impact at the Otter Lake site in terms of the rapidity of gas/odour generation;

- Previous extended closure of the WSF produced no impacts to the environment, community or site;
- The FEP/WSF provides only limited recovery of otherwise more practically recoverable recyclable materials;
- The cost of recovered materials processed through the FEP and diverted from landfill, 300 tonnes of recyclables plus special handling materials, is $26,700/tonne which is unsupportable or justifiable; and
- The FEP/WSF cost/tonne is a negative system KPI.

The Otter Lake landfill system was intended to be a "dry" landfill rather than a "wet" landfill. As previously noted, the consultants were unable to identify a similar process anywhere in NA. In accordance with the strategy, "wet" organics, putrescible materials and materials contaminated with putrescible material were to be processed and then stabilized {dried} and then sent to the landfill. The designation of the Otter Lake landfill as a "dry" landfill is important. It speaks to the intended purpose of the Otter Lake FEP/WSF as it was originally envisioned by the CSC.

The municipality, based on the CSC vision, agreed to develop the more costly system incorporating the FEP/WSF to increase diversion and minimize the negative impacts from gases, odours, leachate and vectors.[6] All materials would pass through the FEP. The intended uncontaminated materials would then be sent directly to the RDF. {This includes materials that break down, decompose and generate methane gases.} The FEP process would screen, shred and prepare materials, either organic or contaminated with putrescible and/or organic matter, for the WSF bio-stabilizing or "drying" process. This preparation was essentially to shred materials to less than 2 inches in size.

The objective of the FEP processing and the WSF bio-stabilization was to avoid the negative environmental outcomes of the "wet" Sackville Landfill site. Unexpectedly, as previously noted, odours became an issue in late 2002 while cells 1 and 2 were still active. MIRROR quickly responded with the current and ongoing temporary gas/odour management process.

In addition to facilitating a "dry" landfill operation, the FEP/WSF operation, as Redacted – direct contract reference, was designed to achieve the following in terms of the site's operational plan:

- Manually and mechanically separate, sort and process Solid Waste delivered to Otter Lake
- Non-recyclable Inert Materials will be separated and disposed of in the landfill;
- Recyclable Materials will be extracted and stored separately on site for recovery for market;
- Materials capable of being rendered into Stable Materials through bio-stabilization will be processed through the WSF; and

[6] An Integrated ~~Waste~~/Resource Management Strategy, page ii, 1995

- Hazardous substances and other Prohibited Materials will be extracted and temporarily sorted on the Site pending removal by HRM.[7]

The consultants assessed that the processing, shredding and stabilizing of the residual waste stream through the FEP/WSF unintentionally introduces a negative impact to the environment by generating increased volumes of landfill gas {Methane or Greenhouse Gases} in the early years of cell operation before optimized gas collection systems can be installed. Environment Canada's website states:

- Methane is 21 times more potent than carbon dioxide in terms of its global warming potential.
- Emissions from Canadian landfills account for 20% of national methane emissions.
- Estimates have shown that approximately 27 Mega tonnes (Mt) of carbon dioxide equivalent (eCO_2) are generated annually from Canadian landfills, of which 20 Mt eCO2 are being emitted annually.[8]

This unavoidable environmental impact is compounded at Otter Lake where landfill gases present earlier than occurs at traditional landfill operations as a result of the ongoing processing or shredding of materials through the FEP.

Landfill gas and corresponding odours presented at Otter Lake far earlier than was anticipated by MIRROR and HRM. Redacted – direct contract reference s. During the winter 2003, MIRROR developed an effective but labour intensive pro-active temporary gas management system. This system remains an ongoing and constant operation on the active landfill cell with temporary collection and piping installations in the waste and on top of the active cell.

This temporary gas management system is in essence an odour management system. The gases that are captured in the temporary piping systems are burnt off in a perpetual flame system. As a result of their early development from rapidly decomposing shredded materials, not all gases can be captured and some will escape into the atmosphere. Once a cell reaches planned capacity and is sealed, the permanent gas management system is installed as per the operating plan.

In terms of the science of this position, the analysis indicates that the current practice of processing and stabilizing the putrescible and organics contaminated materials through the FEP and WSF is, in fact, the reason for the more rapid generation of gas which exists at the Otter Lake site. Once a landfill cell is properly capped and sealed, gases are captured in permanent systems. This captured and managed gas can then be potentially used in the generation of electricity as is currently the practice at the closed Sackville site.

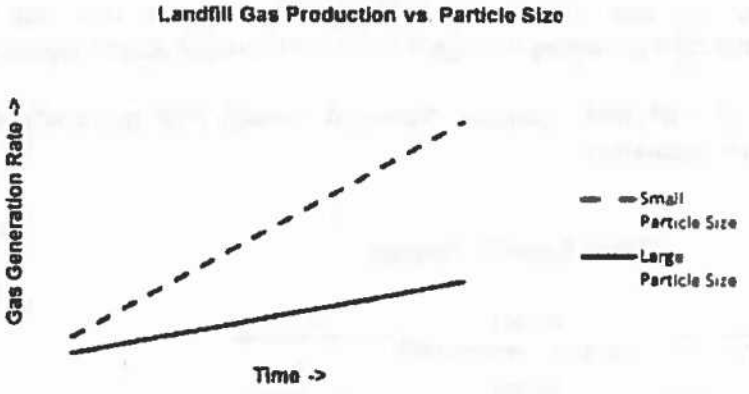
The following is an excerpt from the consultant's report in relation to the current negative environmental impact of the FEP/WSF process:

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7 Redacted – direct contract reference

8 http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=6F92E701-1, January 24, 2013

"The only significant deviation from that contemplated in the 1995 Strategy is that all output from the WSF is sent to landfill. A potential unintended negative environmental consequence of this change is increased production of landfill gas in the immediate months and years after the WSF product is placed. The multiple shredding and mixing of organic waste in the FEP/WSF combination have in fact increased the potential for community odour impacts compared to a scenario where the FEP/WSF did not exist and all material was sent directly to landfill. This is due to the homogeneity and significant reduction in particle size of the waste which increases the surface area available for anaerobic bacteria (gas producing) to thrive as shown on the following graph[9].



An analogy which may assist in the explanation of this phenomenon is the difference in time for a tree trunk to decompose, compared to an equivalent mass of wood chips created from the tree trunk. An intact trunk has a limited surface area for microorganisms to process the wood, whereas the wood chips offer a significant increase in surface area which increases the opportunities for bacterial decomposition."[10]

In terms of this discussion, a clear understanding and awareness of the impact of shutting down the WSF process already exists from both an environmental and community impact perspective. The WSF was previously shut down for over six months while operations continued at Otter Lake. In 2008-09, it was determined that the WSF roof required replacing. The roof replacement project was undertaken in 2010. Prior to the operational change, HRM obtained approval for the amended operational plan from Nova Scotia Environment and consulted with the Community Monitoring Committee.

The WSF was shut down from May through December, 2010. During the WSF closure, MIRROR undertook greater vigilance in monitoring RDF operations. Upon completion of the project, the site returned to full FEP/WSF operations. MIRROR reported no events or issues resulting from the WSF shutdown. It is recognized that modifications to the existing operating model would require development in terms of this option.

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[9] McBean, Edward A. et al, Solid Waste Landfill Engineering and Design, page 80, 1995
[10] Stantec, Waste Resource Strategy Update, page 3.7, January 2013.

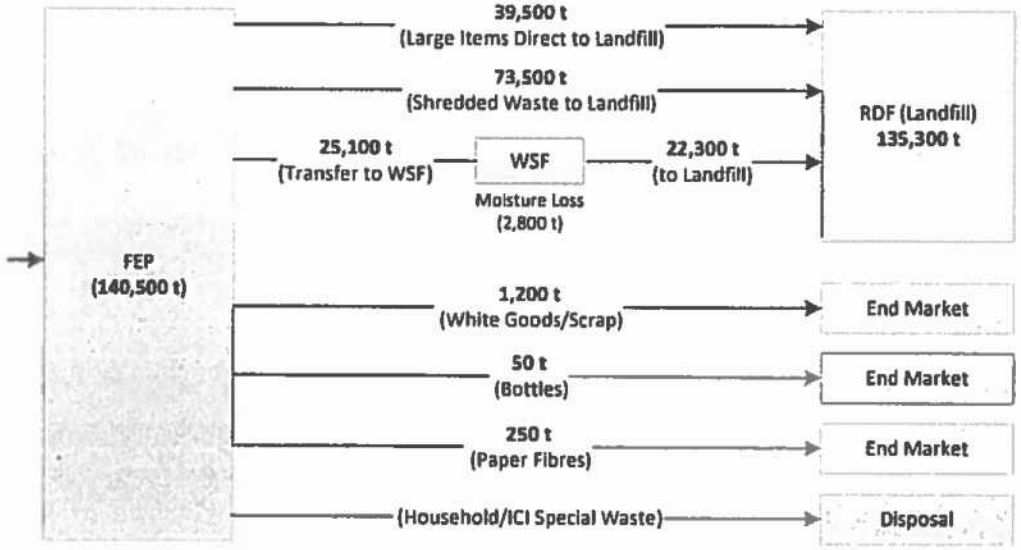
In addition to introducing the environmental impacts of early gas generation, the consultant assessed that the FEP/WSF was providing no real functional waste management system benefit in terms of the system KPI of diversion.

The mass balance graph below (Figure 5) shows the tonnage of materials received at Otter Lake. Key outcomes to note are:

- tonnage received from both residential and ICI sector which is transferred directly or indirectly to RDF (84%) without passing through the WSF;
- limited moisture loss and mineralization of organic materials from the bio-stabilization of materials processed through the WSF{outcome of source separation}; and,
- limited volume of marketable materials recovered through FEP processing (1%) {outcome of source separation}.

Figure 5

Mass Balance Graphic



The following bullets describe how materials that arrive at the Otter Lake tipping floor are handled/processed prior to being placed in the landfill (RDF):

- As depicted above in the mass balance graphic, the tip floor of the FEP receives 140,500 tonnes delivered by both residential and ICI collections (FY12-13). Of this tonnage, 39,500 tonnes are mechanically and manually transferred into trailers and sent directly to the RDF. This material is not processed in the FEP.
- A further 73,500 tonnes is processed through the FEP conveyer sorting and shredding system and then loaded into trailers and sent to the RDF.

- 25,100 tonnes of materials assessed contaminated with organic or putrescible matter is processed through the FEP conveyer sorting and shredding system and then sent through to the WSF facility. This 25,100 tonnes is then subjected to 18 plus days of "bio-stabilization" prior to it being loaded into trailers and sent to the RDF. This process results in a reduction of 2,800 tonnes in moisture loss and mineralization.
- The vast majority of marketable materials, 1200 tonnes {fridges and stoves or "white goods" and large salvageable pieces of metal} are also not processed through the FEP but are manually pulled out of the waste and come directly off the tip floor. In other regions, white goods are more practically and efficiently dealt with through a separate contracted collection system. Isolating this resource stream from the waste stream could enhance the collection system efficiency for these resources and bring the program more in line with its focus on stewardship;
- The FEP processing and screening system captures a very limited quantity of materials requiring special handling or banned materials. Again, savings realised by the closure of the FEP/WSF could support expansion of the current special handling depot operations and annual mobile events. Increasing accessibility should increase diversion of materials through increased participation;
- The FEP/WSF was originally envisioned to support diversion from landfill. The plan evolved to deal with processing materials prior to landfill with a limited objective of recovering marketable resources and materials banned from landfill. As noted in Figure 6, HRM is recovering minimal diversion of recyclables from the FEP; and
- Program data indicates that diversion through source separation is more effectively enhanced through education and communication and site inspections.

In addition to the negative environmental impacts and functional inefficiency in terms of diversion resulting from the FEP/WSF, there is a significant financial impact on annual operating costs for Otter Lake. The following table (Figure 6), details the KPI of cost/tonne for the current FEP/WSF process based on two FY bench marks, 2004 and 2011. The cost/tonne has significantly increased as diversion has correspondingly increased over the past half-decade.

As envisioned by the CSC, the FEP/WSF has steadily declined in functional effectiveness as the waste stream evolved through source separation. The FEP/WSF functional cost to the system has correspondingly increased. Out of 140,500 tonnes delivered to Otter Lake, 135,300 are placed in the landfill. The FEP/WSF process only accounts for diversion of 300 tonnes of recovered fibre and refundable containers and limited HHW/special handling materials. Further, 1200 tonnes of white goods are pulled off before the FEP processing system.

Figure 6

FEP/WSF System Performance & Cost				
Year/Overall HRM Diversion	Isolated FEP/WSF Operating Cost	Recyclable Materials Diverted	Percentage of Diversion From RDF	Cost Per Tonne of Diverted Material
2004/54%	$ 7,200,000	525	0.5%	$ 13,700
2011/61%	$ 8,000,000	300	0.3%	$ 26,700

Figure 6 shows the actual cost per tonne of diverting materials through FEP processing in 2004 and 2011. Over that period, tonnage diverted by the FEP process has decreased by 57%. Over the same period, FEP/WSF cost per tonne has increased significantly.

Figure 7 illustrates the KPI analysis from a projected budgetary perspective in terms of both annual equipment capital and operating costs of sustaining the FEP/WSF operation at Otter Lake. The closure of the FEP/WSF represents a significant projected savings in terms of the Solid Waste Resources annual operating and capital budget. This cost avoidance represents sufficient funding for the potential development of the integrated waste system infrastructure outlined in the report.

Figure 7

Projected Isolated FEP/WSF Capital Equipment and Annual Operating Cost Estimates			
Year	Operating	Capital	Total
13/14	$8,500,000	$2,100,000	$10,600,000
14/15	$8,700,000	$1,300,000	$10,000,000
15/16	$9,000,000	$900,000	$9,900,000
16/17	$9,200,000	$1,600,000	$10,800,000
17/18	$9,400,000	$1,800,000	$11,200,000
18/19	$9,700,000	$2,000,000	$11,700,000
19/20	$9,900,000	$2,700,000	$12,600,000
20/21	$10,100,000	$2,300,000	$12,400,000
21/22	$10,400,000	$1,400,000	$11,800,000
22/23	$10,700,000	$1,300,000	$12,000,000
23/24	$10,900,000	$1,300,000	$12,200,000
24/25	$11,200,000	$1,300,000	$12,500,000
Total	**$117,700,000**	**$20,000,000**	**$137,700,000**

Figure 7 represents the projected annual cost of operating the FEP/WSF along with the associated capital expenditures that are required within that facility.

The adoption of this recommended change will result in new integrated waste system program costs from the implementation of alternative approaches to capture marketable or banned materials. These would include a white goods curbside collection program, enhancement of the existing HHW/Special Handling depot program and operational adjustments at the RDF itself to accommodate collection vehicles delivering directly to the active cell. These costs and others would be fully developed as decisions are made based on the completion of the Strategy Review Project and Regional Council approved changes are implemented.

Financial Summary

Figure 8

Projected Overall System Financial Summary			
Year	FEP/WSF Operating and Capital Equipment Budget	Increasing Cell Height by 15M Annual Capital Cost Avoidance	Total Combined System Cost Avoidance of the Decisions
13/14	$10,600,000	$5,100,000	$15,700,000
14/15	$10,000,000	$5,100,000	$15,100,000
15/16	$9,900,000	$4,600,000	$14,500,000
16/17	$10,800,000	$4,800,000	$15,600,000
17/18	$11,200,000	$4,800,000	$16,000,000
18/19	$11,700,000	$4,800,000	$16,500,000
19/20	$12,600,000	$5,900,000	$18,500,000
20/21	$12,400,000	$7,000,000	$19,400,000
21/22	$11,800,000	$7,000,000	$18,800,000
22/23	$12,000,000	$6,400,000	$18,400,000
23/24	$12,200,000	$5,800,000	$18,000,000
24/25	$12,500,000	$5,800,000	$18,300,000
Total	**$137,700,000**	**$67,100,000**	**$204,800,000**

Projected FEP/WSF budget figures represent the total annual operating and capital expenses associated with this operation. Projected cell height cost avoidance savings refer to the estimated average annual reserve appropriations required to fund the sequential construction of Otter Lake cells based on the current development plan and the range of 135k-150k tonnes per year. Cell funding methodology used in this calculation is the same as current cell capital funding methodology whereby appropriations are made annually based on the asset's useful life.

Municipal Authority

Regional Council has full authority to change the operating model at Otter Lake and close down FEP/WSF processing. There is no legislative or regulatory requirement to operate either the FEP or the WSF prior to sending materials to the RDF. Changes to the operating approval and site operating plan will require a written submission to Nova Scotia Environment detailing changes to the operational plan.

Gas to Electricity Opportunity

The changes to the operating plan and extension of the term of the landfill site present an opportunity for HRM to potentially implement a gas to energy/electricity project. The consultants have identified that the current generation and forecast generation of gases have reached the point of supporting the investment in a system to generate electricity from the captured gas, rather than just burning it off. This would create an additional revenue opportunity and the potential to further reduce site operating costs. This type of project is already operating at the Sackville Landfill.

Maintenance of Existing Cell Height Protocol

The FEP/WSF discussion recommendation is based on the operational inefficiency, system cost savings and negative impact on the environment. The cell height discussion is more far reaching in terms of HRM's waste program. As previously noted, the Regional Plan contemplates the extension of operations at Otter Lake as an option. Regional Council may determine that adjusting the existing cell height protocol is not practical. It is important for Regional Council to remember that Otter Lake is programmed to close in 2024. Efforts to replace the previous Sackville Landfill commenced over 15 years before Otter Lake became operational.

If Regional Council determines to maintain the current cell height protocol and not investigate extending the life of the planned cells and site, staff will seek approval to commence planning to site a new landfill or identify an alternative waste program solution for HRM.

Peer Review

Stantec's analysis of the operations at Otter Lake and specifically that of the FEP/WSF and cell height option, is the subject of an independent professional peer review conducted by SNC Lavalin, commissioned by HRM in December 2012. SNC Lavalin confirms "agreement in principle," with the consultant recommendations on the cell height and closure of the FEP/WSF. The final report will be made available when complete.

LEGAL IMPLICATIONS

Redacted – legal advice

Redacted – legal advice

Redacted – legal advice

Redacted – legal advice

Redacted – legal advice

FINANCIAL IMPLICATIONS

The closure of the FEP/WSF will, on average, produce projected savings of approximately $11.5 million per year for the remaining 12 years of the current MIRROR contract. This totals $137.7 million.

The potential effect on the budget would be ceasing reserve funding for capital expenditures on the FEP/WSF. This will save $4.2 million. The 2012/13 and prior years funding of $2.1 million is currently within a reserve or operating account. The 2013/14 amount is currently in this year's budget envelope.

Figure 9

Projected Effect on 2013/14 Budget

2012/13 Reserve Funding For FEP/WSF Capital	$ 2,100,000
2013/14 Reserve Funding For FEP/WSF Capital	$ 2,100,000
Subtotal	**$ 4,200,000**

Increasing the cell height has the potential to avoid a projection of approximately $114 - $117 million of cell construction costs over the next 20 years. In addition, through this increase in cell capacity volume, the useful life of cells will be doubled. As a result, the cost can be spread over twice the original timeframe resulting in additional budgetary savings.

The potential effect on the budget would be ceasing reserve funding for capital expenditures on cell construction. This will save $10.7 million. The 2012/13 funding of $5.5 million is currently within a reserve or operating account. The 2013/14 amount is in this year's budget envelope.

These above potential savings will be subject to Council's approved changes to the system and operating model going forward.

Figure 10

Projected Effect on 2013/14 Budget

2012/13 Reserve Funding For Cell Not Required	$ 5,500,000
2013/14 Reserve Funding For Cell Not Required	$ 5,200,000
Subtotal	**$ 10,700,000**
Total	**$ 14,900,000**

Cell funding in 2013/14 is slightly lower than 2012/13 in order to create a stable reserve funding approach whereby approximately $8million per year is allocated to Q123. In 2014/15 the planned reserve funding that is associated with Cell 7 is $6.5million. Total funding to the reserve over the three year period is planned to be $17.2million.

COMMUNITY ENGAGEMENT

As directed by Regional Council, once clear understanding of the desired context and approach for the community engagement process is determined, staff will develop and execute a comprehensive community/stakeholder engagement process to explain the broad scope recommendations identified in the consultant report. Feedback from the consultation will then be brought back to Regional Council through Committee.

ENVIRONMENTAL IMPLICATIONS

- The recommended actions have no assessed environmental impact and are assessed to decrease the environmental impact of residual waste materials destined for landfill by reducing the early generation of landfill gases prior to the installation of landfill gas management systems.
- The recommendations will provide HRM with a long-term waste management solution within the existing landfill site plan which has a comprehensive environmental monitoring regime and is permitted as such by Nova Scotia Environment.

ALTERNATIVES

Option 2: Council could maintain the status quo operating model. This is not the recommended course of action. In addition, if this is the determined course of action, staff will require Council direction on commencing a project to locate a new landfill site or identify a new alternative option solution for the Municipality's waste management program.

Option3: Council can immediately close the landfill and send all residual materials to alternative landfills. This is not the recommended course of action. Council would still have to deal with the contract with MIRROR NS Ltd. In addition, HRM does not currently have a transfer station to support efficient consolidation of waste loads for transfer to alternative landfill sites. This option is only viable with an operational transfer station.

ATTACHMENTS

Appendix A – Stantec Report, Waste Resource Strategy Update, January 2013
Appendix B - Diagram of the range of houses from landfill cells
Appendix C - Time line graphs on cell development extending site life

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If the report is released to the public, a copy can be obtained by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

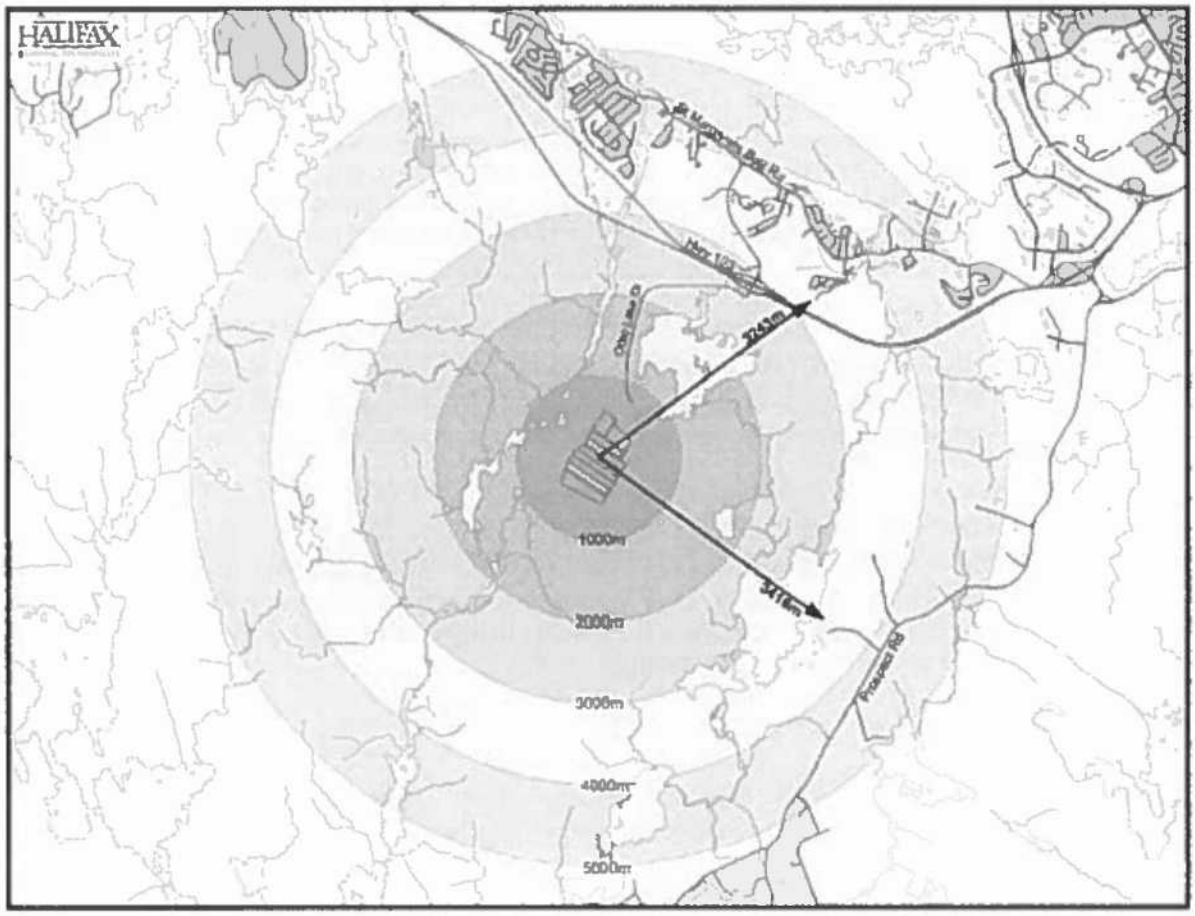
Report Prepared by: Gord Helm/Manager, Solid Waste Resources, 490-6606

Report Prepared by: Martin Ward, General Counsel, Legal Services, 490-6532

Financial Approval by: (Original Signed)
Greg Keefe, Director of Finance & Information Technology/CFO, 490-6308

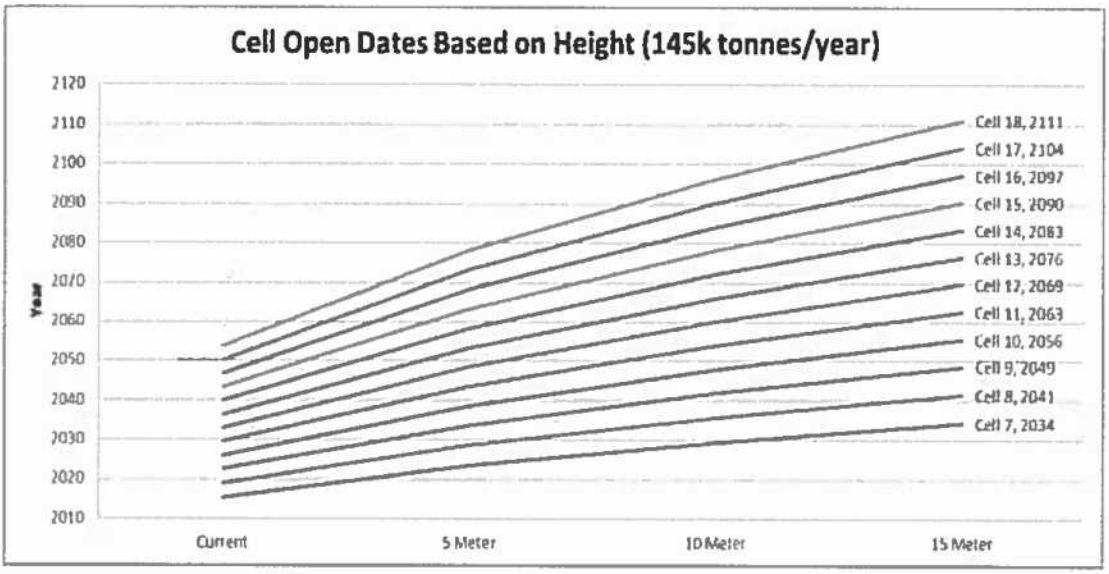
Report Approved by: (Original Signed)
Ken Reashor, Director, Transportation & Public Works, 490-4855

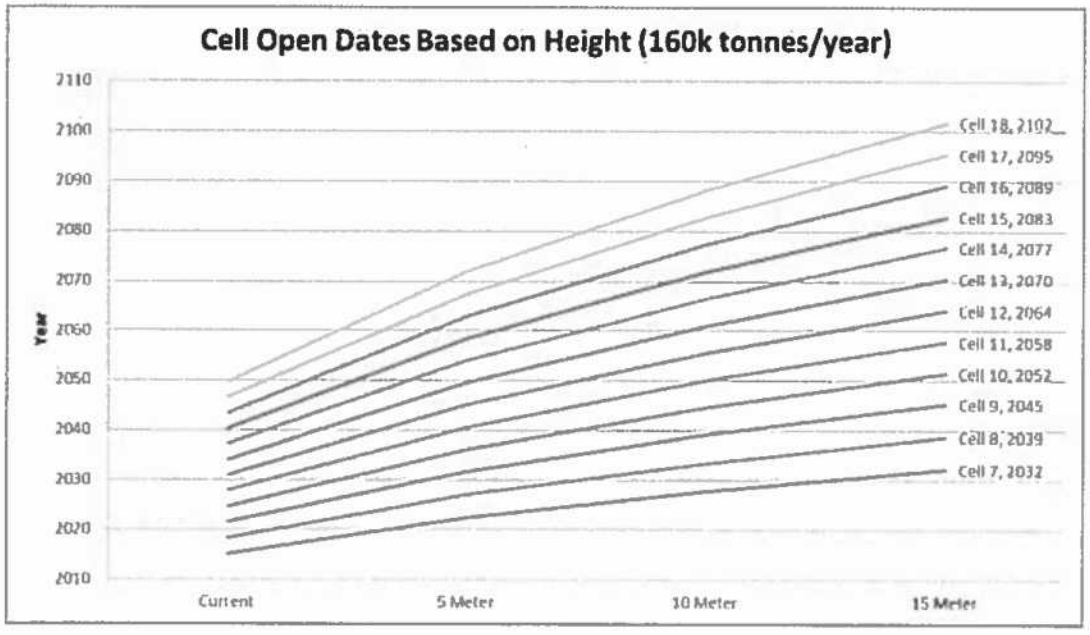
Appendix B – Illustration of distances from wells servicing residences



Appendix C

The following two graphs show the calculated time line to develop the Otter Lake site if an additional nine cells were added, and the corresponding time line changes based on cell height increases of 5, 10 and 15 metres.





Western Region Community Council

Jurisdiction of the Otter Lake Community Monitoring Committee and Contract with HRM

April 17, 2012

10.2 WESTERN REGION COMMUNITY COUNCIL

10.2.1 Jurisdiction of the Otter Lake Community Monitoring Committee and Contract with HRM

A report from the Western Regional Community Council, dated February 28, 2012 was before Council.

Moved by Councillor Adams, seconded by Councillor Walker that Halifax Regional Council acknowledge the responsibility and the authority of the Community Monitoring Committee for the Otter Lake Landfill as being "to monitor the operation of the facilities and any element of HRM's integrated solid waste resource management system where the operation of such elements has a direct impact on the operation of the Facilities" and accordingly; request that staff respond to questions outlined in the December 19, 2011 letter from the Otter Lake Community Monitoring Committee and follow-up letter dated February 23, 2012 as attached to the Western Region Community Council report dated February 28, 2012.

Mr. Mike Labrecque, Deputy Chief Administrative Officer referenced the information and attachments as outlined in the February 28th report to the Western Region Community Council.

He noted that staff has responded to all questions that fall within the jurisdiction of the Community Monitoring Committee (CMC) as provided in the letter from the DCAO dated January 24, 2012. He noted further that HRM staff will be working with Mirror around issues that resulted from the cell closure and will provide a report to the CMC. In addition as outlined in the report, staff will be attending monthly CMC meetings.

Mr. Martin Ward, Municipal Solicitor further clarified that the agreement between HRM and CMC specifically outlines the type of information that can be provided as well certain restrictions. The agreement with the CMC is incorporated as part of the main contract with Mirror. If HRM were to go beyond the limits provided for in the agreement and provide information outside of what is permitted in the contract, it could arguably be considered a breach of that contract.

In response to a question raised by Councillor Hum relative to odour complaints from the area around Royal Hemlock, the DCAO noted that there is a record of complaints logged and that work will be reviewed. Councillor Rankin confirmed that several complaints from the area noted have been received by the CMC, documented and forwarded to staff.

Councillor Watts inquired as to what further Council would actually be doing, beyond what has been provided to date, if the recommendation is approved.

The DCAO responded that the CMC has been provided with all the information they are entitled to under the agreement. In further response the Solicitor indicated that he would view the recommendation as affirmation or confirmation that staff should do so.

Councillor Lund inquired regarding the details of the agreement and access by the CMC to information regarding the design and construction of new facilities or site works.

The DCAO indicated that HRM is governed by the language of the agreement, which speaks to the CMC monitoring the operation of the facilities as defined in the agreement. The language in the agreement specifically excludes design and construction of new facilities.

Councillor Rankin expressed strong concern regarding the matter. He indicated that he was present during the process of the development of the strategy, siting of the facility, development of the contract and negotiations with the Province, which required that a CMC be established. He stated his position on the language of the contract as being inclusive rather than exclusive, citing Section 19 and the legal opinion provided to the CMC.

Mr. Ward, Municipal Solicitor responded that it is a matter of the interpretation of the contract and HRM is governed by the language of the agreement. The language of the agreement speaks to the CMC having jurisdiction over the operation of the facilities as defined in the agreement. The language in the agreement specifically excludes design and construction of new facilities. His understanding is that once the facilities are designed and constructed they are then turned over and become part of the monitoring process. He went on to note that it is the Municipality, not the CMC, that would be required to answer for the provision of information not provided for under the agreement.

Members of Council expressed appreciation for the work of the CMC and the residents in the area of the landfill.

Members of Council inquired again as to whether the wording of the recommendation is in keeping with the terms of the contract and does not give any more authority to the CMC other than what is provided for in the contract.

The Solicitor indicated that the motion must be read as asking only for what the Municipality is legally able to provide and recognition of the authority for the CMC as provided for under the contract.

Mr. Labrecque noted that the CMC's mandate is to monitor the Otter Lake facility operations. Solid Waste staff provide reports to the CMC and are open to attend monthly meetings. The jurisdiction over the strategy is the responsibility of Regional Council.

Councillor Rankin stood to note occasions which, in his view, do not reflect cooperation between staff and the CMC.

Mayor Kelly noted that if the Councillor has issues with the process he can address them to the CAO. Council has received legal advice. Council is aware of the process for amending or altering a contract should they wish to do so.

Councillor Uteck asked whether the scheduled work was delayed for any period due to contract negotiations with Mirror.

The DCAO responded that had not been the case and noted that Attachment 3 of the staff report outlines the time lines in regard to the construction.

MOTION PUT AND PASSED.

10.3 AUDIT & FINANCE STANDING COMMITTEE

10.3.1 Marketing Levy Special Events Reserve Revisions

A report from the Audit and Finance Standing Committee dated March 22, 2012 was before Council.

MOVED by Councillor Uteck, seconded by Councillor Walker that Halifax Regional Council approve the Revised Marketing Levy Special Event Reserves Business Case as outlined in Attachment 1 of the January 23, 2012 staff report.

Councillor Uteck noted that during the March 21, 2012 Audit and Finance Standing Committee a concern from the Marketing Levy Special Events was that funds were being taken from the hotel levy tax and the possibility of losing funds for an event. She questioned whether this was a one time use of funds or ongoing.

Mr. Brad Anguish, Director, Community and Recreation Services advised that staff is aware of the Standing Committee's concern and that staff is executing on the Event Strategy approved by Regional Council in 2010. Mr. Anguish highlighted the alternative approaches as outlined in the January 23, 2012 staff report. He indicated that as staff and Council move forward and better understand HRM's resourcing and demands upon staff and administration. Staff's goal is to reduce administration, not create more; but at the present time given recent administrative changes additional staff are needed.

Councillor Uteck clarified that the Audit and Finance Standing Committee would work with staff on this one year approach but would have the option to make changes.

Based on concerns raised by several members of Council, it was agreed to revise the motion to include the wording *for the 2012 fiscal year only.*

The motion now read:

MOVED by Councillor Uteck, seconded by Councillor Walker that Halifax Regional Council approve the Revised Marketing Levy Special Event Reserves Business Case as outlined in Attachment 1 of the January 23, 2012 staff report for the 2012 fiscal year only.

MOTION PUT AND PASSED.

10.4 TRANSPORATION STANDING COMMITTEE

10.4.1 Request to Province – HRM Traffic Authority Ability to Reduce Maximum Speed Limits

A report from the Transportation Standing Committee dated March 26, 2012 was before Council.

MOVED by Councillor Watts, seconded by Councillor Lund that Halifax Regional Council endorse the draft correspondence included as "Attachment A" of the Transportation Standing Committee report dated March 26, 2012 to the Provincial Minister of Transportation and Infrastructure Renewal requesting consideration be given to allow the HRM Traffic Authority to post maximum speed limits lower than 50 km/h.

Councillor Watts noted the Province's support in allowing the Traffic Authority to lower speed limits in school zones. She further echoed the cycling community's comments of making roads safer; especially in areas where bike lanes may not be able to be designated.

Councillor Mosher requested an update on Council's motion of March 10, 2009 to write a letter to the province to request an amendment to section 104 of the *Motor Vehicle Act* in an effort to reduce speed limits in school zones. Mr. Ken Reashor, Director, Transportation and Public Works advised that the Province has agreed to move forward to reduce speed in school zones. Staff is reviewing what signage would be required; with approximately 1,500 signs needed to implement this program.

In response to questions raised by Council, Mr. Reashor clarified that if the Minister of Transportation was to approve Council's request and grant HRM Traffic Authority the authority to implement reduced speed zones, staff would then use engineering evidence and standards to implement this process.

Mr. Reashor went on to note that there are some streets that have unique qualities (ie. no sidewalks or geometric design features) that would potentially qualify.

MOTION PUT AND PASSED.

Council recessed at 2:40 p.m.

HALIFAX
REGIONAL MUNICIPALITY

PO Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 3

Halifax Regional Council
November 25, 2008
Committee of the Whole

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: [redacted]
Dan English, Chief Administrative Officer

[redacted]
Wayne Anstey, Deputy Chief Administrative Officer - Operations

DATE: September 24, 2008

SUBJECT: **HRM Community Engagement Strategy - Improving HRM's public involvement practices**

ORIGIN

1. At the January 17, 2006 Committee of the Whole (COW) meeting, Regional Council endorsed establishing an HRM Community Engagement model/program.

2. On September 19, 2006 an Information Report was tabled outlining the terms of reference for an assessment and evaluation of HRM's past and present engagement exercises.

3. On April 10, 2007 an Information Report indicated that a strategy for improving HRM's public engagement practices would be tabled with Council.

RECOMMENDATION

It is recommended that Halifax Regional Council adopt the Draft Community Engagement Strategy in Appendix One.

EXECUTIVE SUMMARY

Recognizing the importance of effective community engagement, in January 2006, Council affirmed the need to develop a new framework for community engagement and public consultation. Since then, staff coordinated a detailed review of HRM's community engagement practices and researched successful approaches used locally and by other municipalities. This report seeks Council's endorsement of a new Community Engagement Strategy which provides a policy and strategic direction for improving HRM's community engagement.

BACKGROUND

Since amalgamation, the Municipality has been involved in many community engagement processes and while some have been successful, others attracted criticism. Currently, the only existing policy that speaks to community engagement is the 1997 Resolution Regarding A Public Participation Program for Municipal Planning Strategy Amendments. There is a lack of consistent and coordinated approach to engaging the public.

In the 2003 Community Development Business Plan, Council endorsed a staff proposal to develop a Community Development Framework for improving HRM's service delivery at the community level. The Community Development Framework was developed and has since been operationalized. It is comprised of three key strategies: Community Engagement; Community Capacity Building; and Governance and Service Delivery. Community Engagement is considered key to building informed, cohesive, organized, welcoming and safe communities (see Fig. 1).

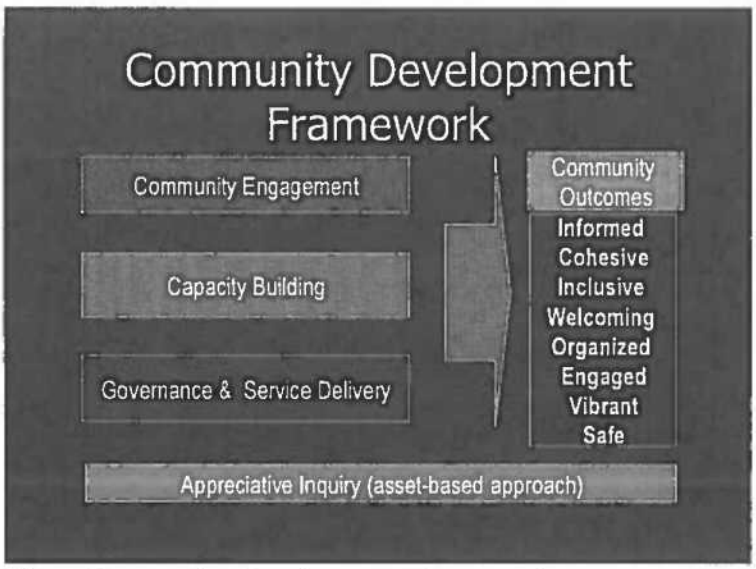


Fig. 1 Community Development Framework

In January 2006, Council affirmed the need to develop a new framework for community engagement and public consultation. Since then a detailed review of HRM's community engagement practice has taken place as well as best practice research. The process of developing the Community Engagement Framework was organized around the following questions:

1)What key values and principles should inform all of HRM's community engagement initiatives?
2) How can HRM ensure a strategic and consistent approach to community engagement?
3) How can HRM coordinate its community engagement?
4) How can HRM ensure broad and representative participation?
5) What processes, tools and techniques can HRM use to ensure meaningful and effective participation?
6) What training and support does staff need to carry out effective community engagement?
7) How do we evaluate and ensure accountability for community engagement?

The assessment of HRM's current engagement practices identified many strengths but also the need to improve and coordinate HRM's community engagement practices. This report seeks Council's endorsement of a new Community Engagement Strategy which will implement new tools and processes across HRM to help ensure that community engagement is conducted in a meaningful, effective and professional manner.

It should be noted that work on implementing many of the actions identified in the strategy is already underway or in some cases has been completed. For example, key tools such as the Community Engagement Checklist, Dictionary, Evaluation Guide and Technique Guides have been developed. Work is also underway on developing an on-line Corporate Calendar. Several business units are already looking at revising their processes and developing improvement plans using principles of good community engagement.

DISCUSSION

The following discussion provides an overview of the proposed Community Engagement Strategy and highlights some of the strategic actions. The discussion is organized around the seven questions listed above to demonstrate how the various elements will work together to meet the desired outcomes.

1.0 Community Engagement Policy and Improvement Strategy Overview

The HRM Community Engagement Strategy provides policy direction and an action plan that will move HRM towards more meaningful, inclusive, effective and efficient community engagement. It is based on a common Definition, Continuum of Community Engagement, 10 Principles and Five

Strategic Approaches. The Strategy is not prescriptive in nature. Rather, it seeks to inform and educate staff, Councillors, external consultants and the public about good principles, effective practices and strategic approaches to planning and conducting public engagement. It also seeks to strengthen internal and external capacity and increase accountability. The implementation tools and processes will be periodically evaluated and improved based on staff, Council and public feedback. An annual report will be presented to Council to report on progress.

1.1) What key values and principles should inform all of HRM's community engagement initiatives?

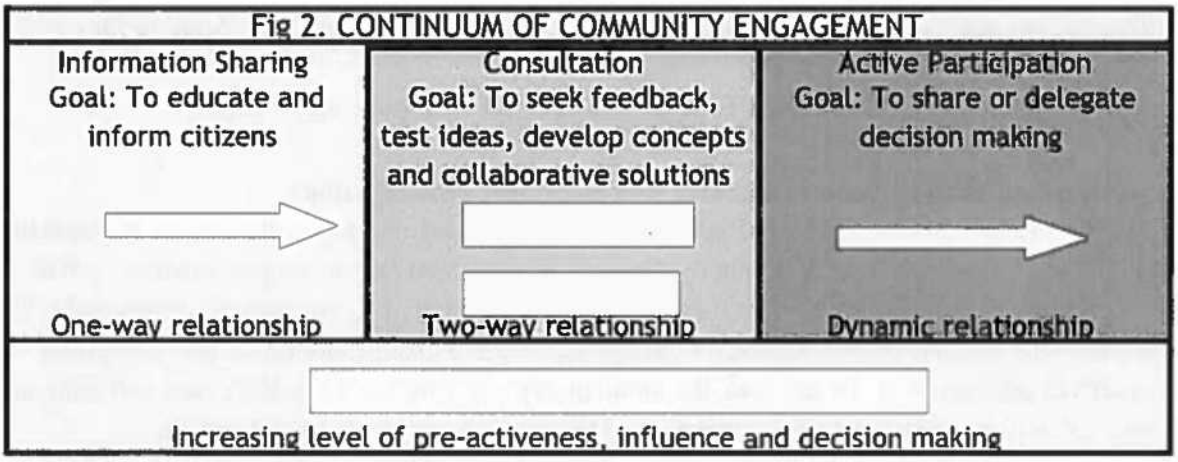
HRM has already embraced community engagement as a key component of sound local democracy. We realize the importance and value of placing residents and communities at the centre of our municipal activities. A set of principles are proposed to guide future practice and to communicate to the public as well as those acting on HRM's behalf the municipality's commitment to community engagement. It is proposed that HRM adopts the following set of Community Engagement Principles:

1. ***Citizen participation is recognized as an asset, is valued and encouraged***
2. ***The purpose and the process are clear to all participants***
3. ***Everyone potentially affected by the process has an opportunity to become involved***
4. ***Barriers to access are recognized and overcome to ensure diverse, inclusive and balanced participation***
5. ***The process is respectful, fair, effective and transparent***
6. ***Communication is clear, timely and effective***
7. ***Public involvement is adequately resourced***
8. ***Participants are informed of outcomes of community engagement***
9. ***The public has an opportunity to provide feedback at the various stages of the process***
10. ***Community engagement will be evaluated and improved***

1.2) How can HRM ensure a strategic and consistent approach to community engagement?

A consistent approach should begin with adopting a common vocabulary and a strategic approach to developing and implementing community engagement.

Community engagement is the process of working collaboratively with and through groups of people to enact positive action. It includes information sharing, consultation and active involvement in decision making. It is proposed that HRM adopts the "Continuum of Community Engagement" model in mandating, designing and implementing its community engagement initiatives (Fig.2).



Information sharing – involves sharing information to build awareness of issues that may affect the public or specific communities.

Consultation – is typically part of a regulatory process by which the public's input on matters affecting them is sought. Its main goals are to improve the efficiency, transparency and public involvement in projects, laws and policies. It may include simple testing of ideas or concepts to build knowledge or it may include a two-way collaboration to develop solutions and build community buy-in.

Active participation – involves sharing decision making to build ownership or delegating decision making to build community capacity and responsibility.

The following actions support a consistent approach to community engagement:

- *Develop community engagement dictionary*
- *Develop and implement Community Engagement Checklist and Readiness Test (to be used by all parties planning community engagement, including coordination with other HRM initiatives)*
- *Educate staff and Councillors on the new Community Engagement framework*
- *Develop a "Process Improvement Program" for individual Business Units*

1.3) How can HRM coordinate its community engagement?

Currently various divisions may post notices of meetings in newspapers and on their individual websites but there is no coordinated approach either internally or externally to notify staff and public of upcoming meetings. As a result more than one HRM meeting may take place in the same community on the same day or several meetings may occur in one week. This results in confusion, poor attendance, and community burn-out. It also means that internally opportunities are missed to coordinate a more efficient approach to community engagement. The following actions support a coordinated approach to community engagement:

- *Develop Community Engagement staff Steering Committee*
- *Develop a Community Engagement Calendar (to be used for posting and checking for conflicts with other community engagement initiatives)*
- *Include a mandatory Community Engagement staff section in all staff reports*

1.4) How can HRM ensure broad and representative participation?

HRM recognizes the importance of informed and active residents, and will continue to provide training and support to build community through volunteerism and active participation. HRM is also committed to representative participation in its community engagement processes and will take steps to improve public outreach to under-represented groups and those that experience barriers to participation. To this end, the municipality will continue to explore new and innovative ways to initiate and sustain the involvement of the broadest range of participants in its engagement processes. The following actions support an inclusive approach to community engagement:

- *Improve public knowledge of HRM's processes and structures*
- *Improve HRM's website (to facilitate e-particiaption)*
- *Develop a community contact database solution*
- *Develop a Community Engagement Inclusion Guide & Workshop*
- *Develop a new volunteer management strategy*
- *Develop a revised and enhanced notification process*
- *Allocate resources to support inclusive participation in HRM processes*

1.5) What processes, tools and techniques can HRM use to ensure meaningful and effective participation?

To assist staff with designing engagement exercises and making decisions about public processes, a CE toolkit will be developed. The kit will include key HRM community engagement documents such as the Guiding Principles, Checklist, Dictionary, Risk Assessment, Communication Guide and Evaluation Guide. It will also provide explanations of both traditional and innovative engagement techniques, the goals and circumstances under which each is most appropriate, as well as the contact information of relevant support staff. The kit will be available in hard copy and on line and will also be made public on HRM's website to support community-driven engagement processes. It will also draw on existing resources, such as the Youth Engagement Tool-Kit. Community Relations staff will also be available to other staff as a resource in designing their engagement processes.

- *Develop a 'Community Engagement Tools and Resources Kit'*
- *Develop a "Community Engagement Resource Group" (CERG)*
- *Develop a "Process Improvement Program" for individual Business Units*

• *Develop a strategic communications plan for business units and their divisions*

1.6) What training and support does staff need to carry out community engagement?
Many staff members are comfortable working with the public and bring substantial skill and expertise to HRM's community engagement projects. The HRM community engagement review process found, however, that our performance lacks professional consistency. Expanded opportunities for staff training will support the implementation of the community engagement framework and allow staff to explore innovative opportunities as well as some of the challenges associated with engaging the public. Programs should focus on the Community Engagement strategy itself, process facilitation, pubic speaking and presentation style, community engagement tools, diversity training, planning inclusive events and processes, conflict resolution, and media relations among others.

• *Expand and promote HRM's staff training programs*
• *Develop a Community Engagement Newsletter*
• *Develop appropriate budget and resource allocation for community engagement*
• *Develop a plan to address needs for technology, equipment, facilities, and meeting spaces*

1.7) How do we evaluate and ensure accountability for community engagement?
All engagement initiatives should incorporate public feedback and evaluation as part of the process. The Community Engagement Tool-Kit will include evaluation templates. It is important to note that while community engagement is an important component of HRM decision making, it is only one component of the process and ultimately the Regional Council and Community Councils are responsible for making governance decisions on behalf of all of their residents. The success of community engagement therefore cannot be judged solely on the outcome of council decisions but rather on the integrity of the process and its adherence to the Ten Principles of Community Engagement. Was the process transparent? Was it inclusive and representative? Did everyone potentially affected have the opportunity to become involved? Were all participants clear on the purpose and outcomes of the process?

Evaluation should not be onerous and should correspond to the length and complexity of the engagement process. It can be completed by staff, an outside consultant or the participating public and it should be used to improve and revise future processes.

• *Institute the "Community Engagement Checklist" as part of planning for all community engagement*
• *Introduce a new mandatory "Community Engagement" section in staff reports*
• *Revise HRM contract templates to ensure external consultants use the new Community Engagement Framework*
• *Require regular evaluation of completed engagement processes*
• *Develop a program to recognize excellence in community engagement*

• *Annually report to Council on progress made with the Community Engagement Strategy*

2.0 Governance

HRM's Community Engagement Strategy will be governed by Community Development's Community Relations and Cultural Affairs Division. Specifically, within this section a Community Engagement Resource Group (CERG) has been established to support the implementation of the strategic directions across the organization. The will serve as a go-to group providing advice and guidance for all Business Units as the strategy rolls out.

Within this context, the Community Engagement Resource Group will convene a Community Engagement Steering Committee. The Committee will work collaboratively to ensure the recommendations are flexible and suitable to the requirements of their divisions, as well as oversee the implementation and evaluation of the strategy over time.

BUDGET IMPLICATIONS

Community Relations is in the process of building a budget in its role as lead on the support and monitoring of the implementation of the Community Engagement Strategy. This budget will come from D710 and is currently estimated at $20,000.

Additionally, the implementation of the strategy will require that the operating budgets of relevant Business Units be adjusted to adequately account for the cost associated with community engagement processes they happen to be leading.

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

1. Adopt the Draft Community Engagement Strategy in Appendix One.
2. Council may choose to require specific amendment to the Strategy.
3. Council may choose not to approve the Strategy. This is not recommended by staff.

ATTACHMENTS

Attachment One - Community Engagement Framework

A copy of this report can be obtained online at http://www.halifax.ca/council/agendasc/cagenda.html then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Kasia Tota, Community Developer, 490-5190

Report Approved by: [redacted]
Andrew Whittemore, Manager, Community Relations and Cultural Affairs, 490-1585

Financial Approval by: [redacted]
Catherine Sanderson, Senior Manager, Financial Services, 490-1562

Report Approved by: [redacted]
Paul Dunphy, Director, Community Development

Attachment 1

HALIFAX
REGIONAL MUNICIPALITY

Community Engagement Strategy



DRAFT Last updated October 7, 2008

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Overview

The Halifax Regional Municipality recognizes the importance of involving residents in the development of policy, programs and services. Community engagement is also the basis for building healthy, strong and inclusive communities.

In January 2006, Regional Council identified the need to develop a new framework for community engagement across HRM. Community Engagement was designated as a key goal of the Council Focus Area on Community Relations. This ***HRM Community Engagement Strategy*** provides a policy and strategic action direction which will guide how the municipality will inform, consult with, and engage the public in developing and implementing its programs and services. The strategy builds on municipal and community strengths while addressing key areas in need of improvement.

The strategy is based on a Definition, Continuum of Community Engagement, Ten Principles of Community Engagement, a Checklist and 5 Strategic Approaches which will ensure that the new framework is implemented across HRM.

The Strategy does not mandate specific community engagement formats to be used at specific times. Each situation demands its own approach and process. Rather, the Strategy seeks to institute a strategic approach to every community engagement process hosted by HRM. The Strategy will not address all of the challenges of managing the complex issues of community engagement, yet by introducing a consistent, strategic approach it will equip HRM with the tools needed to move towards more meaningful, inclusive and effective public involvement.

What is community engagement?

Community engagement is the process of working collaboratively with and through groups of people to enact positive action. It includes information sharing, consultation and active involvement in decision making.

While engagement is often led by government, engagement may also be led by the community with government support. The level of community involvement and influence evolves over time and increases along a 'continuum of community engagement'. While HRM may follow some standard processes to satisfy legislative requirements, in many cases a tailored approach will have to be developed. The onus on HRM is to honour local values and traditions, to use a strategic approach to community engagement, to facilitate effective engagement and to clearly communicate to the public the purpose and scope of engagement. It is important to recognize that in the majority of cases the final decision rests with the elected municipal representatives – the HRM Regional Council.

HRM's Commitment

HRM is committed to supporting an engaged community across HRM by ensuring there is a range of opportunities for residents to be knowledgeable about local government and actively involved in the cultural and civic life of their community.

The following Principles of Community Engagement will guide all future HRM activities:

HRM's Commitment to Principles of Community Engagement

1. **Citizen participation is recognized as an asset, is valued and encouraged**
2. **The purpose and the process are clear to all participants**
3. **Everyone potentially affected by the process has an opportunity to become involved**
4. **Barriers to access are recognized and overcome to ensure diverse, inclusive and balanced participation**
5. **The process is respectful, fair, effective and transparent**
6. **Communication is clear, timely and effective**
7. **Public involvement is adequately resourced**
8. **Participants are informed of outcomes of community engagement**
9. **The public has an opportunity to provide feedback on the process**
10. **Community engagement is evaluated and improved**

A New Community Engagement Strategy for HRM

Since identifying community engagement as a Council Focus Area in January 2007, HRM staff coordinated a detailed review of its community engagement practice as well as successful approaches taken by other municipalities. The review identified a lack of consistency in HRM performance and identified a need for a coordinated approach to community engagement. Based on the findings of these reviews, five strategic approaches are recommended to guide future actions:

1. **Adopt an HRM Community Engagement Framework**
2. **Improve Engagement Practices of Individual Divisions and Business Units**
3. **Increase Training and Internal Support of HRM Staff**
4. **Invest in Public Education, Outreach and Capacity Building**
5. **Ensure Accountability and Promote Excellence in Community Engagement**

Implementation and Governance

HRM's Community Engagement Strategy will be championed by the Senior Management team (SMT) and governed by Community Development's Community Relations and Cultural Affairs Division. A primary role of this Division is to provide a comprehensive community development and cultural framework, and operationalize key municipal strategies including Immigration, Youth Development, Community Engagement, Cultural Planning and Community Grants. Council, all business units and all parties acting on HRM's behalf will be bound by this Strategy, the 10 Principles of Community Engagement and the Community Engagement Checklist. All staff reports to Council will now contain a new "Community Engagement "section. An Operating Action Plan will be implemented through an internal Community Engagement Steering Committee.

Program delivery

The implementation of the ***Community Engagement Strategy*** will move forward in a phased approach, with different actions within each strategic approach being prioritized in the short-term, medium-term, and long-term.

Short-term focus will be placed on the development and adoption of the HRM Community Engagement Framework by Council, including the guiding principles and checklist. Community Engagement Tool-kit, promotional materials and E-Newsletter will be launched. Councillors and key business units will be introduced to the framework in 2008. An HRM Community Engagement Steering Committee will also be established. The development of an overall (internal and external) inclusion strategy for HRM will commence.

Medium-term focus will be placed on the collaborative initiation of tailored community engagement improvement programs in relevant Business Units and staff training. An emphasis will be placed on community capacity building and improved outreach and educational materials, including maximizing HRM's use of its website and the Internet to enhance opportunities for public information, consultation, and participation. Work will also commence to changing the notification process, community calendar and launching a community database solution.

Long-term focus will be placed on, and the evaluation and monitoring of the improvement efforts of relevant Business Units and Divisions and developing a recognition program.

The ***Community Engagement Steering Committee*** will further identify priority areas (i.e. for specific Business Units, facilitate centralized database) and monitor and evaluate the implementation of the strategy over the next Business Cycle.

Evaluation of the implementation of the strategy will be conducted both in an ongoing way (formative) by Community Relations staff and the Steering Committee, and yearly (summative)

with each Business Cycle to measure outcomes and ensure progress is in alignment with Council priorities. Annual progress reports will be tabled with Regional Council.

Budget and Resources

To effectively carry out meaningful community engagement initiatives, distinct resources must be allocated in the operating budgets of individual Business Units. To date, most HRM Business Units have not had dedicated budgets to support community engagement as described in this strategy with the notable exception of major corporate initiatives such as the Regional Plan, Community Visioning, and HRM by Design.

The Community Engagement Resource Group (CERG) is currently in the process of allocating funds for research, professional development / training, and equipment, in order to ensure it is well equipped to respond to inquiries and requests for support and guidance from across municipal Business Units.

This strategy emphasizes the importance of creating the right conditions for improved engagement. The real costs of engagement need to be considered by all Business Units and integrated into all existing and future engagement programs.

PART I

Building the Strategy: Review of Community Engagement in HRM

In the 2003 Community Development Business Plan, Council endorsed staff proposal to develop a Community Development Framework for improving HRM's service delivery at the community level. The Community Development Framework was developed and has since been operationalized. It is comprised of three key strategies: Community Engagement, Community Capacity Building, and Governance and Service Delivery. Community Engagement is considered key to building informed, cohesive, organized, welcoming and safe communities All three are implemented using an Appreciative Inquiry and Asset-based approach (Fig.1).

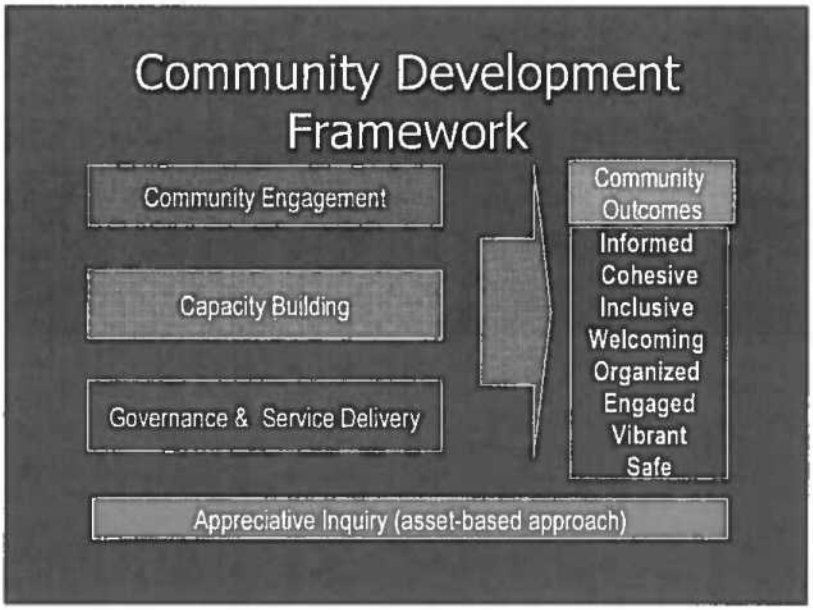


Fig. 1 HRM's Community Development Approach

Community Engagement as one of the three key pillars of the HRM Community Development Framework will facilitate capacity building, governance and service delivery enhancement which will in turn lead to more informed, cohesive, inclusive, vibrant and safe communities. Recognizing the importance of effective community engagement, Council affirmed the need to develop a new framework for community engagement and public consultation. The process of developing the framework included:

1. **January 2007**: Council declares Community Engagement a Focus Area
2. **May 2007:** Assessment of HRM's Community Engagement
3. **August 2007:** Internal Survey and best practice research

Assessment of HRM's Public Engagement Exercises

In May 2007 the MacDonnell Group Consulting and One World Inc. were commissioned by HRM to conduct an assessment of a variety of HRM's public engagement exercises. The objective was to understand HRM's strengths and weaknesses in terms of how we engage the public as a municipality. The consultants evaluated ten past community engagement projects based on a set of indicators of good practice.[1] The process was overseen by an internal staff steering committee comprised of staff from Community Relations, Human Resources, Real Property, Police, Recreation and Planning.

1.1 Focus Groups & Case Study Research

The consultants conducted seven focus groups held throughout the HRM with residents, HRM staff, and Councillors who had participated in one or more of the ten community engagement exercises. Along with the focus groups, they reviewed documentation for each case study. Considering the collected data, as well as relevant policies, legislation, and applicable models of public engagement from other jurisdictions, the consultants identified a number of key findings and recommendations.

Findings

The key challenges identified by the report include clarity on the goals and objectives of engagement, lack of feedback and evaluation at different stages of the process, staff training and support and internal coordination. The recommendations are based on "getting the foundation right for meaningful engagement", including:

- Improving internal consistency and communication;
- Developing a coordinated HRM-wide approach to community engagement, including plans for all processes;
- Developing guiding principles for engagement;
- Reviewing of existing policies and procedures to ensure consistency with the new approach;
- Enhancing staff engagement skills and capacities with appropriate training and through developing mechanisms for shared learning;
- Demonstrating that engagement is important and valued with appropriate venues, proper equipment, and by only seeking involvement when feedback will be used;
- Improving external communication and outreach by using clear language and diverse tools;
- Ensuring the goals of engagement activities are clear and reach a wide and diverse audience;
- Increasing the range of engagement methods used to enhance inclusion, ensuring they match the purpose of engagement and the stakeholders and communities impacted;

[1] Please see the final consultants' report for a list of the case studies and evaluation criteria.

- Establishing clear mechanisms of feedback and evaluation for each engagement initiative.

1.2 Internal Community Engagement Survey

Complementing the findings of the consultant's report staff conducted an internal survey of all HRM business units. The purpose of this additional survey was to determine which units regularly engage the public, to recognize best practices, and identify opportunities for improvement. There were 24 surveys completed by relevant division and project managers. The survey asked questions about general practices, engagement goals and methods, and invited respondents to identify three wishes with respect to HRM's community engagement practices.

Findings

The survey revealed that 85% of HRM's divisions engage the public and over a quarter do it on a daily basis. Most engagement exercises are staff-driven, and while the majority of managers see their staff as being comfortable with public engagement facilitation they also identified a need for better training and internal support, particularly with respect to communication.

1.3 Best Practice Research

The consultant report provided initial research on community engagement tools and techniques, This was supplemented by staff research from various jurisdictions and professional associations. In general, best practice research pointed out the need for a framework, guiding principles, clarity on the continuum of engagement and selecting appropriate approaches to engaging the various segments of the public on specific issues. There is also a general agreement that in order to be effective investment must be made to strengthen internal government capacity. The ***Community Engagement Improvement Strategy*** is guided by the above findings.

PART II

Community Engagement Strategy Framework

The ***Community Engagement Framework*** (the Framework) includes a policy direction regarding common definition, adoption of the continuum of community engagement, and the Ten (10) Principles of Community Engagement. The ***Community Engagement Strategy*** (the Strategy) will be operationalized through Five (5) Strategic Approaches and actions contained in them.

Policy 1: HRM will adopt a Community Engagement Framework which will guide all of its public involvement, including initiatives led by Council, staff, external consultants and community.

2.1 Defining Community Engagement

Community engagement can be defined as *"the process of working collaboratively with and through groups of people to enact positive action. It includes information sharing, consultation and active involvement in decision making".*

Residents expect to be involved in the decisions that affect them, and citizen involvement in deliberations about what is important to them, how their community grows and develops is crucial to more informed government decisions and better service delivery. Effective public engagement taps into the collective knowledge and wisdom of residents and contributes to building more connected, harmonious and resilient communities. When people are involved in initiating and promoting change, the resulting solutions tend to be more successful and lasting.

Community engagement is fundamental to local representative democracy; "Exclusion, however, "is the shadow of public engagement"[2] and engagement that is too numerous, poorly designed and poorly executed can discourage or even silence significant portions of the community. Each situation requires a tailored approach to engagement. The onus on HRM is to honour local values and traditions, to use a strategic approach to community engagement, to facilitate effective engagement and to clearly communicate to the public the purpose and scope of engagement. It is important to recognize that in a vast majority of cases the final decision rests with the elected municipal representatives – the HRM Regional Council.

Policy 2: HRM will adopt a common definition of community engagement, including definitions contained in the Community Engagement Dictionary accompanying the Strategy.

2.2 Continuum of Community Engagement

Community Engagement covers a wide range of processes and government-community connections include information sharing, public consultation and active participation. While engagement is often led by government, engagement may also be led by the community with government support. The level of community involvement and influence evolves over time and increases along this 'continuum of community engagement'.[3] Once a mode of engagement is chosen, the decision must be clearly communicated to the public. Clear, timely and accessible information sharing and communication are part of all stages of the continuum (see Fig. 2).

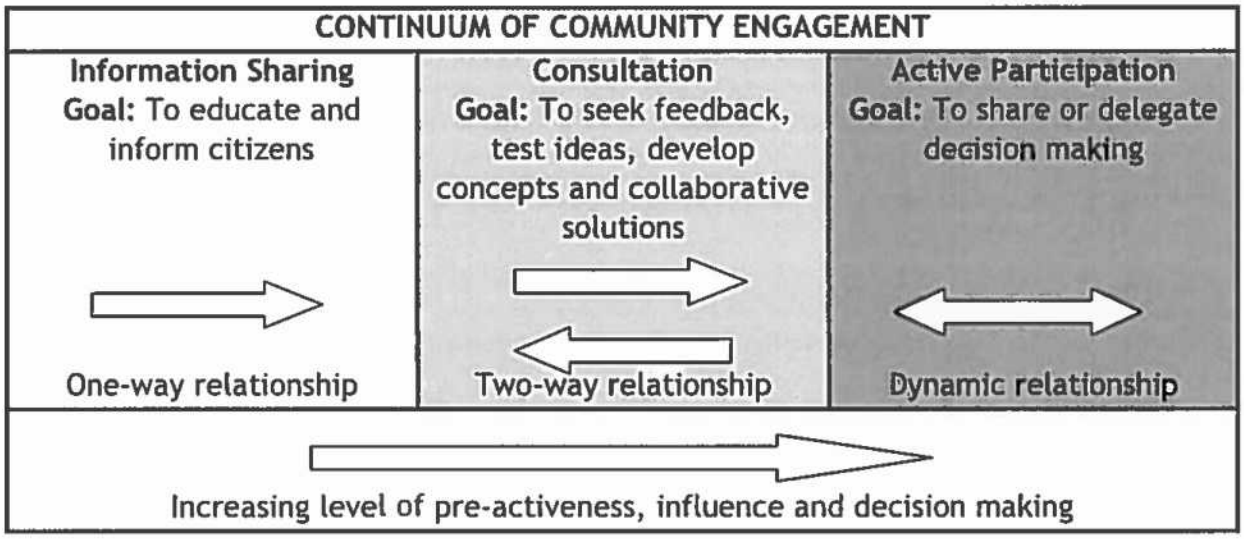


Fig. 2 Continuum of Community Engagement

Information sharing – involves sharing information to build awareness of issues that may affect the public or specific communities. HRM's responsibility here is to provide objective, reliable, timely, easy to find and easy to understand information. Open houses, public announcements, publications such as HRM's "Naturally Green", the Annual Report and the Budget are all examples of information sharing tools.

Consultation – is typically part of a regulatory process where the public's input on matters affecting them is sought. Its main goals are to improve the efficiency, transparency and public involvement in projects, laws and policies. It may include simple testing of ideas or concepts to build knowledge or it may include a two-way collaboration to develop solutions and build community buy-in. HRM's responsibility is to define goals and processes, clearly state the purpose and limits of engagement and how the information collected will be used in decision

[2] Social Planning Research Council of BC. Nov. 2005. Policy Spotlight on Diversity and Civic Engagement. www.inclusivecities.ca

[3] The HRM has adopted and adapted the Organization for Economic Cooperation and Development's (www.oecd.org) engagement model to reflect the range of engagement initiatives in which the HRM is involved.

making. Examples of consultation include Police Town Hall meetings, various Council public advisory committees, public hearings, etc.

Active participation – involves sharing decision making to build ownership or delegating decision making to build community capacity and responsibility. HRM's responsibility is to provide support, time and flexibility to facilitate dialogue between the public, HRM representatives and other partners. HRM should also define a process for integrating input of active engagement in decision making. Community Visioning, community MOUs and facility management agreements are forms of active participation.

Policy 3: HRM will adopt the Continuum of Community Engagement in developing, implementing and communicating public involvement initiatives.

2.3 HRM's Principles of Community Engagement

HRM has already embraced community engagement as a key component of sound local democracy. We realize the importance and value of placing residents and communities at the centre of our municipal activities. The ***Community Engagement Strategy*** recognizes the dedication and hard work of residents, staff, and Council in past and present engagement projects.

This strategy aims to build on that good work by coordinating the municipality's approach to community engagement in order to maximize the benefits to all involved parties. HRM wishes to serve residents in an effective, efficient, and legitimate way. We want to better understand the expectations, strengths, and concerns of residents. With this strategy, we strive to make HRM's community engagement processes more coherent, transparent, and accessible to all. The following Principles of Community Engagement will guide all future community engagement activities led by HRM and those acting on HRM's behalf. They represent an HRM commitment to the public.

HRM's Commitment to Principles of Community Engagement

1. Citizen participation is recognized as an asset, is valued and encouraged
2. The purpose and the process are clear to all participants
3. Everyone potentially affected by the process has an opportunity to become involved
4. Barriers to access are recognized and overcome to ensure diverse, inclusive and balanced participation
5. The process is respectful, fair, effective and transparent
6. Communication is clear, timely and effective
7. Public involvement is adequately resourced
8. Participants are informed of outcomes of community engagement
9. The public has an opportunity to provide feedback at the various stages of the process
10. Community engagement will be evaluated and improved

Policy 4: HRM will adopt the Ten Principles of Community Engagement and use them to guide the development and implementation of all HRM community engagement processes.

2.4 Community Engagement Checklist

Community engagement is an important but only one component of government decision making. It may not always appropriate to engage the public, and when a decision is made to engage the process must be planned for to ensure the public involvement is meaningful, effective and results in positive results for the community. The Continuum of Community Engagement along with the Ten Principles provide a framework for planning any public engagement exercise. Community engagement must take place within a strategic and deliberate decision making process to help ensure that an appropriate level of engagement (see Fig. 3).

To assist staff, Councillors and external parties hosting community engagement on HRM's behalf a 'Readiness Checklist' has been developed to assess the level of readiness to engage the public (Appendix 1). The expectation is not to achieve a perfect score, but to cover as much as possible all of the key aspects prior to engagement to ensure a meaningful and effective exchange between HRM, its residents and stakeholders. A longer version of the Checklist focussed on the key stages of planning community engagement (see Fig. 4) has been developed and will also be provided in the Community Engagement Toolkit.

Each level of engagement along the continuum can be implemented through a range of engagement tools and techniques. In the past, HRM used both traditional techniques, such as advisory committees and public meetings, as well as more innovative processes such as

community visioning, asset mapping and appreciative inquiry. The complexity of the issues at hand, the desired outcomes of the process, and the timeline, all help to determine which methods are most appropriate. The Community Engagement Tool-Kit will provide a guide to the various techniques.

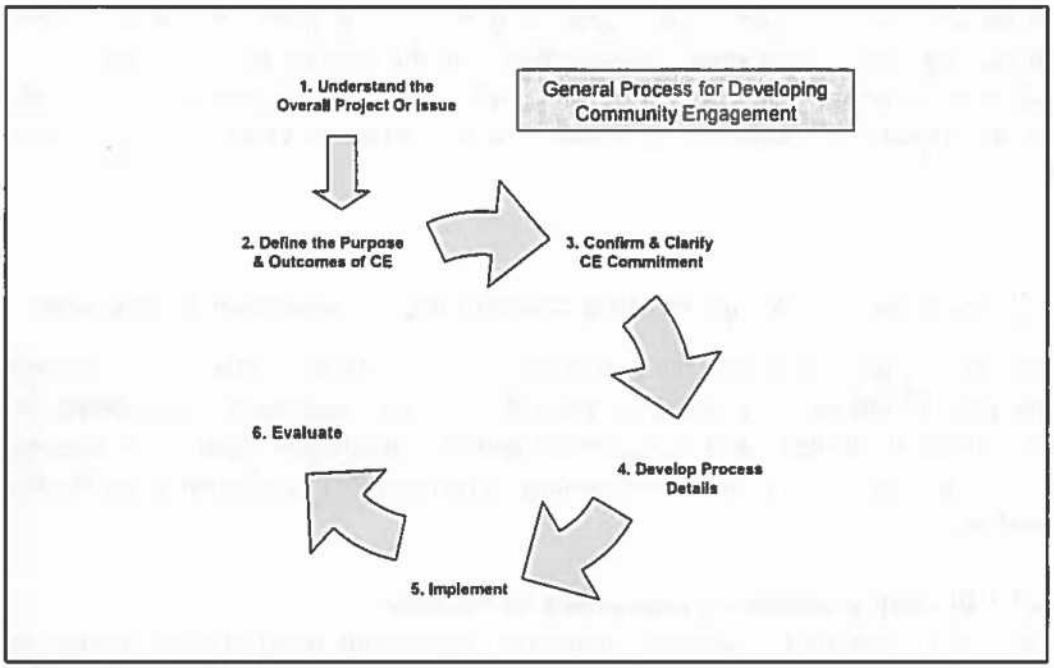


Fig. 3 General process for developing Community Engagement processes

Policy 5: HRM will adopt the Community Engagement Checklist in the development and implementation of its community engagement initiatives.

PART III

The Strategy: Improving Community Engagement in the HRM

The assessment of HRM's current engagement practices identified many strengths but also the need to improve and coordinate HRM's community engagement practices. Further best practices research has augmented these studies and together form the basis for the five strategic approaches and accompanying actions set forth in this strategy. An administrative Action Plan was also developed and it details the governance, costs, and timelines associated with theses actions.

Strategic Approach 1: Adopt an HRM Community Engagement Framework

A community engagement framework will shape and direct HRM's community engagement (CE) practices. It will help staff make decisions about when engagement is appropriate, how processes should be designed and implemented, and who should participate. This framework will also enhance both staff and public understanding of community engagement goals, methods, tools, and techniques.

Action 1.1 Develop a community engagement dictionary
There are many terms used to describe community engagement, many of which are not used consistently. To ensure expectations are accurate for any given process, HRM will use the Continuum of Community Engagement and the terms in the Community Engagement Dictionary. Regardless of what terms are used by others agencies, HRM will consistently use these terms and definitions to ensure clarity and avoid misunderstanding. A draft community engagement dictionary has been developed by Community Relations staff and will be provided as part of a Community Engagement Tool-Kit.

Action 1.2 Develop and implement Community Engagement Checklist & Readiness Test
To assist staff and those acting on HRM's behalf with designing engagement processes and making decisions about public processes, a community engagement checklist has been developed. The checklist identifies the typical stages in any engagement process, and allows staff to "check off" key actions along the planning process. A short checklist focused on "readiness" confirms that community engagement is ready to proceed. Public communication should regularly reiterate the process and the checklist may also be used as a basis for public monitoring and evaluation. A short and along version of the checklist will be provided. A short version of the checklist is appended to this strategy (Appendix I).

Action 1.3 Develop a 'Community Engagement Tools and Resources Kit'
To assist staff with designing engagement exercises and making decisions about public processes, a Community Engagement Toolkit will be developed. The kit will include key HRM community engagement documents such as the Guiding Principles, Checklist, Dictionary, Risk Assessment, Communication Guide and Evaluation Guide. It will also provide explanations of both traditional and innovative engagement techniques, the goals and circumstances under which each is most appropriate, as well as the contact information of relevant support staff. The kit will be available in hard copy and on line and will also be made public on HRM's website to support community-driven engagement processes.

Strategic Approach 2: Support Improved Community Engagement Practices of Individual Divisions / Business Units

To facilitate the integration of the new community engagement framework across HRM, it is proposed that Community Relations staff support each Business Unit in the development of its own program for improvement. The ***Community Engagement Strategy*** champions will work as a team and actively engage staff in the implementation of this new direction.

Action 2.1 Develop a 'Community Engagement Resource Group' (CERG)
HRM has a number of staff with substantial knowledge and experience in community engagement. These staff members will comprise Community Relations Resource Group (CERG) who will focus on skill development and relevant research (i.e. developing the toolkit). This group, comprised of Community Relations staff to begin with, will be available for guidance and consultation in regards to the design, implementation and evaluation of all of HRM's engagement exercises. The group will also help build capacity amongst staff and provide peer-to-peer mentoring. Over time, Community Engagement expertise will grow throughout the organization as staff becomes familiar and confident with community engagement principles and techniques.

Action 2.2 Develop a Community Engagement Steering Committee
A Community Engagement Steering Committee will guide and support each relevant HRM division to tailor the community engagement framework to fit its own requirements. CERG will work with the Senior Management Team to identify appropriate staff. The Steering Committee will monitor, evaluate and guide revisions to the Community Engagement Strategy.

Action 2.3 Educate staff and Councillors on the new Community Engagement Framework
The new Community Engagement Strategy will need to be communicated clearly to staff, Councillors, and contractors acting on HRM behalf and the public. The Community Engagement Framework will be shared with staff and Councillors through workshops, presentations, written materials, on the web, intranet and open discussions. A special effort will be made to incorporate community engagement as part of new staff and Council orientation sessions. Templates will also be developed to clearly communicate where specific processes are

on the Continuum of Engagement. Community Relations will work with Corporate Communications to develop promotional materials.

Action 2.4 Develop a 'Process Improvement Program' for individual Business Units
Community engagement should align with Council Focus areas and Corporate priorities but it can also inform those priorities. Some HRM business units and divisions have already moved forward with community engagement improvement plans, while others still need to initiate such a process. Community Relations staff will provide support and foster an environment where divisions can easily adapt and apply their improvement programs consistent with the HRM Community Engagement Framework. The goal is to initially assess the three top community engagement processes in each business unit or division and develop a standardized plan that complies with the Principles of Community Engagement.

Action 2.5 Develop a Community Engagement Calendar to improve coordination
Currently various divisions may post notices of meetings in newspapers and on their individual websites but there is no coordinated approach either internally or externally to notify staff and public of upcoming meetings. As a result more than one HRM meeting may take place in the same community on the same day or several meetings may occur in one week. This results in confusion, poor attendance, community confusion and burn-out. It also means that internally opportunities are missed to coordinate a more efficient approach to community engagement. Community Relations staff will work with Corporate Communication, Clerk's Office, Web Services and all the business units to develop and promote the use of an interactive Community Engagement Calendar for internal and external use.

Strategic Approach 3: Increased Training and Internal Support of HRM Staff

It is essential that staff have the appropriate skills, tools, and supports to engage the public in an effective, efficient, and meaningful way. The HRM community engagement review process identified the need for more comprehensive staff training, which may include both community engagement processes and techniques. Internal support should place emphasis on internal and external communication and allocation of appropriate resources. It may include developing new staff competencies related to community engagement.

Action 3.1 Expand and promote HRM's staff training programs
Many staff members are comfortable working with the public and bring substantial skill and expertise to HRM's community engagement projects. The HRM community engagement review process found, however, that our performance lacks professional consistency. Expanded opportunities for staff training will support the implementation of the community engagement framework and allow staff to explore innovative opportunities and gaining comfort with engaging the public. Programs should focus on the Community Engagement strategy itself, process facilitation, pubic speaking and presentation style, community engagement tools,

diversity training, planning inclusive events and processes, conflict resolution, and media relations among others.

Action 3.2 Develop a Community Engagement Newsletter
In addition to staff training, a quarterly electronic newsletter will be developed by Community Relations staff in conjunction with Corporate Communication. The objective will be to share information on ongoing initiatives, best practice research in facilitation and community engagement, and to provide staff with practical tips on how to effectively engage the public.

Action 3.3 Develop a strategic communications plan for business units and their divisions
The HRM community engagement review process revealed that strategic communication, both between business units and with the public, is often lacking. Emphasis should be placed on timely, clear, concise, objective communication free of technical jargon. Communication materials may also address history of the issues, relevant policy and procedures, and alternative approaches to addressing issues. Communication should also regularly reiterate the basics of the process such as schedule, milestones, decision making points, progress and opportunities for feedback. Business Units and Divisions should work in cooperation with Corporate Communications to develop their own strategic communications plan to improve their exchanges with the public and with one another.

Action 3.4 Develop appropriate budget and resource allocation for community engagement
The review process revealed that while traditional engagement processes are relatively well resourced, there is little budget support for Community Engagement processes that are innovative, that go beyond the status quo dictated by policy or legislation, or that focus on reaching more diverse participants. Additionally, staff is often forced to play a dual role of both an expert and a facilitator, a situation that creates a perception of bias, public confusion, and staff burnout. In order to promote effective and representative engagement, dedicated resources to support defined community engagement roles as well as inclusive and more innovative processes should be prioritized. All business units will be encouraged to incorporate realistic plans for community engagement as part of their business planning.

Action 3.5: Develop a plan to address needs for technology, equipment, facilities, and meeting spaces
The HRM community engagement review process revealed that logistics and technology often pose a challenge in delivering effective engagement initiatives. Inconsistent access to updated audio-visual technologies, appropriate facilities and meeting spaces, and other equipment has on occasion resulted in less-effective processes. Business Units and Divisions should assess their inventory of technology and equipment. Priority should be placed on ensuring that equipment is updated and maintained in working order. All business units should work collaboratively to inventory community meeting spaces and facilities that meet basic standards of quality and accessibility. They should also ensure resources, if needed, are available to secure appropriate locations.

Strategic Approach 4: Invest in Public Education, Outreach, and Capacity Building

HRM recognizes the importance of informed and active residents, and will continue to provide training and support to build community through volunteerism and active participation. HRM is also committed to representative participation in its community engagement processes and will take steps to improve public outreach to underrepresented groups and those that experience barriers to participation. To this end, the municipality will continue to explore new and innovative ways to initiate and sustain the involvement of the broadest range of participants in its engagement processes. HRM will value and respect citizens' input and participation through appropriate and varied opportunities for involvement.

Action 4.1 Improve public knowledge of HRM's processes and structures
For many, government structures and practices are confusing and unclear. HRM should promote a higher level of awareness amongst public and private sectors about how the municipality works and what opportunities exist for participation. Community engagement can inform how these processes can be modified to create a better fit and easier access for local communities. In addition, HRM "how-to" guides (print and web-based) should outline municipal structures, services provided and how to access them, and how to participate in municipal processes. Materials should be translated to increase access by linguistically diverse groups. Workshops should be developed on specific topics, i.e. volunteering, getting permits, getting involved in planning and development processes. Tours of City Hall and informal meet-and-greets between municipal Councillors, staff and community leaders should also be encouraged and promoted.

Action 4.2 Improve HRM's website
HRM's website is an efficient and relatively low-cost way to reach out to the public. At a minimum, the website is an easy way to share information. However, the interactive nature of the Internet provides many opportunities for innovation in community engagement (i.e. on-line forums such as the one used in Vision HRM; an interactive calendar of Community Engagement events; audio and vide-streaming). HRM should explore how it can maximize the benefits of the web, keeping in mind that online Community Engagement is dependent on public access to computers and the Internet. HRM recently announced an expansion of high-speed Internet access to rural areas. More public access terminals with well-advertised locations would also broaden the accessibility of on-line Community Engagement. The revision of Halifax.ca provides an opportunity for a higher level of service.

Action 4.3 Develop a community contact database solution
HRM should coordinate a centralized database solution for maintaining community contact information that would be accessible to all divisions. The database would arrange and cross-reference the contact information of concerned residents and community groups, based on areas of interest, geography, past participation in training or public processes, etc. The database would help to ensure that all the appropriate residents and community groups are informed about

participation opportunities. New contact forms will be developed to incorporate consent for internal sharing of contact information.

Action 4.4 Develop a Community Engagement Inclusion Guide & Workshop
Many divisions reach out to diverse groups in their engagement exercises; however, there is no consistent approach for addressing diversity in public outreach. The Community Engagement review process identified this lack of coordination as often contributing to a less representative participant base than desired. HRM should draw on current expertise within HRM Human Resources and Community Relations as a first step to developing a Community Engagement Inclusion Guide. Such a strategy would develop contact and media lists, consider potential barriers to participation (based on age, language, literacy, economic status, gender, race, ethnic or cultural background, newcomer status, communication style) and develop strategies for addressing these barriers. More inclusive processes must include multiple and appropriate opportunities for involvement.

Action 4.5 Develop a new volunteer management strategy
HRM recognises that an empowered and organized community sector is the main aim of community development, which enables residents to assess, communicate, and act on their diverse needs and concerns more effectively. HRM currently provides training to community members and groups in facilitation, leadership and board development in order to promote volunteerism, build capacity and help community develop the skills and confidence necessary to act as significant stakeholders in the municipality. Similar training could be offered to all HRM citizen committees to ensure a clear understanding of purpose, decision making scope and effective group dynamics. The annual HRM Volunteer Conference provides an opportunity to connect with volunteers and exchange expertise. The development of a coordinated Volunteer Management Strategy is currently underway and will contribute to stronger and more legitimate community engagement.

Action 4.6 Develop a revised and enhanced notification process
Current notification practices for most HRM Community Engagement processes primarily rely on formal newspaper notifications as well as mail outs, website notification and placards on properties. In order to reach a broader range of participants, an enhanced notification process should be developed that will go above and beyond notification mandated by legislation and utilize a combination of traditional and innovative communication vehicles (i.e. community-based networks such as notice boards and church bulletins, television spots, internet communication such as e-mail and Facebook, door-to-door campaigns, etc). Special attention will be paid to considering the need for clear language, translated materials, and amount of time notice is given in advance of events. Community Relations will work with Clerk's Office, Corporate Communication, Web Services and other Business Units to enhance the existing process.

Action 4.7 Allocate resources to support inclusive participation in HRM processes
Inclusive processes require resources to remove barriers to participation. This may include communication resources to broaden advertising in community newspapers, assisting volunteers with transportation costs, childcare, interpreters and ensuring accessible meeting spaces. It is imperative that HRM allocates resources to broaden its base of engaged citizens.

Strategic Approach 5: Improved Accountability and Promotion of Excellence

The goal of this strategy is to empower and enable HRM as an organization to demonstrate its commitment to public involvement by increasing the level of staff professionalism, increasing internal resources and coordination. The Strategy invites each business unit to take ownership of reviewing and improving their respective activities. To this end, it is proposed that all engagement initiatives use the "Community Engagement Checklist" as part of engagement planning, and that staff reports include a new "Community Engagement section". In addition to regular evaluation it is recommended that a corporate program to recognize excellence and innovation in community engagement be recognized in HRM.

Action 5.1 Institute the "Community Engagement Checklist" as part of planning for all community engagement
Appendix I includes a checklist for planning community engagement activities. The completion of this checklist is mandatory for any staff or Council driven community engagement exercise, as well as any exercise led by a third party acting on behalf of HRM (i.e. consultant). This checklist has been developed in accordance with HRM's Community Engagement Guiding Principles and is intended to help staff design effective and accessible community engagement processes.

Action 5.2 Introduce a new mandatory 'Community Engagement' section in staff reports
A new "Community Engagement" section will become a mandatory requirement of staff reports. It will include a mandatory description of a Community Engagement process including how internal and external stakeholders were engaged on a given initiative (i.e. how they were informed, consulted or actively engaged). Staff may also wish to append more detailed description of the process to staff reports (e.g. meeting minutes, key issues and how they were addressed). In the event that stakeholders or the wider community were not engaged, the new section will provide a brief rationale for that decision. Community Relations will work with SMT and Clerk's Office to institute this change.

Action 5.3 Revise HRM contract templates to ensure external consultants use the new Community Engagement Framework
The new Community Engagement Framework will apply to all parties representing HRM. It is therefore important that Request for Proposal templates include a requirement that any public involvement abides by the Community Engagement Principles and Framework. Community Relations will work with Procurement staff to institute this change.

Action 5.4 Require regular evaluation of completed engagement processes
All engagement initiatives should incorporate public feedback and evaluation as part of the planning process. Evaluation should not be onerous and should correspond to the length and complexity of the engagement process. It can be completed by staff, an outside consultant or the participating public. All evaluation should be shared with the CERG to help assess need for training, coordination and to share "lessons learned" across the municipality.

Action 5.5 Develop a program to recognize excellence in community engagement

The improvement of community engagement practice at HRM will initially require additional staff resources. This effort and innovation should be recognized and celebrated by the municipality. It is recommended that these successes be shared among business units through an annual community engagement recognition program. Community Relations will work with Corporate Communication and the DCAO Office to implement the program.

Implementation and Governance of the Strategy

Governance

HRM's Community Engagement Strategy will be championed by the Senior Management team (SMT) and governed by Community Development's Community Relations and Cultural Affairs Division. A primary role of this Division is to provide a comprehensive community development and cultural framework, and operationalize key municipal strategies including Immigration, Youth Development, Community Engagement, Cultural Planning and Community Grants.

A Community Engagement Resource Group (CERG) has been established to support and coordinate the implementation of the Community Engagement strategic directions across the organization. The Community Engagement Resource Group will convene a Community Engagement Steering Committee comprised of representatives of all business units involved in community engagement work. The Committee will work collaboratively to ensure the recommendations are flexible and suitable to the requirements of their divisions, as well as oversee the implementation and evaluation of the strategy on annual basis.

Program delivery

The implementation of the ***Community Engagement Strategy*** will move forward in a phased approach, with different actions within each strategic approach being prioritized in the short-term, medium-term, and long-term.

Short-term focus will be placed on the development and adoption of the HRM Community Engagement Framework by Council, including the guiding principles and checklist. Community Engagement Tool-kit, promotional materials and E-Newsletter will be launched. Councillors and key business units will be introduced to the framework in 2008. An HRM Community Engagement Steering Committee will also be established. The development of an overall (internal and external) inclusion strategy for HRM will commence.

Medium-term focus will be placed on the collaborative initiation of tailored community engagement improvement programs in relevant Business Units and staff training. An emphasis will be placed on community capacity building and improved outreach and educational materials, including maximizing HRM's use of its website and the Internet to enhance opportunities for public information, consultation, and participation. Work will also commence to changing the notification process, community calendar and launching a community database solution.

Long-term focus will be placed on, and the evaluation and monitoring of the improvement efforts of relevant Business Units and Divisions and developing a recognition program.

The ***Community Engagement Steering Committee*** will further identify priority areas (i.e. for specific Business Units, facilitate centralized database) and monitor and evaluate the implementation of the strategy over the next Business Cycle.

Evaluation of the implementation of the strategy will be conducted both in an ongoing way (formative) by Community Relations staff and the Steering Committee, and yearly (summative) with each Business Cycle to measure outcomes and ensure progress is in alignment with Council priorities. Annual progress reports will be tabled with Regional Council.

Budget and Resources

To effectively carry out meaningful community engagement initiatives, distinct resources must be allocated in the operating budgets of individual Business Units. To date, most HRM Business Units have not had dedicated budgets to support community engagement as described in this strategy with the notable exception of major corporate initiatives such as the Regional Plan, Community Visioning, and HRM by Design.

The Community Engagement Resource Group (CERG) is currently in the process of allocating funds for research, professional development / training, and equipment, in order to ensure it is well equipped to respond to inquiries and requests for support and guidance from across municipal Business Units.

This strategy emphasizes the importance of creating the right conditions for improved engagement. The real costs of engagement need to be considered by all Business Units and integrated into all existing and future engagement programs.

Community Engagement Action Plan

Strategic Direction/ Action	Progress	Short Term (2008-2010)		Medium Term (2011-2013)		Long Term (2014-2016)	
		Staff	Budget	Staff	Budget	Staff	Budget
Strategic Approach 1: Adopt an HRM Community Engagement Framework							
1.1 Develop a community engagement dictionary	Completed	CRCA	N/A				
1.2 Develop and implement Community Engagement Checklist & Readiness Test	Completed	CRCA, All BUs	N/A				
1.3 Develop a 'Community Engagement Tools and Resources Kit'	Completed	CRCA	$5,000			CRCA	$5,000
Strategic Approach 2:Support improved CE practices in Divisions/BUs							
2.1 Develop a "Community Engagement Resource Group" (CERG)	Completed	CRCA	N/A				
2.2 Develop a Community Engagement Steering Committee	Started	CRCA/All BUs	N/A				
2.3 Educate staff and Councillors on the new Community Engagement Framework	Started	CRCA, CC	N/A	CRCA, CC	N/A	CRCA, CC	N/A
2.4 Develop a "Process Improvement Program" for individual Business Units	Started with P&D	CRCA. All BUs	Individual operating	CRCA. All BUs	Individual operating	CRCA. All BUs	Individual operating
2.5 Develop a Community Engagement Calendar to improve coordination	In progress – Web Services	CRCA, CC, WS, All	WS operating				
Strategic Approach 3: Increase training and internal support to staff							
3.1 Expand and promote		CRCA, HR	$5,000	CRCA, HR	$5,000	CRCA, HR	$5,000

Strategic Direction/ Action	Progress	Short Term (2008-2010)		Medium Term (2011-2013)		Long Term (2014-2016)	
		Staff	Budget	Staff	Budget	Staff	Budget
HRM's staff training programs							
3.2 Develop a Community Engagement Newsletter		CRCA, CC	$ 1,000	CRCA, CC	$1,500	CRCA, CC	$1,500
3.3 Develop a strategic communications plan for business units and their divisions		All BUs, CC, CRCA	Individual operating	All BUs, CC, CRCA	Individual operating	All BUs, CC, CRCA	Individual operating
3.4 Develop appropriate budget and resource allocation for community engagement		All BUs	Individual operating	All BUs	Individual operating	All BUs	Individual operating
3.5 Develop a plan to address needs for technology, equipment, facilities, and meeting spaces	CRCA – Started	CRCA, All BUs	$5,000	CRCA, All BUs	$5,000	CRCA, All BUs	$5,000
Strategic Approach 4:Invest in public education, outreach and capacity building							
4.1 Improve public knowledge of HRM's processes and structures		CRCA, CC, All BUs	$5,000	CRCA, CC, All BUs	$5,000	CRCA, CC, All BUs	$5,000
4.2 Improve HRM's website	Started – Web Services Halifax.ca	WS					
4.3 Develop a community contact database solution	Started	CRCA, All BUs					
4.4 Develop a Community Engagement Inclusion Guide & Workshop	CRCA, CC			CRCA, HR	$3,000		
4.5 Develop a new volunteer management strategy	Started	CRCA					
4.6 Develop a revised and enhanced notification process				CRCA, CC, All BUs	Individual operating	CRCA, CC, All BUs	Individual operating
4.7 Allocate resources to support inclusive participation				CRCA, All BUs	Individual operating		

Strategic Direction/ Action	Progress	Short Term (2008-2010)		Medium Term (2011-2013)		Long Term (2014-2016)	
		Staff	Budget	Staff	Budget	Staff	Budget
in HRM processes							
Strategic Approach 5: Improved Accountability and Promotion of Excellence							
5.1 Institute the "Community Engagement Checklist" as part of planning for all community engagement	Started – SMT approval	CRCA, All BUS	N/A				
5.2 Introduce a new mandatory "Community Engagement" section in staff reports	In progress	CRCA, Al BUs, Clerk's Office	N/A				
5.3 Revise HRM contract templates to ensure external consultants use the new Community Engagement Framework		CRCA, Finance	N/A				
5.4 Require regular evaluation of completed engagement processes		CRCA, All BUs	N/A				
5.5 Develop a program to recognize excellence in community engagement				CRCA, DCAO's Office	$500	CRCA, DCAO's Office	$500
Total			$20,000		$20,000		$22,000

Appendix I – HRM Community Engagement Readiness Checklist

Introducing the Checklist

This "Readiness Test" is a short form of a longer Checklist available in the Community Engagement Tool-Kit. It is designed in a form of questions to help those who lead community engagement to check their level of readiness to engage the public. It is accompanied by a point system which allows one to assess relative readiness. While one may never be completely ready, the more bases are covered through the planning process the greater the probability that an engagement process will be meaningful, effective and efficient.

The completion of this checklist is mandatory for any staff driven community engagement exercise, as well as any exercise lead by a third party acting on behalf of HRM (i.e. consultant). This checklist has been developed in accordance with HRM's Community Engagement Guiding Principles and is intended to help staff design effective and accessible community engagement processes. Additional templates to help staff work through the Checklist will be provided in the Community Engagement Toolkit.

The checklist has been developed and revised based on feedback from HRM staff experienced in developing a variety of community engagement processes. Each community engagement process is unique. In most cases, the essential activity areas in each of the phases will inform one another and be worked on simultaneously, rather than sequentially.

Introducing Community Engagement Resource Staff

Community Relations Staff are available to assist staff in the development of community engagement initiatives including:

- Process design and troubleshooting
- Advice on innovative community engagement techniques
- Assistance with community contacts
- Assistance with addressing inclusion in community processes
- Assistance with revising existing business unit processes to align with community engagement framework

Current Staff Contacts are:

Kasia Tota Community Developer Community Relations and Cultural Affairs Tel. 490-5190 E-mail totak@halifax.ca	**Phil Hammonds** Community Developer Community Relations and Cultural Affairs Tel. 490-6577 E-mail hammonp@halifax.ca

Community Engagement Short Checklist/Readiness Test

READINESS STATEMENT	NO	SOME WHAT	YES
1. We can confirm that a decision has not been made and there is a purpose for the involvement process beyond education and information sharing			
2. We know what information the decision makers are looking for and how they will use it			
3. We have clear understanding of what we need to know from the public and how we will facilitate input			
4. We selected appropriate engagement strategies to reach our objectives			
5. There is adequate time for meaningful involvement			
6. We have project budget and have identified resources to sponsor an effective process			
7. We have identified potential stakeholders, their level of engagement			
8. We have developed an inclusion strategy to address potential barriers to participation including training and support			
9. We have developed project plan including key milestones, decision making points and timing			
10. We identified and analyzed risk			
11. We developed an effective communication plan			
12. We have identified project spokesperson			
13. We have coordinated our process with other HRM processes			
14. We have a plan on how to collect and report public input back to participants and decision makers			
15. We developed an evaluation plan as part of the process			
16. Our process clearly aligns with the HRM Principles of Community Engagement			

This Agreement for Community Monitoring of Solid Waste Facilities made this 16 day of February, 1999.

BETWEEN:

HALIFAX REGIONAL MUNICIPALITY, a body corporate pursuant to the *Halifax Regional Municipality Act*

(hereinafter called "HRM")

APPROVED AS TO FORM
Municipal S...

- and -

HALIFAX WASTE/RESOURCE SOCIETY, a body corporate incorporated pursuant to the *Societies Act*

(hereinafter called "the Society")

WHEREAS

HRM has, pursuant to HRM's integrated solid waste resource management strategy, designated a site near Goodwood, Halifax County, as the site for a residuals disposal facility and waste processing facility.

HRM is committed to ensuring that operations at these facilities will be monitored by residents of the communities which are adjacent to the facilities, and by residents of the Regional Municipality at large.

The Society has been formed by residents of the adjacent communities and of the Regional Municipality for the purpose of working together with HRM in the establishment and implementation of a monitoring process and of facilitating the participation of residents in that process.

HRM and the Society wish to enter into an agreement, on the terms set out below, establishing a structure and procedures for the monitoring of operations at the facilities.

NOW THEREFORE this Agreement witnesses that for and in consideration of the mutual covenants hereinafter set out, and other good and valuable consideration, the parties agree as follows:

1. ***Definitions***

1.01 "Acceptable Waste" means

(i) Inert Materials;

(ii) Stable Materials; and

(iii) Residual Materials.

1.02 "Applicable Law" means any law, by-law, rule, regulation, judgment or order of any federal, provincial or municipal court or other governmental body having jurisdiction, applicable to the design, approval, construction, equipping, financing, ownership, possession, testing, acceptance, operation or maintenance of the Facilities or Site, the closing of Residuals Disposal Cells or the care or maintenance thereof after closure. "Applicable Law" also includes the Landfill Guidelines. Notwithstanding the foregoing, "Applicable Law" does not include Restrictions on the Disposal of Residual Materials.

1.03 "Area Residents" means persons who are resident in the area within the radius of five (5) kilometres from the centre of the location of the FEP/WSF Facilities.

1.04 "Bio-Stabilization" means a process of accelerated controlled biological decomposition of Solid Waste (by the consumption of readily available nutrients by micro-organisms) to break down the putrescible protein and sugars and a considerable proportion of the starches present in Solid Waste, leaving the materials thus processed substantially free of readily putrescible elements.

1.05 "Commencement of Operations" means the date specified by HRM in writing to the Society, for the purposes of this Agreement, as the date that the operation of the Facilities has commenced at the Site.

1.06 "Committee" means

a) the Community Monitoring Committee established under Article 5 of this Agreement except as provided for in b);

b) for the period commencing as of the date of execution of this Agreement and ending as of the Commencement of Operations and for the purposes of fulfilling those responsibilities referred to in Article 6 hereof, the Interim Committee.

1.07 "Contractor" means any person, individual, corporation, partnership, firm, joint venture, syndicate, association or form of entity or organization retained under contract by HRM to construct the Facilities and the "Contractor" may also be the "Operator".

1.08 "FEP/WSF Facilities" means the front-end waste processing facility and waste stabilization facility to be situated and operated at the Site.

1.09 "Facilities" means the FEP/WSF Facilities and the RDF Facilities.;

1.10 "HRM" means Halifax Regional Municipality.

1.11 "Inert Material" means Solid Waste which (i) is not Unacceptable Waste; and (ii) does not contain elements which are recognizable as readily putrescible.

1.12 "Interim Committee" means the Committee comprised of those persons listed in Schedule "A".

1.13 "Landfill Guidelines" means the standards and guidelines contained in the draft Nova Scotia Standards and Guidelines for Landfills dated July, 1994 prepared by the Nova Scotia Department of Environment.

1.14 "Memorandum and By-Laws" means, respectively, the Memorandum of Association and By-Laws of the Society in the form attached to this Agreement as Schedules "B" and "C" respectively.

1.15 "Operations" or "Operation", and variations thereof, when used in relation to the Facilities, refers to the operations of the Facilities at the Site, excluding the design, construction and commissioning of the Facilities, but including any closure, post-closure care and remediation activities related to the Facilities.

1.16 "Operator" means any person, individual, corporation, partnership, firm, joint venture, syndicate, association or form of entity or organization retained under contract with HRM for the management and operation of the Facilities, or any part of the Facilities, and the subcontractors thereof.

1.17 "RDF Facilities" means the Residuals Disposal Cells and related facilities to be situated and operated at the Site.

1.18 "Residual Materials" means minor quantities of any material or substance the disposal of which at a solid waste landfill site is banned or prohibited by law and which, notwithstanding the reasonable and diligent efforts of the Operator to identify and remove such materials, remain in the waste that is disposed of in a Residuals Disposal Cell.

1.19 "Residuals Disposal Cells" means the cells to be constructed on the Site for the purpose of disposing of Acceptable Waste.

1.20 "Restrictions on the Disposal of Residual Materials" means any law, including subsections 30(1) and (2) under Division II of the Solid Waste Resource Management Regulations under the Environment Act, which prohibits the disposal of Residual Materials in a Residuals Disposal Cell.

1.21 "Site" means the lands on which the Facilities are to be constructed as shown on the Site Plan.

1.22 "Site Drawings" means the drawings and specifications entitled "Halifax Regional Municipality Residuals Disposal Facility - Site A January, 1997" prepared for Mirror NS by Porter Dillon Limited comprising thirty (30) drawings.

1.23 "Site Plan" means the site plan which is attached as sheet no. 2 of the Site Drawings.

1.24 "Society" means Halifax Waste/Resource Society.

1.25 "Solid Waste" includes refuse, garbage, rubbish and all other solid spent materials from any source.

1.26 "Stable Materials" means items of Solid Waste that are substantially free of readily putrescible elements after having undergone Biostabilization excluding Unacceptable Waste.

1.27 "Unacceptable Waste" means any material or substance the disposal of which at a solid waste landfill is banned by Applicable Law (other than Residual Materials) and which is not capable of being rendered into Stable Material through Biostabilization in the FEP/WSF Facilities.

2. ***Operations at the Site***

2.01 It is recognized and understood that HRM will cause the Facilities to be developed and operated at the Site.

2.02 It is the intention of HRM that the Facilities will be operated by a private sector Operator under contract between the Operator and HRM. HRM will ensure that any contract or contracts between HRM and an Operator will contain provisions which are complementary to the community monitoring process envisaged by this Agreement and which will enable and permit the implementation of this Agreement.

2.03 It is understood and agreed that only Acceptable Waste will be authorized for disposal in the Residual Disposal Cells. It is further understood and agreed that any contract between HRM and an Operator of the RDF Facilities will impose on the Operator the obligation not to dispose of in the Residual Disposal Cells material other than Acceptable Waste.

2.04 HRM will require of an Operator that the Facilities be operated in accordance with Applicable Law.

2.05 The Committee shall, as of the Commencement of Operations, monitor the operation of the Facilities at the Site and otherwise fulfil the responsibilities conferred on it under this Agreement in a manner consistent with this Agreement.

3. ***The Society***

3.01 The Society agrees that neither the Memorandum or By-Laws will be altered or amended such as to conflict with the provisions of this Agreement or to render the Society incapable of meeting its obligations under this Agreement.

3.02 The Society agrees to provide to HRM a report or reports of its business and affairs, at such times and in such form as HRM may from time to time reasonably require.

4. ***Interim Community Monitoring Committee***

4.01 The Interim Committee is hereby established for purposes of this Agreement, and recognized and confirmed as the entity authorized to carry out the interim monitoring responsibilities referred to in Article 6 of this Agreement.

4.02 The Interim Committee shall fulfil the responsibilities conferred upon it by or under this Agreement for the period of time commencing on the date of execution of this Agreement and ending as of the Commencement of Operations, and the members of the Interim Committee are deemed to be jointly appointed by HRM and the Society for terms equal to such period. The Interim Committee shall, for purposes of this Agreement, be deemed to be dissolved effective as of the Commencement of Operations.

4.03 The Chair of the Interim Committee shall be as set out in Schedule "A".

4.04 In the event that a member of the Interim Committee resigns or is otherwise unable to complete that member's term as a member of the Interim Committee, HRM and the Society shall jointly appoint a person to serve for the unexpired balance of the vacating member's term, except in the case of a vacancy in a position filled by a member of the Council of HRM in which case the vacancy shall be filled by a person appointed by the Council.

4.05 In the event that a vacancy occurs in the office of the Chair of the Interim Committee, the Interim Committee shall fill the vacancy by selecting a member of the Interim Committee to be Chair for the unexpired balance of the term of the vacating Chair.

4.06 A quorum of the Interim Committee consists of a majority of the members of the Interim Committee.

4.07 Subject to this Agreement, the Interim Committee shall determine its own procedure.

5. ***Community Monitoring Committee***

5.01 Effective as of the Commencement of Operations there is established a Community Monitoring Committee, constituted and comprised as set out in this Agreement.

5.02 The Society agrees to appoint and elect, in accordance with its By-Laws, those persons to be appointed by it as members of the Committee in accordance with this Article by such time as will enable those members of the Committee to begin their service in that capacity as of the Commencement of Operations. HRM agrees to appoint those persons to be appointed by it as members of the Committee by such time as will enable them to begin their service in that capacity as of the Commencement of Operations.

5.03 The Committee shall consist of fifteen (15) members, as follows:

(a) nine (9) persons elected by the Society who are residents of Halifax Regional Municipality, not more than six (6) or less than four (4) of whom shall be Area Residents;

(b) two (2) persons appointed by the Council of HRM who are residents of Halifax Regional Municipality but not Area Residents;

(c) the members from time to time of the Council of HRM representing polling districts 22 and 23, and, in the event of a change in the boundaries of those districts, the two (2) members of the Council, as determined by the Council, representing substantially the area which, as of the date of this Agreement, falls within polling districts 22 and 23;

(d) One (1) member of the Council of HRM, other than the members referred to in clause (c), appointed by the Council; and

(e) The Mayor of HRM.

5.04 Each of the persons appointed under Article 5.02(a), (b) and (d) shall hold office for a term of such duration as is determined by the respective appointing authority, and may be appointed by their appointing authority for not more than one additional term of the same duration.

5.05 In the event an appointed member of the Committee resigns, ceases to meet the qualifications for appointment, or is otherwise unable to complete the term for which that member was appointed, the appointing body shall appoint a person to serve for the unexpired balance of the vacating member's term, provided that the person appointed to fill the vacancy shall be from the class of persons prescribed by Article 5.03 from which the vacating member of the Committee was appointed.

5.06 The Committee shall select from among the members of the Committee appointed pursuant to Article 5.03(a) a person to act as Chair of the Committee, who shall hold that office for a term of one year from the date of selection, and may be selected to serve for an additional term or terms of the same duration.

5.07 In the event that a vacancy occurs in the office of the Chair of the Committee, the Committee shall fill the vacancy by selecting a member of the Committee appointed pursuant to Article 5.03(a) to be Chair for the unexpired balance of the term of the vacating Chair.

5.08 A quorum of the Committee consists of ten (10) members of the Committee, and, for greater certainty:

(a) a vacancy or vacancies on the Committee does not affect the ability of the Committee to discharge its powers and duties, provided that the number of members of the Committee remaining in office is not fewer than a quorum; and

(b) the absence of a member or members of the Committee from any meeting does not affect the ability of a quorum of the Committee to discharge any of the powers and duties of the Committee.

5.09 Subject to this Agreement, the Committee shall determine its own procedure.

6. **Pre-Operational Review and Contract Amendments**

6.01 HRM shall ensure that the Interim Committee is regularly informed concerning construction of the Facilities throughout the period of their construction and that the Interim Committee, through its Chair or other representative designated by the Interim Committee, is provided with reasonable access to the Site during construction provided (i) that reasonable notice is provided to the Contractor of the intention to visit the Site; (ii) that such access to the Site shall be made available and such visitation to the Site shall be conducted during normal business hours and in a manner which does not interfere with the construction of the Facilities or the performance of the Contractor's obligations under its contract with HRM; and (iii) that all visitors to the Site shall be required to comply with all safety and other reasonable rules and regulations applicable to persons present on the Site including those adopted by the Contractor.

6.02 The Chair of the Committee shall be notified in writing of the text of any proposed amendment of an agreement to which HRM is a party relating to the construction or operation of the Facilities, not less than fifteen (15) days before HRM enters into an agreement to effect the proposed amendment. If, within such fifteen (15) day period, HRM's clerk receives notice from the Committee that its Chair wishes to make representations to Council of HRM concerning the proposed amendment, then HRM shall not enter into an agreement to effect the proposed amendment until thirty (30) days after the date HRM's clerk received such notice from the Committee and within such thirty (30) day period the Chair of the Committee shall be provided the opportunity to appear before HRM Council for the purpose of commenting on the proposed amendment.

6.03 The Committee may, as it sees fit, report to Area Residents or either or both of the HRM Council and the Society, concerning the matters referred to in Articles 6.01 and 6.02.

6.04 HRM agrees that it will appoint and instruct a representative or representatives to meet with representatives designated by the Committee for the purpose of attempting to develop in good faith:

(a) prior to commencement of the operation of the Facilities, specific tests (and testing protocols relating thereto) which may be conducted for the purpose of determining compliance by the Contractor, Operator or both with their respective obligations under any contract with HRM relating to the design, construction, acceptance testing and operation of the Facilities in addition to any such tests or testing protocols contained in any such contract;

(b) the terms and conditions under which the Committee shall be entitled to conduct or monitor the results of tests developed pursuant to paragraph (a) of this Article 6.04;

(c) procedures for conducting random inspections of the content of waste loads delivered by haulers to the Facilities for processing and disposal;

(d) procedures for determining and measuring the composition of waste delivered from time to time to the Facilities for processing and disposal and variations in such composition and the effectiveness of HRM's waste reduction and diversion programs;

(e) standards, programs, procedures and processes relating to the cleanliness of vehicles hauling waste to the Facilities for processing and disposal; and

(f) conceptual plans, programs and procedures for the reclamation and restoration of the Site after permanent closure.

6.05 If HRM proposes to have any Residuals Disposal Cell constructed according to specifications ("proposed specifications") which are different than those contained in the document entitled "Halifax Regional Municipality Residuals Disposal Facility - Technical Specifications Site A January, 1997" prepared for Mirror NS by Porter Dillon Limited as updated and supplemented from time to time then, notwithstanding that such proposed specifications may be acceptable to the Nova Scotia Department of the Environment, HRM shall notify the Chair of the Committee of HRM's intention to construct a Residual Disposal Cell according to such proposed specifications and if, within fifteen (15) days thereafter, the clerk of HRM receives notice from the Committee that its Chair wishes to address Council concerning the proposed specifications, the Chair, or another representative of the Committee, shall be provided with an opportunity to appear before Council to comment on the proposed specifications.

7. Responsibilities During Operation

7.01 The Committee shall, effective as of the Commencement of Operations,

(a) monitor the operation of the Facilities;

(b) ensure that members of the Committee are regularly and fully informed concerning the operation of the Facilities;

(c) receive information and representations from Area Residents concerning any matter relating to the operation of the Facilities;

(d) report to the Area Residents information concerning the operation of the Facilities;

↳ defined on page 3.

(e) report to the Council of HRM and other authorities having jurisdiction relevant views of Area Residents;

(f) report to the Council of HRM and other authorities having jurisdiction the views and comments of the Committee, and of Area Residents, concerning the operation of any element of HRM's integrated solid waste resource management system other than the Facilities, where the operation of such element or elements has a direct impact on the operation of the Facilities;

(g) comment or make representations to such body or authority, as the Committee thinks fit, concerning any matter falling within the mandate of the Committee as set out in this Agreement;

(h) report to the Council or the Society concerning the activities and affairs of the Committee at such times and in such manner as the Council or the Society, respectively, may require;

(i) fulfil such other responsibilities as may be conferred on the Committee by agreement of HRM and the Society.

8. ***Access to Facilities and Relevant Information***

8.01 HRM shall ensure, for and during the period that the Facilities are in operation, that:

(a) the Committee receives full and complete reports concerning the operation of the Facilities, in such form and at such times, as may be required by the Committee;

(b) the Committee has, through its Chair or other representative designated by the Committee, access to the Facilities, provided that:

(i) reasonable notice is provided to the Operator and HRM of the intention to visit the Facilities;

(ii) such access shall be made available and any such visitation shall be conducted during normal business hours and in a manner which does not interfere with the operation of the Facilities or the performance of the Operator's obligations under its contract with HRM; and

(iii) all visitors to the Facilities shall be required to comply with all safety and other reasonable rules and regulations applicable to persons present on the Site including those adopted by the Operator;

(c) the Committee has, through its Chair or other representative designated by the Committee, reasonable access to such information as is from time to time in the possession of either an Operator or HRM, or both, concerning the operation of the Facilities, including, without limitation, the results of tests conducted by an Operator relating thereto;

(d) the Committee has access to information in the possession of HRM concerning the operation of any aspect of HRM's integrated solid waste resource management system which has a direct impact on the operation of the Facilities.

8.02 Where the Committee is not reasonably satisfied, based on information available to it under Article 8.01, that the Committee is accurately informed concerning a matter relating to the operation of the Facilities, the Committee shall have access to the Facilities, on reasonable notice to HRM and an Operator, to enable to be conducted in

accordance with this Article such test or tests as are necessary to provide the Committee with the information which it requires. All such tests shall be conducted subject to the following conditions:

(a) the cost of such tests must not exceed the amount allocated to the Committee under Article 9.02 or 9.03 for that purpose, as the case may be, for the fiscal year in which the test is conducted;

(b) all such tests shall be performed under the supervision of a qualified professional engineer, and at such times and in such manner so as not to interfere with the normal operational routine for the facility to which the test relates.

8.03 Nothing in Articles 8.01 or 8.02 shall entitle the Committee to receive reports or information relating to financial matters, personnel matters, matters which are the subject of legal advice or matters proprietary to an Operator, and all such reports or information are excluded from the scope of Article 8.01 except to the extent that they are otherwise accessible to the Committee under law.

8.04 HRM shall ensure that the provisions of Article 8.01 are, to the extent required, supported by appropriate provisions in relevant agreements between HRM and an Operator.

9. Financing

9.01 It is recognized by HRM that the effectiveness of the Committee in fulfilling its functions under this Agreement depends in part on the allocation of financial and other resources to defray the expenses of the Committee.

9.02 Effective for the HRM fiscal years ending March 31, 1998 and March 31, 1999, HRM shall include, as part of its budget for solid waste management for each of those fiscal years, the sum of Twenty-five Thousand Dollars ($25,000.00) which sum shall be appropriated and expended for the purposes of meeting those expenses of the Committee incurred for those fiscal years within the categories and amounts identified in the estimates contained in Schedules "B" and "C" of this Agreement.

9.03 Effective for the HRM fiscal year ending March 31, 2000, HRM shall include, as part of its budget for solid waste management for that fiscal year, the sum of Sixty-Five Thousand Dollars ($65,000.00) which shall be appropriated and expended for the purposes of meeting those expenses of the Committee incurred for that fiscal year within the categories and amounts identified in the estimates contained in Schedule "D" of this Agreement.

9.04 Effective for each HRM fiscal year after March 31, 2000 during which the Facilities are operated HRM shall include, as part of its annual budget for solid waste management, an allocation of funds in such amount as HRM, acting reasonably, considers appropriate for the purpose of meeting the following categories of expenses of the Committee:

(a) occupancy costs, including space, office equipment and supplies, telephone, etc.;

(b) part-time administrative and clerical support;

(c) postage;

(d) advertising (including printing of public notices and materials for community distribution);

(e) expenses relating to the holding of public meetings;

(f) professional fees for services and advice on matters within the mandate of the Committee under this agreement, including engineering and other technical matters related to the operation of the Facilities;

(g) miscellaneous expenses, including reimbursement of out of pocket expenses incurred by members of the Committee and other expenses required to be incurred to enable the Committee to fulfil its responsibilities under this Agreement.

9.05 The Committee shall, not later than January 31 of each HRM fiscal year after the fiscal year ending March 31, 2000, prepare and submit to HRM an estimate of expenditures required to be incurred in support of the Committee's activities in the next following fiscal year. HRM shall take into account the estimate in deciding, pursuant to Article 9.04, on the allocation of funds to be made for the activities of the Committee during that fiscal year.

9.06 Where, following review of the estimate of expenditures submitted by the Committee under Article 9.05, HRM proposes to allocate an amount for any fiscal year which is less than the total amount estimated by the Committee under Article 9.05, HRM shall, before finally deciding on the amount to be allocated:

(a) notify the Committee in writing of the amount proposed to be allocated and of the reasons for the proposed allocation; and

(b) provide to the Chair of the Committee the opportunity to appear before the HRM Council, not sooner than ten days (10) days following the notice referred to in (a), for the purpose of commenting on the proposed allocation.

In the event that, following completion of the procedure referred to in this Article 9.06, the final decision of HRM is to allocate for the fiscal year in question an amount less than the total amount estimated by the Committee under Article 9.05, HRM shall forthwith notify the Committee in writing of the reasons for that decision.

9.07 The Committee is not authorized to make expenditures or incur liabilities, but may requisition through HRM staff the expenditure of funds consistent with the allocation as approved by HRM under this Part 9 for the fiscal year in question.

9.08 It is understood and agreed that, where appropriate, a portion of the expenditures contemplated by the estimates referred to in Articles 9.02, 9.03, 9.04 and 9.05 for facilities, space, services, equipment or supplies required by the Committee, may take the form of facilities, space, services, equipment or supplies provided to the use of the Committee directly by HRM from its internal resources.

10. Term and Termination

10.01 This Agreement shall be effective as of the date of its execution and, subject to this Agreement, shall remain in effect for such time as the Facilities are operated at the Site.

10.02 This Agreement may be terminated as follows:

(a) effective upon notice in writing given by HRM to the Society in the event that the Commencement of Operations has not occurred by July 1, 1999, and, in the opinion of HRM, is for any reason unlikely occur within one year of that date;

(b) effective upon notice in writing given by either party to the other in the event of any default on the part of the other in the performance of its obligations under this Agreement if, after ten business days notice in writing of the default, the defaulting party has failed to cure the default.

11. **Miscellaneous**

11.01 This Agreement shall bind and enure to the benefit of the parties hereto, their successors and permitted assigns.

11.02 Neither this Agreement nor any of the rights or obligations hereunder may be assigned by either party without the prior written consent of the other party, which may be withheld in the discretion of the other party.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed and delivered by their duly authorized officers or representatives as of the date first above written.

SIGNED, SEALED AND DELIVERED in the presence of: [redacted]

Witness

Witness

) **HALIFAX REGIONAL MUNICIPALITY**

) Per: _____

) Per: _____

SIGNED, SEALED AND DELIVERED in the presence of: [redacted]

Witness

Witness

) **HALIFAX WASTE/RESOURCE SOCIETY**

) Per: [redacted] Secretary

) Per: [redacted]

SCHEDULE "A"

MEMBERS OF INTERIM COMMITTEE

1. Mr. Bert Caines of Goodwood
2. Mr. Michael Walsh of Hatchett Lake
3. Mr. David McCusker of Brookside
4. Mr. Don Wright of Dartmouth
5. Mr. Reg MacAusland of Tantallon - Chair
6. Mr. Kevin Murphy of Timberlea
7. Mr. Jack Mitchell - Councillor District 23
8. Mr. Reg Rankin - Councillor District 22
9. Ms. Carol Ann Wright of Beechville

SCHEDULE "B"

Cost Estimates - Fiscal Year Ending March 31, 1998

1.	Legal, Administration Consulting, Support, Engineering	$ 2,000.00
2.	Communications, Paper Advertising, Facilities	15,000.00
3.	Research, Testing Reviews, Publications, Meetings, Etc.	4,000.00
4.	Miscellaneous Expenses	4,000.00
	TOTAL	**$25,000.00**

SCHEDULE "C"

Cost Estimates - Fiscal Year Ending March 31, 1999

1.	Legal, Administration Consulting, Support, Engineering	$ 2,000.00
2.	Communications, Paper Advertising, Facilities	15,000.00
3.	Research, Testing Reviews, Publications, Meetings, Etc.	4,000.00
4.	Miscellaneous Expenses	4,000.00
	TOTAL	**$25,000.00**

SCHEDULE "D"

Cost Estimates - Fiscal Year Ending March 31, 2000

1.	Legal, Administration Consulting Support, Engineering	$15,000.00
2.	Communications, Paper, Advertising Facilities	35,000.00
3.	Research, Testing, Reviews, Publication Meetings, Etc.	10,000.00
4.	Miscellaneous Expenses	5,000.00
	TOTAL	$65,000.00

This Agreement for Community Monitoring of Solid Waste Facilities made this _____ day of February, 1999.

BETWEEN:

HALIFAX REGIONAL MUNICIPALITY, a body corporate pursuant to the *Halifax Regional Municipality Act*

(hereinafter called "HRM")

- and -

HALIFAX WASTE/RESOURCE SOCIETY, a body corporate incorporated pursuant to the *Societies Act*

(hereinafter called "the Society")

MONITORING AGREEMENT

Robert W. Carmichael
Cox Hanson O'Reilly Matheson
Barristers and Solicitors
1100 - 1959 Upper Water Street
Halifax NS B3J 3E5

Appendix D

Leachate Disposal Capacity Study

Community Monitoring Committee

It's Purpose, It's Mandate, It's Role in the Process

July 15, 1997

Dist / Jul 15/97

941

Community Monitoring Committee

It's Purpose, It's Mandate, It's Role in the Process

- The Community Monitoring Committee (CMC) a committee established by Halifax Regional Municipality, stated purpose was and is to represent the best interests of the host area communities in respect to the impact of the proposed establishment and operations of an FEP/RDF facility at Otter Lake (site A).....as opposed to representing the interests of either of the agreement partners (e.g. HRM and Mirror).

- Throughout the process, the CMC has adopted the position of PLAYWRIGHT not CRITIC.

- CMC has not endorsed or supported the selection of Site 'A' as a physical site. Its mandate was and is to represent community involvement and interests if Site 'A' is approved by the Nova Scotia Department of Environment as an appropriate site.

- During the process, the CMC committee agreed, subject to assurances of HRM, that appendixes and schedules in respect to testing procedures and safeguards would be forthcoming and form part of the HRM/Mirror agreement, to support the timing of an application for a permit to construct an RDF, forwarded to DOE by Halifax Regional Municipality.
  CMC did not, and has not, endorsed the application or the applications content as providing adequate or appropriate community safeguards or benefits.

- During 1996/97 the CMC, in discussion with HRM representatives, DID agree to the format of a proposed agreement between HRM and CMC (as a society). That proposed format represented primarily the composition and structure of CMC together with the terms of its relationship with HRM in respect to operation, funding and administration over the plus 25 year involved if Site 'A' became an operational facility.
  That agreement, remains unsigned, as it was conditional on the timely receipt and review of the documents representing the HRM/Mirror contract which only now are available.

- CMC has not, and is not, nor has it, identified or implied, asked for, accepted, or denied, the role of PRIMARY GUARDIAN or agent for monitoring the adequacy or safety of the proposed operations at Otter Lake (Site A). That RESPONSIBILITY and LIABILITY rests with HRM and its COUNCIL.

- CMC has not, in the process, accepted any responsibility for the adequacy of design, or the financial ramifications of capital costs or future operational costs of the proposed facility. Those items are the responsibility of HRM, its Council, and its Advisors.

- CMC has, during the process, requested the inclusion of a number of safeguards, and measurable tests in the HRM/Mirror contract as items to benefit the adjacent communities. A number of these have been included in the proposed contract.

- The communities will continue to exist over the life of this proposed facility and operation and beyond whereas the individuals, corporation, and agents of today will come and go. Community involvement and protection is not a choice, or clause, but the primary necessity.
The CMC, as proposed, provides the vehicle for community involvement, consultation and monitoring throughout the process should it become a reality.
The growing communities adjacent to the site deserve HRM's commitment that the process proposed will not be allowed to fail, and that the investment in a solution to a problem for all of HRM, will not be the only investment by HRM in the host communities.

9.4.1

HALIFAX
REGIONAL MUNICIPALITY

Halifax Regional Council
July 15, 1997

To: His Wors[redacted]r Fitzgerald & Members of Regional Council

F[redacted] Chief Administrative Officer

George McLellan, Commissioner of Regional Operations

Date: July 14, 1997

Subject: MIRROR/HRM Draft Agreement

ORIGIN:

Staff presentation to Council on the MIRROR/HRM Draft Agreement on Thursday, July 10, 1997.

RECOMMENDATION:

1. That Council approve the document for execution, including those changes as attached, and including such further minor changes as staff may consider advisable, not inconsistent with the substance of the Draft Agreement.

2. That Council approve the Recommendation, as outlined in detail in the Confidential Staff Report to Council dated July 8, 1997 and titled "Expropriation of Lands - Residual Disposal Facility and Front-End Processing Facility," to begin the friendly expropriation of lands to clear titles in the majority of the properties, including expropriation of one parcel of land where staff was unable to arrive at an agreement with the property owner.

. . . /2

3. That Council authorize staff to retain CBCL as HRM's Consultant pursuant to the Agreement subject to negotiations on fee and fee structure.

DISCUSSION:

Council has expressed a desire to proceed with a negotiated Agreement as requested of staff by earlier Resolutions. The Draft Agreement is now before Council for approval in its current form. The public consultation process has been extensive and the Agreement reflects this.

Numerous studies have been done including studies involving the site. As Council will recall, the findings of the Nova Scotia Research Foundation of 12 March 1997 were that the site poses no significant radiological hazard for uranium and radon above that which is already present naturally in the area. In their report they concluded that risks to surrounding communities are considered negligible. This Council and indeed previous Councils, have debated the issue of siting this Facility over many weeks of considerable public consultation. Site A, at Otter Lake near the Goodwood area was **confirmed** by HRM Council as the landfill site for HRM, pending approval from NSDOE.

Council has previously confirmed that MIRROR NS Ltd., would remain as HRM's partner with the responsibility to design, build and operate the RDF and the FEP/WSF. This too was debated at great length and with extensive public input. Council settled this matter in a Resolution in Council and instructed staff to proceed to negotiate with MIRROR.

Council further passed a Resolution that the Community Monitoring Committee would represent the interests of the surrounding community and staff was to negotiate with the Committee on all matters pertaining to the Site A Landfill site and the operation of the Facilities. This has been done and will be an on-going process.

Finally, it must be noted that any approval for this Agreement is subject to the BFI and Municipal Enterprises Boards giving their endorsement of the negotiated Agreement. The Agreement is also subject to review by the Community Monitoring Committee who represent the interests of the surrounding community and the site approvals from NSDOE which staff have been advised will be forthcoming. Additionally, staff will also take into consideration comments of Council.

BUDGET IMPLICATIONS:

These are detailed in the Agreement.

ALTERNATIVES:

1. In respect to Recommendation #1, where, in the event Council does not approve the MIRROR Draft Agreement on July 15, 1997, that authorization be given to begin construction of the Access Road and Exit/access to Highway 103 pending the signing of the Agreement. Clearing and grubbing of lands can then begin in earnest. This will allow HRM to meet the very tight time lines for construction of the RDF and FEP/WSF Facilities before January 1, 1999.

2. Council has the alternative to delay any approval of the Agreement or its intended direction, as well as further progress in the time line overall. This would be a serious and costly impediment to the overall implementation of the community-initiated Strategy as evolved over the past year and is not recommended.

Further information regarding the contents of this report may be obtained by contacting Jim Bauld, Manager of Solid Waste at 490-6717; Joe Mann, Project Manager, at 490-6722; or Louis Coutinho, Executive Assistant, at 490-4023. For additional copies, or for information on this report's status, please contact the Office of the Municipal Clerk at 490-4210 (Tel) or 490-4208 (Fax).

CONESTOGA-ROVERS
& ASSOCIATES

45 Akerley Boulevard
Dartmouth, Nova Scotia B3B 1J7
Telephone: (902) 468-1248 Fax: (902) 468-2207
www.CRAworld.com

October 8, 2014 Reference No. 088605

Mr. Robert Orr
Coordinator, Collection & Processing
Solid Waste Resources
Transportation & Public Works
Halifax Regional Municipality
orrr@halifax.ca

Dear Mr. Orr:

Re: Review and Analysis of Increasing Landfill Cell Height
Otter Lake Facility, Halifax Regional Municipality, Nova Scotia

Executive Summary

Conestoga-Rovers & Associates (CRA) was retained by Halifax Regional Municipality (HRM) to complete a high level technical review of the proposed vertical expansion of the Residual Disposal Facility (RDF) located at the Otter Lake Facility (Site). CRA understands that, as part of the Solid Waste Resources Strategy Review, a vertical expansion of the RDF up to a maximum increase of 15 m has been proposed for consideration by HRM.

There is no technical reason to prevent the vertical expansion of the RDF. A vertically expanded RDF will be within the range of waste depths and heights at a number of landfills across North America. To optimize the vertical expansion of the RDF, design and operational changes will be required that address such items as cell design and sequencing, slope stability, and landfill gas (LFG) management. Therefore a revised design and operations plan for the RDF vertical expansion will need to be developed.

A reasonable approach to implement vertical expansion would be to start in Cells 1 and 2, filling from northwest to southeast to final grades and then moving progressively in a southwest direction towards Cell 6. Benefits of this approach include: progressively re-opening portions of the RDF that has older waste and therefore less LFG generation and associated concerns for odours and differential settlement (due to degradation of organics); and easier transition for the Site operator given that Cells 1 and 2 are shallower cells and have a larger footprint when compared to subsequent cells.

From a cost perspective, substantial changes in operational costs are not anticipated, while significant capital costs reductions will be realized through reductions in capital savings on a capital cost per waste tonne basis. As an example, the vertical expansion capacity over Cells 1-5 is approximately 1.8 million to 2.25 million metric tonnes (MT) (based volume

calculations completed by Dillon Consulting assuming a density range of 0.8-1.0 MT/cubic metre). This quantity of waste represents the construction of 3.6 to 4.5 new cells (assuming 500,000 MT per cell which is roughly the capacity of Cells 7-9). With the capital cost to develop each cell at roughly $19 million, a vertical expansion in Cells 1-5 represents a $68 to $85 million reduction in capital costs.

1.0 Introduction

Conestoga-Rovers & Associates (CRA) was retained by Halifax Regional Municipality (HRM) to complete a high level technical review of the proposed vertical expansion of the Residual Disposal Facility (RDF) located at the Otter Lake Facility (Site). CRA understands that, as part of the Solid Waste Resources Strategy Review, a vertical expansion of the RDF up to a maximum increase of 15 m has been proposed for consideration by HRM. The recommendations are presented and discussed in the following reports:

- Waste Resource Strategy Update (Stantec, 2013)
- A Peer Review of the January 2013 Stantec Report "Waste Resource Strategy Update" (SNC Lavalin, 2013)
- Integrated Solid-Waste Resource Management Strategy Review – Final Report (HRM, 2014)

The Stantec 2013 report concluded that:

- The main benefits for vertical expansion include increasing the RDF capacity by 4.28 million cubic metres and approximately 23-years of capacity, and reducing landfill capital cost substantially on a cost per tonne basis.
- There were no technical issues in expanding the RDF by 10-15 m.
- The vertical expansion should be subject to meaningful stakeholder consultation.

The peer review documented by SNC Lavalin concurred with Stantec's recommendation. SNC Lavalin's 2013 report also documented the findings from a visual impact assessment completed in support of the vertical expansion. The visual assessment utilized six balloons positioned at the proposed maximum elevation in the RDF; and concluded that the balloons were not visible from residential areas visited. SNC Lavalin also noted that increasing the height of the RDF could potentially increase groundwater elevations causing groundwater to come in contact with the cell liner.

Dillon Consulting (Dillon), on behalf of the Site operator Mirror Nova Scotia (Mirror NS), also completed a review of the recommendations with respect to technical, operational, and environmental challenges with vertical expansion of the RDF. Dillon's comments are presented in Memorandums dated September 2012 and May 2013; and are the subject of this review.

CRA's review provides a high level technical review and opinion on components of increasing the height of the RDF for the closed and active cells. Section 2.0 provides an overview of considerations for vertical expansion of the RDF, and Section 3.0 provides CRA's comments on the specific challenges identified by Dillon.

1.1 Background

The RDF has approval for nine cells. Cells 1 to 5 have been filled and capped, while Cell 6 is in operation. The RDF blends into the local topography with the final cover design elevation nominally at 113 m AMSL. The base of the landfill also follows the topography resulting in a depth of waste that increases as landfill development is advanced to the southwest. The final depth of refuse at the crest of the landfill ranges from 12 to 27 m based on the original design (Design Drawings Mirror NS, 1998). A 15 m vertical expansion of the RDF would increase the final cover elevation to a nominal elevation of 128 m AMSL and increase the depth of waste at the crest of the landfill to 27 to 42 m, depending on the final design contours.

2.0 Increasing Landfill Cell Height Overview

2.1 Overview

Landfill design takes into account a number of technical components including site setting (e.g., topography, site size, geologic and hydrogeologic conditions), system components (e.g., leachate, surface water, landfill gas), and operational requirements (e.g., access, waste placement, fill rate, maintenance). The optimal landfill height can be best determined with all of the above considered. The following are several examples of sites that CRA has recently been involved with that demonstrate landfill design solutions that can be applied, as needed, to the RDF to facilitate vertical expansion:

- Lloydminster Waste Disposal Facility (AB): 46 m above grade vertical expansion over existing waste for a total depth of waste of approximately 60 m. Footprint and capacity requirements permitted the use of 4:1 side slopes with terracing for slope stability, site access, and progressive capping.

- Atlantic Waste Facility (BC): 35 m above grade depth of waste. Site size required 3:1 side slopes to accommodate the volume of waste. Textured geomembrane and drainage net with side slope swales were required for slope stability and site maintenance.
- New York State Area Landfill: Approximately 30 m vertical expansion over existing waste for a total depth of waste of 85 m. Horizontal landfill gas (LFG) collection system used at site to facilitate early collection of LFG. As part of vertical expansion, depth of pipe bedding and cover used for horizontal LFG collection pipe increased to minimize the impact of differential settlement on the LFG collection system.

2.2 Vertical Expansion of the RDF

The proposed depth of waste at the RDF, including a 15 m vertical expansion, is well within the range of waste depths at a number of landfills, noting the reference sites above. However, to optimize the vertical expansion of the RDF, design and operational changes will be required. At a minimum, the following should be considered in the vertical expansion design:

- Design and sequencing
- Slope stability
- Leachate and surface water management
- Landfill system components
- LFG management
- Visual impact

2.2.1 Design and Sequencing

A design and sequencing plan needs to be developed as part of a revised operational plan for the RDF. Design considerations should include, but are not limited to:

- Sizing new cells to accommodate progressive capping thus minimizing operational concerns (e.g., leachate generation, LFG collection).
- Sizing new cells to accommodate landfill operations (e.g., haul roads, safe access and use by site personnel and other entities that require access to the active landfill area).
- Balancing capital and operational costs as well as nuisance factors (e.g., construction mobilization, use of interim cover and temporary LFG collection system, relocation of haul roads, and leachate management).

A practical approach would be to implement vertical expansion starting in Cells 1 and 2 filling from northwest to southeast to final grades and then moving progressively in a southeast

direction towards Cell 6. The width of each cell does not necessarily need to be aligned with the current cell limit but rather should be sized to suit operational considerations.

Starting in the northwest end of Cell 1 would:

- Minimize odours generated from previously placed waste: Mirror NS has reported that only small quantities of LFG are generated in older cells, therefore minimizing any potential odour issues from the previously landfilled waste as portions of the final cover are removed.
- Minimize differential settlement: A substantial amount landfill settlement occurs as a result of degradation of organics. The potential for differential settlement in the older cells would be lower given the reported low generation of LFG.
- Cells 1 and 2 are shallower cells and have a larger footprint when compared to subsequent cells, which will allow for an easier transition for the Site operator.
- Realize cost saving from use of existing haul roads and shorter haul distance.

Increasing the height of Cells 7-9 will require a review of the cell layout and modifications to optimize the footprint for each sub-cell, facilitate progressive closure, and minimize leachate generation. Cell 6, which is currently being filled, should continue to be filled and completed with an enhanced interim cover to existing design elevations prior to commencing the vertical expansion. An enhanced interim cover would consist of a minimum 0.3 m low permeable soil completed with 0.15 m vegetative cover. The interim cover would need to be graded to promote drainage and maintained until the vertical expansion progresses to Cell 6.

Existing final cover should be removed to the extent required to accommodate the active fill area. Soil material removed from the existing final cover can be reused in support of landfill operations (e.g., interim or daily cover) or as final cover. Layers stripped below the existing final cover geomembrane should only be reused under the future final cover geomembrane layer (whether to support landfill operations or to be reused in final cover construction). Salvaging of the geomembrane and geotextile materials for reuse as final cover is not practical, however it may be suitable to use the recovered material for temporary uses.

With the progressive removal of final cover, the permanent LFG system that has been installed in the existing cells could be modified[1] to allow for the continued recovery of LFG without extending the vertical LFG wells. While such an approach will reduce the ability to spatially

[1] This could be accomplished by capping the wellhead below the existing waste and by constructing a permanent connection between the wellhead and the sub-header. Control of vacuum applied at each well will be accomplished through a single valve for each sub-header.

control and optimize the quality of LFG collected, it will provide temporary LFG collection until a permanent LFG collection system with new vertical extraction wells is constructed with the placement of final cover (or possibly horizontal LFG collections trenches are installed and operational).

2.2.2 Slope Stability

A slope stability analysis will need to be completed in support of vertical expansion to determine the need for design modifications or implementation of slope stability controls. Slope stability concerns are typically readily addressed through the use of slope flattening, terraced slope design, toe of landfill slope armoring with heavy rock, and surface water management controls (e.g., landfill side slope interceptor swales).

2.2.3 Leachate and Surface Water Management

Given that the landfill footprint will not increase, the quantity of leachate and surface water to be managed should not increase with vertical expansion and implementation of an optimized cell design and sequencing plan.

Leachate is generated as a result of precipitation infiltration into the waste. In order to minimize leachate generation, the cell design and sequencing plan should include the use of soil berms and/or grading to divert clean surface water from coming in contact with waste, minimize the active face, and encourage surface water runoff from areas completed with final and or interim cover through grading.

Surface water is collected from runoff from areas of the landfill completed with final or interim cover or diverted from the active waste disposal area. Enhanced vegetation on the final and interim cover systems and over bare soil areas around the Site (if any), as well as ditch controls, will reduce erosion and will increase evapotranspiration and infiltration (outside of the lined landfill footprint), reducing the volume of surface water to be managed while improving the quality of the surface water collected.

2.2.4 Landfill System Components

The current landfill base liner and leachate collection system are adequate to support a 15 m vertical expansion. The vertical expansion will not adversely impact the performance of the base liner system including the leachate collection piping (150 mm HDPE DR11). The

perforated leachate collection pipe is a redundant means of leachate transport should the drainage media clog due to biofouling or other chemical reactions (e.g., calcium).

The final cover over the vertical expansion area may need to be modified to include a stronger geomembrane and side slope swales. If needed, these modifications can be readily incorporated into the final cover over the vertical expansion area.

2.2.5 Landfill Gas Management

There are no technical challenges due to vertical expansion for LFG collection that cannot be readily addressed. A LFG collection system within the vertical expansion area should consider the benefits and drawbacks of both vertical extraction wells and horizontal collection trench components. The advantage of horizontal collection trenches is that they permit nearly immediate collection of LFG from active areas and provide long term collection once the area is closed, however, present operational challenges for waste placement and construction. The use of vertical collection wells only may not be sufficient to adequately control odours, without the addition of temporary wells and/or use of soil based daily cover on a regular basis.

2.2.6 Visual Impact

Based on the visual assessment completed by SNC Lavalin, it does not appear that the proposed vertical expansion will cause a visual impact to the local communities. In the event of any visual concerns, practical options exist to mitigate visual impacts such as the installation of planting beds or visual screening berms on top of the landfill or the side slopes to break-up the skyline view in select areas. Planting beds consist of a topsoil layer sufficiently thick enough (minimum 0.45 m) to allow for the growth of vegetation such as shrubs while not impacting the performance of the landfill final cover. A visual screening berm would consist of a soil berm sized sufficiently based on its purpose and could also be vegetated with shrubs or small trees.

3.0 Items Raised by Dillon on Behalf of Mirror NS

3.1 The Assessed Potential Lift Capacity and Duration of Operations in Each Cell and Anticipated Duration between Capping Events

A carefully planned and implemented design and sequencing plan would minimize the active area and facilitate the installation of operational controls to minimize leachate generation and facilitate LFG collection. The optimized cell area needs to balance the cost and safety of operations, including waste placement and temporary facilities (daily/interim cover, LFG

collection, surface water controls, and haul roads), verses nuisance factors (odour, dust, vector and vermin) and costs for leachate management. At a minimum, the design should accommodate progressive capping and expansion of the LFG collection system. Therefore the duration to fill each cell and duration between capping events should not change substantially from current site practices.

3.2 Based on Balloon Study Conducted by SNC Lavalin, Assess the Practical Cell Lift Operation Limits Achievable While Maintaining the Site's Isolation and Visual Impacts

SNC Lavalin completed a visual assessment utilizing six balloons setup at the proposed 15 m vertical expansion elevation of RDF (i.e., 128 m AMSL). The balloons were not visible from nine residential areas visited, however, the balloons and current landfill mound were visible from a bedrock outcrop near the commercial area of the Brunello Estates commercial / residential / golf course (Exist 3, Highway 103). The SNC Lavalin assessment demonstrates that visual impact from the proposed vertical expansion would likely be minimal.

Based on information provide a 15 m vertical expansion is achievable while maintaining the site's limited visual impacts. In the event of any visual concerns, cost effective mitigation measures that could be implemented to break-up the skyline view in select areas include the use of planting beds or visual screening berms on top or along the side slopes of the landfill closest to any receptors. As an example, currently the Waterloo Landfill uses planting beds established with small trees and shrubs on top of the landfill to break-up the skyline view.

3.3 Provide Brief Overview of Best Practices for Phased Removal of the Existing Cap in Cells 1 to 5, Corresponding Operational Issues to be Dealt With, and the Degree to which any Salvage of Cap Construction Materials Would/Should be Available for Re-Use

As noted in Section 2.2.1, a reasonable approach would be to implement vertical expansion starting in Cells 1 and 2 filling from northwest to southeast to final grades and then moving progressively in a northwest direction towards Cell 6. Benefits of this approach include: progressively re-opening portions of the RDF that has older waste and therefore less LFG generation and associated concerns for odours and differential settlement (due to degradation of organics); and easier transition for the Site operator given that Cells 1 and 2 are shallower cells and have a larger footprint when compared to subsequent cells.

Existing final cover should only be progressively removed to the extent required to accommodate the active area. As noted in Section 2.2.1, soil material removed from the existing final cover could be reused in support of landfill operations or as final cover. Use of the cover soils in daily operations verses obtaining material from the borrow area would reduce borrow area operations and minimize the effort for stockpile management of the salvaged soils.

With the progressive removal of final cover, the permanent LFG system that has been installed in the existing cells could be modified to allow for the continued recovery of LFG in the older placed waste as the new waste is being landfilled, as noted in Section 2.2.1. Should the existing system become damaged (e.g., due to landfill operations or differential settlement), vertical replacement wells could be installed, as needed, and incorporated in the LFG collection system.

3.4 By Comparison to Existing On-Going Active Cell Temporary Gas Management Techniques and Existing Permanent Gas Management Infrastructure, Provide any Envisioned Operational or System Changes in Terms of Methods and Infrastructure for Gas Control During Landfill Operations Related to Cell Lift Activities on Cells as a Result of Extending the Period When Cells Would be Open

It is CRA's understanding that the use of the temporary LFG system was implemented with the development of Cells 1 and 2 as a result of odour issues. The Stantec 2013 report indicates that an un-intended consequence of the Front End Processor (FEP) and Waste Stabilization Facility (WSF) is that LFG is generated earlier in the RDF than in a typical municipal solid waste landfill as a result of the shredding and mixing of organic waste in the FEP/WSF. CRA also understands that a shredded construction and demolition (C&D) material has been used substantially since 2001 as a daily cover.

There are no technical challenges with vertical expansion for LFG collection that cannot be readily addressed. The vertical expansion design needs to meet both the short term and long term LFG collection requirements, while minimizing capital and operational costs. As noted in Section 3.1, a carefully planned and implemented design and sequencing plan would minimize the active area and facilitate the installation of operational controls to minimize leachate generation and facilitate LFG collection. The use of temporary LFG systems is not ideal and the design should minimize the need of temporary systems. CRA understands that temporary LFG collection wells and above grade piping are installed on an annual basis; and as the landfill reaches final contours, the vertical wells are extended with solid risers to form part of the permanent system. While the temporary system is effective at collecting LFG in the short term to address potential odour issues , as designed is inherently labour intensive with the need to manually drain condensate from the collection piping. In addition, the temporary system does

not facilitate placement of additional waste while operational, and does not maximize the collection of LFG post closure as the extended wells are not screened in the upper portion of the waste. Vertical expansion design considerations include the use of horizontal LFG collection trenches in conjunction with vertical collection wells, the use of the temporary LFG collections system (modified as necessary) that promotes gravity condensate drainage, and the use of soil based daily cover soils. The use of soil based daily cover would minimize moisture infiltration and as such leachate generation and potentially slow LFG generation.

3.5 Cell Access Operational Considerations to Address Access Road Routing and Slopes, Access Road Section on Top of Existing Cells With the Objective of Minimizing Impact to Permanent Gas Management Infrastructure, Potential for Differential Settlement in the Cover, Effect on Leachate Production (if any), and Operational Issues Related to Associated Cells, Firewalls, Cell Walls And Slopes for Cell Lift Construction and Capping

As noted in Section 2.2.1, a reasonable approach would be to implement vertical expansion starting in Cells 1 and 2 filling from northwest to southeast to final grades and then moving progressively in a northwest to southeast direction towards Cell 6. This would allow for the use of the existing roads over the landfill cover to be utilized as haul roads to the active area. A review of the material types and depths should be completed to determine if improvements are required for landfill traffic, to minimize routine maintenance, to ensure the protection of the cover and LFG collection system, and for safety. The improvements may be as simple as adding an aggregate surface course and routine grading or may involve the widening and buildup of the roads (uniformly or specifically where they cross LFG collection piping), ditching to direct surface water runoff, and protection of above grade LFG components. Long term integrity of the final cover geomembrane is of less importance as it will be removed as landfilling advances to the southeast. Haul road construction within the active area would be similar to the current practice.

Haul traffic on top of the landfill may cause an increase in settlement. The settlement will primarily impact LFG collection piping and efforts should be made to minimize crossing of the pipes. As noted above, additional aggregate (or potentially temporary steel plates) may need to be added over the LFG collection pipe to better distribute the load and to protect the infrastructure. Differential settlement in the landfill may require maintenance to promote drainage and maintain the integrity of the final cover. Though vertical expansion will cause differential settlement due to the additional placed waste, other factors play an important role such as placement techniques, waste characteristics, and landfill design and operation.

As noted in Section 2.2.3, in order to minimize leachate generation the cell design and sequencing plan should include the use of soil berms and or grading to divert clean surface water from coming in contact with waste, minimize the active face, and encourage surface water runoff from areas completed with final and/or interim cover through grading. Overall, leachate generation for the Site should not increase as the landfill footprint is not increasing. As the landfill is vertically expanded, lower layers of previously placed waste will consolidate therefore potentially impeding the collection of leachate and contribute to leachate mounding. The presence of fire breaks used in the RDF may compound this issue by limiting the vertical migration of leachate and lateral/vertical migration of LFG. Potentially operational issues could involve an increased number of leachate seeps (prior to final cap placement) and lower LFG recovery. By only removing the final cover from the top of the cell, leachate seeps from the side slopes should not be a concern and will help minimize the generation of new leachate. Currently Mirror NS has reported that no leachate mounding is occurring in the RDF and seeps have been observed with minimal frequency from un-capped portions of the RDF.

There should be no concerns in applying interim cover, fire breaks, or final cover on an adequately designed vertically expanded RDF. Health and safety considerations should be evaluated by completing a slope stability assessment which may result in design modifications or the implementation of controls in support of vertical expansion, in conjunction with operational procedures.

3.6 Cell Lift Operations to Increase Cell Usage Could Have Operational Consequences that may Affect Operational Costs, Including:

- Waste placement/sequencing limitations
- Extended use of temporary landfill gas collection systems
- Modification of existing landfill gas infrastructure
- Staged installation and design modification of future landfill gas management infrastructure
- Increased leachate production
- Modified stormwater management provisions (e.g., terraced construction) to accommodate extended landfill side slopes
- Provide reasonable order of magnitude cost assessment of operational changes and compare to individual cell construction and closure costs (40 months; $25 million)

The vertical expansion design and operation needs to balance the cost and safety of operations, including waste placement and temporary facilities (e.g., daily/interim cover, LFG collection, surface water controls, haul roads), verse the nuisance factors (e.g., odour, dust, vector and vermin) and costs for leachate management. At a minimum, the design should accommodate

progressive capping and expansion of the LFG collection system. The duration to fill each cell and duration between capping events should not change substantially from current site practices (i.e., filling Cells 1-6). For Cells 7-9, a revised design and sequencing plan should be developed and consider progressive landfill closure thus minimizing operational concerns (e.g., leachate generation, LFG generation).

As discussed in Section 2.2.3, the quantity of leachate and surface water generation should not increase as the landfill footprint will not change with a vertical expansion. In order to minimize leachate generation, the cell design and sequencing plan should include the use of soil berms and/or grading to divert clean surface water from coming in contact with waste, minimize the active face, and encourage surface water runoff from areas completed with final and or interim cover through grading. Enhanced vegetation on the final and interim cover systems and over bare soil areas around the Site (if any), as well as ditch controls, will reduce erosion and will increase evapotranspiration and infiltration (outside of the lined landfill footprint), reducing the volume of surface water to be managed while improving the quality of the surface water collected.

Side slope swales may be required to channel surface water runoff horizontally midway along the side slope. This can readily be incorporated into the final cover design with minimal overall costs and without a decrease in air space available for the disposal of refuse and daily cover. The use of terracing is effective for slope stability and provides ample space for installation of surface water control features, however it reduces landfill air space for waste placement.

As previously noted, a reasonable approach would be to implement vertical expansion starting in Cells 1 and 2 filling from northwest to southeast to final grades and then moving progressively in a northwest to southeast direction towards Cell 6. The width of each cell does not necessarily need to be aligned with the current cell limits and should be sized to suit operational considerations.

A vertical expansion is not expected to increase the overall operational costs at the Site. Minor cost increases are expected for some items but cost reductions can also be realized. Several examples include (assuming vertical expansion progresses as described):

- Removal and management of salvaged cover material will increase operational costs, however, the use of the salvaged material in the daily operations will reduce costs to supply temporary cover soils from the borrow area and will allow the clean borrow supply for final cover works.

- Increased operational costs to modify the existing permanent LFG system (i.e., capping each well head) and install horizontal LFG collection trenches, however, the use of the temporary LFG system will no longer be needed (resulting in operational cost savings). Overall, the operation of the LFG collection system should not increase on a cost per tonne/basis.
- Landfill Access Roads: Construction of the total length of access road will be deferred resulting in a decrease cost for winter maintenance (e.g., snow removal, sanding), road side ditch maintenance (e.g., ditch cleaning, grass cutting), and grading and aggregate for road maintenance/improvements. This will be offset by increases in cost for improving roads to accommodate truck traffic and to protect the LFG collection system.
- Shorter haul time to the active face will reduce cost (less time and less fuel). When filling in Cells 1 and 2 the travel distance per load is reduce by at least 1 km round trip as compared to filling Cell 7.
- Cost to manage windblown litter may increase due to fill height relative to surrounding areas.

Overall, any increases in operational cost, if any, will be substantially lower than capital cost savings association with the construction and closure of new cells at the RDF (i.e., on a cost per waste tonnage basis). In addition, annual capital savings set aside for new cell construction will be greatly reduced given that new cells will not be required for an extended period of time (i.e., > 15 years).

3.7 Assess the Potential that Conducting Cell Lift Operations Could Increase the Bearing Pressure of the Cells on the Soil/Bedrock Below to such an Extent to Impact Groundwater Elevations Under the Liner

CRA understands that the geology underlying the base liner at the RDF consists of a thin layer of overburden over bedrock. As part of a revised design plan a geotechnical assessment should be completed to ensure that the integrity of the base liner system is not adversely affected due to differential settlement in the underlying native soils and bedrock as a result of vertical expansion and corresponding increase in landfill bearing pressure. It is not anticipated that this will be a concern due to the depth of overburden, nor is it expected that this would result in an increase groundwater elevations beneath or surrounding the cells.

3.8 Assess the Potential Impact of Cell Operations Improving the in Place Density of the Compacted Waste, and the Additional Capacity Realization of this Added Compaction

The vertical expansion will result in further consolidation of previously placed waste in the RDF. This net gain in landfill air space realized from the consolidation of adequately placed waste (modern landfilling practices typically result in an in-place waste density in the range of 0.8-1 MT/m^3) however, is minimal (potentially 5 percent), when compared to net gain in air space due to degradation (potentially 20-30 percent depending on the waste characteristics).

3.9 Assess the Potential Impact of any Cell Density Increase on the Liner System Itself; Including the Leak Detection Layer, Leachate Collection Layer, and Overall Environmental Protective Resilience

The current landfill base liner and leachate collection system are adequate to support a 15 m vertical expansion. The vertical expansion will not adversely impact the performance of the base liner system including the leachate collection piping (150 mm HDPE DR11). It is noted that the perforated pipe is a redundant means of leachate transport should the drainage media clog due to biofouling or other chemical restrictions (e.g., calcium).

4.0 Conclusion

There is no technical reason to prevent the vertical expansion of the RDF. A vertically expanded RDF will be within the range of waste depths and heights at a number of landfills across North America. To optimize the vertical expansion of the RDF, design and operational changes will be required that address such items as cell design and sequencing, slope stability, and landfill gas (LFG) management. Therefore a revised design and operations plan for the RDF vertical expansion will need to be developed.

A reasonable approach to implement vertical expansion would be to start in Cells 1 and 2, filling from northwest to southeast to final grades and then moving progressively in a southwest direction towards Cell 6. Benefits of this approach include: progressively re-opening portions of the RDF that has older waste and therefore less LFG generation and associated concerns for odours and differential settlement (due to degradation of organics); and easier transition for the Site operator given that Cells 1 and 2 are shallower cells and have a larger footprint when compared to subsequent cells.

CONESTOGA-ROVERS
& ASSOCIATES

October 8, 2014

Reference No. 088605

From a cost perspective, substantial changes in operational costs are not anticipated, while significant capital costs reductions will be realized through reductions in capital savings and on a capital cost per waste tonne basis.

We trust that this technical evaluation provides the relevant information required by HRM regarding the proposed vertical expansion of the RDF. Should you have any questions please do not hesitate to contact us.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

[redacted]

Andrew Philopoulos, P.Eng., M.Sc.

[redacted]

Christine Skirth, CET, PMP

AP/al/4
Encl.

SNC·LAVALIN

A PEER REVIEW OF THE JANUARY 2013 STANTEC REPORT "WASTE RESOURCE STRATEGY UPDATE"

Halifax Regional Municipality - Solid Waste Resources





ENVIRONMENT

17 | April | 13

REPORT
Rev. C04 > Internal ref. 511766-0001-T-EN-REP-0002

A Peer Review of the January 2013 Stantec Report "Waste Resource Strategy Update"

Version 1.0

Prepared for:
Halifax Regional Municipality
Solid Waste Resources –
Transportation and Public Works
PO Box 1749
Halifax, NS B3J 3A5

Prepared by:
SNC-Lavalin Inc.
Environment Division
Suite 200, Park Lane Terraces
5657 Spring Garden Road
Halifax, NS B3J 3R4

April 2013

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SNC·LAVALIN
Environment

Division of
SNC-LAVALIN INC.
Suite 200
Park Lane Terraces
5657 Spring Garden Road
Halifax, Nova Scotia
Canada, B3J 3R4

Telephone: 902-492-4544
Fax: 902-492-4540

April 17, 2013

Halifax Regional Municipality
Solid Waste Resources
PO Box 1749
Halifax, Nova Scotia
B3J 3A5

Attention: Barry Nickerson, P. Eng.
Waste Resources Engineer

Dear Mr. Nickerson:

RE: Peer Review of January 2013 Stantec Report for HRM titled "Waste Resource Strategy Update"

Please accept this as our Peer Review document of the January 2013 "Waste Resource Strategy Update" by Stantec Inc. for the Halifax Regional Municipality (HRM), in response to the August 2012 HRM Request For Proposal (RFP) #12-061 (HRM Solid Waste Resource Strategy System Review, Performance Assessment and Options Analysis).

This document was prepared with contributions from David Haley, Norman Gridley, and other project team members. Please feel free to contact the undersigned about this document at your convenience.

Yours truly,

SNC•LAVALIN ENVIRONMENT

[redacted]

Cameron Ells, P.Eng.
Regional Director, Atlantic

CE/ap

511766-0001-T-EN-REP-0002, Revision C04

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EXECUTIVE SUMMARY

HRM Council asked HRM staff to have some cost effective, environmentally sustainable options identified for an evolving HRM solid waste resource management strategy.

Stantec was awarded a contract, based on an HRM Request for Proposals (RFP) that resulted in their January 2013 "Waste Resource Strategy Update Report." SNC-Lavalin was later awarded a contract, based on another HRM RFP to prepare a peer review of the Stantec report.

In this peer review project for the Halifax Regional Municipality (HRM), the intent was to include "a comprehensive assessment of the analysis, advice, options, conclusions and recommendation as provided in the report for Section 3.0 Otter Lake Waste Processing and Disposal Facility, and Section 4.0 Landfill Design."

We believe that the HRM system can continue to achieve its environmental performance goals in a more cost effective manner (e.g. implementing option A1 to close the FEP / WSF and A3 to increase the maximum landfill cell elevation for the RDF). For a 21st century stream of wastes intended for the RDF landfill cells, the system requirements for the cost effective and environmentally sustainable separation of materials (e.g. white goods, household hazardous materials, recyclable materials, organic materials having the readily volatile, leachable, and biodegradable potential), could be achieved by other means, processes, and methods within the HRM solid waste management system, than those of the current FEP and WSF infrastructure.

In preparing this Peer Review report, SNC-Lavalin:

- reviewed documents provided by HRM, including the 1997 Operations Plan,
- reviewed the 1995 CSC Strategy - "accepted in its principles" by HRM Council in 1996,
- reviewed applicable legislative and regulatory documents,
- met regularly with HRM staff on this project (e.g. Jan 3, 10, 16, and 17, 2013),
- visited the Otter Lake facility on January 10, 2013,
- reviewed the January 2013 Stantec report,
- focussed on Sections 3 and 4 of the Stantec Report, after consulting with HRM staff,
- considered Options - Community Engagement - HRM Council decision making process,
- considered and described additional performance, financial, and technical information,
- described our varying support for potential options recommended in the Stantec report,
- described our varying support for the conclusions presented in the Stantec report,
- described financial review of some options recommended in Stantec report,
- described additional waste stream laboratory sample results and interpretations,
- described Balloon Study for observing balloons above RDF, from various view planes, and
- conducted the peer review tests sought by HRM in the December 7, 2012 RFP.

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It is understood that HRM is starting a 2013 Community Engagement process. This would help HRM Council establish the social and community boundaries for the HRM Integrated Solid Waste Resource Management program for many years to come. In doing so, HRM will seek the most effective means to achieve the desired environmental performance goals. This may involve considering some of the menu of options presented in the Stantec report. In deciding which options to apply, decision makers may choose to seek what we have indicated as additional information. This summarizes our peer review of the major recommendations.

We support the following recommendations, whose concepts and details, with the indicated additional information, merit serious consideration by the final decision makers:

A1 – Closure of FEP and WSF by the end of 2013

- We support this recommendation because the FEP and WSF have never operated as originally envisioned.

A3 – Extend Life of Otter Lake (RDF) Landfill through Vertical Expansion

- This a proven engineering best practice. Concerns associated with view-planes have been considered during a supplemental assessment.

We expect that with more information, we would agree with these recommendations:

A2 – Request Modification of the Nova Scotia Landfill Liner Specification

- A site-specific risk assessment could be used to prepare a different site specific design that would also achieve the environmental performance goals.

We expect that with more information, we would support these recommended options; the concepts can be supported in principle, as meriting further consideration by decision makers; but we currently lack sufficient information to completely agree or disagree with the following:

B1 – Create a Centralized Waste Resource Campus

B2 – Relocation of MRF to (a centralized) Campus

B3 – Increase Organics Processing Capacity (add an anaerobic digestion capacity to the system)

- The requirement for Recommendation B3 is directly linked to the current policies related to the management of ICI organics, including the HRM By-law restricting cross boundary waste/resource transport.
- Additional analysis is required on the cost / benefit of anaerobic digestion.

C1 – Improve Recovery of Recyclables and Organics:

- We agree with the recommendation as an overall goal,
- We expect that with more information, we would agree with the recommendation to eventually move to collecting a single stream of recyclables at the curbside, due to the collection system efficiencies, and
- We lack sufficient information to either agree or disagree with many of the suggestions put forward in support of this recommended goal.

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C2 – Control Curing and Sale of Finished Compost:

- We expect that with more information, we would disagree with the recommendation (of having HRM operate a new secondary curing area).

C3 – Improve Curbside Collection Frequency:

- We expect that with more modelling information, we would disagree with the recommendation to reduce the number of collection zones, and
- We disagree with the recommendation for doubling the year round collection frequency of the current residential green bin food organic waste stream to a weekly basis.

Based on our review, we believe that the Stantec report provides a wide range of options with which HRM can commence a Community Engagement process in 2013. Recognizing the fundamental importance of the 1995 CSC Strategy and the 1997 HRM Operations Plan in creating the basis of the waste management system now in place, it will be helpful for HRM to start this process with the same underlying principles of maximizing waste diversion, meeting current regulations and standards, and ensuring a cost effective system is in place to serve residents and businesses for the long term.

In our review, we commented on each conclusion and provided a brief discussion. Of the twelve Conclusions in Section 12 of the Stantec report:

- We agreed with Conclusions 1, 2, 3, 4, 5, 6, 7, and 10,
- We somewhat agree with Conclusions 11 and 12, and
- We somewhat disagreed with Conclusions 8, and 9.

An interesting item in the next version or evolution of the HRM waste and resource management strategy will be with respect to a better source separation of the various ICI waste stream components.

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Additional Information

Our February 27, 2013 Balloon Study involved six 600 mm diameter helium filled balloons at the proposed new maximum height for the cells. The topography map figure attached to this document indicates various places where we tested the view planes with respect to the Otter Lake cells. Aside from the bedrock outcrop in the anticipated commercial portion of the Brunello Estates development, we are confident that the increase in height of the landfill cells will not be visible from the other locations visited.

Waste stream samples from the FEP and WSF were taken and analysed to investigate their relative volatilization and leachate potentials. The relative differences were such that we believe the existing gas management and leachate systems have sufficient capacity to continue meeting the groundwater and air quality performance goals for the HRM solid waste system.

Developing the WSF and 2002 "ad-hoc" gas management system capacities, was a response to the more rapid, short term release of high concentration gas from RDF landfill cell destined wastes receiving added mechanical and thermal energy at the FEP / WSF. Without the FEP / WSF, the gas releases to be managed would be expected to be slower, at a lower concentration, and for a longer period of time. This is why be believe the current gas management systems will have more than enough capacity to achieve the HRM community odour incident performance goal of zero incidents per year. If other means, processes, and methods are used to replace what the FEP / WSF was intended to achieve, in a cost effective and environmentally sustainable manner, a reduction can be reasonably anticipated in the annual $750,000 cost to HRM for the "ad hoc" gas management system at the RDF that has been operating since 2002. An unintended consequence of the original FEP / WSF operations would appear to be a contribution to the more rapid, short term, release of the high concentration mass of gas that was responded to by the "ad-hoc" gas management system at the RDF landfill cells since 2002. Aside from the fall of 2011, there have not been very many reported community odour incidents due to the Otter Lake FEP / WSF / RDF activities since 2002. This includes the May – December 2010 seven month period when the WSF was not operating.

The current Otter Lake facility environmental performance goals are based on:

- Minimized average number of annually reported community odour incidents (i.e. Zero),
- Air quality parameters and values indentified in the current Operating Permit, and
- Groundwater and storm water runoff quality parameters and values presented in the annual environmental monitoring report.

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Some highlights from our financial review are summarized in the following:

Financial Review: Relative Change in RDF Material Density if FEP and WSF are closed	
+5 %	Increased volume (decreased density) due to unshredded material +20 % volume for unshredded versus shredded materials <25 % of total 2011 material in RDF was shredded material from WSF (HRM: Section 3.2 graphic incorrect in report. FEP to RDF is unshredded.)
+1 %	Increased volume due to contingency for daily cover materials in response to potential change in odour incident responses
->10 %	Decreased volume (increased density) of unshredded material in RDF from increased mechanical compaction efforts (within manufacturer's range)
< 0 %	No net increase in volume, where change in compaction effort is more significant than the density change from 100% unshredded RDF material.

Financial Review: Reductions to HRM Solid Waste Budget if FEP and WSF are closed	
$7.2 M/year	Front End Processing (FEP) Unit annual operations budget
$1.7 M/year	Waste Stabilization Facility (WSF) annual operations budget
$1.8 M/year	FEP / WSF capital cost and repair budget
$0 / year	No change in cost to repurpose or decommission if done 10 years early
$0 / year	No change in salvage value for FEP / WSF if done 10 years early
$10.7 M/yr	Cumulative reduction to HRM budget if FEP / WSF are closed

Financial Review: Additions to HRM Solid Waste Budget if FEP and WSF are closed	
$100 K/year	Residual Disposal Facility (RDF) additional labour
$100 K/year	RDF area additional annual access road improvements and relocations
$0 /year	RDF infrastructure charge due to change in material density and volume
$100 K/year	RDF area addition to annual mechanical equipment compaction effort
$0 /year	RDF Gas Management Resources change in infrastructure and operations
$0 /year	RDF change in annual odour incident responses, and leachate collection, transportation and treatment budget
$300 K/year	White Goods Program (additional resources)
$150 K/year	Household Hazardous Waste Program (additional resources)
$100 K/year	RDF area additional mechanical compaction efforts and equipment
$100 K/year	Scale house and associated functions salvaged from FEP budget
$950 K/yr	Cumulative additions to HRM budget if FEP / WSF are closed

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Implementing Options A1 and A3 – Financial Results

We have presented a summary of these considerations as tables. The net financial influence on the annual HRM Solid Waste Budget from closing the FEP and WSF is anticipated to be:

- between $9,000,000 – 10,000,000 per year based on FEP / WSF capital and operations, and downstream responses to achieve certain tasks by other means, and
- a potentially substantial reduction in the $750,000 per year budget, for the continued use of the short term "ad hoc" landfill gas control and management system at the RDF.

If it is decided to implement the A1 option on closing the FEP and WSF, there are some financial implications for the HRM solid waste system. They include:

- If filling Cells 6 – 9, to the current design height were to occur over a 15 year period (~11 years x 10/7.5 x $10,000,000), the financial implication for the HRM system could be around $150,000,000.
- If filling Cells 1 – 5 to the proposed additional 15 metres was accomplished over at least 12.5 years; and filling Cells 6 – 9 to the proposed additional 15 metres was accomplished over at least 11 years, the financial implication for the HRM system could be around $230,000,000, as a present worth value.
- 38.5 year fill time = 15+11 (Cells 6-9 current plus 15 m) +12.5 (Cells 1–5 plus 15 m)

If it is decided to implement the A3 option on increasing the landfill cell height, there are some financial implications for the HRM solid waste system. They include:

- If the cost for a new cell is about $15,000,000 to construct, or $25,000,000 for construction and closing, and with the current maximum height an additional cell is constructed about every three years,
- Assuming the cell closure costs would be the same, regardless of the final height, the financial value for the HRM system of increasing the RDF landfill cell heights would be at least $100,000,000 (7 x $15,000,000 > $100,000,000) if not significantly more, based on the seven additional cell liners that did not have to be constructed.

If it is decided to implement both the A1 option on closing the FEP and WSF, and the A3 option on increasing the cell heights:

- The cumulative financial effect of taking an FEP / WSF decision, and an increase in landfill height decision could be on the order of at least $480,000,000 over almost forty (40) years.
- If the current HRM system budget could accomplish the same goals for about $12,000,000 less per year (i.e. $12,000,000 = $480,000,000/40 years), that could reduce the average $170/tonne RDF cost to HRM, to something less than $100/tonne.

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Summary of Peer Review Test Results for Options A1, A2 and A3

We have also prepared a tabulated summary of the results we found in applying tests A, B, and C, to recommendations A1, A2, and A3 in sections 3 and 4 of the January 2013 report, with respect to the methodology and validity of recommendation derivation presented.

Providing a greater focus of our peer review evaluation on the A1, A2, and A3 recommendations in Sections 3 and 4 of the Stantec report reflects our contracted scope of work. The same table was not produced with respect to the B or C group of Stantec recommended options for HRM.

Recommendation A1 - Closure of the FEP (Front End Processing unit) and WSF (Waste Stabilization Facility) by the end of 2013		
Refer to our Section 11.1.5 Methodology of Recommendation Derivation in Stantec Section 3. Refer to our Section 11.1.6 Validity of Recommendation Derivation in Stantec Section 3.		
Test A – System Performance	for Methodology	Yes - Partially
Test A – System Performance	for Validity	Yes - Partially
Test B – Benchmark Analysis and Best Practice	for Methodology	Not comparable
Test B – Benchmark Analysis and Best Practice	for Validity	Not comparable
Test C – Options Analysis and Recommendations	for Methodology	Yes - Partially
Test C – Options Analysis and Recommendations	for Validity	No
Recommendation A2 – Request Modification of the Nova Scotia Landfill Liner Specification		
Refer to our Section 11.2.1.1 Methodology of Recommendation Derivation in Stantec Sec. 4.1. Refer to our Section 11.2.1.2 Validity of Recommendation Derivation in Stantec Section 4.1.		
Test A – System Performance	for Methodology	With more info. - Yes
Test A – System Performance	for Validity	With more info. - Yes
Test B – Benchmark Analysis and Best Practice	for Methodology	Yes
Test B – Benchmark Analysis and Best Practice	for Validity	With more info. - Yes
Test C – Options Analysis and Recommendations	for Methodology	With more info. - Yes
Test C – Options Analysis and Recommendations	for Validity	No
Recommendation A3 – Extend Life of Otter Lake Landfill through Vertical Expansion		
Refer to our Section 11.2.2.1 Methodology of Recommendation Derivation in Stantec Sec. 4.2. Refer to our Section 11.2.2.2 Validity of Recommendation Derivation in Stantec Section 4.2.		
Test A – System Performance	for Methodology	Not applicable
Test A – System Performance	for Validity	Yes
Test B – Benchmark Analysis and Best Practice	for Methodology	Yes
Test B – Benchmark Analysis and Best Practice	for Validity	No
Test C – Options Analysis and Recommendations	for Methodology	Yes
Test C – Options Analysis and Recommendations	for Validity	Yes

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1. INTRODUCTION

1.1. PEER REVIEW GOALS, METHODOLOGY, AND CONTEXT

In this peer review project for the Halifax Regional Municipality (HRM), the intent was to include "a comprehensive assessment of the analysis, advice, options, conclusions and recommendation as provided in the report for Section 3.0 Otter Lake Waste Processing and Disposal Facility, and Section 4.0 Landfill Design."

In following the methodology described in our proposal, we met with HRM staff; visited the Otter Lake facility; reviewed documentation provided electronically by HRM, including files on a Stantec FTP site; tested the recommendations in Stantec Report Sections 3 and 4, and to a lesser degree those in other sections; sought additional information, and prepared our report.

The evolution of the HRM solid waste resource management program included:

- 1995 Community Stakeholder Committee (CSC) "An Integrated Waste Resource Management Strategy"
- 1996 HRM Council motion which had the 1995 CSC Strategy "accepted in its principles"
- 1997 HRM Operations Plan for the Otter Lake facility
- 2002 start of the "ad hoc" gas management system at the RDF landfill cell
- 2013 Stantec report for HRM "Waste Resource Strategy Update Report"

HRM Council asked HRM staff to have some cost effective, environmentally sustainable options identified for an evolving HRM solid waste resource management strategy.

Stantec was awarded a contract, based on an HRM Request for Proposals (RFP) that resulted in their January 2013 "Waste Resource Strategy Update Report." SNC-Lavalin was later awarded a contract, based on another HRM RFP to prepare a peer review of the Stantec report.

The Stantec mandate was described as a high level review and identification of potential options for achieving the HRM solid waste resource management system performance goals in a more cost effective, but still environmentally sustainable manner. Stantec was asked to look at the integrated HRM system as a whole; exemplified by the 1997 HRM Operations Plan for the Otter Lake facility. One response was the "campus" concept in their report, where various components of the HRM system might function more efficiently, if they were in closer proximity, yet still function in an environmentally sustainable manner. The options recommended by Stantec in their report appear as a menu of individual options. As a high level document, these options can start a discussion where additional information is considered; where the 2013 Community Engagement process provides some feedback; and where the HRM Council will make the final decisions about an evolving HRM system (e.g. which options; and in what form).

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This SNC-Lavalin peer review report presents:

- An Executive Summary,
- Information on our contracted scope of work for HRM,
- Our comments with respect to supporting – or not - the major options Stantec recommended and their conclusions; with respect to the merits of each major option they recommend; and for that option continuing to be in an ongoing process involving further considerations, additional information, community engagement, and HRM Council decision making,
- Our discussions on technical items of interest to HRM, and some of our additional performance, financial and technical information with respect to the Stantec options A1 on closing the FEP / WSF (e.g. Waste Sample Investigation; and Financial Review), and option A3 on increasing the maximum height elevation for the Otter Lake residual disposal facility (RDF) landfill cell (e.g. Balloon Study), and
- Our peer review of the process being demonstrated in the Stantec report, with respect to tests sought by HRM (i.e. Test A - System Performance Assessment, Test B - Industry Bench Mark Analysis and Best Practices, and Test C – Options Analysis and Recommendations) and the methodology used in identifying the major option, and to testing their validity. The results of our validity testing of an option being recommended by Stantec, is not of itself an endorsement or a criticism.

In preparing this Peer Review report, SNC-Lavalin:

- reviewed documents provided by HRM, including the 1997 Operations Plan,
- reviewed the 1995 CSC Strategy "adopted in principles" for use by HRM Council in 1996,
- reviewed applicable legislative and regulatory documents,
- met regularly with HRM staff on this project (e.g. Jan 3, 10, 16, and 17, 2013),
- visited the Otter Lake facility on January 10, 2013,
- reviewed the January 2013 Stantec report,
- focussed on Sections 3 and 4 of the Stantec Report, after consulting with HRM staff,
- considered Options - Community Engagement - HRM Council decision making process,
- considered and described additional performance, financial, and technical information,
- described our varying support for potential options recommended in the Stantec report,
- described our varying support for the conclusions presented in the Stantec report,
- described financial review of some options recommended in Stantec report,
- described additional waste stream laboratory sample results and interpretations,
- described Balloon Study for observing balloons above RDF, from various view planes, and
- conducted the peer review tests sought by HRM in the December 7, 2012 RFP.

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1.2. CONTRACT AND PROJECT DOCUMENTS

The most relevant documents associated with this Peer Review project are:

- HRM RFP December 7, 2012;
- SNC-Lavalin proposal December 18, 2012;
- January 2013 "Waste Resource Strategy Update Report" by Stantec Inc.;
- August 2012 HRM Request For Proposal (RFP) #12-061 (HRM Solid Waste Resource Strategy System Review, Performance Assessment and Options Analysis);
- other relevant files provided by HRM, and on a temporary Stantec FTP site;
- the 1995 CSC Strategy as adopted "in its principles" by HRM Council in 1996;
- the 1997 HRM Operations Plan for the Otter Lake facility with Mirror; and
- applicable legislative and regulatory documents.

1.3. PROJECT MEETINGS AND SITE VISIT

In preparing this Peer Review report, we met with HRM staff at four scheduled times (Jan 3, 10, 16, and 17, 2013), and visited the Otter Lake facility on January 10, 2013. We also met with HRM representatives afterwards, which were more impromptu or at short notice.

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2. DOCUMENT REVIEW

The documents reviewed and referred to most often during this project included:

- The 132 page HRM RFP #12-061 (August 2012);
- The 187 page January 2013 Stantec report (Waste Resource Strategy Update Report);
- The 1995 Community Stakeholder Committee document "in its principles" adopted for use by HRM Council in February 1996 (An Integrated Waste Resource Management Strategy for Halifax County / Halifax / Dartmouth / Bedford); and
- The 1997 HRM Operations Plan for the Otter Lake facility, which presents the commitments and desired outcomes, and which deviate considerably from some items in the 1995 CSC Strategy.

The HRM Waste Strategy Reference Document list provided by HRM included:

- 5-year breakdown of organic tonnages (both commercial and residential).
- Diagram of Otter Lake Cell #6 liner in comparison to US EPA Subtitle D Liner System.
- Dillion Density Memo 2011
- Dillion-Otter Lake-RDF Elevation Change Impacts
- Historic Operating Cost Review and Tonnage for Otter Lake.
- CCME Composting Guidelines (2005)
- HRM Collection Contract (2008). Includes costing for collection in the 8 areas of HRM.
- HRM Number of Collection Services Areas from 2008-2011.
- HRM Solid Waste Characterization Study (2003) by SNC-Lavalin.
- HRM Solid Waste Characterization Study (2009) by SNC-Lavalin.
- HRM Solid Waste Characterization Study (2010) by SNC-Lavalin.
- HRM Solid Waste Characterization Study (May, 2004) by SNC-Lavalin.
- HRM Solid Waste Strategy Transportation October 11, 2012
- Lab results from composting samples taken from the Miller Composting Plant, New Era Plant and the Elmsdale curing area
- Materials Recovery Facility Operation Agreement between HRM and Miller.
- Miller 2011 Annual Report
- Municipal Solid Waste Conversion Technology: Waste Characterization Study (prepared by CBCL). (2011)
- New Era 2011 Annual Report
- Nova Scotia Composting Guidelines 2006
- Nova Scotia Municipal Waste Diversion Calculations and Per Capital Disposal.
- NS Municipal Solid Waste Landfill Design Guidelines.
- Otter Lake Cell 6 Final Budget
- Otter Lake RDF 2011 Annual Report April 2012
- Provincially Banned Materials

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- Q123 Construction Reserve. Summary of total funding and balance for Otter Lake.
- Refuse Tonnage: Summary of total waste tonnage for HRM from 1999/2000 to 2011/2012.
- Revised Regional Solid Waste/Resource Management Plan Framework (1996).
- RFP for the Operation of the MRF (2008).
- RFP for the Operation of the MRF Addenda's 1&2 (2008).
- Solid Waste Tonnage Reports 2001 to 2011.
- Summary of collection costs (curbside and condo) for 2008-2011.
- Summary of residential tonnages (all streams).
- HRM Solid Waste Resource Collection and Disposal By-Law.
- Summary of MRF tonnages from 1997 to 2012.
- Summary of materials recovered at the MRF (in terms of sales) from 2005 to 2012.
- Table of Expenditures & Revenues and Net Costs per Tonne for the MRF.
- Table of Monthly Tonnages and Market Price of Recyclable Materials.
- Tip Fees History. Tipping fees for HRM's previous transfer station, the landfill, and organics from 1990 to 2010.
- Integrated Resource Management Strategy (CSC1995).
- Tonnages of Waste Received at Otter Lake from 2006-2011.
- Types of materials processed at the MRF. A comparison of 1992, 2007/2008, and 2011.
- Waste Management 2012 Municipal Tipping Fee Survey
- Waste Resource System Mass Balance for residential and commercial waste from 2007-2011
- Waste Resource System Mass Balance for total waste from 2006-2010.
- Weekly Organics Collections Council Reports

Regulatory and legislative documents that were reviewed included:

- HRM By-Law S-600 "Solid Waste Resource Collection and Disposal By-Law"
- Nova Scotia Composting Guidelines 2006
- NS Municipal Solid Waste Landfill Design Guidelines
- Nova Scotia Environment Act
- Nova Scotia Environmental Goals and Sustainable Prosperity Act (EGSPA)
- CCME Guidelines for Compost Quality (2005)

Additional documents were also provided by HRM during our review. Examples include:

- Otter Lake WSF Materials Characterization and Testing (Dec 2012 – Jan 2013)
- February 16, 1999 Agreement for Community Monitoring of Solid Waste Facilities

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3. LEGISLATIVE, REGULATORY AND INFORMATION REVIEW

3.1. HALIFAX REGIONAL MUNICIPALITY (HRM)

We expect that in years to come, there will be no change to Section 16.3 of the HRM By-Law S-600 "Solid Waste Resource Collection and Disposal By-Law". Under this section, no person shall export or remove solid waste outside of HRM, that has been generated inside of HRM. The industrial, commercial, institutional (ICI) tipping fee revenues support a significant component of the HRM program. General tax revenue supports the residential portion. The incentive ratio of the ICI waste tip fee being greater than the ICI organic tip fee supports the ICI program. If ICI waste and revenues leave HRM, so would their associated financial support for the current program, or similar one

The underlying principle of stewardship, in the 1995 CSC Strategy, and in the 1997 Operations Plan, will continue to underpin the integrated Waste Resource Management System of HRM as it evolves, the community engagement process, and the decision making of the HRM Council.

3.2. PROVINCE OF NOVA SCOTIA (NS)

We do not expect that the integrated HRM solid waste / resource system in the years to come will be influenced by reasonably anticipated changes to these provincial documents:

- The NS Environmental Goals and Sustainable Prosperity Act (EGSPA) which includes the 300 kg/person goal of residential and ICI waste going to a landfill
- The NS Environment Act, whose 2011 amendments includes increasing to ten years from five years, the time between which regular reviews and amendments occur
- The NS Solid Waste Resource Management Regulations - Schedule B - which bans compostable organic material from landfills, and the landfill design guidelines, and
- The Halifax Regional Municipality Charter

3.3. OTHER DOCUMENTS

The 2005 CCME Guidelines for Compost Quality (PN 1340) are among the environmental performance goals for the HRM program. These guidelines discuss measurable recommended targets for several parameters including: relative temperature difference to ambient air, curing time, oxygen respiration rate, carbon dioxide evolution rate, temperature duration (due to pathogens), PAH, PCB, pesticides, herbicides, fecal coliforms, or Salmonella sp.

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4. COMMENTS ON REPORT RECOMMENDATIONS

Comments are provided on the main recommendations in the January 2013 report.

The subsection title identifies the option recommended in the report. We state the degree to which we either agree or disagree with bringing the option forward for consideration by HRM decision makers; or if we support in principle the bringing of the option forward with more available information. In those cases, we have summarized our description of that additional information. We then provide our brief discussion on topics of specific interest to HRM in the RFP we responded to, that are relevant to the recommendation in question.

4.1. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION A1 – CLOSURE OF FEP AND WSF BY THE END OF 2013

With respect to closing the FEP and WSF, this is a recommendation that we support; and whose concepts and details, with the indicated additional information, merit serious consideration by the final decision makers.

We understand that HRM Council will make the final decision, after consulting with staff, 2013 community engagement participants, and others. After reviewing the report, we sought additional performance, financial, and technical information in forming our opinion.

Would implementing these recommendations, with the corresponding changes to infrastructure and operations, significantly change the capacity of the HRM solid waste resource management system to achieve its overall performance goals? After reviewing the report, we sought additional information. Operating the Otter Lake facility includes meeting air quality and groundwater quality performance goals (e.g. air quality guidelines with the facility operating permit, which apply whether or not the FEP or WSF is operating). There is now about a fifteen year environmental monitoring track record for the facility. In our opinion, implementing this recommendation can be done in such a manner that the demonstrated environmental performance trends of the overall system would continue (e.g. the environmental effects as indicated in the results presented in the annual environmental effects monitoring reports).

Would implementing these recommendations, and taking into account the net effect of the resulting positive and negative financial implications, significantly change the potential financial performance of the overall solid waste system in meeting its performance goals? After reviewing the report, we sought additional information. We reviewed and considered the cumulative net effect of several variables. For the FEP and WSF, their cumulative annual operating, capital and repair costs are on the order of $10,700,000. FEP and WSF decommissioning or repurposing charges - now or later - are unlikely to be a significant financial

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factor in a time of low interest rates. To segregate materials by other means may involve additional labour at the RDF; improved access roads to the cell itself; an alternative white goods program; a stronger household hazardous waste program, and more. The cumulative financial impact of implementing these system changes on the annual operating, capital and repair budgets may be in the order of $950,000.

Would there be a financial implication on the lifecycle of a new $15,000,000 landfill cell? Would implementing the recommendation significantly change how often this investment would be made? Another way of asking that question is: Would the final density of waste material in the cell substantially change? In 2011, about 25% of material entering the RDF was first "stabilized" at the WSF (i.e. the material is mechanically shredded, and the volatilization, the biodegradation, and the leachate potentials are reduced through a mechanical air drying process, that also reduces the moisture content). The final density of shredded material is expected to be about 20% greater or more, compared to unshredded material. Without the FEP, the WSF and their mechanical shredding of materials, the same total mass of material entering the RDF could take up 5% (i.e. 20% of 25%) more volume. Additional daily cover materials could take up 1% more volume. We reviewed technical information about the mechanical compaction equipment used at Otter Lake, and other equipment and operational options available to HRM. There is a very plausible scenario, where greater compaction efforts would increase density in the RDF by more than 6%. The incremental increase in compaction efforts, may involve an average annual financial increase on the order of $50,000 – 100,000. Implementing the recommendations, with additional compaction efforts for materials being placed in the RDF, is not expected to change the rate at which new landfill cells are budgeted and constructed. In our opinion, implementing this recommendation can be done in such a manner that there is an annual financial benefit to the HRM solid waste system on the order of almost $10,000,000 / year.

In 2011, the WSF processed about 25% of the waste material being placed in the RDF. The WSF stabilization process reduces the moisture content, and to some extent reduces the volatilization and leachate potential of the waste material. If there was no WSF to stabilize materials, would the resulting RDF infrastructure and operations be such that the overall solid waste system performance goals for groundwater and air quality still be achieved? Performance goal examples include what HRM chose to include in its operating permit, and not having a trend of unacceptable operational incidents or environmental impacts, as demonstrated by the trend in groundwater and air quality monitoring results in the annual reports. After reviewing the report, we sought additional information. We took four waste samples and had a laboratory analyze them for volatile and leachate potential. Sample A is from material just off the truck, as if there was no FEP or WSF, and it was going to the RDF. Sample B material had passed through the FEP, was unshredded, and was going to the RDF. Sample C material was shredded in the FEP / WSF but not yet stabilized. Sample D was shredded stabilized material leaving the WSF for the RDF. We were interested in the relative differences in the volatile and leaching

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potential between the samples, and not so much in the absolute concentrations. One sample is not a demonstrated population, or representative of the full waste stream. HRM has detailed waste audit characterization reports. There is also a recent CBCL report, for considering the potential of the material for biological breakdown and methane generation.

For about seven months - from May to December 2010 - when the WSF was not operating, the infrastructure and operations at Otter Lake facility adapted to this circumstance, with no reported operational issues. In the RDF, this involved using the same "ad hoc" gas management infrastructure and operations that had been used for partially filled cells since 2002. These resources include labour, pipe, and equipment to control, capture, and convey the volatiles to the more permanent gas management systems. Our financial review assumed that the future use and costs of these resources from May to December 2010 would be similar in the future.

Our sample results indicated some relative differences in volatile and leachate potential. From anecdotal field experience, the combination of a high moisture content for loose, handled material (e.g. rainwater on exposed uncovered loose material in the RDF) seems to be the greatest indicator of the potential for a community odour reporting incident. Leachate is currently collected and treated off site. If future RDF waste material has a higher moisture content, and a greater leachate potential or concentration, we believe the existing infrastructure and flexible operational capacity is such that the current documented trends in groundwater and air quality performance at Otter Lake would continue. The operating and monitoring results during and after a seven month period when the WSF was not operating – similar to if there was no operating FEP and WSF - indicated that monitored groundwater and air quality goals were met. In our opinion, if there was no FEP or WSF (e.g. May – December 2010), there is sufficient infrastructure and a demonstrated operational capacity at Otter Lake, such that the trend in environmental groundwater and air quality performance would continue.

Stantec's mandate may have been to bring some potentially useful ideas to the table, and not necessarily to present the detailed arguments and background information, for taking multi-million dollar implementation and municipal budget decisions. The report did not seem to consider future flexibility in waste stream composition in the development of its FEP and WSF recommendations, as per the HRM RFP.

In our opinion, there is sufficient available information to support the A1 recommendations, and that it merits serious consideration by the final decision makers.

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4.2. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION A2 – REQUEST MODIFICATION OF THE NOVA SCOTIA LANDFILL LINER SPECIFICATION

In response to a changing waste stream arriving at the landfill, different infrastructure – including a different liner specification - could be used to achieve the same current environmental performance goals. Where a desired environmental performance can still be achieved, the economic basis for the removal of the leak detection layer is compelling. An HRM site specific technical analysis would necessarily include a risk based assessment that incorporates information on the historic performance of liner systems (that do not have leak detection), site specific physical conditions, the sensitivity of adjacent receptors and some consideration of potential offsite impacts in the event of failure or partial of the liner system. Without this technical analysis, we believe that efforts to influence a near term change in current provincial requirements regarding liner specifications, are unlikely to succeed. They may not be necessary, as the option exists to submit an alternative design to NS Environment.

With respect to requesting a modification in the NS guidelines to the default landfill liner specification, we believe that HRM should instead develop a site specific design alternative, as per existing guideline options, to meet the same environmental performance goals.

With respect to developing an Otter Lake specific landfill design, this is an equivalent alternative recommendation that we can support in principle; and whose concept merits bringing additional information and details to the final decision makers.

Conducting a site specific design is not immediately necessary, although it would be useful. If the A3 option that Stantec recommended is implemented, this may not happen for many years.

Additional information or technical testing with analysis, may show that the cumulative influence of changes to the characteristics of materials entering the landfill in 2013, and a liner design change; for the site specific soil, groundwater, and related characteristics of Otter Lake, and the other HRM system infrastructure and operations; continue to provide an acceptable level of protection. If so demonstrated, and when considering some precedents with projects under the provincial contaminated sites guidelines, the regulator would have a technical basis for considering an acceptable change to the applicable landfill liner cell design.

The leak detection system was part of the 1995 Community Stakeholder Committee (CSC) strategy, and is a component of default provincial landfill design and operation. It was intended to raise public confidence in long term landfill performance. There is now about 15 years of operational experience at Otter Lake that can be a basis for such confidence.

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The report recommends the removal of the protective cushion layer and the leachate detection system. The report is not explicit, but we believe this involves not including a secondary HDPE impermeable liner in future designs. This would make a significant difference to the potential construction costs. The report notes that the wastes in 2012 no longer include the hazardous material found in previous wastes, and the current liner design being used does not reflect this reduced level of risk. While this is true, the justification for reducing the level of containment provided by the existing design criteria would require a site-specific risk assessment. A contingency scenario to be modelled would be the impact of a liner failure and response plan actions, on the adjacent receptors.

Achieving an acceptable risk or hazard to human health and the environment, would involve evaluating the cumulative effect of the physical and chemical characteristics of the materials in the landfill; the cap; the leaching characteristics; the leachate collection and treatment systems; the liner; the soil geology and groundwater characteristics; and the parameter values used to describe the potential human and ecological receptors. A different 2013 liner specification, in response to different characteristics in the materials being placed in the landfill in 2013, could continue to provide an acceptable level of protection. We expect that in this context, an acceptable liner design for Otter Lake involving changes from the current design (e.g. the "cushion" gravel layer over the liner, and leak detection system) could influence the construction budget of the next new cell, by 10% or more.

4.3. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION A3 – EXTEND LIFE OF OTTER LAKE LANDFILL THROUGH VERTICAL EXPANSION

Raising the maximum landfill height, and thus extending the landfill cell life span offers technical and economic efficiencies on a strict dollar per tonne basis of material placed in the landfill. In raising the landfill height, the multimillion dollar investment in the liner, base, groundwater quality monitoring and their wells, and more can be paid for by the tipping fees associated with more tonnes and cubic metres of waste material. An operation plan could describe how this would be accomplished for new cells, and also retroactively applied to already closed cells, if desired by HRM decision makers.

With respect to raising the maximum landfill elevation, this is a recommendation that we support; and whose concepts and details, with the indicated additional information, merit serious consideration by the final decision makers.

We understand that HRM Council will make the final decision, after consulting with staff, 2013 community engagement participants, and others. After reviewing the report, we sought additional visual information in coming to our opinion.

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Would increasing the maximum elevation of the cells by 15 metres, unduly intrude into the view planes of the area around the Otter Lake facility? A Dillon Consulting document for HRM outlined a scenario for a 15 metre cell height extension. HRM decision making has been based on considering the view planes of the cells from residential locations, as per their community commitment. We conducted a balloon study to see if balloons flying at the proposed elevation would be visible from local residential locations.

Balloon Study (February 27, 2013)

Section 8 of this document presents information and elaborates on our February 2013 Balloon Study. We set up six bright helium filled balloons at the proposed new maximum elevation over an Otter Lake facility cell. We then drove to a variety of locations in the area to test if we could observe the balloons, and took some pictures. A map figure attached to this document presents our view planes. Based on this evaluation, we conclude that the increase in height of the landfill cells will not be visible from the residential locations we visited. The cells are visible from a bedrock outcrop in the anticipated commercial area, not the residential area, of the Brunello Estates commercial / residential / golf course development close to Exist 3 of Highway 103.

We understand the existing landfill cells are visible from a portion of the Bluff walking trail located west of the Otter Lake Landfill facility. We interpret this to be a sightline along the Lower Marsh Lake Brook system.

Other Considerations

Increasing the cell heights, will also increase the bearing pressure of the cells on the soil below, and tend to increase the groundwater elevations under the liner. This capillary action is similar as to why fluid stays higher in a narrow straw compared to a wide one. The current program for monitoring, assessment, contingency response planning, and follow up actions, could be adjusted to test if in response to higher cell heights, the groundwater elevation rises to come into contact with the lower drainage layer under the cell liner.

There is no provincial regulation or requirement about the heights of landfill cells in Nova Scotia. If HRM Council approves an increase in height, appropriate engineering design and operations planning would then have to take place. These would follow the same approval process as was used for the existing landfill cells. There are no engineering impediments to developing and preparing an operational plan or specification changes, for both the additional height for future cells, and retroactively for existing cells.

4.4. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION B1 – CREATE A CENTRALIZED WASTE RESOURCE CAMPUS

Developing this recommendation was outside of the scope of work, of the 2012 HRM Request for Proposals to which Stantec responded. Based on some experiences in other jurisdictions,

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and on a conceptual level, it may have some economic and technical merits. This significantly differs from the current operations, the 1997 HRM Operations Plan, and the 1995 Community Stakeholder Committee (CSC) Strategy. The Otter Lake Operations Plan was written by the site operator – MIRROR – and not by HRM.

Consolidating some or most of the waste infrastructure geographically, can be technically viable and may be an economically superior option, to be developed and used in future HRM consultations. The cost estimates presented in the Stantec report are useful for concept level discussions, but are not considered to be suitable for budget decision making purposes.

With respect to a potential "campus" construction somewhere, this is a recommendation that we can support in principle; and whose concept merits bringing additional information and details to the final decision makers.

We lack sufficient information to either agree or disagree with the immediate implementation of this recommendation.

Additional information should demonstrate the existence of a financially viable campus option, for an acceptable site, and with good quality cost estimates, compared to a viable multi-site approach, not unlike the current system.

4.5. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION B2 – RELOCATION OF MRF TO CAMPUS

It appears that sorting recyclables arriving as a single stream at a common facility is more economically efficient than using a multiple stream of sorted materials at the curbside; because the work crews and trucks can be even more efficiently used in their curbside collection efforts. Changing to a one stream collection process would involve a new MRF.

The Stantec report does not explicitly address if the current MRF could be reconfigured and used for processing and segregating a single stream of recyclables being delivered to it. We understand that it would be impractical to convert the current multi-stream MRF to a single stream one, due to the required technology, equipment, age, and space considerations. Some additional capacity might be possible through extra shifts to the current MRF.

One would reasonably anticipate some economic and technical efficiencies if a new MRF were at a campus location. One would anticipate some technical necessities of having a new MRF at a new location, if a single stream collection system is used for recyclables.

The final decision makers of HRM Council can determine in the future if HRM will choose to build a new MRF at a different location or not. The upcoming discussions in the HRM decision

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making process may find that there are probably potential location options for a new MRF - that do and do not include a campus setting - and perhaps do not include the current location, due to the additional material storage requirements.

With respect to moving the MRF to a different location recommendation; this is a recommendation that we can support in principle; and whose concepts merit bringing additional information and details to the final decision makers.

We lack sufficient information to either agree or disagree with a decision on whether or not to implement this recommendation.

Additional information would include an objective siting study, with reasonable financial information, that recommended a preferred location for a new MRF – be it at a campus location or elsewhere. How long HRM continues with the current multiple stream of curbside recyclable collections, or when or if it changes it, will also influence MRF decision making.

4.6. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION B3 – INCREASE ORGANICS PROCESSING CAPACITY

From a technical perspective, a mix of a new anaerobic digestion facility (for the wet and larger, harder to digest organics), and the aerobic facility capacity (for the smaller, easier to digest organics), would provide a stronger opportunity for HRM to meet its 2005 Canadian Council of Ministers of Environment (CCME) treatment guidelines for organics. The processed treated organic material can then be used off site for other purposes in a controlled manner.

The current process and infrastructure from before 2005, are not consistently meeting the current environmental performance guidelines. The report did not present a business case for adding an anaerobic digestion capacity to the HRM system, as a preferred option. It read as a comment or suggestion – be it one with some technical merit - but without demonstrating that it followed a stated methodology for deriving this recommendation.

With respect to adding an anaerobic digestion capacity to the HRM system, this is a recommendation that we can support in principle; and whose concepts merit bringing additional information and details to the final decision makers.

We lack sufficient information to either agree or disagree with deciding to implement this recommendation as presented at this time.

Additional information or technical testing could show that using anaerobic infrastructure for the "wet ICI" wastes, and aerobic infrastructure for the "drier residential" green bin type source separated organic materials, would consistently meet the applicable CCME guidelines. It may be

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worthwhile to compare the value anaerobic digestion to alternative measures – public or private sector based - for adequately treating the "wet ICI" wastes.

4.7. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION C1 – IMPROVE RECOVERY OF RECYCLABLES AND ORGANICS

Removing a greater portion of the industrial, commercial, and institutional (ICI) organic materials from the ICI waste stream is an understandable aspiration.

Can the ICI organics be diverted to a new anaerobic (without oxygen) digestion facility, and the current aerobic (with oxygen) digestion facilities be used to treat the residential organic wastes, that both waste streams consistently meet the applicable 2005 CCME guidelines? The answer may be "yes" but the Stantec report itself did not provide a sufficient cause to conclude this. The report alone does not provide us with a confident sense of what might be the required capital and operating costs, to consistently meet the applicable CCME goals.

The Stantec report presents logical suggestions about modelling and assessing the benefits of truck based automated versus manual collection; separate collection of leaf and yard waste (LYW); single stream versus dual or multiple stream recyclables processing; and to determine collection re-zoning. Modelling was not always discussed in the report, but was included in the recommendations.

The Stantec report presents some recommendations, including: ". . . continuing to carefully evaluate the results of waste characterization studies....encouraging ICI diversion through continued education programs....all new development should be required to implement a compliant source separation program...potentially increasing ICI diversion through enhanced enforcement."

The recommendation regarding new developments is solid and can be readily implemented. These recommendations would be stronger or more compelling if they were presented with corresponding business analysis for HRM to proceed. Private sector business investment or ICI operations would be influenced by such requirements and enforcement.

We agree with the C1 recommendation as an overall goal.

We lack sufficient information to either agree or disagree with many of the suggestions put forward in support of this recommended goal.

We support the "single stream" recommendation in principle, to eventually move to collecting a single stream of recyclables at the curbside, due to the collection system efficiencies. This concept merits bringing additional information and details to the final decision makers.

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Current curbside habits of HRM residents need not change if all recyclables are collected in one area of the same truck, in the future. This recommendation has significant implications for future MRF operations, equipment, location, and the HRM program.

4.8. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION C2 – CONTROL CURING AND SALE OF FINISHED COMPOST

An environmental performance goal for the HRM system is to have the processed organics meet the 2005 CCME guidelines. Processed HRM organics from the composting facilities have not shown themselves so far, to be an economic resource. At Otter Lake, the quality of the WSF processed waste is such that it is then deposited in the RDF landfill cell as waste.

Operating a secondary curing area for processing composted organics is an idea with some technical merit for meeting the applicable guidelines maturity standard. The Stantec report does not demonstrate that it followed a stated methodology for deriving this recommendation. The economic merits have not been demonstrated. The text is conditional, making comments on several options, without presenting a basis for this recommendation.

We expect that with more information, we would disagree with the recommendation. Still, developing this option further, for a later "go" or "no go" decision may be useful for the long term HRM decision making process.

Additional information would a) by providing additional curing, in a study or preferably a lab bench test, evaluate the incremental technical improvement to the HRM composted material, to meet the desired CCME quality guideline and maturity goal; and b) test the recommendation, by means of a financial review of the high quality potential capital and operational costs, to provide sufficient additional capacity at an identified location. The curing pad could be privately or publicly owned but operated under a contract for HRM.

4.9. COMMENT ON STANTEC REPORT SECTION 12 RECOMMENDATION C3 – IMPROVE CURBSIDE COLLECTION FREQUENCY

While plausible in theory, we have not read a compelling business case for reducing in practice, from eight (8) HRM curbside collection zones to about 4 – 6. HRM policy and decision makers are well placed to determine when the benefits of greater regionalization efforts are worthwhile, and when they are not.

We expect that with more modelling information, we would disagree with the recommendation to reduce the number of collection zones.

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Additional information may be available or could be developed with HRM staff, who already have some collection model data that could be used or reworked.

We have not read a compelling business case for doubling the urban organics collection frequency to a weekly basis. Recyclables are already collected weekly in urban and some suburban areas of HRM. The additional "investment" in human and equipment resources used, would have to be "paid for" in the system costs. Residents are not charged a direct tipping fee rate of $/tonne for materials and waste left on their curbside. For HRM, how much of a change in the organic diversion rate, would then be considered a "success" operationally?

We disagree with the recommendation.

This is based on our perception that the recommendation was intended to apply to all current urban organic "green bin" collections. We do not expect that an increased frequency would significantly increase the already higher than average diversion rate compared to other jurisdictions, and if it did so, that such an increase would be sufficient to economically justify the additional capital and operating costs to do so.

The collection of ICI organics is organized and executed by the ICI sector and not by HRM, or using HRM trucks and labour. A case may exist for the ICI sector to increase the frequency with which it collects organics from ICI locations.

Additional information to support this "modified" or "clarified" recommendation would include a financial review of the additional capital and operational costs for implementing a weekly green bin style source separated system, or functional equivalent; and the net ripple effects - technical, financial, or otherwise - on the balance of the HRM solids waste system.

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5. COMMENTS ON SPECIFIC TOPICS OF INTEREST TO HRM

5.1. SEPARATING AND MATERIAL SHREDDING

Residential green bin organic food wastes do not go to the FEP / WSF at the Otter Lake facility. The industrial, commercial, institutional (ICI) waste (e.g. from a food court) arriving at the FEP / WSF does include some relatively wet, heavy, material, with a relatively greater volatilization, biological breakdown, and leachate potential.

For materials perceived with the greatest of these potentials, the rationale for separating and shredding them into two sizes (coarse and fine particles) was that the smaller material would contain the greater total organic content, while the coarse material would contain less. Our observations and additional laboratory results for samples we took at the FEP / WSF support this assumption. We are uncertain as to how 150 mm screen size came to be selected for the screening and separating of the finer from coarser materials.

The finer material is directed to the Waste Stabilization Facility for processing prior to being disposed of in the RDF. The shredding process facilitates a more rapid processing of the mixed waste containing the organic fraction of material. This process is intended to reduce the volatilization, biological breakdown, and leachate potential of the material. The WSF stabilization process includes partially drying the material, and reducing the moisture content of the material. This alone would reduce the volatilization and leachate potential of the material, until the next rain or wetting event. The waste from the WSF, after entering the RDF, then has opportunities to increase its moisture content again, and to become saturated with water.

The report did not identify cost effective, alternative approaches for the continued use of the WSF process infrastructure and operations, perhaps because it recommended the option to close the WSF. The most cost effective alternative appears to be to conclude the use of the WSF process, and to use other infrastructure and operations at the Otter Lake facility to continue to achieve the applicable facility environmental performance goals.

Paper and plastic are examples of hydrocarbon based organic materials arriving at the FEP that do not have a relatively high volatilization, biological breakdown, and leachate potential, compared to say the food portion of organics originating from food court waste.

The FEP / WSF waste stream samples A, B, C, and D, discussed earlier in this Section, indicated differences in volatilization and leachate potential, for materials that were shredded and not shredded; and stabilized and not stabilized. We considered these differences, in the context that the relative portion of WSF stabilized materials is about ~25% of the total quantity of materials being placed in the RDF. The differences were such that we believe that if shredding and biostabilization were not happening, that the RDF infrastructure and operational capacity is

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such, that the overall performance goals regarding groundwater and air quality would continue to be achieved. This is consistent with the seven month experience in 2010, when shredding and stabilization did not occur.

Material shredding was also mentioned in the Stantec report as a contributing factor to landfill gas production and in-place landfill material density. These relationships are discussed in other Sections.

Some less than 150 mm / 6 inch size material is currently shredded before being placed in the WSF and later the RDF. Shredding prior to the RDF, results in a short term release of some landfill gas which is then directed by fans through a biofilter outside of the WSF.

Landfill gas released by materials – shredded through the WSF or unshredded - placed in the landfill cell while it is being filled, is for the most part being currently captured and controlled by gas control measures used since 2002, involving labour, fans and piping systems. For HRM, the acceptable target number of annually reported community odour incidents is zero. After 2002, with an exception in the fall of 2011, this target or performance goal of minimizing odour incidents has been achieved.

After each cell is filled and capped, the permanent landfill gas capture and management system is used to control the landfill gas resulting from biological activity.

Unshredded materials handled in the FEP and placed in the landfill release biodegradation gas more slowly, compared to shredded materials passing through the WSF and also then placed in the landfill cell. In either case, the off gas can be similarly addressed in the short term with the "ad hoc" gas management system used since 2002 for cells where material is being placed; and by the permanent gas management system for covered landfill cells where no more waste is being placed.

The extra 2002 "ad hoc" system is in response to odour incidents in 2001. Suppose the mass of potentially volatile gas or off gas resulting from biological breakdown of material is the same for identical samples of waste stream arriving at the Otter Lake facility. The more a sample is mechanically handled (e.g. modestly by bag breaking in the FEP; or significantly by shredding for the WSF process), or the more it is heated, or the more it is neither completely saturated or completely dry; the more rapidly volatiles enter the air and at a greater concentration.

So the mass to be released from the waste sample that went from the truck to the RDF (i.e. no to low added energy), without any handling in the FEP or WSF, will do so relatively slowly and over a relatively long time. The design and operation of the permanent gas management system has sufficiently controlled the long term potential for community off gas odour incidents.

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The mass to be released from the "bag broken at the FEP waste sample" (i.e. medium added energy) that arrives at the RDF, initially releases its gas a little quicker, at a greater concentration, for a shorter period of time. The permanent gas management system plus a medium sized extra "ad hoc" system controls for the potential community off gas incidents.

The mass to be released from the "shredded, heated, and processed at the WSF sample" (i.e. high added energy) initially releases its gas much quicker, at a higher concentration in the air, for a relatively short period of time. Beside the WSF, an additional set of blowers, pipes, and biofilter system is used to control for the potential community off gas incidents.

The observation made is that the more mechanical or thermal earlier energy that is added to the waste stream sample, the earlier and greater will be the gas management resources, required capacity and costs to control for the threshold condition of the relatively highest concentration of volatile gas being released.

Would the "ad hoc" system at the landfill cell have sufficient capacity to manage the off gas potential of materials that historically have been perceived as having a relatively high off gas potential, and as such were shredded for the WSF process? The demonstrated answer to this question is yes, based on the seven month experience from May – December 2010, when during some roof repair work, the WSF was not operating.

Would the "ad hoc" system at the landfill cell have sufficient capacity to manage the off gas potential of materials that have historically been mechanically handled at the FEP and WSF? Yes, because the volatile concentrations being released by the materials would generally be lower, the release rate would be slower, but it would be happening for a longer period of time.

Is the "ad hoc" system a response to the mechanical and thermal energy added to the waste materials at the FEP and WSF before it arrived at the RDF? Was the "ad hoc" system being used during the seven month period when the WSF was not operating? If no, then the system would appear to be a response to an active FEP and WSF. If yes, then perhaps the "ad hoc" system is not just in response to FEP and WSF activities. However, the maximum or threshold size or capacity of the equipment, pipe, labour, and more of the "ad hoc" system was a result of the thermal and mechanical energy added to waste materials at the FEP and WSF.

Without the FEP and WSF, the landfill cell "ad hoc" gas management system requirements and operations would lessen, for managing against potential community odour incidents. It is reasonable to anticipate that the annual $750,000 expense of this "ad hoc" system would also be less, possibly significantly less, if materials arriving at the RDF had not received additional mechanical or thermal energy at the FEP and WSF.

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Unshredded material may have less available surface area that is subject to leaching, which may have been the model for the current leachate collection, treatment and disposal system. The combined current operational FEP / WSF material shredding, leachate and off gas system costs, are greater than the expected incremental increased RDF costs would be in responding to the potential combination of unshredded materials, and associated leachate, and off gas management efforts. Shredding also allows for a greater long term density of material to be placed in the landfill. We sought additional information and believe that the shredding costs are greater than the value of the volume efficiencies gained; and that additional compaction efforts would also more than financially compensate for this.

The incremental cost of shredding material in the FEP / WSF is greater than what might be the extra leachate handling costs at the RDF, on the order of millions of dollars each year.

From pages the *Decision-Maker's Guide to Solid-Waste Management* (USEPA, 1995):

> "After compaction, shredded refuse has a greater density than compacted unprocessed MSW. This can result in preserving landfill space and reducing the amount of required cover material. In addition, landfill settlement and stabilization may be more uniform over time in the landfilled area. "

In a research paper entitled *Technical and Economic Analysis of Pre-Shredding Municipal Solid Wastes Prior to Disposal* (Garrett C. Fitzgerald, 2009), the author presents data showing that the in-place density of shredded MSW is approximately 20% greater than for non-shredded waste.

There is a cumulative net multimillion dollar benefit to the HRM system from eliminating the cost of shredding material in the FEP / WSF, and accounting for what might be the increased volume of the cell occupied by unshredded materials (5% = 20% x 25%) – whether or not there is a relatively greater mechanical compaction effort applied against the materials in the future.

5.2. LANDFILL GAS GENERATION

Landfill gas is generated by the decomposition of organic materials. A typical landfill gas is primarily methane (40%), with the rest mainly carbon dioxide. An efficient composting process consumes the bi-products of decomposition and little methane gas is generated. The vast majority of waste delivered to the Otter Lake landfill FEP is sent to the landfill (135,000 tonnes in 2011). A portion of this waste (25,100 tonnes in 2011), perceived as having a relatively greater potential for volatilization, leaching, and biodegradation, is segregated and shredded in the WSF process. This waste is intended to be partially composted (biostabilzed) and then deposited in the landfill. It may be more accurate to describe the waste leaving the WSF as

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being drier, rather than being more physically or chemically stabilized. When wetted again in the RDF landfill cell, some of this waste will release more gas. The 2011 primary landfill gas contributor is the decomposition of the organic content of the 73,500 tonnes of mixed waste sent directly to the landfill from the FEP, plus the 22,600 tonnes of WSF processed waste.

The production of gas in the RDF landfill cell will continue as long as organics remain in the wastes placed in it. The report discusses shredding as a contributing factor to the gas production. Shredding results in both an accelerated volatilization process and decomposition process. However the same mass of gas will eventually be released as from non-shredded material, it will just take longer. Most mixed waste landfills generate landfill gas for up to 30 years beyond the last deposit of waste.

For wastes being processed in the WSF, some gas is rapidly released as a result of volatilization and the accelerated bio-decomposition process due to the shredding of material, and curing. A portion of these gases are piped through a large outdoor biofilter at the WSF. If the same waste was not processed in the WSF, the same gas would be released at a slower rate in the landfill cell, and managed by the gas management systems' piping and controlled handling system.

The existing short term "ad hoc" and long term permanent landfill off gas control and management systems have shown themselves capable of addressing shredded and unshredded wastes from the FEP / WSF placed in the RDF cells. With or without waste from the shredded WSF process, the HRM target of zero community odour incidents per year has been achieved for the last ten years, with the exception of the fall of 2011. If there was no WSF process, the landfill gas would be released more slowly, but the gas release would still be within the capacity of both the current "ad hoc" and permanent systems.

The mechanical and thermal energy added to the wastes at the FEP / WSF, may well be why there now exists the short term "ad hoc" gas management to control against potential community odour incidents, and what the required capacity has been. Closing the FEP / WSF would not reduce the long term potential gas mass released, but it would reduce the maximum or threshold short term concentration at which the organic mass is being volatilized. The required capacity for the short term "ad hoc" gas management infrastructure and operations, and the associated annual operating budget of $750,000 per year, would also both be reduced.

We believe that the current trend in achieving the off gas performance goals can be more cost effectively accomplished without the FEP / WSF waste processing, and associated shredding.

Without shredding materials, a steadier off gas release rate, over both the short and the long term, may make for a more efficient use of gas management equipment and infrastructure.

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5.3. LANDFILL COMPACTION

The greater the density of waste materials; the longer each multi-million dollar disposal cell will last. However, are all actions that result in a greater final density of materials in the disposal cells necessarily cost effective?

Currently the shredding at the FEP / WSF of about ~25% of materials entering the RDF cell is one influence on the final compacted waste density. The mechanical compaction effort applied to the other materials placed in the RDF cell is another influence.

Suppose a tonne of unshredded material entering the RDF occupies 20% more volume, compared to a tonne of shredded material leaving the WSF for the RDF. The cumulative influence on the total volume of the cell is about 5% (5% = 20% x 25%).

If the cost for a new cell is about $15,000,000 to construct, or $25,000,000 for construction and closing, and with the current maximum height it needs to be replaced approximately every forty months or between three to five years, then that 5% difference in volume might be valued at about $250,000 – 400,000 per year. Where mechanical compaction efforts more than offset this, and result in no net change in volume, the value of that successful effort would be about $250,000 – 400,000 per year. Financially for the HRM system, the effects of additional mechanical compaction efforts would balance out the density difference in waste arriving at the RDF that was not processed at the FEP / WSF.

If the current maximum height of the landfill cells is increased by the proposed 15 metres, the total additional volume capacity of the Cells 1 – 5 could be at least 80%; and for Cells 6 – 9, it could be at least an additional 75%. Cells 1 – 5 were substantially filled over the last 15 years or 180 months. The Dillon Consulting memo in Appendix A of the report offered the opinion that there could be 152 months – or 12.5 years - of additional capacity for Cells 1 – 5 (152 /~180 is more than 0.8 or 80%). For Cells 6 – 9, the scaled figure in the memo is about an average of 10 squares across the four cells, and the additional elevation is at least an additional 7.5 squares (7.5 / 10 is at least 0.75 or 75%). The memo offered the opinion that for Cells 6 – 9, the increased height could be the equivalent of an additional 134 months – or about 11 years - of capacity. An additional 80% capacity of Cells 1 – 5, could be the equivalent of four (4) replacement cells. An additional 75% capacity of Cells 6 – 9, could be the equivalent of three (3) replacement cells. It seems reasonable that if seven (7 = 4 + 3) replacement were being constructed, their cost would be at least the costs of the current Cells 1 – 5, and perhaps significantly more if that included the development of a new site location for them. Assuming the cell closure costs would be the same, regardless of the final height, the financial value for the HRM system of increasing the RDF landfill cell heights would be at least $100,000,000 (7 x $15,000,000 > $100,000,000) if not significantly more, based on the seven additional cell liners that did not have to be constructed.

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We calculate the net combined capital, repair, and operating costs of the FEP / WSF where the shredding occurs, after accounting for other additional costs if the FEP / WSF was not there, is in the range of $9,000,000 - $10,000,000 per year. If filling Cells 6 – 9, to the current design height were to occur over a 15 year period (~11 years x 10/7.5), the financial implication for the HRM system of not operating the FEP / WSF could be around $150,000,000. If filling Cells 1 – 5 to the proposed additional 15 metres was accomplished over at least 12.5 years; and filling Cells 6 – 9 to the proposed additional 15 metres was accomplished over at least 11 years, the financial implication for the HRM system of not operating the FEP / WSF could be around $230,000,000, as a present worth value.

The cumulative financial effect of taking an FEP / WSF decision, and an increase in landfill height decision, could be on the order of at least $480,000,000 over almost forty (40) years. $480,000,000 = $100,000,000 (7 cells) + $380,000,000 (FEP / WSF).

If the current HRM system budget could accomplish the same goals for about $12,000,000 less per year (i.e. $12,000,000/year = $480,000,000/40 years), that could reduce the average $170/tonne RDF cost to HRM, to something less than $100 / tonne.

The density of waste in the Otter Lake RDF cell, prior to the start of the GPS program for mechanical compaction was about 765 kg/m^3. After the GPS program began, the field densities being achieved increased to almost 800 kg/m^3.

However, for the compaction equipment used at Otter Lake, this density is within the mid-range of the manufacturer's specifications and information. There is reasonable cause to think that additional mechanical compaction efforts with the current equipment, or possibly larger equipment, could more than offset a 5% volume change for unshredded materials.

A GPS based system has now started to be used by HRM equipment such that its compaction and daily cell cover material activities at Otter Lake are more efficient and effective. The final density of waste in the landfill cell is anticipated to increase by about 15 – 20%. This is also contributing to an increased final density of materials placed in a landfill cell.

The methods to increase compaction mentioned in the report are all well understood and applicable.

Some additional compaction of materials in the landfill cell would result if the maximum cell height were increased for future operations.

We expect that the volume reduction financial benefits to the HRM Solid Waste program from compaction of unshredded materials in the future, would more than offset any incremental cost increases from running the permanent landfill cell gas collection system, for a longer time.

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5.4. UTILIZATION OF DAILY COVER MATERIALS

The suggestions in the report reviewed are standard ones. Construction and demolition debris are currently being used as daily cover materials. We support this approach. If unshredded materials are being placed in the cells in the future, the suggestion of using the larger compaction equipment may be a useful cost effective way to keep the material in the cell as dense as is practical.

5.5. LANDFILL CELL LINER DESIGN

The landfill liner represents a significant portion of the overall cell capital cost. The report has compared the Nova Scotia design guidelines with other jurisdictions and United States based regulatory criteria. The report concludes that the default Nova Scotia design criteria requires a significantly greater level of containment than the other systems and it may be possible to modify the existing criteria to remove several components of the liner systems.

The leak detection system was part of the 1995 Community Stakeholder Committee (CSC) strategy, and is a component of default provincial landfill design and operation. It was intended to raise public confidence in long term landfill performance. There is now about 15 years of operational experience at Otter Lake that can be a basis for such confidence.

The report recommends the removal of the protective cushion layer and the leachate leak detection system. The report is not explicit, but we believe this involves not including a secondary HDPE impermeable liner in future designs. This would make a significant difference to the future cell construction costs. The report notes that the wastes in 2012 no longer include the hazardous material found in previous waste streams, and the current liner design being used does not reflect this reduced level of risk. While this is true, the justification for reducing the level of containment provided by the existing design criteria would require a site-specific risk assessment. A contingency scenario to be modelled would be the impact of a liner failure and response plan actions, on the adjacent receptors.

Achieving an acceptable risk or hazard to human health and the environment, would involve evaluating the cumulative effect of the physical and chemical characteristics of the materials in the landfill; the cap; the leaching characteristics; the leachate collection and treatment systems; the liner; the soil geology and groundwater characteristics; and the parameter values used to describe the potential human and ecological receptors. A different 2013 liner specification, in response to different characteristics in the materials being placed in the landfill in 2013, could continue to provide an acceptable level of protection. We expect that in this context, an acceptable liner design for Otter Lake involving changes from the current design (e.g. the "cushion" gravel layer over the liner, and leak detection system) could decrease the construction costs of the next new cell, by 10% or more.

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5.6. FINAL CELL DESIGN HEIGHT

There would be technical and economic efficiencies for the HRM Solid Waste program if the future landfill cell height elevation were increased. This would differ from the current operating parameters. Our evaluation sought to test the visual significance of changing these heights, with respect to the view planes already used in HRM decision making.

The original design accommodated restrictions related to view planes. Our February 2013 Balloon Study tested how visible the proposed additional cell elevation would be from residential view planes in the area. Aside from a bedrock outcrop in the anticipated commercial area of the Brunello Estates commercial / residential / golf course (Exist 3, Highway 103), we are confident that the increase in height of the landfill cells will not be visible from the other locations we visited for the study.

We agree that increasing cell height is a practical way to increase the landfill capacity and reduce overall capital and operating costs. There are no engineering restrictions on re-designing the cell development plan to make effective use of available height.

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6. PEER REVIEW OF CONCLUSIONS

Section 12 of the Stantec report presented twelve conclusions.

Stantec Conclusion 1: *"The total diversion rate is high in HRM compared to other municipalities, but realistic opportunities exist to improve the recovery of residential and ICI recyclables and organics in accordance with provincial legislation."*

(SNC-Lavalin: There are relatively more opportunities with respect to the ICI wastes)

We agree with this conclusion.

How much of an improvement in a total diversion rate is realistic? The residential component of the program is a demonstrated success. As noted in the report, with respect to performance as it relates to other municipal jurisdictions and the provincial target of reducing waste disposal to the target of 300 kg/capita by 2015 HRM is in the middle of the group compared to other regions. A source separation solution for some of the ICI waste streams, especially the organics, would be a challenging and useful outcome for future efforts.

Stantec Conclusion 2: *"The front-end processing (FEP) and waste stabilization facility (WSF) at Otter Lake do not provide a useful function compared to their stated purpose in the 1995 Strategy."*

(SNC-Lavalin: A "useful function" in this case, such as for example the white goods program, should be one that can be executed within a reasonable economic rationale)

We agree with this conclusion.

The FEP and WSF in 2013 provide some functions that can be accomplished by other means (e.g. household hazardous goods; white goods). The FEP and WSF in 2013 provide some functions where a compelling business case for doing so does not exist (e.g. physical separation in 2011 of 250 tonnes of paper, and 50 tonnes of plastic, from over 140,000 tonnes of waste received by the FEP, at a multimillion dollar cost). The FEP and WSF in 2013 provide some functions that do not appear to be positive for the HRM system (e.g. adding mechanical and thermal energy to waste by shredding, such that a resulting more rapid release gas at the RDF was controlled and managed by a new $750,000 per year "ad hoc" system that has been operating since 2002). Compared to the purpose in the 1997 Operations Plan, and the very different waste stream arriving at the facilities in 2013 compared to 1998, due to the now very successful diversion rates, change involving the FEP and WSF is recommended.

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Stantec Conclusion 3: *"The landfill liner design specification in Nova Scotia is more stringent than most comparable state and provincial jurisdictions, and potential modifications could significantly reduce future capital costs."*

(SNC-Lavalin: The default design for various provincial or state jurisdictions, varies with the desired envelope of possibilities associated with their various provincial or state site conditions)

We agree with this conclusion.

That the NS liner specification differs from other jurisdictions, and its modification could reduce future capital costs of cell development, is not in itself, a compelling reason to change the specification. Would a liner design change result in an unacceptable risk or hazard to human health or the environment? Would a liner design change mean that there is an unacceptable level of environmental protection? Where the answers to these questions are no, there would exist a reasonable case for proposing a different and site specific liner specification.

Stantec Conclusion 4: *"An opportunity exists to significantly extend the life of the landfill at Otter Lake, and reduce the site per tonne capital costs by increasing the finished grade by 10-15 metres."*

We agree with this conclusion.

There are technical and economic advantages to increasing the maximum height, and the corresponding option A3 recommended in the Stantec report, merits consideration by those involved in the HRM decision making process. In the February 2013 SNC-Lavalin Balloon Study, the only location where we observed balloons was from the top of a bedrock outcrop, in the anticipated commercial area of the Brunello Estates development, just off of Exist 3 of Highway 103. Two balloons were visible from this location, as was the crest of the existing finished cells. We are unsure of status of view planes from hiking trails, new subdivisions, the upper floor of a school, etc. After the 2013 Community Engagement process, the HRM Council will make the final decision with respect to potentially increasing the maximum landfill height elevation.

Stantec Conclusion 5: *"The two composting operations in Halifax and Dartmouth do not provide a sufficiently finished product to meet applicable guidelines which become effective in the near future."*

We agree with this conclusion.

The 2005 CCME Compost Quality Guidelines are among the current day performance goals for the HRM system. It is helpful to acknowledge, as the Stantec report does, that these guidelines did not exist when the facilities were first designed and permitted.

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Stantec Conclusion 6: *"Composting facilities are at capacity and additional processing capacity is required in the short and longer term."*

We agree with this conclusion.

This will become increasingly urgent if the ICI diversion program evolves.

Stantec Conclusion 7: *"Alternative composting technologies may improve the processing of ICI organics."*

We agree with this conclusion.

Alternative approaches may improve the processing of ICI organics. An alternative approach for treating a mixed waste stream, may or may not be more useful to an HRM program, than – if one existed - an effective, practical, and affordable source separation program. Alternative technologies may improve the processing of ICI organics. Alternative approaches must be first evaluated and demonstrated, before making major capital budget decisions.

Stantec Conclusion 8: *"Collection programs are cost effective and meet most customer needs however there are opportunities to improve diversion by increasing the frequency of collection."*

We somewhat disagree with this conclusion.

Collection programs are relatively cost effective, and do meet the needs of most residents. Given the current diversion rate in the HRM program, we do not believe that doubling the organics collection frequency to a weekly basis for most people in HRM would necessarily be a cost effective way to increase the diversion rate. Pilot testing potential changes in frequency and source separation to collection programs would be a worthwhile effort in seeking an increase in diversion rates.

Stantec Conclusion 9: *"Opportunities exist for more collaborative use of resources with other waste management regions in Nova Scotia."*

We somewhat disagree with this conclusion.

While exporting ICI waste out of HRM may be a potentially economically preferred option for the responsible individual property owners, it is not currently an economically preferred option for the HRM program. We do not anticipate a change in the HRM By law S 600, banning the export of ICI waste from HRM to other jurisdictions (except perhaps by HRM itself).

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While there may be some economically useful options for recyclables from outside of HRM to be processed within HRM, there is no financial or waste flow information presented in the Stantec report to justify this type of activity.

We expect that there will be no change in the foreseeable future to Section 16.3 of the HRM By-Law S-600 "Solid Waste Resource Collection and Disposal By-Law". On a political level, HRM prefers to control the flow of waste and materials entering and leaving its jurisdiction, and pay for having this ability. On an economic level, this is also because the ICI tipping fee revenues entering the HRM general coffers, provide some financial economies of scale that support a full HRM program, even if the tipping fees paid by the ICI sector do not cover their unit costs to HRM. If ICI waste and revenues leave HRM, the unit costs for just the residential wastes and materials would rise significantly, and perhaps prohibitively. There would be significant reductions in the total number of tonnes being processed, and insufficient financial resources to operate the current HRM program.

If the overall HRM integrated solid waste resource management program costs were significantly less, and the program relied less on keeping all of the ICI waste and associated tipping fees within HRM, then perhaps the S 600 By-law might change, and – possibly – there may be some outside-of-HRM waste processing options to consider.

Stantec Conclusion 10: *"Energy-from-Waste and developing waste reduction technologies are not considered appropriate investments for HRM at this time."*

We agree with this conclusion.

Stantec Conclusion 11: *"Overall program costs in HRM are high and represent a higher financial burden on both the private and public sectors compared to similar communities."*

We somewhat agree with this conclusion.

The performance goals for the HRM system are unlike other Canadian jurisdictions, so comparing costs for achieving different outcomes is not an "apples to apples" effort.

The Otter Lake facility processing costs of about $170 per tonne is high compared to other landfills; while the per tonne cost of the collection system is less than in other jurisdictions.

The HRM system seeks to achieve a higher diversion rate, with fewer tonnes of waste material per person entering the RDF landfill cell, and that contributed to the $170 / tonne experience in HRM. In our opinion, the opportunity exists to take advantage of some potential infrastructure and operations options such that the $170 / tonne average cost to HRM could be reduced, while maintaining or improving on the current trend in diversion rates. Is a high landfill unit cost

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where high diversion rates result in fewer deposited tonnes due to diversion, automatically better or worse than a lower unit cost for more tonnes per person being deposited in a landfill cell? A high diversion rate may well be reflected in a higher unit cost for the program, but options exist to lower the $170/tonne unit rate without compromising diversion effectiveness, and possibly encouraging more diversion by allocating system budgets to different priorities. Perhaps a more interesting comparison between jurisdictions would be the total program budget, per person, divided by the number of tonnes placed in the landfill.

If the costs in HRM compared to other jurisdictions are truly relatively high, for achieving similar goals, then yes this is a financial burden. If HRM costs are greater, to achieve an HRM specific set of goals that are different from elsewhere, then this may not be a relative financial burden. It is part of the package of pros and cons for choosing to live and work in HRM.

Where there may be technical and financially more effective ways to meet the desired performance goals with the HRM system, they must be pursued within social and community expectations. Within this context, seeking ways to reduce the $170 / tonne landfilling cost to HRM, and still achieve goals, is desirable. Is this a relative financial burden in HRM compared to other jurisdictions? If the snow clearing budget per person might be more in Quebec City, or Moncton, would that be a relative financial burden for people there?

Stantec Conclusion 12: *"HRM would benefit from the creation of a centralized waste resource campus, rather than having facilities at four different locations in Halifax and Dartmouth. Development can be staged over time to match the end-of-useful-life of current infrastructure and incorporate new elements for HRM such as outdoor windrow compost curing pads; permanent educational and household special waste facilities; and the development of a materials transfer capability."*

We somewhat agree with this conclusion.

With economies of scale, and with transportation and logistical efficiencies, including the use of transfer stations in the system, this infrastructure approach may offer technical and financial long term benefits for the HRM program. Conceptually, and perhaps with the Ontario examples provided, there is cause to think this would be the case for HRM as well. The information in the report reviewed did not prove that this would be the case for HRM, but it is an idea whose merits could be tested, and could be positive.

The concept is worthy of discussion. It would be a significant difference from what is part of the 1997 HRM Operations Plan, and other foundation documents.

The financial numbers in the report reviewed that are associated with this concept, should be further developed, before being relied upon as a basis for HRM budget decision making.

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7. WASTE SAMPLE INVESTIGATION

7.1. INTRODUCTION

While preparing our Peer Review of the January 2013 Stantec Report for the Halifax Regional Municipality (HRM) titled "Waste Resource Strategy Update" report, we conducted a relative volatilization and leachate potential investigation of waste streams in the FEP and WSF area of the Otter Lake Facility.

This section presents a summary of our purpose and methodology in conducting this investigation; and our interpretation of the results. The laboratory sample results are presented as tables attached to this document. Also attached is a figure indicating the relative locations of our samples. The Stantec report presents a menu of options; some of which may be considered in the future, within the boundaries of the applicable solid waste strategy, approved by HRM Council. The results influenced our option A1 opinion.

7.2. PURPOSE AND METHODOLOGY

7.2.1. PURPOSE

In preparing our Peer Review report, consideration was made of the relative volatilization, biodegradation, and leachate potential of materials in the FEP, WSF and RDF. If materials were being shredded or not shredded before going to the RDF; and if materials were being stabilized or not stabilized at the WSF before going to the RDF; what is their relative volatilization, biodegradation for producing off gas, and leachate potential?

This is significant in part because changes to these potentials may influence a changing potential in consistently meeting the facility groundwater and air quality performance goals.

The HRM RFP specifically asked for comments to be included in our report with respect to landfill off gas characteristics. How these might change if there was no FEP and WSF?

In 2011, the WSF processed about 25% of the waste material being placed in the RDF. The WSF stabilization process reduces the moisture content, and to some extent reduces the volatilization and leachate potential of the waste material. If there was no WSF to stabilize materials, would the resulting RDF infrastructure and operations be such that the overall solid waste system performance goals for groundwater and air quality still be achieved? Performance goal examples include the operating permit requirements, and not having a trend of unacceptable operational incidents or environmental impacts, as demonstrated by the trend in groundwater and air quality monitoring results in the annual reports. After reviewing the report, we sought additional information.

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7.2.2. METHODOLOGY

We were interested in the relative differences in the volatile and leaching potential between the samples, and not so much in the absolute concentrations. One sample is not a demonstrated population. HRM has detailed waste audit characterization reports.

There is also a recent CBCL report, for considering the potential of the material for biological breakdown and methane generation. We did not perceive that the long term biodegradation potential for producing landfill off gasses significantly differed if the materials were shredded or not; or stabilized or not. We contemplated that the short term volatilization and leachate potential could change among those four waste streams.

We discussed a potential analytical program with a local laboratory, and then with HRM.

At the Otter Lake facility, we took four samples while in the presence of a representative of HRM Solid Waste. Photos were taken and kept for future reference.

We took four waste samples and had a laboratory analyze them for volatile and leachate potential. We were not focussed on absolute concentrations, but relative ones between shredded and unshredded materials; between stabilized and unstabilized materials.

Figure 1 attached to this letter, indicates the relative location of our four samples:

- Sample A (FEP) is from material just off the truck, as if there was no FEP or WSF, and it was going to the RDF. This is similar to option A1 in the report we reviewed.
- Sample B (RDA) material had passed through the FEP, was unshredded, and was going to the RDF. This is similar to the majority of material now entering the cells.
- Sample C (WSF) material was shredded in the FEP / WSF but not yet stabilized.
- Sample D (RDF) was shredded stabilized material leaving the WSF for the RDF.

Each sample (2 x 1 litre) contained sufficient material to perform our desired analytical tests. Some results of the laboratory program are presented in tables attached to this investigative report:

- Table 1 – BTEX / TPH in mg/kg, and as leachate mg / litre
- Table 2 – Leachable metals in ug / litre
- Table 3 – Volatile Organic Compounds (# of distinct compounds detected)

We also had the laboratory test for moisture content, pH, and percent loss on ignition.

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Our expectation was that since Sample A (FEP) had received the least mechanical agitation, it would have the least volatilization and leaching potential. This would rise with Sample B (RDA) for unshredded material from broken bags, and rise still further as Sample C (WSF) for materials judged in the field to merit being processed at the WSF. The potential would then fall in Sample D (RDF) for material that had been processed and leaving the WSF for the RDF.

7.2.3. Interpretation of Results

The moisture content was greatest in Sample A (FEP), least in Sample B (RDA), and similar in Samples C (WSF) and D (RDF). The pH values were consistently in the 5.1 – 5.3 range.

The loss on ignition indicated the greatest relative carbon content with Sample A (FEP) at 95%. The relative difference with the 72% result for Sample B (RDA) reflects the loss through volatilization of material that has now been handled and is going to the RDF. The relative difference with the 78% result for Sample C (WSF) reflects that materials chosen to be stabilized are perceived to have a greater organic content than the Sample B material. The 52% result for Sample D (RDF) reflects material that has been handled and heated.

The BTEX / TPH analysis provided an opportunity for the relative volatilization and leachability of hydrocarbons, including volatile organic hydrocarbons and polyaromatic hydrocarbons that are part of the TPH mix. Only Sample C (WSF) had detectable concentrations of BTEX solvents and BTEX leachate. Samples A (FEP) and B (RDA) had comparable TPH concentrations and leachate potential. The sample results or instrument readings were such that this screening effort was sufficient. There were no additional analysis for concentrations of volatile organic compounds or polyaromatic hydrocarbons.

The metal leaching results seemed to indicate that the potential for some metals associated with Sample A (FEP) was similar to the weighted average of 75% of the Sample B (RDA) value plus 25% of the Sample C (WSF) or D (RDF).

The relative potential of volatile organic compounds to be released into the air, was indirectly indicated by the number of distinct VOC compounds that were detected on a carbon tube placed in the sample. The relative number of VOC compounds detected was consistent with the pattern of energy applied to each waste stream. Sample A (FEP) had not been shredded or stabilized, and had 3 detectable VOC compounds. Sample B (RDA) from the waste stream that had been handled and was leaving the FEP for the RDF, had 5 detectable VOC compounds. Materials to be stabilized at the WSF were perceived in the field as having a greater volatilization and leachate potential. That is effectively why they were selected to be stabilized at the WSF. Sample C (WSF) had 15 detectable VOC compounds. Stabilized materials leaving the WSF for the RDF, as represented by Sample D (RDF) had 7 detectable VOC compounds.

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In 2011, the WSF processed about 25% of the waste material being placed in the RDF. The balance of the material entering the RDF was not shredded or stabilized, although some handling and agitation in the FEP and on the conveyor belts would reasonably have had some influence on the volatilization potential of the waste stream materials.

The sample program in this investigation is not sufficient in size to claim the results as being representative of the conditions of these inherently heterogeneous waste streams, as a whole. However we find that the results provide an interesting relative measure of volatilization and leachate potential for the waste streams as represented by:

- Sample A (FEP) is from material just off the truck, as if there was no FEP or WSF, and it was going to the RDF. This is similar to option A1 in the report we reviewed.
- Sample B (RDA) material had passed through the FEP, was unshredded, and was going to the RDF. This is similar to the majority of material now entering the cells.
- Sample C (WSF) material was shredded in the FEP / WSF but not yet stabilized.
- Sample D (RDF) was shredded stabilized material leaving the WSF for the RDF.

There are volatilization and leachate potential results where the Sample A (FEP) results are similar to a blend of 75% Sample B (RDA) plus 25% Sample C (WSF) or D (RDF) for the total mass of material entering the RDF.

Our sample results indicated some relative differences in volatile and leachate potential. We believe that the moisture content of the material is a greater indicator of the potential for a community odour reporting incident. Leachate is currently collected and treated off site. If future RDF waste material has a higher moisture content, and a greater leachate potential or concentration, we believe the existing infrastructure and flexible operational capacity is such that the current documented trends in groundwater and air quality performance at Otter Lake would continue.

In our opinion, when considering the short term volatilization and leachate potential of the waste stream materials – with or without shredding; with or without stabilization - the difference in this potential for the full mix of materials, does not significantly change enough to compromise or overwhelm the capacity of the current gas management and leachate collection, transportation and treatment systems, to achieve the desired groundwater and air quality performance goals.

In our opinion, if there was no FEP or WSF, there is sufficient infrastructure and a demonstrated operational capacity at Otter Lake, such that the trend in environmental groundwater and air quality performance would continue.

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8. BALLOON STUDY

8.1. INTRODUCTION

While preparing our Peer Review of the January 2013 Stantec Report for the Halifax Regional Municipality (HRM) titled "Waste Resource Strategy Update" report, we have also prepared this Balloon Study.

The Stantec report option A3 involved taking actions to raise the maximum height or elevation of the Otter Lake facility RDF cells.

Would increasing the maximum elevation of the cells by 15 metres, unduly intrude into the view planes of the area around the Otter Lake facility? A Dillon Consulting document for HRM outlined a scenario for a 15 metre cell height extension. HRM decision making has been based on considering the view planes of the cells from residential locations.

We conducted a "Balloon Study" where helium filled balloons were placed on the cell area. We then drove to different view planes in the area to see if the balloons could be observed.

8.2. COMMENTS ON FEBRUARY 27, 2013 BALLOON STUDY

Raising the maximum landfill height, and thus extending the landfill cell life span offers technical and economic efficiencies on a strict dollar per tonne basis of material placed in the landfill. An operation plan could describe how this would be accomplished for new cells, and also retroactively applied to already closed cells, if desired by HRM decision makers.

With respect to raising the maximum landfill elevation, this is an option that we support; and whose concepts and details, with the indicated additional information, merit serious consideration by the final decision makers.

We understand that HRM Council will make the final decision, after consulting with staff, 2013 community engagement participants, and others. After reviewing the report, we sought additional visual information in coming to our opinion.

On February 27, 2013, we set up six bright helium filled balloons at the proposed new maximum elevation over an Otter Lake facility cell. From the top of the cell we observed residential areas beside the Beechville-Lakeside-Timberlea Elementary school in Glengary Estates, and in the Maplewood subdivision. We could also see high rise apartment buildings from Clayton Park, and commercial buildings in the Bayers Lake Industrial Park.

Figure 1 attached to this letter indicates our observation locations, and their relative location with respect to the Otter Lake facility:

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- Silver Birch Drive, Hubley
- Beechville, Lakeside, Timberlea Trail south of highway 103 and east of Exist 4
- James St., Glengary Estates, Timberlea
- Johnston Ave., Greenwood Heights, Timberlea
- Brunello Estates, Exit 3, Highway 103
- Greenhead Road, Lakeside
- States Lanes, Beechville Estates
- Old Coach Road, Hatchet Lake
- Prospect River Court, Prospect

The only location where balloons were visible was from the top of a bedrock outcrop, just off HWY 103 Exit 3 in the anticipated commercial area of the proposed Brunello Estates commercial/residential/golf course community. Two balloons were visible from this location as was the crest of the existing finished cells. Due to the tree line at street level obstructing the view, the increase in height of the landfill cells may be visible from the third floor windows at the west extremity of Beechville Estates, the Timberlea-Beechville-Lakeside Elementary school and adjoining residences in Glengary Estates, and a few houses in Maplewood Subdivision.

We understand the existing landfill cells are visible from a portion of the Bluff walking trail located west of the Otter Lake Landfill facility. We interpret this to be a sightline along the Lower Marsh Lake Brook system.

We are confident that the increase in height of the landfill cells will not be visible from the other locations visited. We were told by the Indian Lake Golf Course owner that on occasion, vehicles backing up at the landfill can be heard at the golf course.

At the end of the day, the balloons were still afloat, however, they were deflated the following morning. All balloons and strings were removed from the site on February 28th.

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9. COMMENTS ON STANTEC REPORT RESPONSES TO SOME HRM RFP QUESTIONS AS PART OF THE SCOPE OF WORK

Our comments are presented on the Stantec Report Responses, to some August 2012 HRM RFP Questions as part of the scope of work.

Has the system resulted in the expected diversion and at what cost?

Some diversion rates in the integrated ~~waste~~ / resource management strategy has been a success. The residential organics diversion rate is the most notable success; while the ICI organics diversion rate is the greatest area for improvement in the overall system. The diversion rates for white goods, household hazardous goods, consumer electronics, and other items have been better as expected. In some cases, materials have not so much diverted, but are not so commonly used now (e.g. types of paint). The Stantec report notes that diversion rates have generally met expectations, and places HRM diversion statistics in the middle of the range of those reported in similar jurisdictions. The cost of the diversion rates achieved is reflected in the overall average cost to HRM of $170 / tonne of waste in the RDF. The system is seen to be more expensive when compared to other systems, however those systems do not provide the front end processing that the HRM system provides. Other Nova Scotia jurisdictions meet the applicable Nova Scotia regulations, permits, and goals without an FEP or WSF. Compared to other jurisdictions, the HRM system may be seeking to accomplish a little more with respect to diversion, but the $170 / tonne HRM cost is significantly more. Could the HRM solid waste resource management infrastructure and operations systems continue to accomplish a little more with respect to diversion, at something less than $170 / tonne? Yes, it could do so with some changes to the current HRM infrastructure and operations.

How does the HRM system compare to the National GAP statistics?

In the Stantec report, a table in Section 6.4 Comparison of Current Operations to Industry Best Practice, presents diversion statistics for Halifax and other jurisdictions. Their report states that they used the GAP methodology that is also used by Waste Diversion Ontario (WDO) for equitably measuring performance for Ontario municipalities. The Stantec diversion calculations for HRM are in a similar range as those calculated by HRM.

Compared to six Ontario municipalities, HRM has:

- A higher than average processing cost ($/tonne) for recycling processing costs
- A lower than average revenue to the system per tonne of recycled material collected
- The lowest waste generation per person rate of all municipalities in the table
- Below average all in processing costs($) / waste generation per capita (Tonne / person)

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Are the system components doing what the Strategy envisioned?

The report provided sufficient analysis to allow a conclusion that yes, the integrated waste / resource management plan has been implemented in accordance with the original strategy. The analysis supports a conclusion that some components of the system are more effective than others, and that the diversion rates for some waste streams (e.g. residential green bin organics) has been more successful than others (e.g. ICI food based organics). The report notes several challenges involving the system components and operations (e.g. quality of the compost in meeting or exceeding CCME criteria). The experienced operation of the FEP differs from what was envisaged in the 1997 Operations Plan; which in turn differed from the aspirations in the 1995 CSC Strategy.

Meeting CCME quality standards has been difficult; this has primarily been a result of the poor quality IC & I material affecting the operation of the compost facilities. The original strategy assumed the final compost material would be marketable and result in revenue for the system, which has not been the case. The operation of the FEP differs from the original strategy in that organics are not diverted from landfill disposal. However, what is perceived as being the waste arriving at the FEP having the more volatile organic component, is separated and processed at the WSF, and then deposited in the RDF landfill cell.

The WSF process is intended to be a stabilizing one that reduces the potential – among other things - for the material to cause reportable community odour incidents. That reduction in this potential by the current WSF process, may be more of a function of the reduced moisture content, than from more physical or chemical bonding that is stabilized regardless of the moisture content of the material. When the material is unsaturated – or does not have the void spaces within it flooded with water - a greater moisture content better enables the transfer of organics from the material into the air. HRM field experience leaves the perception that the potential of the material leaving the WSF to contribute to a community odour incident, increases with a rise in the moisture content of the material from when, for example, the material leaving the WSF is wetted by rainwater when it is soon deposited in the RDF.

What are the conditions of the existing assets?

The report has not provided a condition assessment of existing assets. The report does however mention several system components (MRF, FEP) are nearing their useful design life; however building and equipment inspection results are not provided.

Are there flawed assumptions in the integrated strategy?

The report does not directly address this question; however the analysis clearly identifies factors that have required changes to the original integrated strategy. As mentioned previously, the assumed revenue from compost operations has not proven to be correct. The strategy also assumed technologies would be available to efficiently remove organics and recyclables during the FEP process, however this has not been proven to be the case. An earlier vision assumed

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the RDF would be operated as a dry system, and this is also not the case. While the residential green bin organics do not go into the RDF landfill cell, some stabilized and un-stabilized ICI organics are being deposited in the RDF. Relative to other waste in the RDF landfill cell, gas released from these ICI organics happens quicker, at a higher concentration, and for a shorter period of time. The strategy envisioned an evolving system (e.g. the role of the FEP / WSF infrastructure and operations), with diversion success based primarily on the stewardship model. The assumption has proved correct for the residential sector, but not so accurate for the IC & I sector. The "system components" discussion above cautioned about describing the reduced potential of waste leaving the WSF as being the result of chemical stabilization, or essentially being the result of a sometimes temporary reduction in moisture content.

The 1995 CSC Strategy, which was adopted in its principles by HRM for their operations, noted that (for infrastructure components such as the FEP and WSF) "these sites will operate to maximum potential and be scaled down in a planned manner as source-separated centralized composting scales up." The composting capacity of the system has scaled up from the 1990's, and will increase in the future, by one means or another. HRM decision making about this evolution in infrastructure and operations would be such that HRM will "provide systems which manage the collected residues in a cost effective and environmentally sustainable manner."

Is the ICI model optimized and at who's benefit?

The report does not provide a detailed analysis of the ICI waste management model. The report provides an overview of the constraints imposed on the commercial sector as a result of the by-law provisions, and discusses the overall impact of the ICI materials on the system capacity and operations. The original Strategy assumed Commercial tipping fees would be an important revenue stream used to offset the costs of processing the ICI waste materials. The report does not provide a business case analysis of the revenues and costs associated with the management of ICI mixed wastes and organics. For the ICI organic materials at the composting facilities, the $75/tonne tipping fee is less than the $160/tonne cost to HRM. For the ICI waste sent to the RDF landfill cells, the $125/tonne tipping fee is less than the $170/tonne cost to HRM. The ICI tipping fees provide some useful economies of scale revenue to the HRM system.

What is the impact of changing the existing model and separating ICI from the residential waste management system?

The report identifies problems in achieving compost quality guidelines and attributes this to the poor quality, wet, saturated ICI organic material at the compost facilities. Based upon the analysis presented in the report, the removal of the ICI organics from the residential organics would have a positive impact on compost quality. The report discusses anaerobic digestion as a potential treatment alternative for ICI organic materials at the composting facilities, given the constraints of the By-law to limit cross municipal boundary movement of materials. The removal of ICI material would also impact tipping fee revenues.

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Are there Provincial legislative or regulatory implications?

Several of the options recommended in the Stantec report may have potential technical or economic merit. While they differ from current infrastructure and operations, they can be considered to be within the context of an evolving system that meets overall goals in a cost effective and environmentally sustainable manner. The infrastructure and operational response can evolve from what was the 1990's waste streams, to what is and can be reasonably anticipated as being the evolved waste streams of today and tomorrow. HRM Council will decide the next evolution of the HRM Integrated Solid Waste Management System (ISWMS).

The Stantec report states that they conducted their work on the assumption that there would be no change to Section 16.3 of the HRM By law S-600 (i.e. causing much of the ICI waste streams to be processed in HRM system facilities). Some speculation about potential arrangements with other jurisdictions might imply a change in this By law.

The Stantec recommendation regarding changes to the landfill liner design specification, seeks to change the provincial Municipal Solid Waste Landfill Guidelines. In reading Section III 1 b) of the guidelines, perhaps a site specific proposal would instead best meet HRM's interests.

Section III 1 b) "In the event that a proponent advocates an alternative design to the minimum standard, it will be the responsibility of the proponent to demonstrate to the satisfaction of the Department that the proposed alternate design is capable of achieving an equivalent or higher level of protection than the minimum standards. Any proposal for an alternate design will be assessed on the technical merits of the design and will be evaluated on a case by case basis."

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10. TESTING STANTEC RECOMMENDATIONS AGAINST THE 1995 STRATEGY

10.1. DEVELOPMENT AND CONTEXT OF THE 1995 CSC STRATEGY

The Community Stakeholder Committee was created in the context of a municipal waste management crisis. In the early 1990s the Upper Sackville Landfill was nearing its maximum capacity, and was known for environmental issues, including leachate generation and odour. The agency responsible for solid waste management on behalf of the four participating municipalities had proposed an Energy from Waste (EfW) project (i.e. Incineration) as a solution to the existing system. In accordance with regulatory requirements, the EfW project was subject to an Environmental Impact Assessment (EIA) process. As an outcome of the EIA process, the decision of the Minister of the Environment was to reject the incineration project.

This situation led to the County of Halifax, acknowledging that any future landfill site serving the four member municipalities would be located on property within its administrative boundaries, accepting responsibility for developing a new municipal waste management strategy on behalf of those four municipalities.

Over a 15 month period, under this framework of commitment, the Community Stakeholder Committee was established, and through an extensive series of meetings of both the CSC and subcommittees (termed working groups at the time) created by it, the Integrated Waste Resource Management Strategy was developed. A consensus based process was applied in all meetings. The strategy which was created was then voted on and "accepted in its principles" by the new HRM Council in 1996. The fundamental premise of the strategy was stewardship: that waste was to be considered as a resource, and that through a series of aggressive diversion and recycling programs, valuable materials would be recovered, and the residual waste stream requiring landfilling would thereby be minimized. An associated concept was the processing of the residual waste stream (to stabilize the organics) before placement in the landfill. This concept was also a foundation principle for the site selection process of the new landfill.

In 1996 the amalgamated Halifax Regional Municipality was created, encompassing the four municipal units. The HRM developed its 1997 Operations Plan which reflected the CSC Strategy, which was then the basis for financing and implementing the components of the integrated waste management system, which is in place today.

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10.2. TESTING RECOMMENDATIONS AGAINST THE 1995 CSC STRATEGY

The Stantec recommendations are guided by the Scope of Work objectives. The objective is to ensure that the integrated solid waste resource management system can be flexible, and can evolve to meet changing capacity requirements; to achieve diversion objectives; to satisfy regulatory requirements; to be consistent with HRM environmental stewardship requirements; and to promote program efficiencies.

The Stantec recommendations do relate to what changes to the Integrated HRM Solid Waste / Resource Management System, might be financially more efficient, while still maintaining the underlying principles of the 1995 CSC Strategy. Several of the options that Stantec recommends would benefit from additional information than what is presented in the report itself, in the process by which they may be considered by HRM Council. We have suggested what that additional information could include in our specific comments on each option recommended by Stantec. The Stantec report appears to have been consistent with the 1995 CSC Strategy "in its principles." Any potential program changes involving the options Stantec has recommended would be expected to happen after feedback has been provided from the Community Engagement process to HRM Council, which would then make the final decisions in an open public manner.

It was recognized in the 1995 CSC Strategy that the system would evolve. One overriding principle of the 1995 CSC Strategy was Stewardship. For the most part, the recommendations are consistent with this principle; one specific area that may require further evolution, and application of the principles of stewardship, is the management of IC & I waste streams.

The following is from the 1995 CSC Strategy. "To ensure the maximum diversion of organic content is achieved prior to the opening of new residuals disposal facilities, the Strategy includes front end processing facilities to divert the remaining "third stream" mixed wastes. At these facilities, residual organic material will be separated and processed. Beginning with the approved opening of new residuals disposal facilities, these sites will operate to maximum potential and be scaled down in a planned manner as source-separated centralized composting scales up.

To achieve the Strategy's waste diversion goals, the following is required:

- Encourage waste reduction at source for all sectors of society, supported by independently funded programs and personnel.
- Provide source-separated multi-stream collection and handling and a household hazardous waste (HHW) depot for all residential generators by January 1, 1997. This refers to all residential generators now served by municipally-sponsored collection contracts.

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- Establish incentive-based means of achieving stewardship and source separation for all IC&I generators.
- Provide systems which manage the collected residues in a cost effective and environmentally sustainable manner."

Source separated centralized composting has scaled up, and since 1995, the success in this particular program - where the residential green bin materials are composted and do not go the residuals disposal facility at Otter Lake - has significantly changed the composition of the waste stream arriving at the RDF.

It would seem that scaling back on facilities such as the FEP and WSF infrastructure and operations, would be consistent with the 1995 CSC Strategy if a significant portion of organics with relatively high volatilization and leaching potential (e.g. residential green bin organics) are no longer going to RDF landfill cells; and if this was a cost effective change that is managed in an environmentally sustainable manner.

Within this context, we note that the following major options recommended in the Section 12 Stantec Report, are changes to current infrastructure and operations, that could be cost effective and managed in an environmentally sustainable manner, and in that sense be consistent with the 1995 CSC Strategy:

- Stantec A1 – Closure of FEP and WSF by the end of 2013
- Stantec A2 – Request Modification of the Nova Scotia Landfill Liner Specification
- Stantec A3 – Extend Life of Otter Lake Landfill Through Vertical Expansion
- Stantec B1 – Create a Centralized Waste Resource Campus
- Stantec B2 – Relocation of MRF to Campus

Additional information, especially for Options A2, B1 and B2, would be useful before HRM Council makes any final decision making. Still the potential in these options to be cost effective and managed in an environmentally sustainable manner, merits some consideration, preferably with some additional information. We have suggested such additional information, along with some potential budget estimates, in a separate letter to HRM.

10.3. 2013 COMMUNITY ENGAGEMENT PROCESS

Any potential HRM solid waste resource management program changes involving the options Stantec has recommended would be expected to happen after feedback has been provided from the Community Engagement process to HRM Council, which would then make the final decisions in an open public manner.

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The Stantec report and this peer review are part of a process that started when HRM Council voted to have staff look into ways by which the infrastructure and operations might evolve in response to the changes in the waste streams. The options subsequently identified, this peer review, the community engagement, the additional information, and more are steps in the same process where HRM Council will make the final decisions about what will change.

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11. RESULTS OF THE PEER REVIEW

Section 4 reviews specific sections of the January 2013 Stantec report "Waste Resource Strategy Update Report." The corresponding sections of the August 2012 HRM RFP and the Stantec report are identified. The applicable conclusions and recommendations are stated. We have then typically identified portions or quotes from the section being reviewed, and offered comments. Section 7 presents our opinions on the recommendations.

As per our HRM RFP, the focus of the peer review is on the Stantec report Section 3 - Otter Lake Waste Processing and Disposal Facility, and the Stantec report Section 4 - Landfill Design. The peer review tested both the methodology and validity in accordance with the RFP. Descriptions of the peer review tests are summarized below.

Peer Review Tests

The indicated Stantec report Sections, conclusions and recommendations were reviewed and tested, based on the test descriptions in the HRM RFP for:

- Test A – System Performance
- Test B – Benchmark Analysis and Best Practices
- Test C – Options Analysis and Recommendations

For each test, we made consideration with respect to:

- (Methodology) The extent to which there was a declared or identified methodology that was demonstrated to have been followed in the report, that resulted in the conclusions and recommendations.
- (Validity) How compelling was the report text in supporting or proving the validity of the conclusions, recommendations, and cost estimates provided.

Summary of Peer Review Tests

We have also prepared a tabulated summary of the results we found in applying tests A, B, and C, to recommendations A1, A2, and A3 in sections 3 and 4 of the January 2013 report, with respect to the methodology and validity of recommendation derivation presented.

Providing a greater focus of our peer review evaluation on the A1, A2, and A3 recommendations in Sections 3 and 4 of the Stantec report reflects our contracted scope of work. The same table was not produced with respect to the B or C group of Stantec recommended options for HRM.

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Table 1: Summary of Peer Review Test Results for Options A1, A2 and A3

Recommendation A1 - Closure of the FEP (Front End Processing unit) and WSF (Waste Stabilization Facility) by the end of 2013		
Refer to our Section 11.1.5 Methodology of Recommendation Derivation in Stantec Section 3. Refer to our Section 11.1.6 Validity of Recommendation Derivation in Stantec Section 3.		
Test A – System Performance	for Methodology	Yes - Partially
Test A – System Performance	for Validity	Yes - Partially
Test B – Benchmark Analysis and Best Practice	for Methodology	Not comparable
Test B – Benchmark Analysis and Best Practice	for Validity	Not comparable
Test C – Options Analysis and Recommendations	for Methodology	Yes - Partially
Test C – Options Analysis and Recommendations	for Validity	No
Recommendation A2 – Request Modification of the Nova Scotia Landfill Liner Specification		
Refer to our Section 11.2.1.1 Methodology of Recommendation Derivation in Stantec Sec. 4.1. Refer to our Section 11.2.1.2 Validity of Recommendation Derivation in Stantec Section 4.1.		
Test A – System Performance	for Methodology	With more info. – Yes
Test A – System Performance	for Validity	With more info. - Yes
Test B – Benchmark Analysis and Best Practice	for Methodology	Yes
Test B – Benchmark Analysis and Best Practice	for Validity	With more info. - Yes
Test C – Options Analysis and Recommendations	for Methodology	With more info. - Yes
Test C – Options Analysis and Recommendations	for Validity	No
Recommendation A3 – Extend Life of Otter Lake Landfill through Vertical Expansion		
Refer to our Section 11.2.2.1 Methodology of Recommendation Derivation in Stantec Sec. 4.2. Refer to our Section 11.2.2.2 Validity of Recommendation Derivation in Stantec Section 4.2.		
Test A – System Performance	for Methodology	Not applicable
Test A – System Performance	for Validity	Yes
Test B – Benchmark Analysis and Best Practice	for Methodology	Yes
Test B – Benchmark Analysis and Best Practice	for Validity	No
Test C – Options Analysis and Recommendations	for Methodology	Yes
Test C – Options Analysis and Recommendations	for Validity	Yes

We also considered and made comments with respect to the completeness of the section. How completely did the Stantec report respond to the deliverables being sought for in the HRM RFP. What, if any, were highly significant deliverables sought by HRM that were not in the January 2013 report.

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11.1. OTTER LAKE WASTE PROCESSING AND DISPOSAL FACILITY

What Was Sought and What Was Delivered

In the HRM RFP dated July 2012, three (3) key objectives were established with respect to the waste processing and landfill operating model. The objectives listed in Section 5.1.1 of the RFP are included below:

a. Review the current landfill operating model which includes waste processing and provide a performance assessment in comparison to other municipal systems. Complete a system assessment to validate the operating models outcomes in terms of the original 1997 Operations Plan objectives. Make recommendations on evolving the existing model to recognize the changes in the waste stream that have occurred over the past 15 years from the original content.

b. Provide a comprehensive examination of the strategy components related to the Waste Processing & Landfill Operating Model, processes, practices, costs and a bench mark industry analysis to provide a detailed recommendations report on evolving the strategy with options to meet diversion objectives and achieve efficiencies in order to deliver a more fiscally sustainable solid waste program for HRM. This assessment shall include a cost benefit analysis of the current landfill cell height criteria and the corresponding financial implications in terms of cost per tonne for increasing the cell height/volume in increments of 5 meters.

c. Provide recommended changes to the existing operating model and policies, and assess their impacts on the existing program in terms of environmental stewardship, community impacts, facility operations and program costs.

The *Waste Resource Strategy Update* report reviews the front end processing and waste stabilization facility in Section 3.0 Otter Lake Waste Processing and Disposal Facility. The following conclusions related to the landfill operating model are from Section 12.1 of the report.

> "1) *The total diversion rate is high in HRM compared to other municipalities, but realistic opportunities exist to improve the recovery of residential and ICI recyclables and organics in accordance with provincial legislation."*
>
> 2) *The front-end processing (FEP) and waste stabilization facility (WSF) at Otter Lake no longer provide a useful function compared to their stated purpose in the 1995 Strategy."*

The following landfill options were recommended in Section 12.2 of the January 2013 report.

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"A1 – Closure of the FEP and WSF by the end of 2013

The FEP and WSF do not function in a manner envisaged in the 1995 CSC Strategy, or when the 1997 Operations Plan was prepared. These facilities were intended to stabilize organic wastes and produce a low grade compost product. Few organics are now actually processed, and the multiple shredding of the waste prior to disposal may actually increase the generation of landfill gas over the short term in the period before gas collection systems can be installed. Implementation of this recommendation is contingent on HRM implementing a separate collection for white goods (stoves; refrigerators) rather than the current practice of loading these items in with the regular curbside waste and then removing the appliances from the waste at the FEP. The annual cost to operate the FEP and WSF is reported to be $8.9 million per year. Most of this amount could be recognized as sustainable savings less any contractual commitments."

11.1.1. COMMENT ON STANTEC REPORT 3.1 EXISTING OPERATIONS

11.1.1.1. Comment on Stantec Report 3.1.1 Front End Processing (FEP)

The report states that "no significant effort is made to remove compostable materials such as wet paper, cardboard, or other recyclables from the conveyor lines." During our January 10, 2013 visit to the Otter Lake facility, the observed bales of cardboard, and large pieces of paper may have been from what had accumulated over several months. The 250 tonnes of baled cardboard and paper products diverted from the RDF landfill cell at the FEP in 2011, were an insignificant portion (< 1%) of the 140,500 tonnes of materials that arrived at the FEP in 2011. Paper and other wastes too small to be baled continued along the FEP line to the WSF / RDF.

The Stantec assessment provides some discussion on the removal of white goods and scrap metals but does not describe how this process works. This separation of materials happens on the tip floor.

In fact, the Waste Resource Strategy Update Report (WRSU) provides little explanation why "no significant effort" is being made to recover organics and recyclables at the FEP.

"The rationale for sending smaller particles to the WSF was the assumption that most compostable organics would be smaller than most non-compostable materials after coarse shredding". This statement is unsupported by waste characterization information. It is also unclear how the size of the material particles (coarse) was selected, and if the equipment successfully shreds' the material to this particle size.

The summary diagram provided on the Stantec Report Page 3.2 indicates that 73,500 tonnes of mixed waste material, with their black bags broken open, were sent to the landfill in 2011. Residential green bin food wastes do not go to the FEP or end up in the RDF. Some organics

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are in the waste streams, especially in some mixed ICI waste. The WSF dries some small sized, typically non food organics like paper before it goes to the RDF (e.g. 22,600 tonnes in 2011). The FEP / WSF processes reduce but do not eliminate the potential volatilization, biological breakdown, and leaching potential of these organics entering the RDF. Could an acceptable level of environmental protection be the result of different infrastructure and operations? Yes.

11.1.1.2. Comment on Stantec Report 3.1.2 Waste Stabilization Facility (WSF)

The result of the WSF process reduces the volatility, leaching, and biodegradation potential, of some compostable materials (i.e. stabilizes them). These materials are more apt to be small paper, and typically are not food, lawn or yard waste. Conventional aerobic composting is a suitable stabilization process. The effectiveness of the compost process could be further defined with additional characterization information as measured at the end of the compost cycle. The short term off-gas being volatilized by the FEP - WSF stabilization process is being effectively addressed by piping it through the WSF bark bio-filter. We do not perceive that the WSF process results in a significant change in the long term methane off-gas potential from the biological breakdown of organic hydrocarbons. Could an acceptable level of environmental protection be the result of different infrastructure and operations? Yes. Could the HRM system benefit by using some WSF infrastructure in an alternative but cost effective way, to compost source separated organic materials that are not to be placed in the RDF landfill cell? Yes.

The report does not provide comment on the condition of the system and the remaining useful life of these facilities. The compostable quality of the WSF stabilized material is such that it is effectively "garbage." It is not an economic resource, and it is not suitable for further processing and re-use.

11.1.1.3. Comment on Stantec Report 3.1.3 Residual Disposal Facility (RDF)

The report was to provide a performance assessment of the RDF in comparison to other municipal systems. The report concluded "Stantec is of the opinion that the RDF is generally well designed and operated". While we agree with this statement, it would be appropriate to support this conclusion with references to regulatory inspection results, HRM operational reviews, and compliance monitoring data. The design and operation of the RDF meets the provincial regulations as evidenced by the regulatory approval. There is no assessment of the RDF operational performance (in comparison to other municipal systems) or if the infrastructure (roads, scales, daily and final cover systems, surface water drainage etc.) is in good repair.

The impact of the use of shredded mixed waste on the RDF capacity, verses typical non-processed waste would also provide information necessary to assess the overall cumulative effect of the FEP, WSF, RDF, collection systems, composting facilities, and recycling programs. Changes to any one of these variables, may be offset by changes elsewhere. Could an

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acceptable level of environmental protection be the result of different RDF infrastructure and operations? Yes.

11.1.2. COMMENT ON STANTEC REPORT 3.2 COMPARISON OF CURRENT OPERATIONS TO THE 1995 STRATEGY

11.1.2.1. Comment on Stantec Report 3.2.1 Front End Processing (FEP)

The 1995 Strategy states that "The processing of mixed residues from both residential and IC & I sectors is required to ensure that usable and/or inappropriate materials are removed before delivery to the residuals disposal facility". In addition "recyclable materials will be processed . . . and routed to markets" and "compostable materials that are recovered from the mixed waste stream will be processed in composting facilities separate from the source separated compostable facilities."

From the 1995 Integrated Waste/Resource Management Strategy (IWRMS): "To ensure the maximum diversion of organic content is achieved prior to the opening of the new residuals disposal facilities, the Strategy includes front-end processing facilities to divert the remaining "third stream" mixed wastes. At these facilities, residual organic material will be separated and processed. Beginning with the approved opening of new residuals disposal facilities, these sites will operate to maximum potential and be scaled down in a planned manner as source-separated centralized composting scales up."

Given the reasonably successful curb side diversion rate of residential green bin organics, the planned expansion of centralized composting facilities, the operational and the covered RDF cells, and the intended HRM effort to better separate organics from within the ICI waste streams, the low percentage of "third stream" wastes to be separated from what is being conveyed to the RDF, the maximum potential for the FEP operations has already passed, and consideration of scaling back FEP operations is consistent under these circumstances with the 1995 CSC Strategy.

The report states that "the waste stream in 1995 contained large amounts of both recyclable and compostable materials which the FEP was intended to remove". This statement is correct, and in the context of the broader integrated strategy, expected. The compostable material arriving at the FEP is not the green bin food organics and the lawn and yard waste that is typically composted elsewhere. The ICI waste arriving at the FEP includes sometimes significant portions of compostable material such as food organics.

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"The FEP does indeed process all waste received, but there is little benefit gained from this activity as few recyclables are recovered and no useful or valuable compost is produced." The FEP processes all of the waste it receives. Organics received at the FEP go to the RDF either directly or indirectly through the WSF.

Significant portions of materials collected through the HRM solid waste resources management program, do not arrive at the FEP as they are successfully diverted elsewhere (e.g. blue bag / cardboard program, and compost facilities) by the system collection methods (e.g. green bins). Some wastes arriving at the FEP are diverted away from the RDF landfill cells, such as those under the white goods, and household hazardous materials programs.

The technical design and contracted operational requirements of the FEP (e.g. between HRM and MIRROR) are based on the HRM Council supported 1997 Operations Plan, and the implementation agreements. These came after the 1995 CSC Strategy or IWRMS.

The figure on page 3.2 of the reviewed report graphically shows that FEP functions include the diversion of household / special wastes (e.g. paints and solvents), paper fibres (e.g. large cardboard and paper), large items, bottles, white goods and scrap. Small sized compostable materials (e.g. smaller than 150 mm / 6 inch) are diverted to the WSF. From the WSF, after reducing but not eliminating the volatilization, leaching, and the methane producing biodigestable potential of these materials, the small sized compostable materials (22,600 tonnes in 2011) are conveyed to the RDF. The same figure indentifies the 73,500 tonnes of mixed waste, including (>150 mm / 6" sized) compostable materials, that is sent directly to the RDF. The total amount of materials directed to the RDF in 2011 was 135,600 tonnes.

Some material at the FEP has a relatively low potential to result in an immediate odour release through volatilization, leaching, and the methane producing biodegradation process. This material goes directly to the RDF. The report did not note apparent community odour incident issues, but our later discussions with HRM staff confirmed that in the fall of 2001, there were community odour incidents from earlier than expected landfill gas production. The "ad hoc" gas management system was the response to the 2001 incidents, and it continues to operate in 2013. This manages gas in the short term being released from the RDF landfill cell waste, but before the cell is capped and the long term gas management infrastructure is put in place. The fall 2011 community odour incidents are associated with heavy rainfall while capping Cell 5.

Shredded material at the FEP with a relatively high volatilization and biodegradation potential, (<150 mm / 6" size) goes to the WSF first for the stabilization process. A high percentage of this includes organics from the mixed ICI waste stream. The result is a waste product, not a compostable material additive, and is not an economic resource. The residential green bin food waste produces - not sent to the FEP / WSF but to the dedicated compost facilities elsewhere in HRM – does produce a compost product.

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The Stantec report also makes no reference to how the current HRM operation conforms to the Provincial Solid Waste Management Regulations and the related provision that bans organics and some other materials from landfills. Other jurisdictions in Nova Scotia meet the same provincial guidelines with different infrastructure and operations (i.e. without an FEP or WSF). The municipal source separated composting programs are the responses by HRM and other jurisdictions to the applicable provincial requirements banning organics from landfills. The provincial operating permit for the Otter Lake facility reflects the infrastructure and operations being used. Where there is different infrastructure and operations, such as in other jurisdictions in Nova Scotia, or possibly with Otter Lake in the future, a different provincial operating permit would be prepared.

Could the targeted level of environmental protection continue to be achieved with different infrastructure and operations? Yes.

11.1.2.2. Comment on Stantec Report 3.2.2 Waste Stabilization Facility (WSF)

"The 1995 Strategy recognized that the output from the WSF would be low quality compost, but it was anticipated that it would still be a valuable and useful resource. In contrast, the 1997 agreement between HRM and MIRROR specifically identifies that all WSF output is to be placed directly in the RDF." The perceived or desired usefulness of the processed WSF waste differed between the 1995 CSC Strategy and 1997 HRM Operations Plan documents.

In the context of the HRM operations plan and agreements with MIRROR, it may be that the WSF is achieving something less than stabilization. For some small sized compostable shredded material from the FEP, the WSF may be reducing but not eliminating the potential for an immediate odour release through volatilization, leaching, and the methane producing biodegradation process. The WSF process may be somewhat reducing the moisture content of the waste leaving it on a temporary basis, but which then increases after arriving in the RDF.

The WSF process reduces the moisture and organic content of the waste. Water and carbon dioxide result from the biological breakdown of hydrocarbons. The captured off-gas – volatilized hydrocarbons, carbon dioxide, and more - is effectively addressed environmentally by piping it through a WSF bark bio-filter. That the economic potential of the compost material is negligible, owes much to the success of collection programs that divert green bin residential food waste away from the Otter Lake FEP / WSF / RDF facilities. The quality of the ICI mixed waste stream is such that while compost is not produced, there remains some volatilization, leaching, and biodegradation potential. From the FEP and WSF processes, this waste ends up in the RDF.

Could the targeted level of environmental protection continue to be achieved with different infrastructure and operations? Yes.

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11.1.2.3. Comment on Stantec Report 3.2.3 Residual Disposal Facility (RDF)

"The environmental performance of the landfill has also been acceptable compared to the expectations in the 1995 strategy" The Stantec report provides little supporting information on the condition of the existing landfill (See Section 3.1.3) or on the effectiveness of the RDF operations. However, the RDF is a permitted facility which conforms to the provincial design and operating requirements, as evidenced by the regulatory approval.

A primary consideration is reviewing the actual cell life versus projected cell life, and if discrepancies exist, to explore these. The Stantec report states that a "significant deviation from the 1995 Strategy is that all output from the WSF is sent to the landfill." Instead of being a resource, the material leaving the WSF process is effectively garbage; albeit, drier and less likely to have volatilization or short term odour producing characteristics. Attempting to mix the loose, dry, light WSF material with compost facility material, would lower the quality of the compost and present some technical challenges. The material leaving the WSF is not suitable as cover material in the RDF, as it is too light, so it is deposited as waste or garbage in the RDF.

If those materials currently being stabilized in the WSF were instead sent directly to the RDF, would the environmental performance goals with respect to gas release and leachate potential still be achieved? In considering the experiences in other jurisdictions; what happened at Otter Lake when the WSF was not operating for a seven month period from May to December 2010; and our interpretations of the February 2013 waste stream sample laboratory results for relative volatilization and leachate characteristics, we find the answer to that last question to be yes. If so, is the long term incremental improvement in gas release and leaching potential for materials through the WSF stabilization process, a worthwhile investment? We find the answer to be no. If the materials were not stabilized through the WSF process, we believe there is sufficient capacity in the current Otter Lake facility infrastructure, capacity, and operations, to meet its environmental performance goals, and to do so in a more resource efficient manner.

About half of the waste entering the RDF (in 2011, 73,500 tonnes of 135,600 tonnes) is a mixed waste stream from the FEP that includes some compostable organics from the ICI waste and residential waste streams. Does the shredding provide a net economic benefit, when considering the downstream impacts on gas release and collection, and similarly for leachate?

HRM's analysis presented in the Next Steps Paper No. 2A identifies 29,805 tonnes/year of organics and recyclables, that could be potentially diverted from this waste stream. Typically it is some of the organics from the mixed ICI waste stream that is being processed at the WSF. Approximately 250 tonnes of paper fibre and 50 tonnes of recyclables were diverted from the 2011 waste stream arriving at the FEP. That 300 tonnes of material diverted from the RDF landfill cell is about 1% of 29,805 tonnes.

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The impact of shredded mixed waste on the rate of landfill gas generation is discussed. This rate increase is a combined result of the mechanical and thermal energy applied to the waste during the FEP / WSF process, and the physical, chemical, and biological characteristics of the organics that are not removed or stabilized before they arrive at the RDF. The Stantec report concludes that the shredded organic waste in the FEP/WSF increases the potential for community odour impacts compared to a scenario where the FEP/WSF did not exist.

We understand that in the RDF since 2002, whatever is the currently uncapped cell receiving waste, is where the short term "ad hoc" gas management measures are being used. During the seven month period from May – December 2010 when the WSF was closed for repairs, this "ad hoc" system has controlled the landfill gas being released such that there were no reported community odour incidents except for the fall of 2011. In the fall of 2011, significant rain events contributed to delays in placing clay for capping the cell that was just filled. Since 2002, with the exception of the fall of 2011, the HRM performance goal of minimizing the number of reported community odour incidents has been achieved. The additional cost to HRM for maintaining the "ad hoc" gas management system is approximately $750,000 per year.

The mechanical and thermal energy received by the waste entering the FEP / WSF is understood to result in the relatively more rapid, short term release of gas at greater concentrations, but ultimately being released for a shorter period of time. After 2002, the new "ad hoc" short term gas management infrastructure and operations at the RDF landfill cell have resulted in there being limited reported community odour incidents, except for in the fall of 2011. If the current FEP and WSF actions were not happening, and the waste was not receiving the extra mechanical and thermal energy, the volatilization and release of gas from wastes entering the RDF landfill cell, would occur for a longer period of time, but at a slower rate, and at a reduced gas mass in air concentration.

Materials that have been sent directly from the FEP to the RDF have a relatively low potential for short term volatilization, leaching and biodegradation. That potential is greater for the materials selected, shredded, and entering the WSF stabilization process. That potential in the WSF materials is somewhat reduced when the processed materials are then sent for disposal in the RDF. Those materials collected by the HRM system, with the highest volatilization and leachate potential, are not in the waste materials at the Otter Lake FEP / WSF / RDF facilities, but the potential resources resulting from treatment at the compost facilities elsewhere in HRM.

There have been community odour impacts, and these are more typically associated with the partially filled RDF cells, when rain increases the moisture content of exposed waste in the RDF.

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A capacity now exists in the partially filled RDF cell, to intercept and capture the gas that might otherwise lead to potential community based odour incidents. This involves a group of full time staff, temporary piping, air blowers, and the permanent gas control measures for the completed cells.

Shredded materials in the RDF, given their relative particle size and homogeneous mixing, are likely to more rapidly release volatilized gas, and methane from biodegradation in the short term, compared to unshredded materials. Moisture content and oxygen are also critical factors. The reviewed report did not note that removing the FEP/WSF will not eliminate the production of landfill gases; it would just occur over more years, in a more controlled setting.

There would be a decrease in density of mixed waste placed in the landfill cell if the current shredding process is discontinued. The cumulative influence of this and changing compaction efforts on the landfill capacity and program financial efficiency, was not evaluated in the report. After reviewing the report we sought additional information, presented elsewhere in this document, to respond to these questions.

11.1.3. COMMENT ON STANTEC REPORT 3.3 COMPARISON OF CURRENT OPERATIONS TO INDUSTRY BEST PRACTICES

11.1.3.1. Comment on Stantec Report 3.3.1 Front End Processing (FEP)

The Stantec report indicates they could find no direct comparisons to HRM FEP process. This makes a comparison to industry best practices difficult.

The report would benefit from a discussion on effective ways to better separate the more volatile and leachable food based organics from the mixes encountered in the ICI waste stream. Either doing so economically at the curb side source, or at central location, or both, is a desirable practice for the HRM system. Of the ICI waste entering the HRM system, some is sufficiently organic to go to the compost facilities and not the RDF. What goes to the FEP – WSF infrastructure sometimes is a mix of organic and other wastes. This waste does go to the RDF.

The FEP – WSF infrastructure and operations do not provide a value added outcome with respect to off-gas volatilization, and the potential for community odour incident potential, because of the demonstrated performance of the gas management infrastructure and operations at the RDF.

However, based on the existing operation of the FEP there is little bench-marking to report.

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11.1.3.2. Comment on Stantec Report 3.3.2 Residual Disposal Facility (RDF)

The Stantec report confirms the design and operational standards for the RDF are stringent compared to landfills operated in most comparable jurisdictions. This is supported by information presented in the Liner Design Section.

11.1.4. COMMENT ON STANTEC REPORT 3.4 OPPORTUNITIES FOR OPERATIONAL IMPROVEMENTS

11.1.4.1. Comment on Stantec Report 3.4.1 Front End Processing / Waste Stabilization

The report considers four (4) options for consideration by HRM. The following option was recommended:

"Option A1 – Closure of the FEP and WSF by the end of 2013

"The FEP and WSF do not function in a manner envisaged in the 1995 Strategy. These facilities were intended to stabilize organic wastes and produce a low grade compost product. Few organics are now actually processed, and the multiple shredding of the waste prior to disposal may actually increase the generation of landfill gas over the short term in the period before gas collection systems can be installed. Implementation of this recommendation is contingent on HRM implementing a separate collection for white goods (stoves; refrigerators) rather than the current practice of loading these items in with the regular curbside waste and then removing the appliances from the waste at the FEP. The annual cost to operate the FEP and WSF is reported to be $8.9 million per year. Most of this amount could be recognized as sustainable savings less any contractual commitments."

With respect to continuing to achieve the annual goal of minimizing community odour incidents associated with the Otter Lake facility, does the current FEP – WSF infrastructure and operations make a technical contribution at an economic cost? A relatively minor contribution is made in that the total mass of potentially released organic gas mass underwent a minor reduction in the WSF. This minor reduction in the total long term gas release potential is achieved at a net cost to HRM of approximately 9 – 10 million dollars a year, plus the extra short term "ad hoc" gas management infrastructure at the RDF for the short term, rapid release of high concentration gas mass into the air. Can the RDF infrastructure and operations adequately address this in a more cost effective manner? Yes, as demonstrated when the WSF was not operational for a seven month period.

Perhaps a different way of looking at this is if the intended environmental goals are being achieved. The environmental goals include minimizing the number of community odour incidents; and no releases to the air or groundwater that result in an unacceptable human

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health or environmental risk or hazard. Performance goals are also in the operating permit. The 1995 CSC Strategy had a vision for achieving this. The follow-up 1997 facility operations plan, influenced the design and operation of the infrastructure and operations to achieve this, but with some differences, or more detailed clarifications from what was in the 1995 CSC Strategy. In 2012, the FEP, WSF, RDF, collection systems, composting facilities, and the balance of the HRM solid waste program, together act in a way to achieve those same environmental performance goals.

Could an acceptable level of environmental protection be the result of different infrastructure and operations? Yes.

Would a changing mix of waste arriving at Otter Lake, mean that different infrastructure and operations could continue to provide acceptable environmental protection? Yes.

Does the reviewed report provide a compelling case in support of the recommendation to close the FEP and WSF? After reviewing the report, we sought additional performance, financial, and technical information. We agree with the option recommended in the report, and that it merits detailed consideration by the final HRM decision makers.

The report provides some discussion and rationale as to why or why not a particular option is worth considering as a recommendation. The report seems unclear as to if the environmental performance goals are systemic (i.e. the cumulative result of the FEP, WSF, RDF, collection systems, compost facilities) or - for this Section – are the goals specific to just the FEP/WSF? Is the FEP/WSF to be considered a success - or not - in achieving a specific goal or benchmark? Or is the FEP/WSF making - or not making - a cost effective contribution to achieving system wide goals or benchmarks? In looking more broadly than just the report being reviewed, we find that the current FEP/WSF infrastructure and operations are not making a cost effective contribution to maintaining the achievement of the groundwater and air quality goals for the HRM system as a whole.

Most organics (i.e. the residential green bin types and yard waste) do not come to the FEP / WSF / RDF. For those organics that do, some are diverted (i.e. compostable cardboard); some with relatively high volatilization, leaching and biodigesting potential (i.e. from some ICI mixed waste), are processed in the WSF and then go to the RDF; and some with relatively low potentials (i.e. small pieces of paper) are sent to the RDF. In our opinion, the WSF process contribution to minimizing the number of reported annual community odour incidents is such that if it did not exist, it would not be missed, due to the demonstrated gas management infrastructure, capacity, and operations at the RDF.

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Presenting additional information in the report could clarify what HRM is or is not seeking to achieve with the FEP. We sought additional information from HRM and understand that the cumulative influence of the FEP, WSF and RDF are to meet the groundwater and air quality goals of the Operating Permit, the 1997 HRM Operations Plan, and minimizing the annual number of reported community odour incidents while aspiring for no incidents. We then could better assess its effectiveness, and therefore support the recommendation for removal.

That difference in potential performance goals leads to different evaluation results and recommendations. If aspiring to maximize the diversion of compostable materials away from the RDF – regardless of the waste materials' physical, chemical, and biological characteristics – involves one set of recommendations. If aspiring to minimize the leaching characteristics of materials in the RDF – regardless of the landfill design and operations – involves another set of recommendations. If aspiring to achieve systemic environmental performance - the cumulative effect of the infrastructure and operations of the FEP, WSF, RDF, collection system, and composting facilities – involves a different set of recommendations. In our opinion, the current FEP/WSF infrastructure and operations are not necessary for the HRM system as a whole to achieve the desired groundwater and air quality goals and to minimize the annual number of reported community odour incidents.

From the report, it is inferred that the removal of the FEP will benefit the downstream RDF. Some functions (e.g. the white goods waste stream) would presumably be accomplished by other means, and at a cost. Without the WSF process, there would be an incremental change in volatilization, leaching and methane producing biodegradation potential, of material entering the RDF cell. If so, and with the current RDF cell design and operations, would the systemic environmental goals still be achieved (e.g. community odour impacts, and acceptable human health and environmental risks and hazards)? Would those goals still be met for unshredded materials that did not go through the WSF process? Would those goals still be met if the recommended RDF cell design changes occurred? If yes then from a technical perspective, and if yes the changes are a net financial plus for the HRM system, then that would justify the recommended changes. In our opinion, the answer to both of those questions is yes, and that the recommended changes are justified.

After reviewing the report, we sought additional technical and financial information. Some of this is presented in Sections 5, 7 and 12. Essentially, we find that after accounting for downstream costs there is a significant financial benefit to closing the FEP and WSF; and the changing volatilization and leaching potential is such that the existing gas management and leachate systems would continue to meet the groundwater and air quality performance goals.

Our analysis took account of many changes, including changes in landfill capacity from the portion of unshredded instead of shredded waste, and changes in compaction efforts.

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11.1.4.2. Comment on Stantec Report 3.4.2 Residual Disposal Facility (RDF)

The report concludes the RDF is "generally well designed and operated". While this may be accurate, the report does not provide a supporting operational assessment of the RDF.

Opportunities for operation improvements could have been identified as a result of observations made during regulatory inspections, HRM operational reviews, and compliance monitoring data. The report identifies three (3) opportunities to increase the density of the in-place residuals, resulting in additional RDF capacity. There is a qualitative discussion on relative cost concluding there would be no short-term financial gain. The long-term financial gains have been discussed in the context of capital costs associated with delaying the construction of the next cells. What is missing is the business case costing related to the three (3) presented options. Following the recommendation and having unshredded materials in the RDF, may result in an incremental decrease in the density of the in-place residuals. The cumulative influence of these density changes – technical and economic – may support the recommendation made, but this was not shown.

In several of the previous Sections the review focuses on the operation of the FEP and the current practice of shredding mixed waste material. This is relevant to the discussion on density and is addressed in Section 4 - Landfill Liner. This analysis (of density) is pertinent to the discussion regarding the landfill design and Otter Lake operations sections.

11.1.5. Methodology for Recommendation Derivation in Stantec Report Section 3

Test A – System Performance

The FEP and WSF facilities were reviewed in the field by Stantec personnel to observe the process. In addition, a desk top review of supporting data and literature related to actual tonnage through these facilities and associated costs was undertaken. Specifically, the following can be noted regarding actual methodology employed to evaluate the FEP and WSF facilities.

Reference to the 1995 strategy intent and objective was clear as the report re-iterates the intentions developed in the original strategy, being that these facilities were intended to remove recoverable resources including recyclable and compostable materials.

The RFP states that the purpose of the WSF is to reduce the potential of the material to produce odour, gases and attract vectors and to reduce the leachate strength after placement in the RDF. It also states that this outcome is a primary objective of the operational performance system assessment. The WSF reduces that potential at a significant cost, and in our opinion, the current RDF infrastructure, capacity and operations would meet the desired performance goals, even if the WSF did not reduce the waste materials volatilization potential.

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The Stantec report provides a general statement on system performance indicating that materials are recovered, however in low volumes due to the fact that curb side collection of organics and recyclables has significantly reduced the volumes delivered to the Otter Lake facility. It is stated that the system no longer performs as intended due to the significant reduction in organics and recyclables that are collected and transported elsewhere (e.g. green bin and blue bag materials). The site review did indicate that some materials containing compostable organics (22,600 tonnes in 2011) were stabilized in the WSF before placement in the RDF. Recoverable materials (1200 tonnes per year of white goods in 2011, and 300 tonnes per year of bottles and paper) are being separated from the total waste stream at the FEP (140,600 tonnes per year in 2011). Some waste characterization information from different years was available in preparing our peer review of the Stantec report.

While data was not presented in the report, it is reasonable to conclude that the WSF process does reduce the potential for volatilized odour, leachate, and biodegradation methane production from the low quality compostable materials.

We sought additional information, collected four waste stream samples in February 2013, and had them analyzed at a laboratory. This additional information is useful in understanding some of the relative concentrations and associated physical and chemical characteristics, for materials in the RDF cell; and the relative concentrations and characteristics before and after the WSF process. The WSF process does influence the characteristics for a minority portion of materials in the RDF, but in our opinion, it is not necessary in achieving the HRM solid waste system goals (e.g. to minimize the annual number of community odour incidents).

A condition assessment of FEP and WSF structures and their components was not provided within the document. This might have suggested remaining useful life of these facilities and actual O&M costs, or whether those costs have been increasing or decreasing, or simply they are in good repair or require regular repairs.

There is no reference in the report to historical tonnage of waste received at the FEP and WSF facilities for each year since operation prior to 2011. Detail for 2011 was provided which yields a recent picture of what is occurring. HRM has historical data for this which was available to Stantec and to ourselves. Environmental monitoring report information was also available.

In considering the demonstrated methodology used, Test A was met partially.

Test B – Bench Mark Analysis and Best Practice

Stantec attempted to compare the FEP operations and procedures at Otter Lake to other facilities in Canada and North America, however did not find a suitable comparison. The City of Edmonton was referenced as having a similar operation, however details were not provided. Alternatively, comparison to European facilities may have shed some worthwhile information.

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HRM provided FEP waste information to Stantec on more years than just the 2011based year presented on page 3.2 figure of their report. That the facility in 2011 separated about 300 tonnes of recoverable paper and plastic material from the incoming 140,600 tonnes, underscores that the FEP is not achieving its original purpose. The separation or diversion of white goods, household hazardous materials, and other materials from the RDF can be accomplished by other means. The waste stream today significantly differs from the late 1990's when the facility opened. From 2002 / 03 to 2007 / 08 there was a decrease in organics, recyclables, and paper in both residential and ICI waste streams.

In considering the demonstrated methodology used, Test B did not apply as the infrastructure and operations in HRM are sufficiently different from other places, as to not be comparable.

Test C – Options Analysis and Recommendations

Stantec presents four (4) options for the Otter Lake FEP and WSF facilities that might be considered from this day forward. They are:

Option 1 – Maintain Current operations
Option 2 – Improve recovery of recyclables in the FEP
Option 3 – Close and decommission the FEP and WSF.
Option 4 – Repurpose the FEP and WSF to process source separated organics

Each option is described and rationalized with text with subsequent recommendations. Option 3 is recommended by Stantec as the FEP and WSF are reported as requiring $8.9 million in annual operating costs. Those preparing the report had access to relevant financial, budget, and annual cost information, from HRM.

After reviewing the report, we reviewed some cost information with HRM, took into account additional factors (e.g. annual capital repair and replacement; additional labour and material compaction, achieving the separation of white goods and additional household hazardous materials by other means) and calculated a similarly significant financial saving for the HRM system of between $9 – 10 million on an annual basis.

The cost per tonne with the reduction is not provided in the report; nor is the cost per person as requested in RFP. Test C was partially met.

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11.1.6. VALIDITY OF RECOMMENDATION DERIVATION FOR STANTEC REPORT SECTION 3

Test A – System Performance

The document discusses the original strategy, identifies current costs, provides information on recent tonnage at the FEP and WSF facilities and references a number of staff that work at the site. The argument for decommissioning appears to be based on the annual operating costs.

There is some discussion on the benefits, including white goods, some recyclables that are currently recovered, and also a discussion on the potential for collecting these product streams at the source. Costs for 2011 are indicated, and Stantec had access to HRM historical costs since 1995 and original estimates to run these facilities. There is some reference to current contracts for managing the FEP and WSF facilities. We later reviewed one of these contracts.

The report is compelling in its assertion that the FEP and WSF is not functioning and is not providing enough benefits to justify the ongoing costs. We subsequently reviewed additional information and accounted for that in our financial calculations. We found that our support for the recommendation increased.

In considering the validity of the recommendation, Test A was met partially.

Test B – Bench Mark Analysis and Best Practice

The report describes only the intent to compare the operations to other sites. The report states that they were unable to find similar comparable sites in North America. As such there is no comparison analysis or discussion with outcomes provided. The report also states that the FEP and WSF are unusual when compared to other jurisdictions. Report states that the HRM method of pre-processing wastes is simply not done elsewhere.

In considering the demonstrated methodology used, Test B did not apply as the infrastructure and operations in HRM are sufficiently different from other places, as to not be comparable.

Test C – Options Analysis and Recommendations

The report considers four (4) options for consideration by HRM. However it does not detail the components or detailed changes within Options 2- 4. The report provides a strong rationale as to why or why not a particular option is worth considering as a recommendation. A cost benefit analysis on each option is not provided.

A cost benefit analysis was not presented on the relative benefits of placing and compacting shredded WSF waste in the RDF versus a direct end-dump into the cell followed by compaction.

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We sought additional information and tabulated some of the results in this document. We find that plausible changes in the mechanical compaction equipment and operations at Otter Lake are reasonably expected to more than offset a difference in material density if all materials arriving at the RDF were unshredded.

With respect to closing the FEP and WSF, this is a recommendation that we support; and whose concepts and details, with the indicated additional information, merit serious consideration by the final decision makers.

After reviewing the Stantec report, we sought additional performance, financial, and technical information in forming our opinion about the option being recommended by Stantec. This is discussed in another section of this document on our opinion on the A1 option itself, not this section on how that A1 option on the closing the FEP / WSF was derived or validated by Stantec.

Stantec's mandate may have been to bring some potentially useful ideas to the table, and not necessarily to present the detailed arguments and background information, for supporting multi-million dollar municipal budget decisions.

In our opinion, Test C was not met.

11.1.7. Completeness of HRM RFP Section 5.1.1 in Stantec Report Section 3

The RFP identified that highly sought deliverables/objectives related to the FEP and WSF Assessment shall include:

1. A performance assessment in comparison to other municipal systems
2. Complete a system Assessment to validate the operating model outcomes in terms of original strategy objectives
3. Make recommendations in recognition of changes to waste stream which have occurred in the last 15 years
4. Provide a comprehensive examination of the strategy components related to waste processing, practices, costs and bench mark industry analysis with recommendations and options to achieve efficiencies and diversion objectives.

In consideration of the objectives as identified in the RFP the January 2013 report did not provide a stated methodology for evaluating performance of these facilities.

A system assessment was conducted through the use of site inspections, operating information related to historical tonnage data, historical annual costs, environmental benefits (negative or

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positive) at the RDF, and staffing requirements. A building condition assessment was not provided. The operational assessment was based on the HRM Operations Plan for the facility.

Recommendations are provided for decommissioning of the FEP and WSF facilities. Some economic considerations are demonstrated. Some associated environmental, social, and operational considerations have been taken into account, but generally as qualitative support.

A systemic benchmark detailed analysis was not provided. The report addressed the RFP requirement to identify objectives by relating the potential to divert savings from the closed front end facilities towards more public education, in an effort to further reduce waste volumes which are received by the Otter Lake facilities.

While the report has not completely provided all that was asked for in the HRM RFP, we sought additional information, and support the recommended closure of the FEP and WSF facilities, in the context of some of their activities (e.g. white goods program) being accomplished by other means, infrastructure, operations, and investments.

11.1.8. ADDITIONAL COMMENTS

Our mainly positive additional comments about the current FEP, WSF, and RDF operations are:

- We toured the Otter Lake facility on January 10, 2013 and met with Barry Nickerson of HRM and Steve Copp from Mirror. We observed the FEP and WSF facilities as well as the remaining components of the Otter Lake Facility. We found that the FEP was well managed and that some segregation of recoverables had happened, including the observed bales of cardboard and newsprint, and metal objects.
- The FEP facility was producing mainly dry product in various sizes for further processing at either the WSF facility or direct placement into the current open landfill cell. Approximately 30% of received product goes through the WSF.
- The current active cell receives and places waste material from the FEP and from the WSF, and mechanically compacts this mix of materials.
- There were no odours at the open cell nor at the FEP. There was high humidity at the WSF with a slight odour.
- The bark biofilter for gases from the WSF was functioning and was understood to require product replacement every few years.
- The closed portion of the RDF was vegetated and fitted with over 150 methane gas wells that are collecting and thereby directing methane to a flare stack at the lower elevation of the RDF for burning and managing the off gas being produced.
- The landfill produces between 60 - 90 Million Litres of leachate per year.
- Current capped cells may drop 20% in height over a seven year period.
- A clear methodology for the evaluation and assessment of the FEP and WSF facilities has not been presented, but we sought additional information and were satisfied.

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- Historical data on annual costs, volumes received since 1999, staffing levels, recoverable materials received and actual cell construction costs over the last 15 years are available.
- A bench mark analysis did not provide a good comparison, however there may not be a comparable facility in Canada for reference.
- Options were not detailed enough to show what might remain or be reused for alternate applications if the FEP and WSF were re-purposed or decommissioned or what would be the economic, social and environmental gains of such options. A compost operation is discussed however an analysis of each option might better support the recommendations.

It has been presented by Stantec that the cost of running these two facilities is in the range of $9 million per year (2011) and that little recoverable product is generated. Some items raised in this review and requested in the RFP have not been presented. We then sought additional information and calculated a net financial benefit of closing the FEP/WSF that accounts for the resulting downstream costs, while still achieving the HRM environmental performance goals.

This additional information and evaluation increased our level of support for the A1 option (FEP/WSF closure) recommended in the report. This is discussed in another section of this document on our opinion on the A1 option itself, not this section on how that A1 option on the closing the FEP / WSF was derived or validated by Stantec.

11.2. LANDFILL DESIGN

What Was Sought and What Was Delivered

HRM identified four (4) key objectives with respect to the landfill design. The objectives listed in section 5.1.2 of the RFP are summarized below:

1. Conduct industry benchmarking assessment of regulated landfill cell liner design and specifications of no less than ten separate and distinct jurisdictions. Conduct a comparative analysis of the liner specifications considering cost, unit cost, permeability, and environmental protection level.
2. Develop a recommended specification schematic to meet legislative requirements and environmental protection requirements in light of the variation in the waste stream's composition between 1999 (diversion guidelines implemented) and current day (63% diversion achieved in HRM). Develop a second schematic considering that other landfills throughout the province do not necessarily achieve the same degree of waste diversion.
3. Develop a cost estimate comparison for the development of a 500,000 tonne landfill cell in Nova Scotia considering the current specifications and the proposed specifications.
4. Develop an independent report and presentation on the benchmark assessment findings and new recommended cell liner design and specifications for distribution to the NS Landfill Operators Working Group and NS Environment Solid Waste Division.

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The Stantec report addresses the landfill design and capacity issues in Section 4 Landfill Design. The following conclusions related to landfill design were identified by Stantec in Section 12.1.

> "3) The landfill liner design specification in Nova Scotia is more stringent than most comparable state and provincial jurisdictions, and potential modifications could significantly reduce future capital costs.
>
> 4) An opportunity exists to significantly extend the life of the landfill at Otter Lake, and reduce the site per tonne capital costs by increasing the finished grade by 10-15 metres."

The following landfill recommendations were issued by Stantec in Section 12.2 of their report.

> *"A2 – Request Modification of the Nova Scotia Landfill Liner Specification*
> The current landfill liner specification is more stringent than most comparable state and provincial jurisdictions. Given the context in HRM and Nova Scotia in the 1990s, this conservative specification was considered prudent at the time. However, the current specification results in relatively high capital construction costs which in turn lead to increased expenses for the ICI sector and HRM. Based on examples from other jurisdictions, HRM capital costs for liner construction could be reduced by approximately $3.4 million for a typical cell ($10.2 million over the remaining life of the site) if Nova Scotia were to adopt a specification consistent with most similar jurisdictions.
>
> *A3 – Extend Life of Otter Lake Landfill through Vertical Expansion*
> The current design for the finished elevation of the landfill will result in a landform that will be consistent with surrounding topography. While this approach has merit, an extension of approximately 17-23 years to the life of the landfill can be achieved by a 10-15 metre increase in the finished grade of the site. Given the potential benefit to the broader community and the remote locale of the site, Stantec recommends that HRM consider a vertical expansion of the landfill subject to input from the immediate neighbours of the landfill."

11.2.1. LANDFILL LINER ASSESSMENT

11.2.1.1. Methodology for Recommendation Derivation in Stantec Report Section 4.2

Test A – System Performance

The report reviewed the original liner design detail, which was based on the Nova Scotia Municipal Solid Waste Guidelines. In order to verify system performance, Stantec consulted the site operator and the monitoring results for the samples collected from the leak detection

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collection system. The operator indicated that leak detection sumps are pumped out on a regular basis. The water in the leak detection sumps may not be from the leak detection system itself, but from condensate and surface water intrusion. While the analytical results reportedly tend to support this interpretation, Stantec could not conclude this without further investigation. Stantec suggested that HRM review the design and operation of the collection sumps to isolate these sumps from surface water and other sources. If the leak detection system is not contributing to the water in the sumps, Stantec suggested that the leak detection layer requirement could be removed from the Nova Scotia Environment (NSE) guidelines pending NSE's review. It is important that the components of the leachate detection layer are defined in the report. Normally the leachate detection system includes the collection piping bedded in a pervious media and the underlying confinement layer, in this case HDPE. It is unclear if the Stantec recommendation (and cost savings estimate) includes the secondary HDPE confining liner below the leachate collection piping. We have assumed it does.

Analytical results were not presented in the report to test an assumption that the water in the leak detection layer is not contributing to the water that accumulates in the sumps. The guidelines or criteria against which these sample results were compared were not identified in the report. Evaluating the monitoring information would help in testing this assumption.

In suggesting that the secondary geomembrane liner be removed, it would be helpful to discuss the reason secondary containment was adopted as the Provincial default standard, and why the type of liner specified accounts for provincial variations in the local hydrogeology and environmental requirements. The report did not provide a risk based assessment of potential receptors to support the removal of the leak detection layer and secondary geomembrane. We understand from HRM that no liner leaks have been detected since the Otter Lake operations began in the late 1990's. No additional information was referenced to complete the condition assessment of the landfill containment liner system.

The report also reviewed the reason for the cushion layer located above the leachate collection layer. This layer is typically provided to protect the leachate collection system against potential damage that could be caused by the placement and compaction of the initial lifts of waste. The report suggested that this layer could be substituted by careful placement of a 5 m layer of loosely compacted waste.

Design calculations and cost comparisons are not included in the report to support this recommendation. What would be the net financial benefit to the HRM system of not having a cushion layer, while taking additional measures to reasonably protect the liner? What would be the net financial benefit to the HRM system of having a potentially higher cell elevation? These could be calculated, and would be useful for HRM decision makers.

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The Nova Scotia Solid Waste Guidelines standard liner system design provides multiple contingency measures. The liner has been developed to contain municipal solid waste. Although residential green bin food waste organics does not enter the RDF, similar organic material does, that is mixed in with the industrial, commercial, institutional (ICI) waste streams. The residential black bag material may not be 100% free of green bin type organic materials, but the trend is satisfactory.

The guidelines anticipate that alternative site specific liner designs could be presented and technically justified; and be approved if the result is appropriate environmental protection.

The cost savings estimated for the removal of the cushion layer and the leak detection layer cannot be validated from the report itself, since the unit costs and estimated quantities were not provided. A risk assessment cost was not provided, and the results of one are not yet known with any certainty. We sought additional information from HRM, and found that changes from the current design (e.g. the "cushion" gravel layer over the liner, and leak detection system) could influence the construction budget of the next new cell, by 10% or more.

Additional information that provided some expected results, would meet Test A.

Test B – Industry Bench Mark Analysis and Best Practices

Stantec conducted the industry bench mark analysis by reviewing landfill containment liner specification data from several jurisdictions, i.e. ten provinces and states and the USEPA. The jurisdictions in question are presented in the referenced Drawing 01, which indicates that most of these jurisdictions specify a minimum single composite liner (e.g. a geo-membrane overlying a layer of low-permeability clay).

The methodology followed in the bench marking analysis considers liner composition only and does not include a review of liner performance (monitoring data), costs, site-specific receptors, or the waste composition. Compared to some other jurisdictions, the diversion rate in HRM results in a significantly different waste stream for the liner to contain. Due to the diversion rate, the 2013 waste arriving at the FEP / WSF / RDF has a significantly reduced volatilization and leachate potential compared to the waste arriving when the facility was designed and opened in the 1990's.

While more information on more variables should be accounted for in the more detailed HRM decision making to come, we find that this Section meets the intent of Test B.

Test C – Options Analysis and Recommendations

The review of the landfill containment liner generated two (2) options that would require NSE acceptance: 1) removal of the cushion layer and 2) removal of the leak detection layer and secondary liner.

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Stantec provides a figure that presents default liner specifications for a group of North American jurisdictions. Compared to these, constructing the default Nova Scotia specification is relatively expensive. Different jurisdictions have different site conditions to account for, and possibly different waste stream assumptions and environmental performance goals, and these can result in different default designs for their different circumstances. A review of the rationale for the Nova Scotia default design would be useful.

Stantec has stated that the cushion layer is not required in some jurisdictions. There is no indication as to whether the landfills in those jurisdictions have been assessed for damage to the leachate collection system. The alternate placement methodology suggested is not supported in the report by case studies or prior experience. The option recommended does not appear to reconcile the value of volume gained in the cell by the removal of the cushion, against the cost or lost revenue opportunity if five (5) meters of more loosely compacted mixed waste will be in the landfill cell volume. This can be calculated and presented in the future. We do not yet see a strong case for implementing this cushion layer option.

The methodology used to compare the liner cross-sections for the removal of the leak detection appears to be solely based on a desktop review of specifications in other jurisdictions, not their performance, or the potential impact liner failure may have on site-specific receptors. Stantec also stated that aside from ensuring that the leachate collection liner is working effectively, the "leak detection layer does not enhance the environmental performance of the site". This may be the case as long as the primary containment liner is intact, however the leak detection layer forms part of the secondary containment should the first layer be compromised. This would have a direct impact of the environmental performance of the site. Ultimately the selection of a suitable liner system will depend upon Regulatory requirements, the material being contained and the risks associated with these materials entering the environment.

The relatively common use of double liners for hazardous waste sites, is not in itself a justification for their use at a typical municipal waste landfill, and is not a strong argument to be used in support of the recommendation to remove this requirement from the NSE guidelines.

The methodology used to evaluate the removal or ongoing use of the two liner components, does not discuss the relevance of site-specific conditions, historic performance of single liner systems in other jurisdictions, industry and regulatory trends, service life assessment, a review of scholarly articles, or a regulatory opinion. The volatilization and leaching potential of the wastes - and where this has changed due to diversion rates – could also be a relevant factor or consideration in the liner design for a landfill.

Additional supporting analysis would be required to fully satisfy Test C.

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An alternative to changing the default specification in the guidelines is to propose a site specific design, which provides acceptable environmental protection and meets the applicable environmental goals. This option exists in the guidelines. The provincial guidelines would not have to be changed to implement this alternative option.

11.2.1.2. Validity of Recommendation Derivation in Stantec Report Section 4.2

Test A – System Performance

In our view the report lacks sufficient information to conclude that the system is performing in accordance with the original intent. The lack of referenced leak detection analytical data is an example of where this could be easily corrected. The lack of data makes it unclear which parameters were analyzed and which guidelines were used as a basis for comparison. If the source of water in the leak detection layer is unknown, it is difficult to confirm whether the primary liner is working adequately. A technical service assessment of the liner would also have provided suitable comfort in the performance assessment. The report does not confirm whether the liner is functioning as expected. Available supporting information would result in Test A being achieved.

Test B – Industry Bench Mark Analysis and Best Practices

The bench marking analysis compares the minimum required liner compositions for ten (10) jurisdictions but does not consider any other parameters in the analysis. The effect of potential contaminant migration, should the primary liner fail, was not addressed in the report, which makes it difficult to fully understand whether these recommended changes would adversely affect the surrounding environment. As mentioned above, a review of the performance of liner systems without secondary leak detection layers would be appropriate. Anticipating the usefulness of the expected results if additional information was provided, the intent of Test B is met.

Test C – Options Analysis and Recommendations

As previously mentioned, the recommendations were based on liner specifications used in other jurisdictions. On an economic basis, the removal of the leak detection layer is a compelling argument; however, the analysis should also include a risk based assessment that incorporates information on the historic performance of liner systems (that do not have leak detection), site specific physical conditions, and the sensitivity of adjacent receptors should a failure occur.

The recommendation to remove the cushion layer increases the risk of liner damage, and would require specific placement protocols and quality control measures to be applied. Some Ontario jurisdictions would have useful examples. In order to remove the cushion layer but protect the leachate collection system against damage, Stantec recommends loosely compacting the first five (5) metres of waste. Additional analysis is required to determine the difference in the

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tonnage (and system costs) between the existing cushion layer and highly compacted material scenario, versus no cushion layer and a less dense, but somewhat compacted material?

A qualitative estimate of savings incurred by these proposed changes was included in the Stantec report. The cost estimate could not be validated since no engineering details or unit prices were included. Test C was not met.

11.2.1.3. Completeness of HRM RFP Deliverables in Stantec Report Section 4.2

SNC-Lavalin reviewed the report with consideration made of the deliverables identified in HRM's RFP. The specific deliverables presented in section 5.1.2.7 of the RFP, were generally to:

1. conduct industry benchmarking analysis of standard environmental protection landfill cell liner design and specification from other jurisdictions in comparison to NS;
2. conduct expected content analysis comparison between NS/HRM MSW current waste stream to the same jurisdictions where cell liner specifications were reviewed;
3. complete cost benefit analysis per tonne of cell cost for the jurisdictions reviewed in comparison to NS/HRM;
4. develop cost comparison assessment for the development of a 500,000 tonne landfill cell in HRM using both current and recommended cell liner specifications and draft a preliminary assessment report outlining findings and providing a recommended new specification with cost and assessed environmental protection variance; and,
5. draft a separate final report for submission to NSE.

Based on our review of the Stantec report, it appears that the first deliverable was partially complete. Although industry benchmarking of the landfill liner was completed with respect to overall composition, the jurisdictions were not compared in terms of performance cost, permeability and comparable environmental protection levels.

Finally, it appears that the final four deliverables were not included in the report. With respect to the second deliverable, a review of leachate strength from 1999 to present day would have been useful in assessing the environmental impact of the current waste composition in light of recommended liner modifications. We understand from HRM that items 4 and 5 are being provided separately by Stantec.

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11.2.2. LANDFILL CAPACITY ASSESSMENT

11.2.2.1. Methodology in Recommendation Derivation for Stantec Report Section 4.3

Test A – System Performance

The report indicates that the current maximum elevation of the RDF is 113 m above mean sea level and that this elevation was selected during site development to create a landform that blends with the local environment. It is not stated, but it would be assumed that the current landfill is meeting the originally stated objectives for maximum elevation. The report indicates that this design criterion is rare in modern landfill design but does not state whether this is perceived to be a flaw in the original strategy. The report does not provide the reader with background information on how and why this maximum elevation criterion was implemented for this site and relevance these criteria would have on any recommended modification. It is our understanding that this criteria was developed in consultation with community stakeholders. No methodology was given for evaluating the performance of the landfill height and how it compares. Test A is not relevant in this case.

Test B – Bench Mark Analysis and Best Practice

No methodology was declared for comparing what other jurisdictions are doing with respect to landfill height. The report mentions that this design criteria is rare in modern landfills but does not state what other jurisdictions were consulted and what the actual maximum heights are at other landfills. Do we know how satisfied the local residents are with the view planes at these other landfills of greater height? The report states that the setback and visual buffering is rare in other jurisdictions but does not expand on this to state what jurisdictions were consulted and what the typical setback distances are and what, if any, visual buffering achieved. The report states that other jurisdictions typically have landfill heights 20 m to 30 m above the surrounding topography. Our February 2013 balloon study investigated the visual implications of a 15 metre increase in the finished cell height elevation. The HRM landfill design and construction costs are influenced by the cell height elevation decision making by HRM council. Test B is met.

Test C – Options Analysis and Recommendations

The report provides an incremental capacity increase with each 5 meter increase in elevation as well as a capital cost per tonne with each 5 meter increment in elevation.

The referenced Dillon Consulting reports provide a solid supporting reference and methodology.

Proceeding with a new cell height elevation will involve preparing an updated cell development plan based upon general constraints including maximum side slopes, lift height, progressive cell closure, road access, and final cover requirements. The cell development plan would reference and confirm the maximum height available based on site constraints. Incremental heights are

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then applied to the model to establish development cost estimates. Other operation factors would also contribute to the cell development model, such as time required for the consolidation of previous cells, gas management, and expansion of the leachate collection system. This would also allow the designers to maximize the use of air space and minimize development costs. An updated or new cell development plan is not a requirement in making a cell height elevation change decision, but is a result in making that decision. Test C is met.

11.2.2.2. Validity for Recommendation Derivation in Stantec Report Section 4.3

Test A – System Performance

The report concludes there are "no engineering impediments to increasing the elevation of the landfill" and in our view, this is accurate. The report also suggests correctly that an increase in height may be considered a negative visual impact in the community. Regarding the validity of landfill height in the original strategy, the report is neutral in this regard, neither convincing the reader that the maximum elevation is a flaw in the strategy nor that in other jurisdictions the higher elevation is acceptable to the community. The report correctly acknowledges that an opinion on the potential visual impacts will be required.

We conducted a February 2013 Balloon Study for an increased cell height elevation of 15 metres. We raised the balloons and then from several residential locations, we tried to observe the balloons. The balloons were not visible, in late February, with snow on the ground, and no leaves on the trees, except for one location - the anticipated commercial area of the proposed Brunello Estates development – where one could already see the landfill cells. Test A is met.

Test B – Bench Mark Analysis and Best Practice

The report indicates that the Otter Lake landfill design height and profile is rare and/or unusual. The current cell height decision was made by HRM as the owner, and not by a regulatory requirement. The 1997 Operations Plan by HRM for the Otter Lake facility reflects the decision made by HRM. There is a buffer distance required by the province with respect to potable water supply wells. The report did not present comparisons with other jurisdictions. Test B is not met.

Test C – Options Analysis and Recommendations

The report describes the process to modify the vertical height and has two letter reports that were generated by Dillon Consulting to show what the additional height would achieve in terms of additional landfill life. The reports also looked at the sight lines of the facility. The conclusion to raise the landfill height (in the absence of all other factors including social costs) makes sense from an engineering standpoint and is a compelling argument for cost savings on a strict per tonne basis and in extending the life of the landfill. They have recommended their A3 option. Test C is met.

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After reviewing the Stantec report, we sought additional performance, financial, and technical information in forming our opinion about the option being recommended by Stantec. This is discussed in another section of this document on our opinion on the A3 option itself, not this section on how that A3 option for raising the landfill height was derived or validated by Stantec. In our balloon study, we placed balloons on the cell at the higher elevation being discussed. We then went to several residential vantage points in the area, and the balloons were only observed in one of these locations – one where the landfill cells could already be seen. These vantage points and distances are presented in a map figure attached to this document.

11.3. OPPORTUNITY TO CREATE A REGIONAL WASTE RESOURCE CAMPUS

In the subsequent Sections of this report, the Peer Review Tests A, B, and C discussed previously were not applied. We comment on many of the Stantec report sub-Sections.

What Was Sought and What Was Delivered

There is no corresponding HRM RFP Section on a Campus concept that corresponds with the Stantec Report Section 5 Opportunity to Create a Regional Waste Resource Campus.

The Stantec report evaluates the opportunity to create a regional waste resource campus in Section 5.3. The following conclusion related to centralized waste management - a campus concept - was identified in Section 12.1.

12) HRM would benefit from the creation of a centralized waste resource campus, rather than having facilities at four different locations in Halifax and Dartmouth. Development can be staged over time to match the end-of-useful-life of current infrastructure and incorporate new elements for HRM such as outdoor windrow compost curing pads; permanent educational and household hazardous waste facilities; and the development of a materials transfer capability.

The following campus recommendation was made in by Stantec in Section 12.2 of their report.

"B1 – Create a Centralized Waste Resource Campus

Current infrastructure is located at four different properties in Dartmouth and Halifax. With the exception of the Otter Lake facility, sites are of limited size and prevent the consideration of co-collection of materials at the curb in a single truck. Stantec recommends HRM establish a large acreage waste resource campus (Campus) in a location of sufficient size to meet changing infrastructure needs (excluding landfill disposal) for on the order of 50 years. The benefits would include the potential to optimize collection routing and fleet size, lands for compost curing, a common location for infrastructure replacements when needed, and a location for contingency waste transfer. Possible components and timing are presented below.

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- Secure lands, obtain approvals and complete site servicing 2013 / 2014
- Construct and operate compost curing pads 2014 / 2015
- Construct scales, offices and educational centre 2015
- Construct multi-use transfer facility for white goods/waste/HHW 2015
- Construct anaerobic composter for ICI organics 2015 / 2016
- Construct replacement MRF 2017 / 2018
- Optional aerobic composting processing capacity 2018+
- Optional advanced waste reduction(gasification or other) 2020+
- Other long-term waste reduction infrastructure needs 2020+

11.3.1. PEER REVIEW OF REGIONAL WASTE RESOURCE CAMPUS EVALUATION

11.3.1.1. Comment on Stantec Report 5.1 CHALLENGES OF CURRENT DECENTRALIZED MODEL

"The current decentralized model is challenging..." In the 1990's, the decentralized locations of the infrastructure was intended to increase public support for the system from all four (4) member communities that composed HRM. In 2013, this political sentiment may have diminished.

"A possible future need for HRM is outdoor windrow composting pads..." HRM is required by 2014 to have a plan for compost to meet CCME guidelines that can be implemented in 2015.

11.3.1.2. Comment on Stantec Report 5.2 FLEXIBILITY OFFERED BY WASTE TRANSFER FACILITY

"Suspension of service at Otter Lake has occurred only once in 15 years and is unlikely to become a regular occurrence." This is a logical enough statement. However, the HRM RFP sought comment on what might happen with a "catastrophic failure" of the Otter Lake landfill.

"An order of magnitude capital cost estimate to establish a standalone transfer capability is $5 million..." This estimate should be substantiated. However, the reliance on the West Hants facility and system seems reasonable. That reliance is more broadly based, since HRM has had emergency agreements in place for years now with the West Hants, the Chester, and the Queens landfills.

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11.3.1.3. Comment on Stantec Report 5.3 OPPORTUNITY TO CO LOCATE INFRASTRUCTURE OVER THE LONG TERM

The report notes that "...a decision regarding maintaining the current decentralized model or transitioning to a campus concept is a critical first step..." This is logical but it requires HRM Council confirmation of an evolution in the system model, and initiating planning activities at an early enough stage, to allow the development of related recommendations.

11.3.1.4. Comment on Stantec Report 5.4 20 YEAR CONCEPT PLAN FOR REGIONAL WASTE RESOURCE CAMPUS

"Possible components for a new green field campus and timing are presented below..." This list does not include site selection, community consultation, environmental permitting, approvals, and other related activities. These activities are critical to the timing of the implementation for such a facility.

11.3.1.5. Comment on Stantec Report 5.4.2 Siting Considerations

The report reviewed noted that "...especially if the recommendation to close the FEP and WSF is adopted..." The Stantec report does not present an analysis that provides a full technical support for their recommended option. After considering additional performance, financial and technical information as noted in our document, we support the FEP / WSF closure option, and its consideration by HRM Council decision makers.

The report reviewed noted that "...a transportation study has been completed..." A study reference in the report would be useful. HRM staff had provided this to Stantec, and later provided us with an opportunity to read the indicated transportation study.

The report reviewed noted that "...while 40 hectares is considered as a minimum...." Ideally a concept sketch would have been provided, or at least an estimate of land required for each component.

11.3.1.6. Comment on Stantec Report 5.5 DEVELOPMENT COSTS

The costs in this section require justification, perhaps with supporting concept sketch and some preliminary engineering cost estimates. Presumably they are at a conceptual level.

The Stantec report offers a generalized breakdown of costs to implement a Centralized Waste Resource Campus on a green field site. Perhaps the order of magnitude is +/- 50%. To validate the cost breakdown it would be necessary to see a concept plan to scale outlining the following:

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- Extent of area to be developed and limits of grading
- Location of buildings, footprint, and vehicle assembly areas
- Location and extent of roads and typical cross Sections
- Location of outside composting areas
- Location and extent on other storage areas, white goods, ICI, construction materials etc.
- General site topography and drainage patterns

Given that the report identifies that a site would require as a minimum a 40 hectare parcel with a campus layout we have initially looked at disturbing approximately half to achieve acceptable grades.

In consideration of item 1 on page 5.5 Site Preparation and Earthworks we have considered the 20 hectares with a minimum of 300 mm of overburden having to be removed to accommodate parking areas and building footprints at grade. This would equate to approximately 60,000 cubic metres of material to be excavated and relocated. Using a unit price of approximately $\$25/m^3$ to move soil, this would result in an item worth approximately $1.5 million. If the unit price was half this value, i.e. $\$12.50/m^3$, then the item would cost approximately $750,000. These values are much higher than stated in the Stantec report. They are based on our considered assumptions. As such a common known quantity for this item, and the other items identified would assist in validation of the costs presented.

Alternatively, we were involved in the design and contract administration for a 18,000 sq. ft recycling facility and office complex with three bay garage in Nova Scotia which was constructed for $1.6 million in 2006. On this basis it would be expected that the office/education facility might be somewhat high, once again depending on footprint, building type, and interior requirements and use.

Given that little information is presented on the Centralized Campus layout and location, a cost verification exercise cannot be conducted at this time. If half of the 40 hectare site is to be disturbed, than the cost estimate provided by Stantec is considered to be low. Based on this rationale, it can be suggested that the cost estimates offered in the report for a campus setting should be used for initial discussion purposes only, and not considered for budgeting purposes.

11.3.1.7. Comment on Stantec Report 5.6 REGIONAL WASTE RESOURCE CAMPUS AS CORNERSTONE FOR 20 YEAR STRATEGY

The report notes that "....The decentralized location of infrastructure in Dartmouth and Halifax, combined with the complications of bridge crossings, makes the evaluation of all possible scenarios onerous." This statement could be more positive, in suggesting the evaluation of various scenarios, selected based on alternative site locations. An analysis of transportation aspects should be recommended based on alternative sites.

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The report noted that "...The benefits of a campus concept cannot be fully quantified financially at this time." While true, some reference to collection costs, and benchmarking of those costs, might help this discussion.

11.4. MATERIALS RECYCLING FACILITY (MRF)

What was Sought and What was Delivered

HRM RFP Section 5.1.4 Materials Recycling Facility (MRF) Capacity, Technology and Location, included a group of deliverables being sought. Stantec Report Section 6 Materials Recycling Facility, was the response delivered.

An excerpt from Stantec Report Section 12 Recommendations:

B2 – Relocation of MRF to Campus

The existing MRF in Halifax is operating satisfactorily and equipment is suitable for current needs and until the expiry of a contract extension to 2019. As identified above, it is recommended that this activity be relocated to the Campus in anticipation of a 2019 contract start date.

11.4.1.1. Comment on Stantec Report 6.1 EXISTING MRF OPERATIONS

The report concludes that "The MRF is operating in a manner envisaged by the 1995 Strategy." We agree with this technical assessment.

"Material from the ICI sector is also received and processed at the MRF." This was anticipated in the 1995 CSC Strategy. If the opportunity existed, the ICI sector is considered to have the ability to develop a private sector based materials recycling capacity.

11.4.1.2. Comment on Stantec Report 6.2 OPERTIONAL LIMITATIONS

The report notes that the MRF will be beyond its current one-shift processing capacity as a result of population growth and more diversion of recyclables from the ICI sector.

"While operating hours can be extended to accommodate additional tonnage to the MRF, there is insufficient storage capacity to accommodate the same and the site is not suitable for expansion of the MRF to any significant extent." This is a critical statement which leads to future recommendations for possible relocation. We suggest a sketch showing the MRF on its site, and some reference to adjacent property limitations or restrictions. The wholesale rejection of additional working hours is incomplete. It might be possible to add weekend shifts and

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operation, for example, to increase capacity incrementally. We find the conclusion is insufficiently founded.

11.4.1.3. Comment on Stantec Report 6.3 COMPARISON OF OPERATIONS TO 1995 WASTE RESOURCE STRATEGY

The report notes that "HRM has fulfilled these objectives with respect to its MRF operation." We agree.

11.4.1.4. Comment on Stantec Report 6.4 COMPARISON OF CURRENT OPERATIONS TO INDUSTRY BEST PRACTICE

In general this is a very thorough and complete review. However, some areas where additional comments or recommendations could be made are noted below.

"HRM's processing fee is in line with the industry but in the case of revenue only 75% comes back to HRM." Is a different revenue sharing model suggested here? If so, what should it be?

"The residue rate of 9.26% is high for a two-stream program." This may be within a <10% performance standard, with a 5% target. The report could have suggested a target, supported by examples.

"The rebate that HRM provides the contractor for residue disposal is not a common feature for similar programs..." What is being suggested, that this rebate be eliminated?

11.4.1.5. Comment on Stantec Report 6.5 TWO STREAM VERSUS SINGLE STREAM PROCESSING

The report notes that "Single stream recycling can also attract greater participation in multi residential and commercial sectors where there may be storage and space limitations for sorting containers, especially in the context of mandatory organics separation." It would be helpful to have some comparative comments, or some estimates of effects, which could use this finding as a basis for recommending single stream in HRM.

"Single stream processing is a viable option for HRM..." "HRM's current capture rate for recyclable materials is in the order of 63% which when compared to other municipal jurisdictions is low." The other jurisdictions referrenced, all from Ontario, are presented in a Section 6.4 table. The report does not suggest an achievable target for HRM.

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11.4.1.6. Comment on Stantec Report 6.6 REGIONALIZATION

The report notes that "There is a particular benefit in regionalized single stream processing operations..." This is a good finding and can be used to support a recommendation for single stream processing.

The operating cost curve on page 6.10 is useful but needs explanations of the parameters as well as some sources of information.

"HRM could adopt a similar approach in this regard however discussions with other municipalities should ensue...." This is a good recommendation.

11.4.1.7. Comment on Stantec Report 6.7 OPPORTINITIES FOR OPERATIONAL IMPROVEMENTS

Short Term Addition of Boxboard

This recommendation is reasonable, and the savings has been documented ($117,000 per year). We agree with the recommendation.

Construction and Operation of a New MRF – New Location in Mid to Long Term

This recommendation is not sufficiently assessed considering the disadvantages listed (of continuing to operate the existing MRF):

- Limited space – this has not yet been documented fully enough
- Potential value of the sale of the property – this is not a reason to abandon a facility that is operating well
- Greater maintenance required... - this is not documented fully enough, and has been stated elsewhere, the MRF is operating well with equipment being upgraded regularly
- Limited opportunities for regionalization – why because of limited capacity? This rationale is not explained
- Limited if any opportunity for co-locating with other waste management operations – this is correct, although the rationale for doing so is not supported in the text
- Site may not accommodate additional traffic – while stated, and inferred to be true, no technical information is provided to support this statement

Flexibility in Operations in the Mid to Long Term

"A new MRF should be appropriately designed to accommodate HRM's long term processing needs but another consideration is that a new MRF should have flexibility in processing operations to adjust to the ever changing recyclable materials make up." This statement is consistent with the original CSC Strategy. From the work provided by the report, there is no indication that the existing MRF did not achieve this goal. In fact, the statement earlier that the

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MRF is achieving what was desired in the strategy is already noted. The final statement in this section, that "single stream recycling can support this need for flexibility", is clear, and is given to support the change to single stream recycling.

In our discussions with HRM staff, it is understood that it would be impractical to change the existing MRF to accommodate a potential change to a single stream system. The equipment would be significantly different, and would require replacement. If the collection stream is changing, then a new MRF would be required.

11.4.1.8. Comment on Stantec Report 6.8 CONCLUSIONS

The report notes that "The MRF is nearing the end of its operational life expectancy, both building and the majority of the equipment in the MRF." This conclusion is not drawn from the earlier text. Nothing has been stated about the building nearing the end of its life, nor the majority of the equipment at the end of its life. As a conclusion, it should have supporting information. It is recommended this part be strengthened as it is fundamental to the recommendation of building a new MRF.

"There is capacity to handle the short term growth for recyclable material processing by expanding the operating hours." Earlier, the report rejects this change. There should be a clear discussion of shift modifications.

11.4.1.9. Comment on Stantec Report 6.9 RECOMMENDATIONS

"Between 2013 and 2016 determine to implement single stream or dual stream processing option..." This recommendation is very important. The benefits stated earlier in this section strongly support single stream processing. The information from other jurisdictions is also supportive. Would other information change this perspective? Based on what was presented in the report, the recommendation could, be more strongly worded.

"In 2016 commence with formal procurement process for new MRF." The need for the new MRF is not strongly enough supported in the findings, as noted earlier. However, if single stream processing is selected by HRM, then a new MRF (it appears) will be essential to that decision.

11.5. ORGANICS WASTE PROCESSING FACILITIES

What was Sought and What was Delivered

HRM RFP Section 5.1.3 Compost Processing, Capacity and Regulatory Compliance, noted the group of deliverables being sought. The Stantec Report Section 7 Organics Waste Processing Facilities, was the response.

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The following is an excerpt from the Stantec Report Section 12 Conclusions (5th, 6th, and 7th):

1. The two composting operations in Halifax and Dartmouth do not provide a sufficiently finished product to meet applicable guidelines which become effective in the near future.
2. Composting facilities are at capacity and additional processing capacity is required in the short and longer term.
3. Alternative composting technologies may improve the processing of ICI organics.

The following is an excerpt from the Stantec Report Section 12 Recommendations:

B3 – Increase Organics Processing Capacity

The aerobic composting facility south of Halifax is not considered a strategic asset and could be decommissioned at the end of the current contract in 2019. Equivalent organics processing capacity for the Halifax collection zone is recommended to be realized at Otter Lake by repurposing the WSF. The Dartmouth organics processing facility can meet Dartmouth area needs until at least 2030 by constructing an anaerobic processing facility by 2015/2016 at either the current site or at an alternative location.

C2 – Control Curing and Sale of Finished Compost

Once organics are processed at facilities in Dartmouth and Halifax, the unfinished product is sold at a nominal fee of $1/tonne at both facilities. HRM has no control over the final maturation process and foregoes the potential for an increase in net revenue generation. The final maturation (also termed "curing") process typically requires a period of up to one year in outdoor open windrows to meet CCME guidelines and become a saleable product. It is recommended that HRM control the final curing process to ensure guidelines are being met with its compost, and also to gain the benefit of enhanced product value at final maturation.

11.5.1.1. Comment on Stantec Report 7.1 EXISTING OPERATIONS

This section is complete. The reference to the strategy is made. These compostable organic materials are not being received by the Otter Lake facility as waste materials. The intended diversion rate target has been achieved. The intended target for the quality of the resulting compost process has not been achieved. No reference is made in the report to the inability of residents to use the currently resulting composted material.

11.5.1.2. Comment on Stantec Report 7.2 OPERATIONAL LIMITATIONS

Lack of Capacity

"The two organics processing facilities...are at full capacity." We agree.

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Compliance with CCME Guidelines

"The HRM compost program is currently non-compliant in terms of consistently meeting newly adopted CCME guidelines for compost maturity prior to transfer to unmonitored open windrow sites for final curing." We agree.

"The results of the tests indicated that the compost leaving the phase one facilities had greater respiration rates than that allowed under the 2005 CCME guidelines." We agree.

"Both facilities can continue to meet the 1996 requirements but neither facility can consistently meet the requirements of the 2005 CCME guidelines." We agree.

11.5.1.3. Comment on Stantec Report 7.3 COMPARISON OF CURRENT OPERATIONS TO 1995 WASTE RESOURCE STRATEGY

The report notes that the charging system adopted for ICI wastes will be designed to encourage separation. The report states that "HRM implemented a differential tipping fee structure for this sector." While not elaborated on in the report, the HRM tipping fee structure financially encourages compostable organic material to not go to the Otter Lake RDF landfill cell. Other actions are also needed that result in a better source separation of organics in what is collected from the ICI sector.

The reviewed report notes that "...both facilities have experienced nuisance issues...." Can this be elaborated on? How often, how serious, reported by whom, and what action(s) were taken?

The reviewed report notes that "overall, the program has fulfilled the intent of the Strategy having implemented all original recommendations and having diverted a significant amount of organics from the landfill from both residential and ICI sectors." We agree that the organic diversion target has been achieved – principally through the residential green bin program - but the resulting compost quality target, and intended usefulness of the material, has not been achieved.

11.5.1.4. Comment on Stantec Report 7.4 COMPARISON OF CURRENT OPERATIONS TO INDUSTRY BENCHMARKS

Organics Waste Program Performance Comparison to other Municipal Jurisdictions

The table "Key Performance Indicators for Various Municipalities" in the Stantec report, notes that the residential organics diversion is indicated as 27.01%. It would be helpful to the reader to have a reference as to how this number was derived. In this same table, the header "organics processing fees" is misleading, as the item indicated is the costs, not the fees.

"HRM's program compares quite favourably to other municipal programs." We agree.

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"During fiscal 2011 / 2012, 51,238 tonnes of SSO were diverted from landfill, of which 16,615 tonnes, or 32%, consisted of waste from the ICI (and some multi-family) sector." This data needs to be clarified in terms of data source.

"In summary, it is evident that no municipality is providing the level of service that HRM provides to the ICI sector." The discussion addresses two Canadian cities, so the conclusion is not fully supported.

We understand from HRM staff that the tipping fee is $75 per tonne for ICI organic materials going to the composting facilities. In the table on page 7.8, the "fee" (at almost $160 / tonne as the organic facility processing cost to HRM) is much higher than the $75/tonne tipping fee paid to HRM when collecting ICI materials. While the tipping fee is less than the current cost to HRM for processing materials at these composting facilities, it helps to divert some ICI organics away from the Otter Lake landfill. ICI mixed waste, which includes compostable organics and a portion that cannot be composted, goes to the more expensive Otter Lake facility for disposal in the RDF landfill. The processing cost per tonne of material to HRM is currently greater for what enters the RDF landfill at Otter Lake, than for what is processed at the composting facilities.

The FEP does not effectively separate most of the compostable organics included in the mixed ICI waste that arrives at the Otter Lake facility. Those relatively high volatile or leachable organic materials that arrive at the FEP, and are separated and processed in the WSF, are not so much stabilized, as they are somewhat dried out. The WSF material that goes to the RDF, and becomes wetted again, or has a rise in their moisture content, also has the potential – again - to release volatile gas. The mass - or number of volatile gas molecules - may be released more slowly, at a smaller concentration, and over a longer period of time, but that potential to release gas still exists.

Where a portion of collected ICI material is sufficiently organic that it can be composted, it is in the interest of both HRM and the ICI sector, to have it composted and to not have it placed in the Otter Lake RDF. Those compostable organics are arriving at the RDF, while being banned and should not be included in what is sent to the RDF. This circumstance strengthens the resolve to improve the ICI and curb side source separation of wastes and materials.

LYW Programs

"In summary, there is really no 'best practice' as it relates to the management of LYW waste as part of a Green bin/Cart program." We agree.

Compost Material Marketing

This section comments on activity elsewhere in Canada but does not draw any conclusions about HRM.

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11.5.1.5. Comment on Stantec Report 7.5 OPPORTUNITIES FOR OPERATIONAL IMPROVEMENTS

General

"HRM has already made substantial capital investment in existing facilities, in some cases quite recently, and where deemed feasible the continued operation of this infrastructure is recommended as part of the long term system..." This is a solid conclusion. However, in another part of the report the closure of the Goodwood compost facility is recommended as it is referred to as "not a strategic asset." Is there a contradiction between these two statements?

Options to Meet both Short and Long Term Capacity Needs

The financial information / arguments presented are not balanced. The basis of cost estimating between options is not the same, and incomplete information is available. The selection of a preferred option is more difficult for the user of the report. Perhaps this was beyond the Stantec scope of work.

Continued Operation of Miller and New Era

"These facilities are operating reasonably well..." Although this sounds positive, where is the supporting information for this conclusion? And there is reference to "fairly significant" capital upgrades that have been made and are being paid for (or capitalized) by HRM, but these upgrades are not listed. One has to make the presumption that the costs for these upgrades have been incorporated in the fees charged by the private facilities, but it would be helpful for this to be clarified.

"HRM has an opportunity to ensure sufficient processing capacity over the planning period with the combined use of a new anaerobic digestion facility and the use/repurposing of existing aerobic composting facilities." This is correct. The conclusions drawn indicate a range of options, which is the best that can be developed at this stage of a study.

Repurpose the WSF

"The existing WSF is no longer an asset to HRM's landfill operation." This statement is not fully enough supported. In the fashion the WSF is being employed now, this may be true, but it does not allow for or suggest a potential alternative use for some of the WSF infrastructure. The WSF was a fundamental aspect in the original landfill siting efforts, as it was intended to stabilize residual waste before being placed in the landfill. The actual experience at the Otter Lake facility is that the WSF has neither fulfilled that earlier vision, nor has a reasonable prospect for doing so in the future. The value of what the WSF is currently accomplishing, does not justify the current multimillion dollar annual WSF budget.

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Compost Curing Pads

The recommendation for compost curing pads is conditional, not direct, as noted below...
"As part of a Regional Waste Resource Campus concept, compost curing pads could be constructed and operated to provide HRM with greater control over the process, finished product and marketing." This statement is more limiting than it needs to be. The bottom line is that curing of compost is needed and whether or not a regional waste resource campus were implemented, this should be considered.

This recommendation is based on several factors, including a revenue estimate, however the authors leave the final recommendation uncertain.

If the existing aerobic composting facilities continue to operate and they do not meet CCME guidelines, some potential responses could include diverting the ICI materials arriving at the current composting facilities, to another dedicated facility. It may be that separated residential materials arriving and being treated at the current facilities would meet the CCME guidelines. This could be considered in the context of relative the capital and operating costs.

The second to last paragraph in this Section, ending with "at 6000 finished tonnes per year this would equate to somewhere in the order of $324,000/year if all material could be sold." The financial basis in this paragraph, as a support for a business case, is incomplete. While not stated in the report, we understand that the "originally envisaged" $7.50/tonne figure was from the 1995 CSC Strategy. A different figure of $54/tonne is derived from local compost sales reports, but we are uncertain if local in this case refers to HRM. This is a significant amount of revenue against which selection of compost curing options needs to be evaluated.

"A curing and storage area would be an ideal addition to HRM's system particularly in the context of a new Waste Resource Campus and if at Otter Lake even more ideal if the WSF is repurposed as discussed above. If the WSF is repurposed for aerobic composting then all composting, curing and storage could occur on one site with no secondary transfer necessary." The WSF is currently used for garbage waste going to the RDF. Perhaps the WSF infrastructure and operations could be used differently in the future to aerobic compost materials that are not going to the RDF. A review of aerobic composting and curing in the HRM system, and some additional information, may result in a plan and justification for implementing this statement.

Anaerobic Digestion (AD) Processing Facility for ICI Sector Organics

Anaerobic digestion processing is addressed here for ICI organics. The intent is to divert ICI organics such that they are no longer being mixed with residential organics for treatment. The more challenging ICI organics would be treated anaerobically, while the easier to treat residential organics would be treated aerobically. This approach may provide a better opportunity to meet the applicable CCME guidelines. Proponent demonstrations could test if

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treated HRM waste materials meet the applicable CCME guideline values before decisions are made.

This subsection has extensive discussion on AD composting, then focuses on one technology, and leads to a cost estimate "in the order of $25,600,000 with $4,400,000 of that dedicated to aerobic composting and curing." The basis of the cost estimate is unclear. The reference is to "low rate composting and curing of digestrate" but this could be clarified with respect to the technologies discussed in the Section.

"At a minimum if HRM intends to pursue this option they should conduct their own due diligence review of the technology intending to be applied through site visits and the determination of suitability..." This is an appropriate recommendation.

"Alternatively HRM could engage in a more formal request for Expression of Interest and then if more suitable a Request for Proposal process for a new anaerobic digestion facility at a new Waste Resource Campus or at another HRM owned site if more appropriate." This is an appropriate recommendation.

11.5.1.6. Comment on Stantec Report 7.6 CHANGES TO FEEDSTOCK TO AEROBIC COMPOSTING FACILITIES

Removal of LYW

The reviewed report notes that "...if the WSF is re purposed it would be ideal to have an adjacent/near composting pad for LYW.." This is a logical suggestion, though not a recommendation. If the WSF is not repurposed, this could still be done at the Otter Lake site.

"The benefit of freeing up capacity at New Era and Miller is the opportunity in the shorter term to make more practical use of these facilities through increased household organic waste capture..." This is a logical statement, though not a recommendation.

Removal of ICI Organics

"Removal of this material....from the existing aerobic composting facilities to anaerobic digesters (discussed above) would leave a lighter and more homogeneous feedstock which would positively contribute to meeting compost maturity requirements per CCME guidelines." This is not presented as a recommendation because the earlier discussion on AD processing was inconclusive. In other words it is a consideration only. It appears there is insufficient information to determine if removal of the ICI organics from the aerobic digesters would allow those existing private operations to consistently meet CCME guidelines, thereby reducing the estimated capital upgrading.

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Removal of Boxboard

"Removal of boxboard from the organics waste stream would therefore likely contribute to the ability of these processing facilities to meet CCME Guidelines...additional benefits of removing boxboard...with respect to potential cost savings and diversion." This is a logical recommendation.

There appears to be no mention of the challenge of removing boxboard from the ICI organics stream. Perhaps this is considered too minimal to be important in this discussion, but there is no mention of the challenges involved.

11.5.1.7. Comment on Stantec Report 7.7 REGIONAL PARTNERSHIPS

The report notes that "It appears that a regional partnership with another municipality is not a feasible option...however partnership operations with these facilities for processing should continue to be an option for excess capacity..." This is a logical recommendation.

11.5.1.8. Comment on Stantec Report 7.8 CONCLUSIONS AND RECOMMENDATIONS

We present our comments on the Stantec Recommendations in Section 4 of this document, and on the Conclusions, in Section 6.

11.6. COLLECTION PROGRAMS AND CONTAINER CONSIDERATIONS

What was Sought and What was Delivered

The HRM RFP Section 5.1.7 Collection System and 5.1.8 Curbside Collection Container Analysis, noted the group of deliverables being sought. The Stantec Report Section 8 Collection Programs and Container Considerations, was the response.

An excerpt from the Stantec Report Section 12 Conclusions:

8) Collection programs are cost effective and meet most customer needs however there are opportunities to improve diversion by increasing the frequency of collection.

An excerpt from the Stantec Report Section 12 Recommendations.

C1 – Improve Recovery of Recyclables and Organics

Based on the results of annual waste composition studies completed recently by SNC-Lavalin and CBCL, 30% of residential and up to 50% of ICI materials currently sent to landfill could be

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recovered as recyclables or compostable organics. This is an opportunity for HRM to optimize existing programs and increase diversion.

C3 – Improve Curbside Collection Frequency

Challenges with recovery of divertible materials at the curb are often linked to the frequency of collection. Whether the entire collection system is weekly or every 2 weeks, this does not change the amount of material to be collected on a monthly basis. Residents are far more likely to divert organics and recyclables if collection is performed on a weekly basis so that odour and storage constraints do not affect participation.

11.6.1. COMMENT ON STANTEC REPORT 8.2 CURBSIDE COLLECTION CONTRACTS, ZONES AND COSTS

11.6.1.1. Comment on Stantec Report 8.2.1 Residential Collection Contracts

The report notes that "All collection services are provided every two weeks except for weekly recyclable collection in the urban and suburban areas, and weekly organic collection in urban and some suburban areas in July and August."

"The current collection contracts commenced on July 1, 2008 and expire June 30, 2013."

The residential material collection system is a real success story in the HRM system. Still, that level is at a plateau, and for the HRM system as a whole to improve, some change is needed. The most positive change would be an improved and more effective source separation of ICI materials when they are collected, such that more – and preferably substantially all - ICI compostable organics are diverted from the waste stream that concludes with the RDF.

11.6.1.2. Comment on Stantec Report 8.2.2 Condominium Collection Contract

The report notes that "HRM services 8,333 condominium units (larger than 6 units)." Payment for HRM services is based on the number of condo units involved. As more condominiums are constructed over the contract period, more service will be provided and paid for.

11.6.1.3. Comment on Stantec Report 8.2.3 Garbage Collection

There is a useful graphic illustrating Diversion and Disposal Trends, covering the period 2001 to 2012. Even better would be a graphic showing these figures per person over the period.

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11.6.1.4. Comment on Stantec Report 8.2.4 Source Separation

Green Cart Program – The report references from another consultant report that for the residential waste stream "the performance of the system has exceeded the original strategy goal of 21.9% under the mature system, indicating that the organics program has exceeded expectations in performance." The system performance is adequately presented.

11.6.1.5. Comment on Stantec Report 8.2.5 Recycling

"HRM currently provides curbside collection to eligible residences using a blue bag system. Residents are currently able to place unlimited quantities of recycling at the curb, however they are required to separate the material into three streams."
"The performance of the recycling program has not increased significantly over the past decade."

The system performance is adequately presented.

11.6.2. Current Performance Compared To Industry Benchmarks

11.6.2.1. Comment on Stantec Report 8.3.1 Single vs. Two Stream Recycling Collection

"Many of the larger municipalities in Ontario... and in the US ...have switched from dual stream systems to single stream systems over the past ten years, as they encourage residential participation and improve capture rates." The report provided a good discussion, with appropriate examples.

11.6.2.2. Comment on Stantec Report 8.3.2 Recycling Collection Containers

"The performance of the system results in a 15.9% residential curbside diversion rate for recyclables which is low in comparison to other municipalities shown in the table below." What is the source of the reference for the 15.9 percent figure for HRM?

11.6.2.3. Comment on Stantec Report 8.3.3 Automated Garbage Collection

A description of the automated truck system would be useful for those who have not seen one.

The reviewed report notes that "...automated waste collection is considered to be an emerging best practice in waste management where efficiencies can be gained in collection of any waste stream." As a comparison of HRM to other jurisdictions this is helpful information but nothing is provided regarding quantitative costs or benefits.

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11.6.2.4. Comment on Stantec Report 8.3.4 Co-collection of Materials

"Many municipalities are utilizing a co-collection model to achieve efficiencies in collection." "HRM's processing facilities are not geographically located in such a way that co-collection would appear to be able to drive greater efficiencies in its current collection system." This statement indicates that at present co-collection is not recommended. "Co-collection however becomes a real opportunity for HRM in the context of a Waste Resource Campus with multiple processing facilities located on one site." In other words it is suggested this be considered depending on the Campus concept. As with Section 8.3.3, it would be helpful to enhance this with some financial commentary, perhaps related to collection contract costs and changes that could ensue.

11.6.2.5. Comment on Stantec Report 8.3.5 User Pay Programs and RFID

No comment.

11.6.2.6. Comment on Stantec Report 8.3.6 Level of Service

"Some municipalities in Canada have recently begun switching their collection systems to provide a uniform level of service..." This is not quantitative. It would be useful to have a reference and add that this applies to other municipalities with a similar size.

11.6.2.7. Comment on Stantec Report 8.3.7 Bag Limits

"The current HRM bag limit is higher than other Nova Scotia municipalities. HRM could consider gradually reducing their residential bag limit..." This statement could be substantiated with actual data.

11.6.2.8. Comment on Stantec Report 8.3.8 Leaf and Yard Waste Management

The reviewed report notes that "...there are no prescribed 'best practices' with respect to the management of LYW in concert with a household organics collection program..." No comments.

"Residents in HRM are permitted to use kraft paper bags but the elimination of the plastics should be considered further." This is not a recommendation per se, but it could be.

11.6.2.9. Comment on Stantec Report 8.3.9 Expanded Multi-Residential Sector Collection

"Typically, the diversion rate in this sector is 20%, however that would be expected to increase with the implementation of various initiatives mentioned above, and with program maturation."

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The reference to 20% is not substantiated and should be. The associated recommendations are reasonable.

"HRM already employs these best practices with existing multi-family curb side collection and condominium property collection programming and would simply extend these practices to the balance of the multi-family sector." This is a recommendation and it seems reasonable, although no business case information has been provided. Neither the costs nor the benefits are quantified.

11.6.3. Opportunities for Improvement

11.6.3.1. Comment on Stantec Report 8.4.1 Impact of Decisions Regarding Campus Concept and Recyclables Processing

The report notes that "Clear direction as to whether HRM will maintain a de-centralized infrastructure model, or transition to a campus concept, is required before collection contracts can be re-organized." As stated in earlier comments, the Campus Concept has not been fully supported with a business case analysis. As a result there is insufficient information for HRM to take this decision. This statement in the report is not a recommendation, however.

"Another factor which will impact the collection program is the decision to either maintain a two stream recyclables program, or convert to single stream processing and collection." This statement is clear, however, no business case analysis was presented to support staying with two stream or converting to the single stream.

11.6.3.2. Comment on Stantec Report 8.4.2 Contract Timing and Duration

This subsection does not provide clear recommendations. No comment.

11.6.3.3. Comment on Stantec Report 8.4.3 Short Term Collection Program Changes

Three recommendations are provided in this subsection. These are supported by previous analysis.

11.6.3.4. Comment on Stantec Report 8.4.4 Collection Zones

"Stantec recommends that HRM consider reducing the number of collection zones...Stantec suggests that a total of 4-6 zones would be satisfactory." The basis of this recommendation seems to be the benefit to reducing the administrative burden on HRM staff. There is no

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financial analysis or business case presented to support this statement. There may be social and local business benefits for keeping the current number of collection zone contracts.

11.6.3.5. Comment on Stantec Report 8.4.5 Frequency of Collection

"Stantec does however recommend that urban areas receive weekly organics and recyclables collection throughout the year with a maintained bi-weekly garbage collection cycle." There is no business case presented. It is based on a "best practice" argument. It is expected that the estimate of the incremental cost of making this change for everyone would not be worth the corresponding change in material diversion from residential locations. Weekly organics collection may make sense in expanding these services for the ICI locations. In that case, this would increase diversion for the system as a whole (Residential + ICI), even as the diversion rate for the residential portion has trended to stay at about the same value.

11.6.4. Comment on Stantec Report 8.5 Conclusions and Recommendations

Some recommendations do not have support in the text.

"More detailed collection modelling could be undertaken to assess the benefits of automated versus manual collection, separate collection of LYW, single stream versus dual stream collection." This is a logical recommendation, though it was not stated in the previous text.

"Modelling should also be undertaken to determine collection area re-zoning once long term processing facility location(s) are determined." As in the previous recommendation, this makes sense, but was not stated in the text. In the text a reduction of number of collection zones was recommended, but here, modelling is suggested.

11.7. REVIEW OF ENERGY FROM WASTE OPPORTUNITIES

What was Sought and What was Delivered

The HRM RFP Section 5.1.6 Conversion Technology – Energy from Waste Technology Analysis noted what deliverables are sought, and the Stantec Report Section 9 Review of Energy from Waste Opportunities, presents the response.

An excerpt from Stantec Report Section 12 Conclusions:

10) Energy-from-Waste and developing waste reduction technologies are not considered appropriate investments for HRM at this time.

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11.7.1. COMMENT ON ENERGY FROM WASTE CONSIDERATIONS IN 1995

"Many EFW technologies, including gasification and pyrolysis, were in the early stages of development when the 1995 Strategy was developed and therefore, were not considered in the analysis."

This is not why they were not considered in the analysis. EFW had been rejected as an option for long term MSW management in the four municipalities. An EA for an EFW (i.e. incineration only) based municipal solid waste management system, presented for review by the Regional Authority, was formally rejected by the Minister of the Environment. This outcome was a significant driver for the development of the Waste Resource Strategy. It was one of the motivations for public involvement and the activity of the community stakeholders group. We think that to infer that EFW (i.e. as incineration) was an "option" at that time is not correct.

11.7.2. COMMENT ON STANTEC REPORT 9.2 COMBUSTION

11.7.2.1. Comment on Stantec Report 9.2.2 Benchmark Analysis

"Energy production via combustion or incineration is much more widespread in Europe. A recent projection...estimates that over 550 plants with a combined capacity of 80 million TPY will be in operation by 2016." The relative nature of this statement should be corrected. The population of Europe is hundreds of millions, and limitations on space as well as high energy costs are also likely drivers for the greater number of incineration facilities. Some European jurisdictions accept incineration of municipal solid waste and EFW (energy from waste) applications, but not Nova Scotia.

11.7.3. COMMENT ON STANTEC REPORT 9.7 RECOMMENDED FUTURE DIRECTION

The report notes that "EFW is considered as a mid to long-term waste management alternative for HRM to be considered in more detail in the 5-10 year range after local efforts to improve current facilities and operations are well under way."

The basis for this statement is unclear. Why is it an alternative? If the HRM system operates well, and diversion can be enhanced in future, the only reason to consider EFW would be to reduce landfilling requirements. If this is the case, it should be clarified as a landfilling alternative only. As well, this would merit some comment about the energy content of the waste stream that would be directed to an EFW unit after such significant diversion. This recommendation does not have a business case and is improperly technically founded.

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11.8. LOCAL INDUSTRIAL / COMMERCIAL WASTE NEEDS AND OPPORTUNITIES

What was Sought and What was Delivered

The HRM RFP Section 5.1.9 Options for ICI Processing Capacity identified desired deliverables being sought. The Stantec Report Section 10 Local Industrial / Commercial Waste Needs and Opportunities, was the response.

11.8.1. COMMENT ON STANTEC REPORT 10.1 EXISTING OPERATIONS

This Section states that "50% of ICI materials sent to landfill could be recovered as recyclables or compostable organics....this represents a significant opportunity to increase diversion in the HRM." This aspirational goal may have practical expectations, that are something less.

From our discussions with HRM staff, there is a 65 (ICI) / 35 (residential) split in the 140,000 tonnes of material collected annually by the HRM solid waste program. If 50% or half of the 80,000 tonnes (80,000 = 65% of 140,000) collected from ICI (40,000 tonnes), or even a 25% quarter (20,000 tonnes) were not mixed waste, but could be accepted at HRM compost facilities, this would be a significant benefit to the HRM solid waste resource management system. Encouraging more source separation and collection of ICI organic material that is acceptable for aerobic or possibly anaerobic treatment, as opposed to a central facility separation, is a better way to accomplish this.

11.8.2. COMMENT ON STANTEC REPORT 10.2 COMPARISON OF CURRENT OPERATIONS TO 1995 STRATEGY

11.8.2.1. Comment on Stantec Report 10.2.1 By Law S-600

"The current HRM by-law No. S-600 discourages and prohibits in some ways the ICI sector from developing their own parallel system as encouraged in the 1995 strategy." The word "prohibit" seems too strong here. There is no prohibition to developing waste management systems within HRM, although the financial benefits to the private sector of doing so may be limited. There is simply a restriction to moving the ICI waste outside of HRM.

11.8.2.2. Comment on Stantec Report 10.2.2 Waste Characterization Studies

"...the percentage of acceptable material for disposal at HRM facilities has increased steadily since 2003. However, despite this increase, there is still contamination of ICI loads." We agree.

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11.8.2.3. Comment on Stantec Report 10.2.3 Tipping Fees

"Based on observations of the current program, the ICI tipping fee structure has not been encouraging further source separation. By applying a higher fee for mixed loads, there would be a great incentive for source separation." The observations referred to in this statement are not clear. How has the ICI tipping fee structure changed over time, and is it possible to examine the Source Separation as a function of this tipping fee escalation? How much more could the fee be raised to? What is best practice in charging for ICI loads? None of this is mentioned.

As we understand it, $170/tonne is the cost to HRM for processing waste at the Otter Lake facility, while the tipping fee for ICI waste is $125/tonne, and the charge for residential waste is covered by municipal taxes. The ICI tipping fee for organics at the compost facilities is $75/tonne, while the charge for residential organic materials is covered by municipal taxes. This $75/tonne rate differential encourages the diversion of ICI organic materials away from the FEP / WSF / RDF and towards the compost production facilities, but this is not always the successful result. Contrary to the applicable bylaw, and for many years now, some of the ICI waste has not been properly source separated, and as such is not suitable for treatment at the compost facilities. This has resulted in an organic component of some ICI wastes being received at the FEP/ WSF / RDF Otter Lake facility.

11.8.2.4. Comment on Stantec Report 10.2.4 Diversion Targets

"Since 1990, tipping fees for waste have increased from $27.50 to $125 per tonne. Since the introduction of the source separated organics program in 1999, tipping fees for organics have only increased by 10.5% from $68 to $75 per tonne." The trend in how these tipping fees have changed is such that there is an economic incentive for organics to go to the composting facilities and not in a waste stream that ends up in the Otter Lake RDF landfill cells.

11.8.3. Comment on Stantec Report 10.3 BENCHMARK ANALYSIS

"In order to fully assess the current performance of the HRM Waste Resource System, a comparison to similar jurisdictions in Canada was conducted. Jurisdictions used were chosen primarily based on similarities in population and geography to HRM...the results of the analysis showed that most jurisdictions do not provide waste management collection services to the ICI sector." This benchmark analysis is incomplete in terms of documentation. At a minimum, a table of jurisdictions, populations, and collection provision methods should be given, to support the statement. Is this the table with comparisons between Halifax and six Ontario communities? Potentially interesting comparisons could be other coastal communities such as Victoria, St. John's, Saint John, and Quebec City.

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11.8.4. COMMENT ON STANTEC REPORT 10.4 RECOMMENDATIONS

The recommendations in this Section are fairly soft.

"The effectiveness of that By-law change should be assessed and re-evaluated. Consideration to further amend By-law S-600 to require waste haulers to provide services that support HRM's waste management strategy throughout the entire collection process will help increase waste diversion." The benefits and costs of this recommendation should be mentioned. What is the potential to discourage commercial investment, for example, as a result of increased restrictions on waste management? In one form or another, there will continue to be some locally available waste hauling capacity available. The results of regulations or HRM direction will ultimately be reflected in the unit fees paid to these haulers.

"Consideration should also be given to allow a cash transaction payment option for ICI organics customers delivering to the composting facilities that are currently not on account." This makes sense, although it would have a marginal effect on ICI waste diversion.

The reviewed report notes that "continuing to carefully evaluate the results of waste characterization studies....encouraging ICI diversion through continued education programs....all new development should be required to implement a compliant source separation program...potentially increasing ICI diversion through enhanced enforcement." Some of these recommendations are soft, but the requirement for new developments is solid and can be readily implemented. In no case has a business analysis been presented. For example, there is no way to estimate the influence of such requirements or enforcement could adversely affect business investment. These recommendations should be accompanied by additional analysis to support them.

"Revising By-law S-600 to include proper communication and utilization of commercial bins to support source separation." This recommendation seems logical, however, does it go on to suggest that commercial bins would be provided by HRM? No.

The discussion in this Section of the report is fairly light, considering the importance of ICI waste source separation to the success of the HRM system. Could there be more creative suggestions? For example, could there be some creation or utilization of a discussion or working group of ICI collectors to explore how to improve separation without creating undue financial burden? Are there examples of such collaboration elsewhere in Canada or in the US?

Community engagement, focus groups, informed discussion, and more have been used in developing the HRM solid waste resource management program. That trend will continue.

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11.9. WASTE RESOURCE PARTNERSHIP OPPORTUNITIES IN NS BEYOND HRM

What was Sought and What was Delivered

The HRM RFP Section 5.1.10 NS Waste System Regional Overview of Materials and Facilities, noted the deliverables being sought. The Stantec Report Section 11 Waste Resource Partnership Opportunities in Nova Scotia Beyond HRM, was the response.

An excerpt from Stantec Report Section 12 Conclusions:

9) Opportunities exist for more collaborative use of resources with other waste management regions in Nova Scotia.

While exporting ICI waste out of HRM may be a potentially economically preferred option for the responsible individual property owners, it is not currently an economically preferred option for the HRM program. We do not anticipate a change in the HRM By law S 600, banning the export of ICI waste from HRM to other jurisdictions (except perhaps by HRM itself).

While there may be some economically useful options for recyclables from outside of HRM to be processed within HRM, there is no financial or waste flow information presented in the Stantec report to justify this type of activity.

We expect that there will be no change in the foreseeable future to Section 16.3 of the HRM By-Law S-600 "Solid Waste Resource Collection and Disposal By-Law". This is because the ICI tipping fee revenues support a significant component of the full HRM program. If ICI waste and revenues leave HRM, there would be insufficient financial resources for the HRM program.

If the overall HRM integrated solid waste resource management program costs were significantly less, and the program relied less on keeping all of the ICI waste and associated tipping fees within HRM, then perhaps the S 600 By-law might change, and – possibly – there may be some options outside of HRM to consider.

11.10. DEVELOPMENT OF A TRANSFER STATION CAPACITY

What was Sought and What was Delivered

The HRM RFP Section 5.1.5 Development of a Transfer Station Capacity is what was responded to by the Stantec Report Section 5.2 Flexibility Offered by Waste Transfer Capability.

An excerpt from Stantec Report Section 12 Conclusions:

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11) Overall program costs in HRM are high and represent a greater financial burden on both the private and public sectors compared to similar communities.

This conclusion applies to more than one section of the Stantec report.

Due to the agreement and proximity to the West Hants landfill, Stantec "does not recommend any further consideration of a standalone transfer facility." Agreements exist for emergency circumstances between HRM and other jurisdictions as well. The report further states "If HRM at some point chooses to revisit its waste disposal strategy and export waste to other jurisdictions on a long-term or permanent basis, then a transfer facility would likely become a key component of that revised strategy." We agree, especially if HRM Bylaw S-600 was amended, and waste or materials originating from eastern HRM were being transported to the Eastern Region (Pictou, Antigonish, and Guysborough counties) instead of to the Otter Lake facility.

12. LIMITATIONS ON CONTRACTED SCOPE OF PEER REVIEW REPORT

SNC-Lavalin Inc. was retained by the Halifax Regional Municipality to conduct a peer review of the document entitled Waste Resource Strategy Update, dated January 2013 by Stantec Consulting Limited. The Peer Review analysis reflects our best judgement on the report content and recommendations. The report is the property of SNC-Lavalin Inc. and the Halifax Regional Municipality. SNC-Lavalin Inc. accepts no responsibility for any decision made by a third party based on the content of this report. Should new information become available that is pertinent to the subject matter of this report, SNC-Lavalin Inc. reserves the right to modify our opinions, conclusions, and recommendations accordingly.

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13. SUMMARY OF FINDINGS

In preparing this Peer Review report, SNC-Lavalin:

- reviewed documents provided by HRM, including the 1997 Operations Plan,
- reviewed the 1995 CSC Strategy - "accepted in its principles" by HRM Council in 1996,
- reviewed applicable legislative and regulatory documents,
- met regularly with HRM staff on this project (e.g. Jan 3, 10, 16, and 17, 2013),
- visited the Otter Lake facility on January 10, 2013,
- reviewed the January 2013 Stantec report,
- focussed on Sections 3 and 4 of the Stantec Report, after consulting with HRM staff,
- considered Options - Community Engagement - HRM Council decision making process,
- considered and described additional performance, financial, and technical information,
- described our varying support for potential options recommended in the Stantec report,
- described our varying support for the conclusions presented in the Stantec report,
- described financial review of some options recommended in Stantec report,
- described additional waste stream laboratory sample results and interpretations,
- described Balloon Study for observing balloons above RDF, from various view planes and
- conducted the peer review tests sought by HRM in the December 7, 2012 RFP.

Some general finding from our peer review can be summarized as follows:

- The 132 page HRM RFP #12-061 called for many deliverables for the Stantec report,
- The 187 page Stantec January 2013 "Waste Resource Strategy Update" was reviewed,
- Some Sections of the Stantec report met the peer review tests sought by HRM on
  - A - System Performance Assessment,
  - B - Industry Bench Mark Analysis and Best Practices, and
  - C – Options Analysis and Recommendations,
- Not all recommendations were shown to be the derived result of a stated methodology,
- Not all recommendations were shown to be validated by information in the same report,
- We commented on questions and topics of particular interest as noted in our HRM RFP,
- Since the waste stream in 2013 so differs from that of 1995, Stantec has identified some options for consideration by HRM decision makers, where continuing to achieve the community, environmental, stewardship, waste and resource program goals for the system, might be met more efficiently, using a different mix of infrastructure and operations in the future.

It is understood that HRM is starting a 2013 Community Engagement process. This would help HRM Council establish the social and community boundaries for the HRM Integrated Solid Waste Resource Management program for many years to come. In doing so, HRM will seek the most effective means to achieve the desired environmental performance goals. This may involve some of the menu of options presented in the Stantec report. In deciding which options to apply, decision makers may choose to seek what we have indicated as additional information.

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This is our summary of our agreement with the major Stantec recommendations.

We support the following recommendations, whose concepts and details, with the indicated additional information, merit serious consideration by the final decision makers:
A1 – Closure of FEP and WSF by the end of 2013
A3 – Extend Life of Otter Lake (RDF) Landfill through Vertical Expansion

We expect that with more information, we would agree with these recommendations:
A2 – Request Modification of the Nova Scotia Landfill Liner Specification

We expect that with more information, we would agree with these recommended options; the concepts can be supported in principle, as meriting further consideration by decision makers; but we currently lack sufficient information to completely agree or disagree with the following:
B1 – Create a Centralized Waste Resource Campus
B2 – Relocation of MRF to (a centralized) Campus
B3 – Increase Organics Processing Capacity (add an anaerobic digestion capacity to the system)

C1 – Improve Recovery of Recyclables and Organics:

- We agree with the recommendation as an overall goal,
- We expect that with more information, we would agree with the recommendation to eventually move to collecting a single stream of recyclables at the curbside, due to the collection system efficiencies, and
- We lack sufficient information to either agree or disagree with many of the suggestions put forward in support of this recommended goal.

C2 – Control Curing and Sale of Finished Compost:

- We expect that with more information, we would disagree with the recommendation (of having HRM operate a new secondary curing area).

C3 – Improve Curbside Collection Frequency:

- We expect that with more modelling information, we would disagree with the recommendation to reduce the number of collection zones, and
- We disagree with the recommendation for doubling the year round collection frequency of the current residential green bin food organic waste stream to a weekly basis.

We believe that the HRM system can continue to achieve its environmental performance goals in a more cost effective manner (e.g. changing the operations that now take place at the FEP and WSF portions of the Otter Lake facility). The volume and density impacts of having no materials shredded at the WSF, should be balanced by the mix of greater and more efficient (e.g. the new GPS system) mechanical compaction efforts on wastes placed in the RDF landfill cell. For a 21st century stream of wastes intended for the RDF landfill cells, the system

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requirements for the cost effective and environmentally sustainable separation of materials (e.g. white goods, household hazardous materials, recyclable materials, organic materials having the readily volatile, leachable, and biodegradable potential), could be achieved by other means, processes, and methods within the HRM solid waste management system, than the current FEP and WSF infrastructure and operations.

Based on our review, we believe that the Stantec report provides a wide range of options with which HRM can commence a Community Engagement process in 2013. Recognizing the fundamental importance of the 1995 CSC Strategy and the 1997 HRM Operations Plan in creating the basis of the waste management system now in place, it will be helpful for HRM to start this process with the same underlying principles of maximizing waste diversion, meeting current regulations and standards, and ensuring a cost effective system is in place to serve residents and businesses for the long term.

In our review, we commented on each of the twelve (12) Conclusions in Section 12 of the Stantec report and provided a brief discussion.

- We agreed with Conclusions 1, 2, 3, 4, 5, 6, 7, and 10,
- We somewhat agreed with Conclusions 11 and 12, and
- We somewhat disagreed with Conclusions 8, and 9.

We agree with Conclusions 1, 2, 3, 4, 5, 6, 7, and 10.

Stantec Conclusion 1: *"The total diversion rate is relatively high in HRM compared to other municipalities, but realistic opportunities exist to improve the recovery of residential and ICI recyclables and organics in accordance with provincial legislation."*

(SNC-Lavalin: There are relatively much more opportunities with respect to the ICI wastes)

Stantec Conclusion 2: *"The front-end processing (FEP) and waste stabilization facility (WSF) at Otter Lake no longer provide a useful function compared to their stated purpose in the 1995 Strategy."*

(SNC-Lavalin: A "useful function" in this case, such as for example the white goods program, should be one that can be executed within a reasonable economic rationale)

Stantec Conclusion 3: *"The landfill liner design specification in Nova Scotia is more stringent than most comparable state and provincial jurisdictions, and potential modifications could significantly reduce future capital costs."*

(SNC-Lavalin: The default design for various provincial or state jurisdictions, varies with the desired envelope of possibilities associated with their various provincial or state site conditions)

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Stantec Conclusion 4: *"An opportunity exists to significantly extend the life of the landfill at Otter Lake, and reduce the site per tonne capital costs by increasing the finished grade by 10-15 metres."*

Stantec Conclusion 5: *"The two composting operations in Halifax and Dartmouth do not provide a sufficiently finished product to meet applicable guidelines which become effective in the near future."*

Stantec Conclusion 6: *"Composting facilities are at capacity and additional processing capacity is required in the short and longer term."*

Stantec Conclusion 7: *"Alternative composting technologies may improve the processing of ICI organics."*

Stantec Conclusion 10: *"Energy-from-Waste and developing waste reduction technologies are not considered appropriate investments for HRM at this time."*

We somewhat agree with conclusions 11 and 12

Stantec Conclusion 11: *"Overall program costs in HRM are relatively high and represent a higher financial burden on both the private and public sectors compared to similar communities."*

Stantec Conclusion 12: *"HRM would benefit from the creation of a centralized waste resource campus, rather than having facilities at four different locations in Halifax and Dartmouth. Development can be staged over time to match the end-of-useful-life of current infrastructure and incorporate new elements for HRM such as outdoor windrow compost curing pads; permanent educational and household special waste facilities; and the development of a materials transfer capability."*

We somewhat disagree with Conclusions 8 and 9.

Stantec Conclusion 8: *"Collection programs are relatively cost effective and meet most customer needs however there are opportunities to improve diversion by increasing the frequency of collection."*

Stantec Conclusion 9: *"Opportunities exist for more collaborative use of resources with other waste management regions in Nova Scotia."*

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Our February 27, 2013 Balloon Study involved six 600 mm diameter helium filled balloons at the proposed new maximum height for the cells. The topography map figure attached to this document indicates various places where we tested the view planes with respect to the Otter Lake cells. Aside from the bedrock outcrop in the anticipated commercial portion of the Brunello Estates development, we are confident that the increase in height of the landfill cells will not be visible from the other locations visited.

Waste stream samples from the FEP and WSF were taken and analysed to investigate their relative volatilization and leachate potentials. The relative differences were such that we believe the existing gas management and leachate systems have sufficient capacity to continue meeting the groundwater and air quality performance goals for the HRM solid waste system.

The current Otter Lake facility environmental performance goals are based on:

- Minimized average number of annually reported community odour incidents (i.e. Zero),
- Air quality parameters and values indentified in the current Operating Permit, and
- Groundwater and storm water runoff quality parameters and values presented in the annual environmental monitoring report.

Developing the WSF and 2002 "ad-hoc" gas management system capacities, was a response to the more rapid, short term release of high concentration gas from RDF landfill cell destined wastes receiving added mechanical and thermal energy at the FEP / WSF. Without the FEP / WSF, the gas releases to be managed would be expected to be slower, at a lower concentration, and for a longer period of time. This is why be believe the current gas management systems will have more than enough capacity to achieve the HRM community odour incident performance goal of zero incidents per year. If other means, processes, and methods are used to replace what the FEP / WSF was intended to achieve, in a cost effective and environmentally sustainable manner, a reduction can be reasonably anticipated in the annual $750,000 cost to HRM for the "ad hoc" gas management system at the RDF that has been operating since 2002. An unintended consequence of the original FEP / WSF operations would appear to be a contribution to the more rapid, short term, release of the high concentration mass of gas that was responded to by the "ad-hoc" gas management system at the RDF landfill cells since 2002. Aside from the fall of 2011, there have not been very many reported community odour incidents due to the Otter Lake FEP / WSF / RDF activities since 2002. This includes the May – December 2010 seven month period when the WSF was not operating.

An interesting item in the next version or evolution of the HRM waste and resource management strategy will be with respect to a better source separation of the various ICI waste stream components.

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We noted that we also sought additional information regarding the financial implications with respect to the option A1 recommendation made in the report reviewed. We reviewed some internal HRM documents, and discussed them with HRM staff.

For closing the FEP and WSF, we considered the annual operational costs, as well as the capital costs and repairs. If the FEP and WSF are closed, there are downstream ripple effects and activities to be accounted for in achieving the program performance goals by other means. In this case we anticipated additional resources for some programs (e.g. White Goods, and Household Hazardous Waste), along with additional labour and annual access road work. We also considered the cumulative relative influence on the unshredded material volume and density in the RDF if the FEP and WSF are closed.

We have presented a summary of these considerations as tables. The net financial influence on the annual HRM Solid Waste Budget from closing the FEP and WSF is anticipated to be:

- between $9,000,000 – 10,000,000 per year based on FEP / WSF capital and operations, and downstream responses to achieve certain tasks by other means, and
- a potentially substantial reduction in the $750,000 per year budget, for the continued use of the short term "ad hoc" landfill gas control and management system at the RDF.

If it is decided to implement the A1 option on closing the FEP and WSF, there are some financial implications for the HRM solid waste system. They include:

- If filling Cells 6 – 9, to the current design height were to occur over a 15 year period (~11 years x 10/7.5 x $10,000,000), the financial implication for the HRM system could be around $150,000,000.
- If filling Cells 1 – 5 to the proposed additional 15 metres was accomplished over at least 12.5 years; and filling Cells 6 – 9 to the proposed additional 15 metres was accomplished over at least 11 years, the financial implication for the HRM system could be around $230,000,000, as a present worth value.
- 38.5 year fill time = 15+11 (Cells 6-9 current plus 15 m) +12.5 (Cells 1–5 plus 15 m)

If it is decided to implement the A3 option on increasing the landfill cell height, there are some financial implications for the HRM solid waste system. They include:

- If the cost for a new cell is about $15,000,000 to construct, or $25,000,000 for construction and closing, and with the current maximum height an additional cell is constructed about every three years,
- Assuming the cell closure costs would be the same, regardless of the final height, the financial value for the HRM system of increasing the RDF landfill cell heights would be at least $100,000,000 (7 x $15,000,000 > $100,000,000) if not significantly more, based on the seven additional cell liners that did not have to be constructed.

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If it is decided to implement both the A1 option on closing the FEP and WSF, and the A3 option on increasing the cell heights:

- The cumulative financial effect of taking an FEP / WSF decision, and an increase in landfill height decision could be on the order of at least $480,000,000 over almost forty (40) years.
- If the current HRM system budget could accomplish the same goals for about $12,000,000 less per year (i.e. $12,000,000 = $480,000,000/40 years), that could reduce the average $170/tonne RDF cost to HRM, to something less than $100/tonne.

Summary of Peer Review Tests

We have also prepared a tabulated summary of the results we found in applying tests A, B, and C, to recommendations A1, A2, and A3 in sections 3 and 4 of the January 2013 report, with respect to the methodology and validity of recommendation derivation presented.

Providing a greater focus of our peer review evaluation on the A1, A2, and A3 recommendations in Sections 3 and 4 of the Stantec report reflects our contracted scope of work. The same table was not produced with respect to the B or C group of Stantec recommended options for HRM.

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Table 2: Summary of Peer Review Test Results for Options A1, A2 and A3

Recommendation A1 - Closure of the FEP (Front End Processing unit) and WSF (Waste Stabilization Facility) by the end of 2013		
Refer to our Section 11.1.5 Methodology of Recommendation Derivation in Stantec Section 3. Refer to our Section 11.1.6 Validity of Recommendation Derivation in Stantec Section 3.		
Test A – System Performance	for Methodology	Yes - Partially
Test A – System Performance	for Validity	Yes - Partially
Test B – Benchmark Analysis and Best Practice	for Methodology	Not comparable
Test B – Benchmark Analysis and Best Practice	for Validity	Not comparable
Test C – Options Analysis and Recommendations	for Methodology	Yes - Partially
Test C – Options Analysis and Recommendations	for Validity	No
Recommendation A2 – Request Modification of the Nova Scotia Landfill Liner Specification		
Refer to our Section 11.2.1.1 Methodology of Recommendation Derivation in Stantec Sec. 4.1. Refer to our Section 11.2.1.2 Validity of Recommendation Derivation in Stantec Section 4.1.		
Test A – System Performance	for Methodology	With more info. - Yes
Test A – System Performance	for Validity	With more info. - Yes
Test B – Benchmark Analysis and Best Practice	for Methodology	Yes
Test B – Benchmark Analysis and Best Practice	for Validity	With more info. - Yes
Test C – Options Analysis and Recommendations	for Methodology	With more info. - Yes
Test C – Options Analysis and Recommendations	for Validity	No
Recommendation A3 – Extend Life of Otter Lake Landfill through Vertical Expansion		
Refer to our Section 11.2.2.1 Methodology of Recommendation Derivation in Stantec Sec. 4.2. Refer to our Section 11.2.2.2 Validity of Recommendation Derivation in Stantec Section 4.2.		
Test A – System Performance	for Methodology	Not applicable
Test A – System Performance	for Validity	Yes
Test B – Benchmark Analysis and Best Practice	for Methodology	Yes
Test B – Benchmark Analysis and Best Practice	for Validity	No
Test C – Options Analysis and Recommendations	for Methodology	Yes
Test C – Options Analysis and Recommendations	for Validity	Yes

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14. ADDITIONAL INFORMATION

Some highlights from our financial review are summarized in the following:

Financial Review: Relative Change in RDF Material Density if FEP and WSF are closed	
+5 %	Increased volume (decreased density) due to unshredded material +20 % volume for unshredded versus shredded materials <25 % of total 2011 material in RDF was shredded material from WSF (HRM: Section 3.2 graphic incorrect in report. FEP to RDF is unshredded.)
+1 %	Increased volume due to contingency for daily cover materials in response to potential change in odour incident responses
->10 %	Decreased volume (increased density) of unshredded material in RDF from increased mechanical compaction efforts (within manufacturer's range)
< 0 %	No net increase in volume, where change in compaction effort is more significant than the density change from 100% unshredded RDF material.

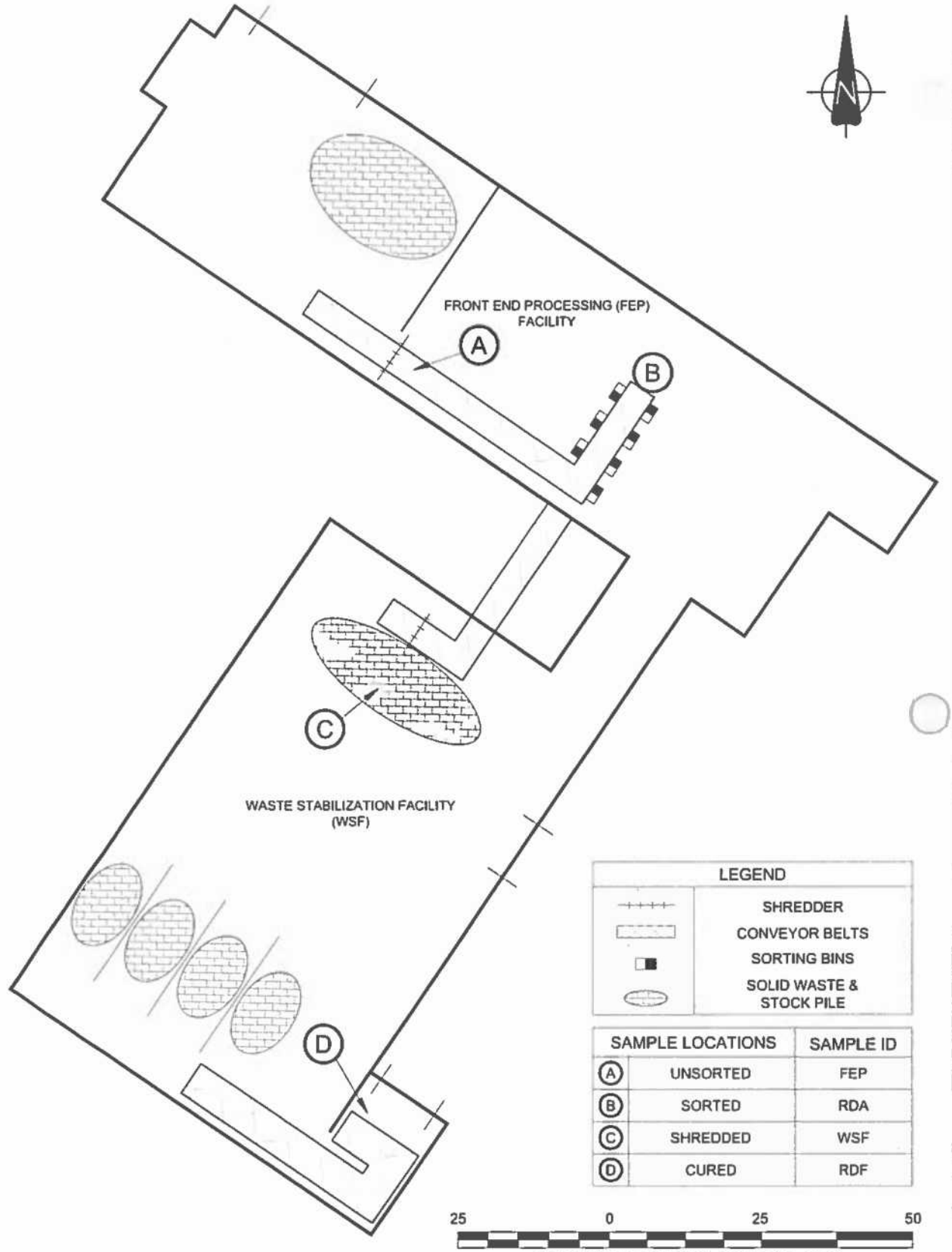
Financial Review: Reductions to HRM Solid Waste Budget if FEP and WSF are closed	
$7.2 M/year	Front End Processing (FEP) Unit annual operations budget
$1.7 M/year	Waste Stabilization Facility (WSF) annual operations budget
$1.8 M/year	FEP / WSF capital cost and repair budget
$0 / year	No change in cost to repurpose or decommission if done 10 years early
$0 / year	No change in salvage value for FEP / WSF if done 10 years early
$10.7 M/yr	Cumulative reduction to HRM budget if FEP / WSF are closed

Financial Review: Additions to HRM Solid Waste Budget if FEP and WSF are closed	
$100 K/year	Residual Disposal Facility (RDF) additional labour
$100 K/year	RDF area additional annual access road improvements and relocations
$0 /year	RDF infrastructure charge due to change in material density and volume
$100 K/year	RDF area addition to annual mechanical equipment compaction effort
$0 /year	RDF Gas Management Resources change in infrastructure and operations
$0 /year	RDF change in annual odour incident responses, and leachate collection, transportation and treatment budget
$300 K/year	White Goods Program (additional resources)
$150 K/year	Household Hazardous Waste Program (additional resources)
$100 K/year	RDF area additional mechanical compaction efforts and equipment
$100 K/year	Scale house and associated functions salvaged from FEP budget
$950 K/yr	Cumulative additions to HRM budget if FEP / WSF are closed

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APPENDIX A

Figure 1 – Sample Locations
Figure 2 – Topography Map for Balloon Study
Table 1 – Summary of Petroleum Hydrocarbon Analytical Results
Table 2 – Summary of Leachable Metals
Table 3 – Summary of Volatile Organic Compounds
Laboratory Results



LEGEND	
	SHREDDER
	CONVEYOR BELTS
	SORTING BINS
	SOLID WASTE & STOCK PILE

SAMPLE LOCATIONS		SAMPLE ID
A	UNSORTED	FEP
B	SORTED	RDA
C	SHREDDED	WSF
D	CURED	RDF

25 0 25 50

APPROXIMATE GRAPHIC SCALE:(METRES)

SNC•LAVALIN
SNC•LAVALIN Inc.
Halifax, Nova Scotia, Canada
Telephone (902) 492-4544
Fax (902) 492 4540
Member of the SNC•LAVALIN Group

DESIGNED BY: AT	PROJECT: HRM WASTE RESOURCE STRATEGY PEER REVIEW		DATE: MARCH 2013
DRAWN BY: BK			PROJECT #: 511766-0001
CHECKED BY: CE	FIGURE TITLE: SAMPLE LOCATIONS OTTER LAKE WASTE PROCESSING & DISPOSAL FACILITY LANDFILL		FIGURE #: 1
CLIENT: HALIFAX REGIONAL MUNICIPALITY	SCALE: NTS		

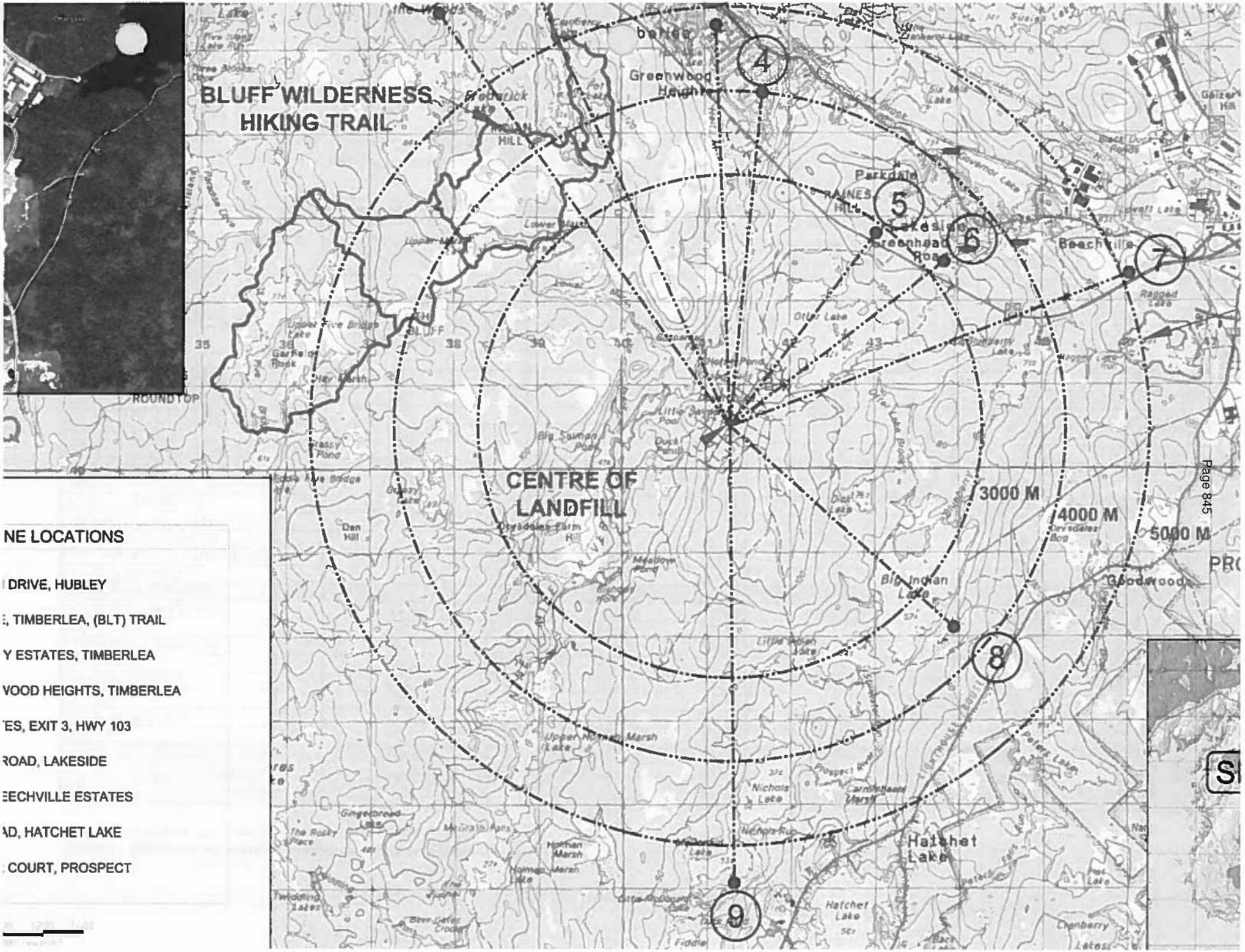

BLUFF WILDERNESS
HIKING TRAIL
CENTRE OF
LANDFILL
3000 M
4000 M
5000 M
4
5
6
7
8
9
Greenwood
Parkdale
Lakeside
Beachville
Goodwood
Hatchet
Lake
NE LOCATIONS
DRIVE, HUBLEY
, TIMBERLEA, (BLT) TRAIL
Y ESTATES, TIMBERLEA
VOOD HEIGHTS, TIMBERLEA
ES, EXIT 3, HWY 103
ROAD, LAKESIDE
ECHVILLE ESTATES
AD, HATCHET LAKE
COURT, PROSPECT

Table 1: Summary of Petroleum Hydrocarbon Analytical Results
Otter Lake Waste Proccessing & Disposal Facility Landfill

Sample ID : Sample Date : Lab ID :	FEP 25-Feb-13 QQ6802	RDL	RDA 25-Feb-13 QQ6803	RDL	WSF 25-Feb-13 QQ6804	RDL	RDF 25-Feb-13 QQ6805	RDL	Units
Benzene	<0.13	0.13	<0.13	0.13	<0.075	0.08	<0.13	0.13	mg/kg
Leachable Benzene	<0.010	0.01	<0.010	0.01	<0.010	0.01	<0.010	0.01	mg/L
Toluene	<0.13	0.13	<0.13	0.13	2.3	0.08	<0.13	0.13	mg/kg
Leachable Toluene	<0.010	0.01	<0.010	0.01	0.012	0.01	<0.010	0.01	mg/L
Ethylbenzene	<0.13	0.13	<0.13	0.13	0.33	0.08	<0.13	0.13	mg/kg
Leachable Ethylbenzene	<0.010	0.01	<0.010	0.01	<0.010	0.01	<0.010	0.01	mg/L
Xylene (Total)	<0.25	0.25	<0.25	0.25	1.9	0.15	<0.25	0.25	mg/kg
Leachable Xylene (Total)	<0.020	0.02	<0.020	0.02	<0.020	0.02	<0.020	0.02	mg/L
PHC ARBCA Fraction									
C6 - C10 (less BTEX)	<13	13	<13	13	15	7.5	<13	13	mg/kg
Leachable C6 - C10 (less BTEX)	<0.10	0.1	<0.10	0.1	0.17	0.1	<0.10	0.1	mg/L
>C10-C16 Hydrocarbons	190 *	120	180 *	110	130 **	50	530 **	100	mg/kg
Leachable >C10-C16 Hydrocarbons	0.64	0.2	0.59	0.2	0.25	0.2	0.5	0.2	mg/L
>C16-C21 Hydrocarbons	990 *	120	1100 *	110	1100 **	50	5300 **	100	mg/kg
Leachable >C16-C21 Hydrocarbons	0.4	0.2	<0.20	0.2	<0.20	0.2	0.21	0.2	mg/L
>C21-<C32 Hydrocarbons	3700 *	180	3700 *	170	930 **	75	5000 **	150	mg/kg
Leachable >C21-<C32 Hydrocarbons	<0.50	0.5	<0.50	0.5	<0.50	0.5	<0.50	0.5	mg/L
Modified TPH (Tier1)	4900	180	5000	170	2200	75	11000	150	mg/kg
Leachable Modified TPH (Tier1)	1	0.5	0.59	0.5	<0.50	0.5	0.71	0.5	mg/L
Reached Baseline at C32	No	--	No	--	No	--	No	--	mg/kg
Leachable Reached Baseline at C32	Yes	--	Yes	--	Yes	--	Yes	--	mg/L
Hydrocarbon Resemblance	Unidentified compound(s) in fuel / lube range.	--	One product in fuel / lube range. Unidentified compound(s) in fuel oil	--	Unidentified compound(s) in fuel / lube range.	--	One product in fuel / lube range. Unidentified compound(s) in fuel / lube	--	mg/kg
Leachable Hydrocarbon Resemblance	Unidentified compound(s) in fuel / lube range.	--	Unidentified compound(s) in fuel / lube range.	--	Unidentified compound(s) in fuel / lube range.	--	Unidentified compound(s) in fuel range.	--	mg/L

Notes:

* Elevated TEH RDL(s) due to matrix interference.
** Elevated TEH RDL(s) due to sample dilution.
RDL Reportable Detection Limit.
-- not available / not applicable

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Table 2: Summary of Leachable Metals (ug/L)
Otter Lake Waste Proccessing & Disposal Facility Landfill

Sample ID :	FEP	FEP Lab-Dup	RDA	RDA Lab-Dup	WSF	WSF Lab-Dup	RDF	RDF Lab-Dup	RDL
Sample Date :	25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	
Lab ID :	QQ6802	QQ6802	QQ6803	QQ6803	QQ6804	QQ6804	QQ6805	QQ6805	
Leachable Aluminum (Al)	2200	4100 *	480	230	480	1400 *	4200	890 *	100
Leachable Antimony (Sb)	<20	<20	<20	<20	<20	<20	<20	<20	20
Leachable Arsenic (As)	<20	<20	<20	<20	<20	<20	24	<20	20
Leachable Barium (Ba)	220	250	120	160	290	580 *	430	140 *	50
Leachable Beryllium (Be)	<20	<20	<20	<20	<20	<20	<20	<20	20
Leachable Boron (B)	<500	<500	<500	<500	<500	2100	840	<500	500
Leachable Cadmium (Cd)	<3.0	<3.0	3.3	<3.0	<3.0	<3.0	11	5.3	3
Leachable Calcium (Ca)	390000	240000 *	170000	380000 *	370000	240000 *	500000	380000	1000
Leachable Chromium (Cr)	<20	<20	<20	<20	<20	<20	77	<20	20
Leachable Cobalt (Co)	<10	<10	<10	<10	<10	<10	17	11	10
Leachable Copper (Cu)	63	21	25	30	<20	24	330	100 *	20
Leachable Iron (Fe)	3100	670 *	<500	<500	12000	3100 *	6300	1800 *	500
Leachable Lead (Pb)	10	8.2	9	6.8	5.3	40 *	80	18 *	5
Leachable Lithium (Li)	<20	<20	<20	<20	<20	<20	53	<20	20
Leachable Magnesium (Mg)	11000	5900 *	14000	25000 *	14000	19000	41000	19000 *	1000
Leachable Manganese (Mn)	830	210 *	490	330 *	1700	2500 *	6200	4000 *	20
Leachable Mercury (Hg)	<0.50 **	<0.50	<0.50 **	<0.50	<0.50 **	<0.50	<0.50 **	<0.50	0.5
Leachable Molybdenum (Mo)	<20	<20	<20	<20	<20	<20	30	<20	20
Leachable Nickel (Ni)	<20	<20	<20	23	20	130 *	290	200 *	20
Leachable Potassium (K)	51000	52000	50000	81000 *	69000	70000	120000	55000 *	1000
Leachable Selenium (Se)	<10	<10	<10	<10	<10	<10	<10	<10	10
Leachable Silver (Ag)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5
Leachable Strontium (Sr)	590	440	350	590 *	850	730	1400	980 *	50
Leachable Thallium (Tl)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1
Leachable Tin (Sn)	<20	<20	<20	<20	<20	<20	37	<20	20
Leachable Uranium (U)	1	<1.0	<1.0	<1.0	3.7	2.4	1.5	<1.0	1
Leachable Vanadium (V)	<20	<20	<20	<20	<20	<20	<20	<20	20
Leachable Zinc (Zn)	640	270 *	240	140	580	530	5600	3500 *	50

Notes:

* Poor Relative Percent Difference (RPD) due to sample inhomogeneity.

** Elevated detection limit due to sample matrix.

RDL Reportable Detection Limit.

-- not available / not applicable

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Table 3: Summary of Volatile Organic Compounds
Otter Lake Waste Proccessing & Disposal Facility Landfill

Sample ID : Sample Date : Lab ID :	FEP 25-Feb-13 QQ6802	RDA 25-Feb-13 QQ6803	WSF 25-Feb-13 QQ6804	RDF 25-Feb-13 QQ6805
1,2,4-Trimethylbenzene	--	--	DC	--
1,3,5-Trimethylbenzene	--	--	DC	--
1,4-Dichlorobenzene	--	--	DC	--
3 Ethyltoluene	--	--	DC	--
a-Pinene	--	--	DC	DC
d-Limonene	DC	DC	DC	DC
Decane	DC	DC	DC	--
Dodecane	--	--	--	DC
Ethylbenzene	--	--	DC	DC
m.p-Xylenes	--	DC	DC	DC
Nonane	--	--	DC	--
o-Xylene	--	--	DC	DC
Styrene	--	--	DC	--
Tetrachloroethylene	--	DC	DC	--
Toluene	--	DC	DC	DC
Undecane	DC	--	DC	--
Total Number of Detectable Compounds	**3**	**5**	**15**	**7**

Notes:

DC Detectable Compounds
-- Non-Detect

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Your Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Your C.O.C. #: B156094

Attention: Cameron Ells

SNC-Lavalin Inc, Environment Division
5657 Spring Garden Rd
Suite 200
Halifax, NS
B3J 3R4

Report Date: 2013/03/07

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B327722
Received: 2013/02/25, 16:00

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
TEH in Leachate (PIRI)	4	2013/02/28	2013/03/01	ATL SOP-00113	Based on Atl. PIRI
TEH in Soil (PIRI) (1)	3	2013/02/27	2013/03/01	ATL SOP 00111	Based on Atl. PIRI
TEH in Soil (PIRI) (1)	1	2013/02/27	2013/03/04	ATL SOP 00111	Based on Atl. PIRI
Mercury - Total in Leachate (CVAA,LL)	4	2013/03/04	2013/03/04	ATL SOP 00026	Based on EPA245.1
Metals Leach TCLP/CGSB extraction	4	2013/02/27	2013/02/28	ATL SOP-00059	Based on EPA6020A
Loss on Ignition at 600	1	2013/02/27	2013/02/28	In progress	Soil Sampling - MC
Loss on Ignition at 600	3	2013/02/28	2013/02/28	In progress	Soil Sampling - MC
Moisture	4	N/A	2013/02/26	ATL SOP 00001	MOE Handbook 1983
VPH in Leachates (PIRI)	4	2013/03/04	2013/03/05	ATL SOP 00118	Based on Atl. PIRI
VPH in Soil (PIRI)	4	2013/02/26	2013/02/27	ATL SOP 00119	Based on Atl. PIRI
TCLP Inorganic extraction - pH	4	N/A	2013/02/27	ATL SOP-00035	Based on EPA1311
TCLP Inorganic extraction - Weight	4	N/A	2013/02/27	ATL SOP-00035	Based on EPA1311
ModTPH (T1) Calc. for Leachate	4	N/A	2013/03/05		Based on Atl. PIRI
ModTPH (T1) Calc. for Soil	4	2013/02/25	2013/03/04		Based on Atl. PIRI
Volatile Open Characterization in Water	4	N/A	2013/03/01		

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel 902-420-0203 Toll-free 800-565-7227 Fax 902-420-8612 www.maxxamanalytics.com

Your Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Your C.O.C. #: B156094

Attention: Cameron Ells
SNC-Lavalin Inc, Environment Division
5657 Spring Garden Rd
Suite 200
Halifax, NS
B3J 3R4

Report Date: 2013/03/07

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 Ext:289

==========

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Total cover pages: 2

Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

RESULTS OF ANALYSES OF SOIL

Maxxam ID		QQ6802	QQ6802	QQ6803	QQ6803		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094	B156094	B156094	B156094		
	Units	**FEP**	**FEP Lab-Dup**	**RDA**	**RDA Lab-Dup**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	54		39		1	3134060
Sample Weight (as received)	g	40	49	49	48	N/A	3134627
Initial pH	N/A	NA	NA	NA	NA		3134634
Final pH	N/A	5.2	5.1	5.1	5.3		3134634
Miscellaneous Parameters							
Loss on Ignition	%	95		72		0.30	3136534

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

Maxxam ID		QQ6804	QQ6804	QQ6805	QQ6805		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094	B156094	B156094	B156094		
	Units	**WSF**	**WSF Lab-Dup**	**RDF**	**RDF Lab-Dup**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	43		44		1	3134060
Sample Weight (as received)	g	48	49	49	47	N/A	3134627
Initial pH	N/A	NA	NA	NA	NA		3134634
Final pH	N/A	5.3	5.2	5.3	5.1		3134634
Miscellaneous Parameters							
Loss on Ignition	%	78		52		0.30	3136534

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

MERCURY BY COLD VAPOUR AA (SOIL)

Maxxam ID		QQ6802	QQ6802	QQ6803	QQ6803	QQ6804		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094	B156094	B156094	B156094	B156094		
	Units	**FEP**	**FEP Lab-Dup**	**RDA**	**RDA Lab-Dup**	**WSF**	**RDL**	**QC Batch**
Metals								
Leachable Mercury (Hg)	ug/L	<0.50 (1)	<0.50	<0.50 (1)	<0.50	<0.50 (1)	0.50	3139951

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Elevated detection limit due to sample matrix.

Maxxam ID		QQ6804	QQ6805	QQ6805		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094	B156094	B156094		
	Units	**WSF Lab-Dup**	**RDF**	**RDF Lab-Dup**	**RDL**	**QC Batch**
Metals						
Leachable Mercury (Hg)	ug/L	<0.50	<0.50 (1)	<0.50	0.50	3139951

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Elevated detection limit due to sample matrix.

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

ELEMENTS BY ICP/MS (SOIL)

Maxxam ID		QQ6802	QQ6802	QQ6803	QQ6803		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094	B156094	B156094	B156094		
	Units	FEP	FEP Lab-Dup	RDA	RDA Lab-Dup	RDL	QC Batch
Metals							
Leachable Aluminum (Al)	ug/L	2200	4100 (1)	480	230	100	3135654
Leachable Antimony (Sb)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Arsenic (As)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Barium (Ba)	ug/L	220	250	120	160	50	3135654
Leachable Beryllium (Be)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Boron (B)	ug/L	<500	<500	<500	<500	500	3135654
Leachable Cadmium (Cd)	ug/L	<3.0	<3.0	3.3	<3.0	3.0	3135654
Leachable Calcium (Ca)	ug/L	390000	240000 (1)	170000	380000 (1)	1000	3135654
Leachable Chromium (Cr)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Cobalt (Co)	ug/L	<10	<10	<10	<10	10	3135654
Leachable Copper (Cu)	ug/L	63	21	25	30	20	3135654
Leachable Iron (Fe)	ug/L	3100	670 (1)	<500	<500	500	3135654
Leachable Lead (Pb)	ug/L	10	8.2	9.0	6.8	5.0	3135654
Leachable Lithium (Li)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Magnesium (Mg)	ug/L	11000	5900 (1)	14000	25000 (1)	1000	3135654
Leachable Manganese (Mn)	ug/L	830	210 (1)	490	330 (1)	20	3135654
Leachable Molybdenum (Mo)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Nickel (Ni)	ug/L	<20	<20	<20	23	20	3135654
Leachable Potassium (K)	ug/L	51000	52000	50000	81000 (1)	1000	3135654
Leachable Selenium (Se)	ug/L	<10	<10	<10	<10	10	3135654
Leachable Silver (Ag)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	3135654
Leachable Strontium (Sr)	ug/L	590	440	350	590 (1)	50	3135654
Leachable Thallium (Tl)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	3135654
Leachable Tin (Sn)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Uranium (U)	ug/L	1.0	<1.0	<1.0	<1.0	1.0	3135654
Leachable Vanadium (V)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Zinc (Zn)	ug/L	640	270 (1)	240	140	50	3135654

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Poor RPD due to sample inhomogeneity.

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

ELEMENTS BY ICP/MS (SOIL)

Maxxam ID		QQ6804	QQ6804	QQ6805	QQ6805		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094	B156094	B156094	B156094		
	Units	**WSF**	**WSF Lab-Dup**	**RDF**	**RDF Lab-Dup**	**RDL**	**QC Batch**
Metals							
Leachable Aluminum (Al)	ug/L	480	1400 (1)	4200	890 (1)	100	3135654
Leachable Antimony (Sb)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Arsenic (As)	ug/L	<20	<20	24	<20	20	3135654
Leachable Barium (Ba)	ug/L	290	580 (1)	430	140 (1)	50	3135654
Leachable Beryllium (Be)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Boron (B)	ug/L	<500	2100	840	<500	500	3135654
Leachable Cadmium (Cd)	ug/L	<3.0	<3.0	11	5.3	3.0	3135654
Leachable Calcium (Ca)	ug/L	370000	240000 (1)	500000	380000	1000	3135654
Leachable Chromium (Cr)	ug/L	<20	<20	77	<20	20	3135654
Leachable Cobalt (Co)	ug/L	<10	<10	17	11	10	3135654
Leachable Copper (Cu)	ug/L	<20	24	330	100 (1)	20	3135654
Leachable Iron (Fe)	ug/L	12000	3100 (1)	6300	1800 (1)	500	3135654
Leachable Lead (Pb)	ug/L	5.3	40 (1)	80	18 (1)	5.0	3135654
Leachable Lithium (Li)	ug/L	<20	<20	53	<20	20	3135654
Leachable Magnesium (Mg)	ug/L	14000	19000	41000	19000 (1)	1000	3135654
Leachable Manganese (Mn)	ug/L	1700	2500 (1)	6200	4000 (1)	20	3135654
Leachable Molybdenum (Mo)	ug/L	<20	<20	30	<20	20	3135654
Leachable Nickel (Ni)	ug/L	20	130 (1)	290	200 (1)	20	3135654
Leachable Potassium (K)	ug/L	69000	70000	120000	55000 (1)	1000	3135654
Leachable Selenium (Se)	ug/L	<10	<10	<10	<10	10	3135654
Leachable Silver (Ag)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	3135654
Leachable Strontium (Sr)	ug/L	850	730	1400	980 (1)	50	3135654
Leachable Thallium (Tl)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	3135654
Leachable Tin (Sn)	ug/L	<20	<20	37	<20	20	3135654
Leachable Uranium (U)	ug/L	3.7	2.4	1.5	<1.0	1.0	3135654
Leachable Vanadium (V)	ug/L	<20	<20	<20	<20	20	3135654
Leachable Zinc (Zn)	ug/L	580	530	5600	3500 (1)	50	3135654

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Poor RPD due to sample inhomogeneity.

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		QQ6802	QQ6803	QQ6804	QQ6805	
Sampling Date		2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30	2013/02/25 14:30	
COC Number		B156094	B156094	B156094	B156094	
	Units	**FEP**	**RDA**	**WSF**	**RDF**	**QC Batch**
Volatile Organics						
Characterisation by MS	N/A	COMMENT (1)	COMMENT (2)	COMMENT (3)	COMMENT (4)	3135274

QC Batch = Quality Control Batch

(1) 10.25 g of sample was weighed out in a 250 ml soil jar. The front portion of a large charcoal tube was added to the sample jar via a small plastic contiiner. The carbon was left in the sample container for a period of 24 hours to absorb vapours. It was then removed from the container, Desorption solvent (CS2) was added allowing it to stand for 30 minutes and the extract vialed. The extract was then analyzed by GC-MSD for VOC-Open analysis.

This sample was detected for the following compounds: Decane, d-Limonene and Undecane.

(2) 10.15 g of sample was weighed out in a 250 ml soil jar. The front portion of a large charcoal tube was added to the sample jar via a small plastic contiiner. The carbon was left in the sample container for a period of 24 hours to absorb vapours. It was then removed from the container, Desorption solvent (CS2) was added allowing it to stand for 30 minutes and the extract vialed. The extract was then analyzed by GC-MSD for VOC-Open analysis.

This sample was detected for the following compounds: Toluene, Tetrachloroethylene, m,p-Xylenes, Decane and d-Limonene.

(3) 9.97 g of sample was weighed out in a 250 ml soil jar. The front portion of a large charcoal tube was added to the sample jar via a small plastic contiiner. The carbon was left in the sample container for a period of 24 hours to absorb vapours. It was then removed from the container, Desorption solvent (CS2) was added allowing it to stand for 30 minutes and the extract vialed. The extract was then analyzed by GC-MSD for VOC-Open analysis.

This sample was detected for the following compounds: Toluene, Tetrachloroethylene, Ethylbenzene, m,p-Xylenes, o-Xylene, Nonane, Styrene, a-Pinene, 3-Ethyltoluene, 1,3,5-Trimethylbenzene, Decane, 1,2,4-Trimethylbenzene, d-Limonene, 1,4-Dichlorobenzene and Undecane.

(4) 10.19 g of sample was weighed out in a 250 ml soil jar. The front portion of a large charcoal tube was added to the sample jar via a small plastic contiiner. The carbon was left in the sample container for a period of 24 hours to absorb vapours. It was then removed from the container, Desorption solvent (CS2) was added allowing it to stand for 30 minutes and the extract vialed. The extract was then analyzed by GC-MSD for VOC-Open analysis.

This sample was detected for the following compounds: Toluene, Ethylbenzene, m,p-Xylenes, o-Xylene, a-Pinene, d-Limonene and Dodecane.

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		QQ6802	QQ6802		QQ6803		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30		2013/02/25 14:30		
COC Number		B156094	B156094		B156094		
	Units	**FEP**	**FEP Lab-Dup**	**RDL**	**RDA**	**RDL**	**QC Batch**
Petroleum Hydrocarbons							
Benzene	mg/kg	<0.13		0.13	<0.13	0.13	3135275
Leachable Benzene	mg/L	<0.010	<0.010	0.010	<0.010	0.010	3140244
Toluene	mg/kg	<0.13		0.13	<0.13	0.13	3135275
Leachable Toluene	mg/L	<0.010	<0.010	0.010	<0.010	0.010	3140244
Ethylbenzene	mg/kg	<0.13		0.13	<0.13	0.13	3135275
Leachable Ethylbenzene	mg/L	<0.010	<0.010	0.010	<0.010	0.010	3140244
Xylene (Total)	mg/kg	<0.25		0.25	<0.25	0.25	3135275
Leachable Xylene (Total)	mg/L	<0.020	<0.020	0.020	<0.020	0.020	3140244
C6 - C10 (less BTEX)	mg/kg	<13		13	<13	13	3135275
Leachable C6 - C10 (less BTEX)	mg/L	<0.10	<0.10	0.10	<0.10	0.10	3140244
>C10-C16 Hydrocarbons	mg/kg	190 (1)		120	180 (1)	110	3135287
Leachable >C10-C16 Hydrocarbons	mg/L	0.64		0.20	0.59	0.20	3136633
>C16-C21 Hydrocarbons	mg/kg	990 (1)		120	1100 (1)	110	3135287
Leachable >C16-C21 Hydrocarbons	mg/L	0.40		0.20	<0.20	0.20	3136633
>C21-<C32 Hydrocarbons	mg/kg	3700 (1)		180	3700 (1)	170	3135287
Leachable >C21-<C32 Hydrocarbons	mg/L	<0.50		0.50	<0.50	0.50	3136633
Modified TPH (Tier1)	mg/kg	4900		180	5000	170	3132844
Leachable Modified TPH (Tier1)	mg/L	1.0		0.50	0.59	0.50	3133489
Reached Baseline at C32	mg/kg	No		N/A	No	N/A	3135287
Leachable Reached Baseline at C32	mg/L	Yes		N/A	Yes	N/A	3136633
Hydrocarbon Resemblance	mg/kg	COMMENT (2)		N/A	COMMENT (3)	N/A	3135287
Leachable Hydrocarbon Resemblance	mg/L	COMMENT (2)		N/A	COMMENT (2)	N/A	3136633
Surrogate Recovery (%)							
Leachable Isobutylbenzene - Extractable	%	117			114		3136633
Leachable n-Dotriacontane - Extractable	%	100			106		3136633
Isobutylbenzene - Extractable	%	121			114		3135287
n-Dotriacontane - Extractable	%	129			93		3135287
Leachable Isobutylbenzene - Volatile	%	99	99		99		3140244

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Elevated TEH RDL(s) due to matrix interference.
(2) Unidentified compound(s) in fuel / lube range.
(3) One product in fuel / lube range. Unidentified compound(s) in fuel oil range. Lube oil fraction.

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		QQ6802	QQ6802		QQ6803		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30		2013/02/25 14:30		
COC Number		B156094	B156094		B156094		
	Units	**FEP**	**FEP Lab-Dup**	**RDL**	**RDA**	**RDL**	**QC Batch**
Isobutylbenzene - Volatile	%	123 (1)			112 (1)		3135275

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Elevated VPH RDL(s) due to sample dilution / matrix interference.

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		QQ6803		QQ6804	QQ6804		
Sampling Date		2013/02/25 14:30		2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094		B156094	B156094		
	Units	**RDA Lab-Dup**	**RDL**	**WSF**	**WSF Lab-Dup**	**RDL**	**QC Batch**
Petroleum Hydrocarbons							
Benzene	mg/kg		0.13	<0.075		0.075	3135275
Leachable Benzene	mg/L	<0.010	0.010	<0.010	<0.010	0.010	3140244
Toluene	mg/kg		0.13	2.3		0.075	3135275
Leachable Toluene	mg/L	<0.010	0.010	0.012	0.012	0.010	3140244
Ethylbenzene	mg/kg		0.13	0.33		0.075	3135275
Leachable Ethylbenzene	mg/L	<0.010	0.010	<0.010	<0.010	0.010	3140244
Xylene (Total)	mg/kg		0.25	1.9		0.15	3135275
Leachable Xylene (Total)	mg/L	<0.020	0.020	<0.020	<0.020	0.020	3140244
C6 - C10 (less BTEX)	mg/kg		13	15		7.5	3135275
Leachable C6 - C10 (less BTEX)	mg/L	0.13	0.10	0.17	<0.10	0.10	3140244
>C10-C16 Hydrocarbons	mg/kg		110	130 (1)		50	3135287
Leachable >C10-C16 Hydrocarbons	mg/L		0.20	0.25		0.20	3136633
>C16-C21 Hydrocarbons	mg/kg		110	1100 (1)		50	3135287
Leachable >C16-C21 Hydrocarbons	mg/L		0.20	<0.20		0.20	3136633
>C21-<C32 Hydrocarbons	mg/kg		170	930 (1)		75	3135287
Leachable >C21-<C32 Hydrocarbons	mg/L		0.50	<0.50		0.50	3136633
Modified TPH (Tier1)	mg/kg		170	2200		75	3132844
Leachable Modified TPH (Tier1)	mg/L		0.50	<0.50		0.50	3133489
Reached Baseline at C32	mg/kg		N/A	No		N/A	3135287
Leachable Reached Baseline at C32	mg/L		N/A	Yes		N/A	3136633
Hydrocarbon Resemblance	mg/kg		N/A	COMMENT (2)		N/A	3135287
Leachable Hydrocarbon Resemblance	mg/L		N/A	COMMENT (2)		N/A	3136633
Surrogate Recovery (%)							
Leachable Isobutylbenzene - Extractable	%			115			3136633
Leachable n-Dotriacontane - Extractable	%			104			3136633
Isobutylbenzene - Extractable	%			109			3135287
n-Dotriacontane - Extractable	%			104 (3)			3135287
Leachable Isobutylbenzene - Volatile	%	99		100	101		3140244

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Elevated TEH RDL(s) due to sample dilution.
(2) Unidentified compound(s) in fuel / lube range.
(3) TEH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

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SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		QQ6803		QQ6804	QQ6804		
Sampling Date		2013/02/25 14:30		2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094		B156094	B156094		
	Units	**RDA Lab-Dup**	**RDL**	**WSF**	**WSF Lab-Dup**	**RDL**	**QC Batch**
Isobutylbenzene - Volatile	%			93 (1)			3135275

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Elevated VPH RDL(s) due to sample dilution / matrix interference.

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		QQ6805	QQ6805		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094	B156094		
	Units	**RDF**	**RDF Lab-Dup**	**RDL**	**QC Batch**
Petroleum Hydrocarbons					
Benzene	mg/kg	<0.13		0.13	3135275
Leachable Benzene	mg/L	<0.010	<0.010	0.010	3140244
Toluene	mg/kg	<0.13		0.13	3135275
Leachable Toluene	mg/L	<0.010	<0.010	0.010	3140244
Ethylbenzene	mg/kg	<0.13		0.13	3135275
Leachable Ethylbenzene	mg/L	<0.010	<0.010	0.010	3140244
Xylene (Total)	mg/kg	<0.25		0.25	3135275
Leachable Xylene (Total)	mg/L	<0.020	<0.020	0.020	3140244
C6 - C10 (less BTEX)	mg/kg	<13		13	3135275
Leachable C6 - C10 (less BTEX)	mg/L	<0.10	<0.10	0.10	3140244
>C10-C16 Hydrocarbons	mg/kg	530 (1)		100	3135287
Leachable >C10-C16 Hydrocarbons	mg/L	0.50		0.20	3136633
>C16-C21 Hydrocarbons	mg/kg	5300 (1)		100	3135287
Leachable >C16-C21 Hydrocarbons	mg/L	0.21		0.20	3136633
>C21-<C32 Hydrocarbons	mg/kg	5000 (1)		150	3135287
Leachable >C21-<C32 Hydrocarbons	mg/L	<0.50		0.50	3136633
Modified TPH (Tier1)	mg/kg	11000		150	3132844
Leachable Modified TPH (Tier1)	mg/L	0.71		0.50	3133489
Reached Baseline at C32	mg/kg	No		N/A	3135287
Leachable Reached Baseline at C32	mg/L	Yes		N/A	3136633
Hydrocarbon Resemblance	mg/kg	COMMENT (2)		N/A	3135287
Leachable Hydrocarbon Resemblance	mg/L	COMMENT (3)		N/A	3136633
Surrogate Recovery (%)					
Leachable Isobutylbenzene - Extractable	%	114			3136633
Leachable n-Dotriacontane - Extractable	%	101			3136633
Isobutylbenzene - Extractable	%	89			3135287
n-Dotriacontane - Extractable	%	75 (4)			3135287

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Elevated TEH RDL(s) due to sample dilution.
(2) One product in fuel / lube range. Unidentified compound(s) in fuel / lube range.
(3) Unidentified compound(s) in fuel range.
(4) TEH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

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Maxxam Job #: B327722
Report Date: 2013/03/07

SNC-Lavalin Inc, Environment Division
Client Project #: 511766-0001
Site Location: SNC CUSTOM LEACHATE
Sampler Initials: AT

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		QQ6805	QQ6805		
Sampling Date		2013/02/25 14:30	2013/02/25 14:30		
COC Number		B156094	B156094		
	Units	**RDF**	**RDF Lab-Dup**	**RDL**	**QC Batch**
Leachable Isobutylbenzene - Volatile	%	102	102		3140244
Isobutylbenzene - Volatile	%	100 (1)			3135275

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
QC Batch = Quality Control Batch
(1) Elevated VPH RDL(s) due to sample dilution / matrix interference.

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Package 1	10.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

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SNC-Lavalin Inc, Environment Division
Attention: Cameron Ells
Client Project #: 511766-0001
P.O. #:
Site Location: SNC CUSTOM LEACHATE

Quality Assurance Report

Maxxam Job Number: DB327722

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3134627 KCA	Method Blank	Sample Weight (as received)	2013/02/27	NA		g	
	RPD [QQ6802-02]	Sample Weight (as received)	2013/02/27	19.2		%	N/A
	RPD [QQ6803-02]	Sample Weight (as received)	2013/02/27	2.1		%	N/A
	RPD [QQ6804-02]	Sample Weight (as received)	2013/02/27	1.0		%	N/A
	RPD [QQ6805-02]	Sample Weight (as received)	2013/02/27	4.2		%	N/A
3135275 THL	Matrix Spike	Isobutylbenzene - Volatile	2013/02/27		89	%	60 - 140
		Benzene	2013/02/27		83	%	60 - 140
		Toluene	2013/02/27		122	%	60 - 140
		Ethylbenzene	2013/02/27		107	%	60 - 140
		Xylene (Total)	2013/02/27		118	%	60 - 140
	Spiked Blank	Isobutylbenzene - Volatile	2013/02/27		94	%	60 - 140
		Benzene	2013/02/27		89	%	60 - 140
		Toluene	2013/02/27		91	%	60 - 140
		Ethylbenzene	2013/02/27		93	%	60 - 140
		Xylene (Total)	2013/02/27		93	%	60 - 140
	Method Blank	Isobutylbenzene - Volatile	2013/02/27		91	%	60 - 140
		Benzene	2013/02/27	<0.025		mg/kg	
		Toluene	2013/02/27	<0.025		mg/kg	
		Ethylbenzene	2013/02/27	<0.025		mg/kg	
		Xylene (Total)	2013/02/27	<0.050		mg/kg	
		C6 - C10 (less BTEX)	2013/02/27	<2.5		mg/kg	
	RPD	Benzene	2013/02/27	NC		%	50
		Toluene	2013/02/27	NC		%	50
		Ethylbenzene	2013/02/27	NC		%	50
		Xylene (Total)	2013/02/27	NC		%	50
		C6 - C10 (less BTEX)	2013/02/27	NC		%	50
3135287 JRU	Matrix Spike	Isobutylbenzene - Extractable	2013/03/01		94	%	30 - 130
		n-Dotriacontane - Extractable	2013/03/01		93 (1)	%	30 - 130
		>C10-C16 Hydrocarbons	2013/03/01		NC	%	30 - 130
		>C16-C21 Hydrocarbons	2013/03/01		88	%	30 - 130
		>C21-<C32 Hydrocarbons	2013/03/01		NC	%	30 - 130
	Spiked Blank	Isobutylbenzene - Extractable	2013/02/28		100	%	30 - 130
		n-Dotriacontane - Extractable	2013/02/28		106	%	30 - 130
		>C10-C16 Hydrocarbons	2013/02/28		77	%	30 - 130
		>C16-C21 Hydrocarbons	2013/02/28		87	%	30 - 130
		>C21-<C32 Hydrocarbons	2013/02/28		101	%	30 - 130
	Method Blank	Isobutylbenzene - Extractable	2013/02/28		104	%	30 - 130
		n-Dotriacontane - Extractable	2013/02/28		111	%	30 - 130
		>C10-C16 Hydrocarbons	2013/02/28	<10		mg/kg	
		>C16-C21 Hydrocarbons	2013/02/28	<10		mg/kg	
		>C21-<C32 Hydrocarbons	2013/02/28	<15		mg/kg	
	RPD	>C10-C16 Hydrocarbons	2013/02/28	10.2		%	50
		>C16-C21 Hydrocarbons	2013/02/28	0.1		%	50
		>C21-<C32 Hydrocarbons	2013/02/28	3.8		%	50
3135654 DLB	Spiked Blank	Leachable Aluminum (Al)	2013/02/27		102	%	80 - 120
		Leachable Antimony (Sb)	2013/02/27		106	%	80 - 120
		Leachable Arsenic (As)	2013/02/27		96	%	80 - 120
		Leachable Barium (Ba)	2013/02/27		101	%	80 - 120
		Leachable Beryllium (Be)	2013/02/27		98	%	80 - 120
		Leachable Boron (B)	2013/02/27		98	%	80 - 120
		Leachable Cadmium (Cd)	2013/02/27		97	%	80 - 120
		Leachable Calcium (Ca)	2013/02/27		93	%	80 - 120
		Leachable Chromium (Cr)	2013/02/27		97	%	80 - 120
		Leachable Cobalt (Co)	2013/02/27		98	%	80 - 120
		Leachable Copper (Cu)	2013/02/27		96	%	80 - 120

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P.O. #:
Site Location: SNC CUSTOM LEACHATE

Quality Assurance Report (Continued)

Maxxam Job Number: DB327722

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3135654 DLB	Spiked Blank	Leachable Iron (Fe)	2013/02/27		101	%	80 - 120
		Leachable Lead (Pb)	2013/02/27		101	%	80 - 120
		Leachable Lithium (Li)	2013/02/27		101	%	80 - 120
		Leachable Magnesium (Mg)	2013/02/27		100	%	80 - 120
		Leachable Manganese (Mn)	2013/02/27		97	%	80 - 120
		Leachable Molybdenum (Mo)	2013/02/27		102	%	80 - 120
		Leachable Nickel (Ni)	2013/02/27		95	%	80 - 120
		Leachable Potassium (K)	2013/02/27		97	%	80 - 120
		Leachable Selenium (Se)	2013/02/27		95	%	80 - 120
		Leachable Silver (Ag)	2013/02/27		105	%	80 - 120
		Leachable Strontium (Sr)	2013/02/27		100	%	80 - 120
		Leachable Thallium (Tl)	2013/02/27		102	%	80 - 120
		Leachable Tin (Sn)	2013/02/27		103	%	80 - 120
		Leachable Uranium (U)	2013/02/27		105	%	80 - 120
		Leachable Vanadium (V)	2013/02/27		99	%	80 - 120
		Leachable Zinc (Zn)	2013/02/27		98	%	80 - 120
	Method Blank	Leachable Aluminum (Al)	2013/02/27	<100		ug/L	
		Leachable Antimony (Sb)	2013/02/27	<20		ug/L	
		Leachable Arsenic (As)	2013/02/27	<20		ug/L	
		Leachable Barium (Ba)	2013/02/27	60, RDL=50		ug/L	
		Leachable Beryllium (Be)	2013/02/27	<20		ug/L	
		Leachable Boron (B)	2013/02/27	<500		ug/L	
		Leachable Cadmium (Cd)	2013/02/27	<3.0		ug/L	
		Leachable Calcium (Ca)	2013/02/27	<1000		ug/L	
		Leachable Chromium (Cr)	2013/02/27	<20		ug/L	
		Leachable Cobalt (Co)	2013/02/27	<10		ug/L	
		Leachable Copper (Cu)	2013/02/27	<20		ug/L	
		Leachable Iron (Fe)	2013/02/27	<500		ug/L	
		Leachable Lead (Pb)	2013/02/27	<5.0		ug/L	
		Leachable Lithium (Li)	2013/02/27	<20		ug/L	
		Leachable Magnesium (Mg)	2013/02/27	<1000		ug/L	
		Leachable Manganese (Mn)	2013/02/27	<20		ug/L	
		Leachable Molybdenum (Mo)	2013/02/27	<20		ug/L	
		Leachable Nickel (Ni)	2013/02/27	<20		ug/L	
		Leachable Potassium (K)	2013/02/27	<1000		ug/L	
		Leachable Selenium (Se)	2013/02/27	<10		ug/L	
		Leachable Silver (Ag)	2013/02/27	<5.0		ug/L	
		Leachable Strontium (Sr)	2013/02/27	<50		ug/L	
		Leachable Thallium (Tl)	2013/02/27	<1.0		ug/L	
		Leachable Tin (Sn)	2013/02/27	<20		ug/L	
		Leachable Uranium (U)	2013/02/27	<1.0		ug/L	
		Leachable Vanadium (V)	2013/02/27	<20		ug/L	
		Leachable Zinc (Zn)	2013/02/27	<50		ug/L	
	RPD [QQ6802-02]	Leachable Aluminum (Al)	2013/02/28	60.4 (2)		%	35
		Leachable Antimony (Sb)	2013/02/28	NC		%	35
		Leachable Arsenic (As)	2013/02/28	NC		%	35
		Leachable Barium (Ba)	2013/02/28	NC		%	35
		Leachable Beryllium (Be)	2013/02/28	NC		%	35
		Leachable Boron (B)	2013/02/28	NC		%	35
		Leachable Cadmium (Cd)	2013/02/28	NC		%	35
		Leachable Calcium (Ca)	2013/02/28	45.0 (2)		%	35
		Leachable Chromium (Cr)	2013/02/28	NC		%	35
		Leachable Cobalt (Co)	2013/02/28	NC		%	35
		Leachable Copper (Cu)	2013/02/28	NC		%	35
		Leachable Iron (Fe)	2013/02/28	NC (2)		%	

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Quality Assurance Report (Continued)

Maxxam Job Number: DB327722

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3135654 DLB	RPD [QQ6802-02]	Leachable Lead (Pb)	2013/02/28	NC		%	35
		Leachable Lithium (Li)	2013/02/28	NC		%	35
		Leachable Magnesium (Mg)	2013/02/28	58.2 (2)		%	35
		Leachable Manganese (Mn)	2013/02/28	119 (2)		%	35
		Leachable Molybdenum (Mo)	2013/02/28	NC		%	35
		Leachable Nickel (Ni)	2013/02/28	NC		%	35
		Leachable Potassium (K)	2013/02/28	2.7		%	35
		Leachable Selenium (Se)	2013/02/28	NC		%	35
		Leachable Silver (Ag)	2013/02/28	NC		%	35
		Leachable Strontium (Sr)	2013/02/28	30.4		%	35
		Leachable Thallium (Tl)	2013/02/28	NC		%	35
		Leachable Tin (Sn)	2013/02/28	NC		%	35
		Leachable Uranium (U)	2013/02/28	NC		%	35
		Leachable Vanadium (V)	2013/02/28	NC		%	35
		Leachable Zinc (Zn)	2013/02/28	80.8 (2)		%	35
	RPD [QQ6803-02]	Leachable Aluminum (Al)	2013/02/28	NC		%	35
		Leachable Antimony (Sb)	2013/02/28	NC		%	35
		Leachable Arsenic (As)	2013/02/28	NC		%	35
		Leachable Barium (Ba)	2013/02/28	NC		%	35
		Leachable Beryllium (Be)	2013/02/28	NC		%	35
		Leachable Boron (B)	2013/02/28	NC		%	35
		Leachable Cadmium (Cd)	2013/02/28	NC		%	35
		Leachable Calcium (Ca)	2013/02/28	78.1 (2)		%	35
		Leachable Chromium (Cr)	2013/02/28	NC		%	35
		Leachable Cobalt (Co)	2013/02/28	NC		%	35
		Leachable Copper (Cu)	2013/02/28	NC		%	35
		Leachable Iron (Fe)	2013/02/28	NC		%	35
		Leachable Lead (Pb)	2013/02/28	NC		%	35
		Leachable Lithium (Li)	2013/02/28	NC		%	35
		Leachable Magnesium (Mg)	2013/02/28	55.9 (2)		%	35
		Leachable Manganese (Mn)	2013/02/28	38.3 (2)		%	35
		Leachable Molybdenum (Mo)	2013/02/28	NC		%	35
		Leachable Nickel (Ni)	2013/02/28	NC		%	35
		Leachable Potassium (K)	2013/02/28	46.9 (2)		%	35
		Leachable Selenium (Se)	2013/02/28	NC		%	35
		Leachable Silver (Ag)	2013/02/28	NC		%	35
		Leachable Strontium (Sr)	2013/02/28	52.0 (2)		%	35
		Leachable Thallium (Tl)	2013/02/28	NC		%	35
		Leachable Tin (Sn)	2013/02/28	NC		%	35
		Leachable Uranium (U)	2013/02/28	NC		%	35
		Leachable Vanadium (V)	2013/02/28	NC		%	35
		Leachable Zinc (Zn)	2013/02/28	NC		%	35
	RPD [QQ6804-02]	Leachable Aluminum (Al)	2013/02/28	NC (2)		%	35
		Leachable Antimony (Sb)	2013/02/28	NC		%	35
		Leachable Arsenic (As)	2013/02/28	NC		%	35
		Leachable Barium (Ba)	2013/02/28	67.0 (2)		%	35
		Leachable Beryllium (Be)	2013/02/28	NC		%	35
		Leachable Boron (B)	2013/02/28	NC		%	35
		Leachable Cadmium (Cd)	2013/02/28	NC		%	35
		Leachable Calcium (Ca)	2013/02/28	41.7 (2)		%	35
		Leachable Chromium (Cr)	2013/02/28	NC		%	35
		Leachable Cobalt (Co)	2013/02/28	NC		%	35
		Leachable Copper (Cu)	2013/02/28	NC		%	35
		Leachable Iron (Fe)	2013/02/28	116 (2)		%	35
		Leachable Lead (Pb)	2013/02/28	NC (2)		%	35

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Site Location: SNC CUSTOM LEACHATE

Quality Assurance Report (Continued)

Maxxam Job Number: DB327722

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3135654 DLB	RPD [QQ6804-02]	Leachable Lithium (Li)	2013/02/28	NC		%	35
		Leachable Magnesium (Mg)	2013/02/28	25.9		%	35
		Leachable Manganese (Mn)	2013/02/28	37.5 (2)		%	35
		Leachable Molybdenum (Mo)	2013/02/28	NC		%	35
		Leachable Nickel (Ni)	2013/02/28	NC (2)		%	35
		Leachable Potassium (K)	2013/02/28	0.6		%	35
		Leachable Selenium (Se)	2013/02/28	NC		%	35
		Leachable Silver (Ag)	2013/02/28	NC		%	35
		Leachable Strontium (Sr)	2013/02/28	14.8		%	35
		Leachable Thallium (Tl)	2013/02/28	NC		%	35
		Leachable Tin (Sn)	2013/02/28	NC		%	35
		Leachable Uranium (U)	2013/02/28	NC		%	35
		Leachable Vanadium (V)	2013/02/28	NC		%	35
		Leachable Zinc (Zn)	2013/02/28	7.9		%	35
	RPD [QQ6805-02]	Leachable Aluminum (Al)	2013/02/28	130 (2)		%	35
		Leachable Antimony (Sb)	2013/02/28	NC		%	35
		Leachable Arsenic (As)	2013/02/28	NC		%	35
		Leachable Barium (Ba)	2013/02/28	NC (2)		%	35
		Leachable Beryllium (Be)	2013/02/28	NC		%	35
		Leachable Boron (B)	2013/02/28	NC		%	35
		Leachable Cadmium (Cd)	2013/02/28	NC		%	35
		Leachable Calcium (Ca)	2013/02/28	26.6		%	35
		Leachable Chromium (Cr)	2013/02/28	NC		%	
		Leachable Cobalt (Co)	2013/02/28	NC		%	
		Leachable Copper (Cu)	2013/02/28	106 (2)		%	35
		Leachable Iron (Fe)	2013/02/28	NC (2)		%	35
		Leachable Lead (Pb)	2013/02/28	NC (2)		%	35
		Leachable Lithium (Li)	2013/02/28	NC		%	35
		Leachable Magnesium (Mg)	2013/02/28	71.4 (2)		%	35
		Leachable Manganese (Mn)	2013/02/28	42.0 (2)		%	35
		Leachable Molybdenum (Mo)	2013/02/28	NC		%	35
		Leachable Nickel (Ni)	2013/02/28	39.0 (2)		%	35
		Leachable Potassium (K)	2013/02/28	77.2 (2)		%	35
		Leachable Selenium (Se)	2013/02/28	NC		%	35
		Leachable Silver (Ag)	2013/02/28	NC		%	35
		Leachable Strontium (Sr)	2013/02/28	37.5 (2)		%	35
		Leachable Thallium (Tl)	2013/02/28	NC		%	35
		Leachable Tin (Sn)	2013/02/28	NC		%	35
		Leachable Uranium (U)	2013/02/28	NC		%	35
		Leachable Vanadium (V)	2013/02/28	NC		%	35
		Leachable Zinc (Zn)	2013/02/28	45.4 (2)		%	35
3136534 BBD	QC Standard	Loss on Ignition	2013/02/28		100	%	80 - 120
	Method Blank	Loss on Ignition	2013/02/28	<0.30		%	
3136633 JRU	Matrix Spike [QQ6803-02]	Leachable Isobutylbenzene - Extractable	2013/03/01		117	%	30 - 130
		Leachable n-Dotriacontane - Extractable	2013/03/01		110	%	30 - 130
		Leachable >C10-C16 Hydrocarbons	2013/03/01		74	%	30 - 130
		Leachable >C16-C21 Hydrocarbons	2013/03/01		98	%	30 - 130
		Leachable >C21-<C32 Hydrocarbons	2013/03/01		100	%	30 - 130
	Leachate Blank	Leachable Isobutylbenzene - Extractable	2013/03/01		113	%	30 - 130
		Leachable n-Dotriacontane - Extractable	2013/03/01		101	%	30 - 130
		Leachable >C10-C16 Hydrocarbons	2013/03/01	<0.20		mg/L	
		Leachable >C16-C21 Hydrocarbons	2013/03/01	<0.20		mg/L	
		Leachable >C21-<C32 Hydrocarbons	2013/03/01	<0.50		mg/L	
	Spiked Blank	Leachable Isobutylbenzene - Extractable	2013/03/01		112	%	30

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Quality Assurance Report (Continued)

Maxxam Job Number: DB327722

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3136633 JRU	Spiked Blank	Leachable n-Dotriacontane - Extractable	2013/03/01		100	%	30 - 130
		Leachable >C10-C16 Hydrocarbons	2013/03/01		83	%	30 - 130
		Leachable >C16-C21 Hydrocarbons	2013/03/01		97	%	30 - 130
		Leachable >C21-<C32 Hydrocarbons	2013/03/01		100	%	30 - 130
	Method Blank	Leachable Isobutylbenzene - Extractable	2013/03/01		110	%	30 - 130
		Leachable n-Dotriacontane - Extractable	2013/03/01		98	%	30 - 130
		Leachable >C10-C16 Hydrocarbons	2013/03/01	<0.20		mg/L	
		Leachable >C16-C21 Hydrocarbons	2013/03/01	<0.20		mg/L	
		Leachable >C21-<C32 Hydrocarbons	2013/03/01	<0.50		mg/L	
3139951 MKH	QC Standard	Leachable Mercury (Hg)	2013/03/04		94	%	80 - 120
	Spiked Blank	Leachable Mercury (Hg)	2013/03/04		102	%	80 - 120
	Method Blank	Leachable Mercury (Hg)	2013/03/04	<0.10		ug/L	
	RPD [QQ6802-02]	Leachable Mercury (Hg)	2013/03/04	NC		%	25
	RPD [QQ6803-02]	Leachable Mercury (Hg)	2013/03/04	NC		%	25
	RPD [QQ6804-02]	Leachable Mercury (Hg)	2013/03/04	NC		%	25
	RPD [QQ6805-02]	Leachable Mercury (Hg)	2013/03/04	NC		%	25
3140244 THL	Matrix Spike [QQ6805-02]	Leachable Isobutylbenzene - Volatile	2013/03/05		102	%	70 - 130
		Leachable Benzene	2013/03/05		100	%	70 - 130
		Leachable Toluene	2013/03/05		104	%	70 - 130
		Leachable Ethylbenzene	2013/03/05		104	%	70 - 130
		Leachable Xylene (Total)	2013/03/05		103	%	70 - 130
	Spiked Blank	Leachable Isobutylbenzene - Volatile	2013/03/05		88	%	70 - 130
		Leachable Benzene	2013/03/05		106	%	70 - 130
		Leachable Toluene	2013/03/05		106	%	70 - 130
		Leachable Ethylbenzene	2013/03/05		104	%	70 - 130
		Leachable Xylene (Total)	2013/03/05		101	%	70 - 130
	Method Blank	Leachable Isobutylbenzene - Volatile	2013/03/05		100	%	70 - 130
		Leachable Benzene	2013/03/05	<0.010		mg/L	
		Leachable Toluene	2013/03/05	<0.010		mg/L	
		Leachable Ethylbenzene	2013/03/05	<0.010		mg/L	
		Leachable Xylene (Total)	2013/03/05	<0.020		mg/L	
		Leachable C6 - C10 (less BTEX)	2013/03/05	<0.10		mg/L	
	RPD [QQ6802-02]	Leachable Benzene	2013/03/05	NC		%	40
		Leachable Toluene	2013/03/05	NC		%	40
		Leachable Ethylbenzene	2013/03/05	NC		%	40
		Leachable Xylene (Total)	2013/03/05	NC		%	40
		Leachable C6 - C10 (less BTEX)	2013/03/05	NC		%	40
	RPD [QQ6803-02]	Leachable Benzene	2013/03/05	NC		%	40
		Leachable Toluene	2013/03/05	NC		%	40
		Leachable Ethylbenzene	2013/03/05	NC		%	40
		Leachable Xylene (Total)	2013/03/05	NC		%	40
		Leachable C6 - C10 (less BTEX)	2013/03/05	NC		%	40
	RPD [QQ6804-02]	Leachable Benzene	2013/03/05	NC		%	40
		Leachable Toluene	2013/03/05	NC		%	40
		Leachable Ethylbenzene	2013/03/05	NC		%	40
		Leachable Xylene (Total)	2013/03/05	NC		%	40
		Leachable C6 - C10 (less BTEX)	2013/03/05	NC		%	40
	RPD [QQ6805-02]	Leachable Benzene	2013/03/05	NC		%	40
		Leachable Toluene	2013/03/05	NC		%	40
		Leachable Ethylbenzene	2013/03/05	NC		%	40
		Leachable Xylene (Total)	2013/03/05	NC		%	40
		Leachable C6 - C10 (less BTEX)	2013/03/05	NC		%	40

N/A = Not Applicable
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel:902-420-0203 Toll-free:800-565-7227 Fax:902-420-8612 www.maxxamanalytics.com

SNC-Lavalin Inc, Environment Division
Attention: Cameron Ells
Client Project #: 511766-0001
P.O. #:
Site Location: SNC CUSTOM LEACHATE

Quality Assurance Report (Continued)

Maxxam Job Number: DB327722

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.
QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
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) TEH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.
(2) Poor RPD due to sample inhomogeneity.

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Validation Signature Page

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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

[redacted]
Alan Stewart, Scientific Specialist (Organics)

[redacted]
Colleen Acker, Supervisor, General Chemistry

[redacted]
Kevin Macdonald, Inorganics Supervisor

[redacted]
Rose Macdonald, Scientific Specialist (Organics)

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SNC·LAVALIN
5657 Spring Garden Road, Suite 200
Halifax, Nova Scotia B3J 3R4
(902) 492-4544 - (902) 492-4540

Waste Resource Strategy Update

Halifax Regional Municipality



January 2013

Executive Summary

The Halifax Regional Municipality (HRM) has over the last 15 years implemented an effective waste resource and reduction strategy. Its residential diversion rate from landfill has increased from approximately 5% in 1995 to 52% currently. Program implementation was guided by an *Integrated Waste Resource Management Strategy* report (1995 Strategy) which was developed by community volunteers. While the principles described in the 1995 Strategy remain valid today, most of the program elements have now been implemented.

Much of the physical infrastructure constructed to support the 1995 Strategy will be nearing the end of its useful life in the next five to ten years. HRM has retained Stantec Consulting Limited (Stantec) to review current programs and services and to recommend an updated strategy to guide HRM decision making over the next 20 years. A key element of this review is to compare local program costs to similar municipal operations. An example is the per tonne cost to operate the Otter Lake processing and disposal site. At a current cost of $170/tonne (including capital, operating and perpetual care), expenses at Otter Lake far exceed more typical industry costs of $50 to $100/tonne for all costs related to landfill disposal. Pre-processing of waste is rarely undertaken elsewhere.

While maintaining the original principles of the 1995 Strategy, the three stated goals of this review are as follows:

- *Reduce program costs through the implementation of service delivery efficiencies;*
- *Upgrade or replace necessary infrastructure to meet existing and near to mid-term capacity and regulatory requirements; and*
- *Maximize the opportunity for program revenue generation from recovery of and/or processing of waste resource materials and increased diversion.*

The following specific constraints were identified which restrict the range of program choices available to HRM over this planning horizon:

- Organic wastes are banned from landfill in Nova Scotia;
- The industrial/commercial/institutional (ICI) sector have no reasonable option currently available for processing organics except for HRM facilities;
- HRM by-law No. S-600 provides HRM with legal control of the import and export of waste generated within the municipality;

- Existing facility locations, capacities and operating agreements; and
- The current waste system in HRM is highly integrated with many interdependencies.

Based on a comprehensive review of HRM's complete waste resource systems, Stantec has generated the following conclusions:

1) The total diversion rate is high in HRM compared to other municipalities, but realistic opportunities exist to improve the recovery of residential and ICI recyclables and organics in accordance with provincial legislation.

2) The front-end processing (FEP) and waste stabilization facility (WSF) at Otter Lake do not provide a useful function compared to their stated purpose in the 1995 Strategy.

3) The landfill liner design specification in Nova Scotia is more stringent than most comparable state and provincial jurisdictions, and potential modifications could significantly reduce future capital costs.

4) An opportunity exists to significantly extend the life of the landfill at Otter Lake, and reduce the site per tonne capital costs by increasing the finished grade by 10-15 metres.

5) The two composting operations in Halifax and Dartmouth do not provide a sufficiently finished product to meet applicable guidelines which become effective in the near future.

6) Composting facilities are at capacity and additional processing capacity is required in the short and longer term.

7) Alternative composting technologies may improve the processing of ICI organics.

8) Collection programs are cost effective and meet most customer needs however there are opportunities to improve diversion by increasing the frequency of collection.

9) Opportunities exist for more collaborative use of resources with other waste management regions in Nova Scotia.

10) Energy-from-Waste and developing waste reduction technologies are not considered appropriate investments for HRM at this time.

11) Overall program costs in HRM are high and represent a greater financial burden on both the private and public sectors compared to similar communities.

12) HRM would benefit from the creation of a centralized waste resource campus, rather than having facilities at four different locations in Halifax and Dartmouth. Development can be staged over time to match the end-of-useful-life of current infrastructure and

incorporate new elements for HRM such as outdoor windrow compost curing pads; permanent educational and household special waste facilities; and the development of a materials transfer capability.

Stantec has developed recommendations for an updated HRM waste resource strategy (Waste Resource Strategy Update) to guide program and service implementation over the next 10-20 years. Consistent with the three stated goals of this assignment, recommendations have been grouped into three sections below. The following list identifies issues representing fundamental change. Other more minor recommendations are included within the body of this report. As discussed previously, an integrated waste system such as that currently operating in HRM includes many program interdependencies. The following recommendations cannot necessarily be addressed in isolation, and contingent activities are noted where applicable.

Opportunities for Cost Reductions

A1 – Closure of the FEP and WSF by the end of 2013

The FEP and WSF do not function in a manner envisaged in the 1995 Strategy. These facilities were intended to stabilize organic wastes and produce a low-grade compost product. Few organics are now actually processed, and the multiple shredding of the waste prior to disposal may actually increase the generation of landfill gas over the short term in the period before gas collection systems can be installed. This may contribute to additional odours from the site. Implementation of this recommendation is contingent on HRM implementing a separate collection for white goods (stoves; refrigerators) rather than the current practice of loading these items in with the regular curbside waste and then removing the appliances from the waste at the FEP. The annual cost to operate the FEP and WSF is reported to be $8.9 million per year. Most of this amount could be recognized as sustainable savings less any contractual commitments.

A2 – Request Modification of the Nova Scotia Landfill Liner Specification

The current landfill liner specification is more stringent than most comparable state and provincial jurisdictions. Given the context in HRM and Nova Scotia in the 1990s, this conservative specification was considered prudent at the time. However, the current specification results in relatively high capital construction costs which in turn lead to increased expenses for the ICI sector and HRM. Based on examples from other jurisdictions, HRM capital costs for liner construction could be reduced by approximately $3.4 million for a typical cell ($10.2 million over the remaining life of the site) if Nova Scotia were to adopt a specification consistent with most similar jurisdictions.

A3 – Extend Life of Otter Lake Landfill through Vertical Expansion

The current design for the finished elevation of the landfill will result in a landform that will be consistent with surrounding topography. While this approach has merit, an extension of approximately 17-23 years to the life of the landfill can be achieved by a 10-15 metre increase in the finished grade of the site. Given the potential benefit to the broader community and the remote locale of the site, Stantec recommends that HRM consider a vertical expansion of the landfill subject to input from the immediate neighbours of the landfill.

Upgrade and Replacement of Infrastructure

B1 – Create a Centralized Waste Resource Campus

Current infrastructure is located at four different properties in Dartmouth and Halifax. With the exception of the Otter Lake facility, sites are of limited size and prevent the consideration of co-collection of materials at the curb in a single truck. Stantec recommends HRM establish a large acreage waste resource campus (Campus) in a location of sufficient size to meet changing infrastructure needs (excluding landfill disposal) for on the order of 50 years. The benefits would include the potential to optimize collection routing and fleet size, lands for compost curing, a common location for infrastructure replacements when needed, and a location for contingency waste transfer. Possible components and timing are presented below.

• Secure lands, obtain approvals and complete site servicing	2013/2014
• Construct and operate compost curing pads	2014/2015
• Construct scales, offices and educational centre	2015
• Construct multi-use transfer facility for white goods/waste/MHSW	2015
• Construct anaerobic composter for ICI organics	2015/2016
• Construct replacement MRF	2017/2018
• Optional aerobic composting processing capacity	2018+
• Optional advanced waste reduction(gasification or other)	2020+
• Other long-term waste reduction infrastructure needs	2020+

B2 – Relocation of MRF to Campus

The existing MRF in Halifax is operating satisfactorily and equipment is suitable for current needs and until the expiry of a contract extension to 2019. As identified above, it is recommended that this activity be relocated to the Campus in anticipation of a 2019 contract start date.

B3 – Increase Organics Processing Capacity

The aerobic composting facility south of Halifax is not considered a strategic asset and could be decommissioned at the end of the current contract in 2019. Equivalent organics processing

capacity for the Halifax collection zone is recommended to be realized at Otter Lake by repurposing the WSF. The Dartmouth organics processing facility can meet Dartmouth area needs until at least 2030 by constructing an anaerobic processing facility by 2015/2016 at either the current site or at an alternative location.

Maximize Program Revenue and Increase Diversion

C1 – Improve Recovery of Recyclables and Organics

Based on the results of annual waste composition studies completed recently by SNC Lavalin and CBCL, 30% of residential and up to 50% of ICI materials currently sent to landfill could be recovered as recyclables or compostable organics. This is an opportunity for HRM to optimize existing programs and increase diversion.

C2 – Control Curing and Sale of Finished Compost

Once organics are processed at facilities in Dartmouth and Halifax, the unfinished product is sold at a nominal fee of $1/tonne at both facilities. HRM has no control over the final maturation process and foregoes the potential for an increase in net revenue generation. The final maturation (also termed "curing") process typically requires a period of up to one year in outdoor open windrows to meet CCME guidelines and become a saleable product. It is recommended that HRM control the final curing process to ensure guidelines are being met with its compost, and also to gain the benefit of enhanced product value at final maturation.

C3 – Improve Curbside Collection Frequency

Challenges with recovery of divertible materials at the curb are often linked to the frequency of collection. Whether the entire collection system is weekly or every 2 weeks, this does not change the amount of material to be collected on a monthly basis. Residents are far more likely to divert organics and recyclables if collection is performed on a weekly basis so that odour and storage constraints do not affect participation.

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Appendices

Appendix A Dillon Consulting Memo dated September 17, 2012
Dillon Consulting Memo dated September 26, 2012

Appendix B Drawing No. 01 – Landfill Liner Designs

1.0 Introduction

1.1 BACKGROUND

Prior to 1995, the Metropolitan Authority responsible for waste management in the vicinity of Halifax offered only the most basic of waste management services to local residents and businesses. Only 5% of recyclable and compostable products were recovered with the remaining 95% of the wastestream being sent to landfill. Problems associated with the Upper Sackville landfill in the early 1990s led to the development of an Integrated Waste Resource Management Strategy in 1995 (1995 Strategy). The 1995 Strategy was prepared by a Community Stakeholder Committee (CSC) as a framework for detailed system planning and design. The issues related to the Upper Sackville landfill ultimately led to the transfer of responsibility for waste management on January 1, 1997 from the Metropolitan Authority to the Halifax Regional Municipality (HRM). HRM was created by the Province of Nova Scotia as a single-tier municipal government whose responsibilities included among other services, full responsibility for waste management within HRM.

During this period of fundamental change prompted by the 1995 Strategy, both HRM and the Province of Nova Scotia developed and implemented policies and programs which advanced the region to the forefront of municipal best practice for waste and recycling. Provincial and local bans on the landfilling of recyclable and compostable products established HRM and Nova Scotia as leaders throughout North America. HRM has continued to rely on the 1995 Strategy to guide its program planning. HRM currently diverts 52% of the municipal wastestream from landfill compared to 5% in 1995. In the words of the CSC volunteers who created the 1995 Strategy:

> *"This Strategy is designed to address the municipal solid wastestream, to achieve the maximum possible diversion of resources from disposal and to encourage citizens to adopt the necessary lifestyle changes to move from a consumer to a conserver society.*
>
> *The Strategy is designed to be flexible enough to incorporate new, environmentally sustainable technologies that will move us towards our ultimate goal of Zero Waste."*

Throughout the text of the 1995 Strategy, flexibility is mentioned several times as well as the need to adapt to changing conditions. Few areas of municipal service delivery have changed as rapidly as waste management over the last two decades.

Given that seventeen years has passed since the 1995 Strategy was developed, HRM has retained Stantec Consulting Ltd (Stantec) to complete a review of current programs and services, and to recommend opportunities for improvement over the next 10-20 year period. This review (Waste Resource Strategy Update) is timely as some of the current infrastructure is

nearing the end of its useful life. A summary of current programs offered by HRM and the scope of Stantec's assignment are provided in the following sections.

1.2 SUMMARY OF EXISTING PROGRAMS AND SERVICES

HRM offers local residents and businesses with a package of programs and services that meets or exceeds those of comparable municipalities in North America. Of particular note, HRM and Nova Scotia have banned the landfilling of household and industrial/commercial/institutional (ICI) organics such as food waste and brush. Existing programs and services are highlighted below.

Residential Collection

- Weekly recyclables collection (biweekly in outlying areas)
- Bi-weekly food and yard waste collection (weekly in the summer in urban/suburban areas)
- Bi-weekly garbage collection

Processing and Disposal Services

- Recyclables processing for ICI sector (facility in Halifax)
- Organics for ICI sector ($75/tonne fee; facilities in Halifax and Dartmouth)
- Disposal facility at Otter Lake south of Halifax ($125/tonne)

Diversion Program Education and Communication Services

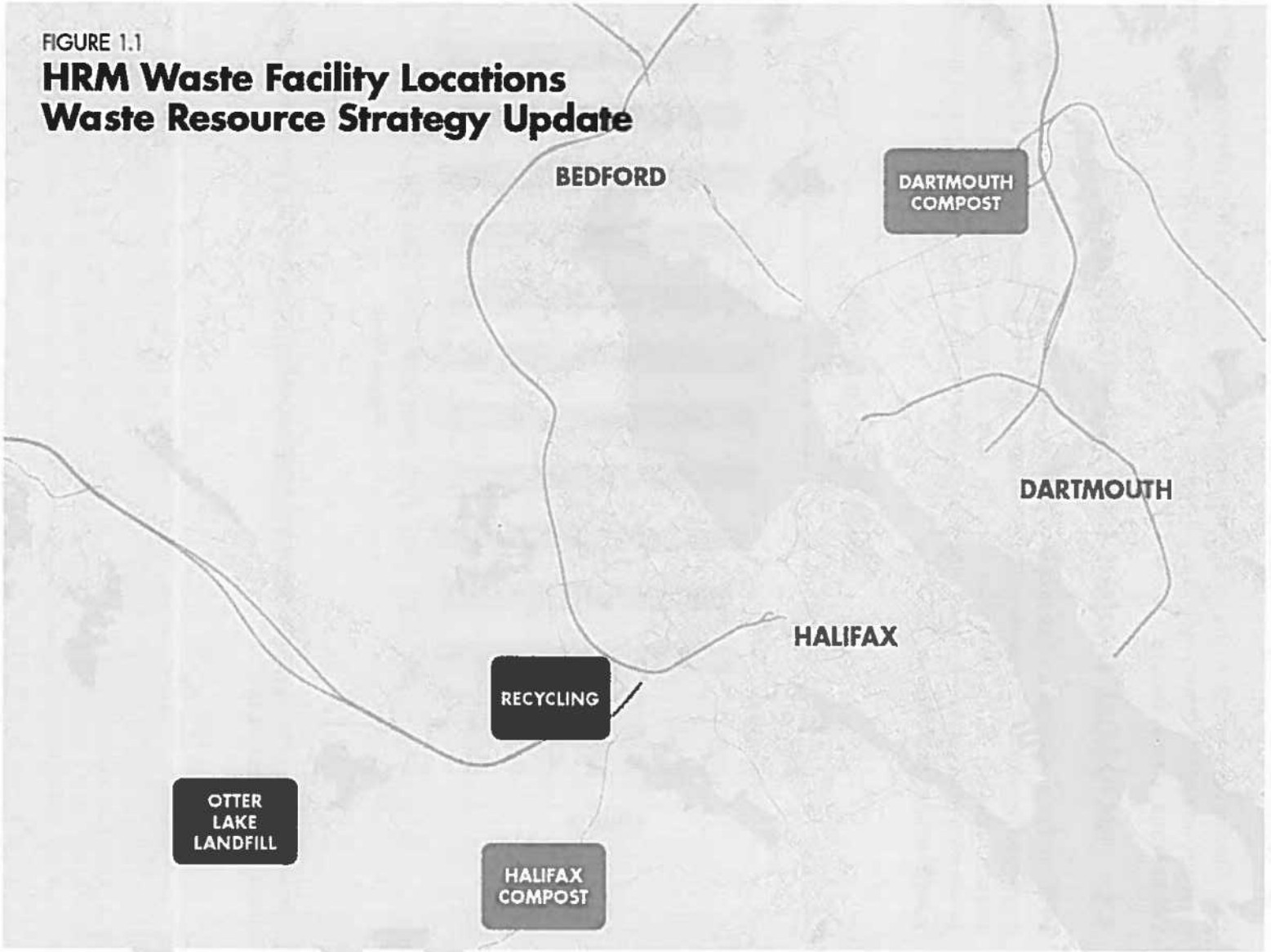
- Proactive outreach and inspection of high rise and ICI locations to support diversion programming
- Licenses and monitors diversion of C & D materials in HRM
- Audits and educational sessions for schools, community groups, and ICI sector.

With respect to the ownership and operation of waste management infrastructure, HRM has relied primarily on design/build/operate (DBO) arrangements with the private sector to construct and operate waste management facilities. HRM currently has no day-to-day role in operations on site. HRM staff provides management and coordination of residential collection, processing, and disposal services.

HRM's current waste management infrastructure is de-centralized at four locations as shown on Figure 1.1. Organics processing facilities operate under the DBO model in both Halifax (operated by New Era) and Dartmouth (operated by Miller). The Materials Recycling Facility (MRF) in Halifax is also operated by Miller but under a conventional provision of services contract as HRM owns the lands, buildings and equipment at the MRF. A municipal household special waste (MHSW) depot is also sited on the MRF property. The disposal facility at Otter

FIGURE 1.1

HRM Waste Facility Locations
Waste Resource Strategy Update

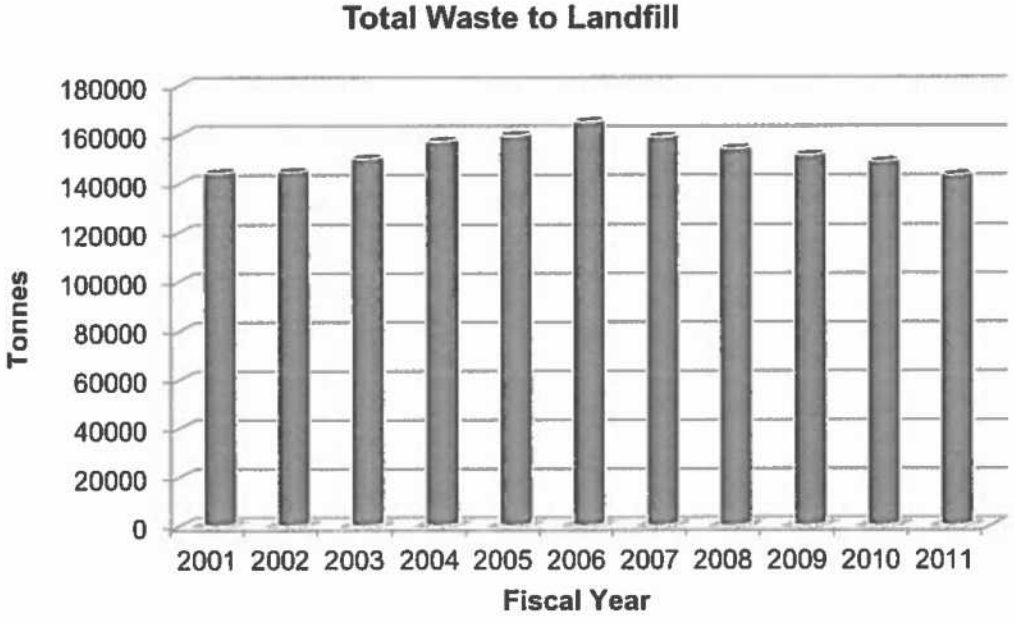


Lake and associated front end processing units were created in the late 1990s under a "cost plus" DBO arrangement with Mirror Nova Scotia Limited (Mirror) which is still in effect.

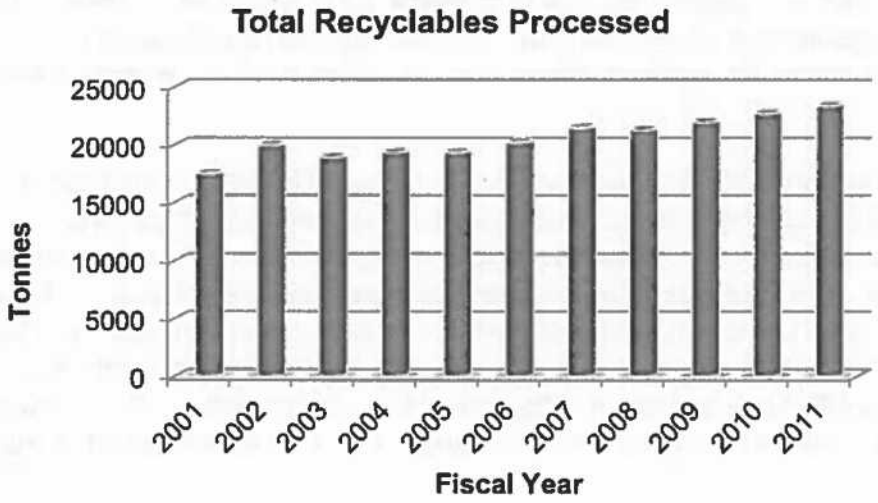
Specific details on each of the preceding programs and services will be provided in following sections as each program area is reviewed individually and also in the context of the complete waste management system.

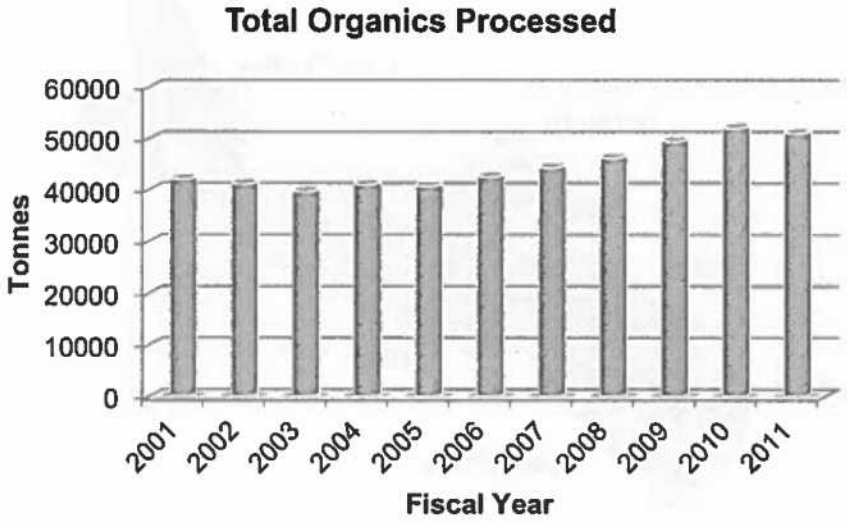
1.3 HISTORICAL TONNAGE DATA AND PROJECTIONS

HRM and its contractors have provided Stantec with historical tonnage data for programs and services relevant to this review. Stantec has completed a general review of the data for reasonableness, but has not independently reviewed the tonnage source documents. Where some data are clearly estimates, notes have been provided. The following graph illustrates waste sent to landfill since 2001.



Similarly, the following graphs show the progress achieved in diverting recyclables and organics from the wastestream.





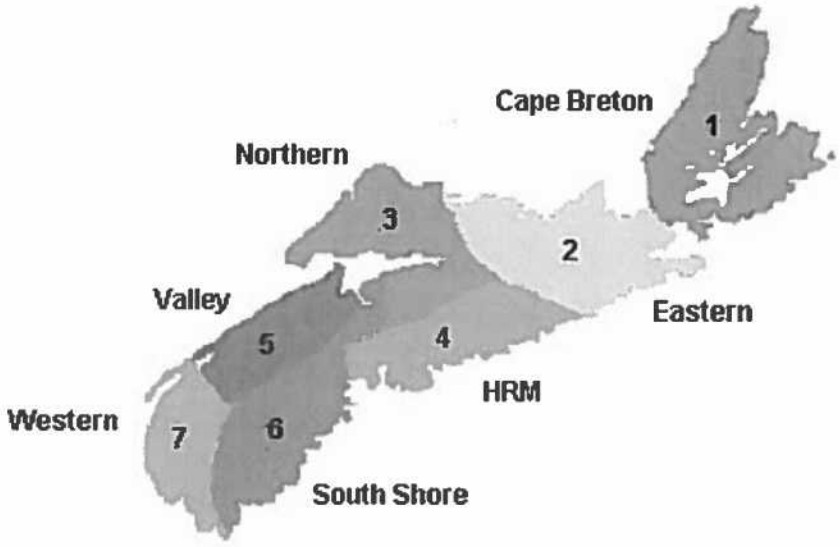
1.4 WASTE DIVERSION STATISTICS

HRM calculates waste diversion on a percentage basis for both the residential and ICI sectors, and as a combined statistic. Overall combined diversion is reported at 62% in 2011. Data specific to the residential and ICI sectors are described below.

The most recent data for the residential sector indicates that close to 52% of residential waste is currently diverted from landfill. Stantec independently calculated residential diversion using a different methodology (GAP) utilized by Waste Diversion Ontario (WDO) for equitably measuring performance for all Ontario municipalities. While Stantec utilized a slightly different methodology, the diversion estimate was in the same range as the HRM calculation.

Other municipalities are typically not able to calculate ICI diversion as waste exporting prevents the accurate measurement of disposal and diversion. Stantec has reviewed HRMs estimate of 66% diversion from the ICI sector and considers it to be a fair representation of local diversion in that sector.

With respect to performance as it relates to other municipal jurisdictions in Nova Scotia and the provincial target of reducing waste to the target of 300 kg/capita by 2015, HRM is in the middle of the group compared to other waste management regions even with a high concentration of industry in HRM. The Province of Nova Scotia generates an annual report on the tonnage of waste disposed on a per capita basis and diversion rate for the seven regions in Nova Scotia as shown below. The 53% diversion reported for HRM by the Province is slightly more than the 52% reported by HRM due to a minor difference in calculation method. The following table provides landfill tonnage per capita and the diversion rate for the time period of April 1, 2010 to March 31, 2011.

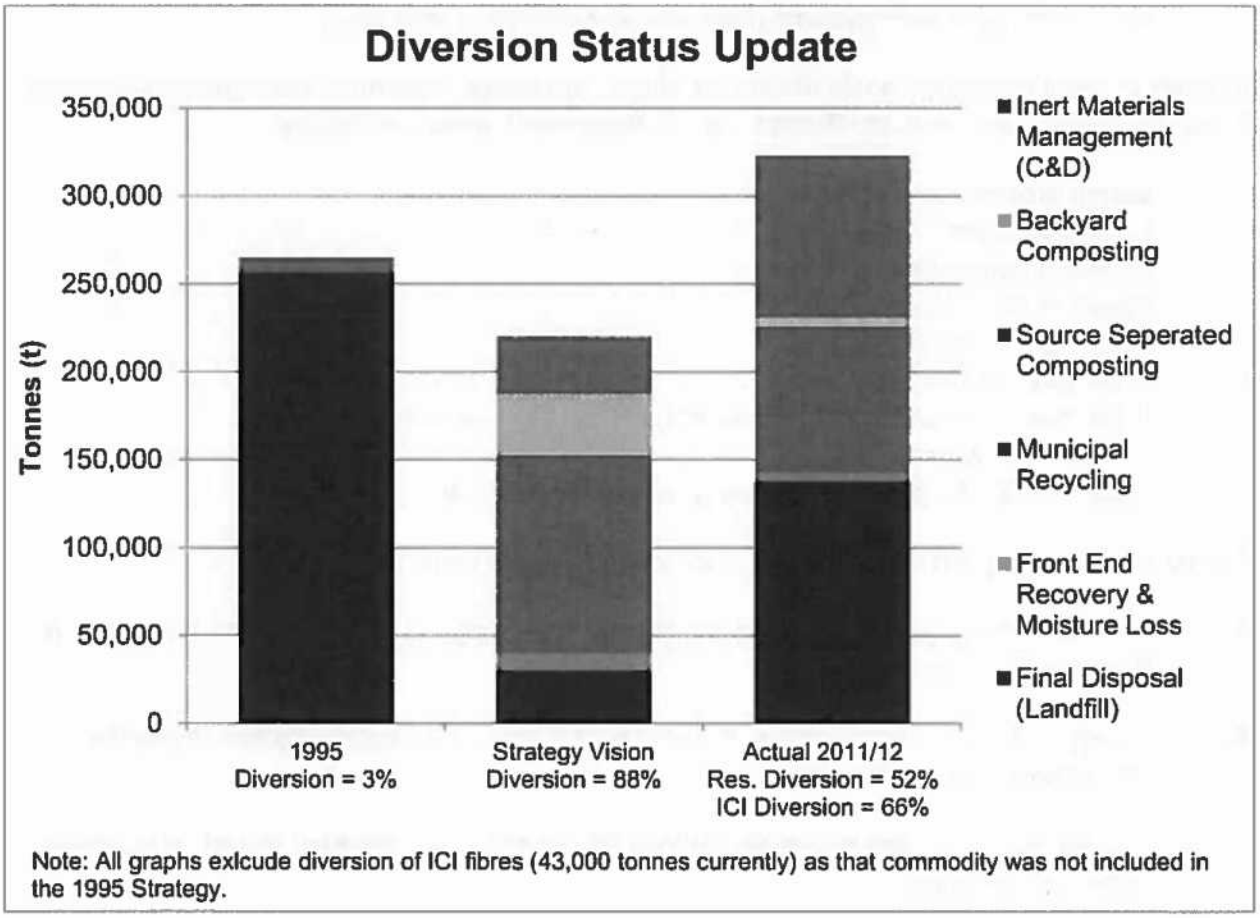


Region	Population (2011)	Tonnes per Capita	Diversion Rate
1 – Cape Breton	135,974	.413	38
2 – Eastern	74,215	.433	43
3 – Northern	81,485	.532	30
4 – HRM	390,096	.393	53
5 – Valley	75,524	.357	47
6 – South Shore	116,080	.328	48
7 - Western	51,125	.303	53

Note: Population data were derived from StatsCan, 2011 which provides data based on geographic zones inconsistent with provincial waste collection zones; Eastern, Western, Northern, South Shore and Valley regions were estimated based StatsCan data and with using Nova Scotia's Municipal Collection Zone Map (http://www.gov.ns.ca/nse/waste/muncollection.asp).

1.5 HISTORICAL WASTE DIVERSION PROJECTIONS

The following three graphs depict how waste tonnage was managed in 1995, projections (from 1995) of what a mature program based on the 1995 Strategy may achieve, and the reality of the current waste management system. As can be clearly seen below, HRM currently manages approximately 100,000 tonnes more waste per year than anticipated in the 1995 Strategy. It also warrants noting the reduction in tonnage to landfill between 1995 and present day.



Note: All graphs exlcude diversion of ICI fibres (43,000 tonnes currently) as that commodity was not included in the 1995 Strategy.

1.6 SCOPE OF STANTEC ASSIGNMENT

The overall goals of this assignment are as follows:

- *Reduce program costs through the implementation of service delivery efficiencies;*
- *Upgrade or replace necessary infrastructure to meet existing and near to mid-term capacity and regulatory requirements; and*
- *Maximize the opportunity for program revenue generation from recovery of and/or processing of waste resource materials and increased diversion.*

In order to meet the stated goals described above, the scope of Stantec's assignment includes a review of major elements of HRM's waste management system including:

- Waste processing and disposal;
- Landfill designs;
- Curbside collections;
- Organics processing;
- Recyclables processing;
- Materials transfer capability;
- Industrial/Commercial/Institutional(ICI) processing capacity;
- Energy from waste; and
- Opportunities for greater partnering across Nova Scotia.

For each major program area, Stantec is to complete three tasks if applicable:

A) Assess current system performance based on the original objectives and principles in the 1995 Strategy;

B) Compare HRM performance to industry best practices, benchmarks and legislative obligations if applicable; and

C) Generate options and recommendations for program improvement based on business case cost analysis.

As recommendations are developed, they are considered in the context of the entire integrated system to ensure that efficiency gains in one program area are not offset by unintended negative consequences in other areas.

2.0 An Integrated Approach to Waste Management

2.1 GENERAL

Prior to the 1990s, municipal waste management was a relatively straightforward logistical exercise. A single vehicle collected all waste placed at the curb and transferred the material to a local landfill. As recycling programs were rolled out across Canada in the early 1990s, a second vehicle going down the street was required and processing centres were constructed to sort the cans, glass, plastics and paper fibres. Many communities then added yard waste collection at the curb, with some including food waste organics. Other related programs include MHSW diversion, expanded deposit/return systems and educational efforts to promote greater waste minimization and diversion from landfill. The education and proactive inspection monitoring required by provincial legislation assists HRM in enforcing diversion requirements.

As can be imagined, this increase in complexity required integration of both program delivery and philosophical approach. The 1995 Strategy recognized the need for an integrated approach and HRM implemented one of the most comprehensive systems in that era. For over a decade HRM remained as one of very few municipalities in North America that diverted food waste organics from landfill. Only in the last 5-10 years have food waste organics been added to some of the more well developed municipal programs in Canada.

As Stantec was reviewing current HRM programs and opportunities for the future, the interdependencies of the various programs were considered. For example, modifications to collections programs can be constrained by the current location of processing infrastructure. The 1995 Strategy suggested that composting facilities be located close to the points of generation to encourage residents to become familiar with and accept composting. This led to the creation of organics processing facilities in both Dartmouth and Halifax which satisfied a philosophical objective of the 1995 Strategy, but nonetheless created a constraint for future decision making.

2.2 LIMITATIONS BASED ON CURRENT INFRASTRUCTURE

This review of the HRM waste resource system must consider the current location, age and condition of all existing physical infrastructure. As previously mentioned, HRM developed a de-centralized model with four primary locations for processing and disposal in the immediate Dartmouth/Halifax area. In general, the continued use of cost-effective infrastructure until near the end of its useful life is preferred unless there is major policy or operational benefits gained from pre-mature closure. However, Stantec will not rely solely on this general assumption and will compare other reasonable scenarios if the financial benefit of a particular approach is not already clearly established.

This is not intended to suggest that the lowest cost option will necessarily be the preferred and recommended option. As discussed, broader policy objectives will also be considered before final recommendations are made.

2.3 IMPACT OF HRM SOLID WASTE BY-LAW NO. S-600 ON ICI SECTOR

The above referenced municipal by-law has a unique provision adopted by Regional Council in 2002 which expressly prohibits the export of waste materials generated within HRM. Section 16.3 of the By-law is restated below.

"No person shall export or remove solid waste generated within the Municipality outside the boundaries of the Municipality and all such solid waste shall be disposed of within the boundaries of the Municipality and in accordance with this By-law."

A following section in the By-law clarifies that solid waste is defined as ICI waste (garbage), organics and construction and demolition waste, but excludes recyclables and special wastes such as sludges and biomedical wastes.

Stantec was advised that this provision of the By-law was challenged in court by private firms seeking to export waste, and that the By-law was upheld.

In plain language, ICI waste generators and haulers must use local facilities for organics processing and landfill disposal. Given that HRM owns the only sanitary landfill and contracts for the only organics processing facilities in the region, private firms are obligated to pay the fees specified by HRM. This type of restrictive provision is very rare in municipal By-laws. This concept is often referred to as "flow control".

Flow control was adopted in 2002 to support the HRM solid waste strategy approved by the HRM and the Province in the 1990s where HRM facilities were sized to accept all local waste, and also be confident that sufficient revenue would be generated to pay for those facilities. HRM controls the wastestream and has the ability to direct waste to facilities to economically support the program. HRM can direct waste to outside the region should it so choose. One drawback of this approach in HRM was that no private sector processing facilities were ever developed. This created a dependency which HRM must now continue to support.

If HRM were to deny access to ICI generators for organics processing and export was required, then the holistic concept of Section 16.3 would be called into question. ICI waste generators would also likely renew arguments that they be entitled to export garbage to the landfill of their choice beyond HRM.

While not a legal opinion, it is Stantec's observation that it would be difficult to modify the By-law to apply flow control selectively and only to HRM's advantage. That said, HRM must either commit to the current flow control model by constructing facilities to meet ICI needs, or allow ICI generators to manage their entire wastestream as they see fit and accept the consequences of

the likely loss of revenue at the landfill and organics processing facilities. From a fairness standpoint, it is difficult to envisage a scenario beyond these two all or nothing alternatives.

Stantec has completed this assignment on the premise that no change in Section 16.3 is contemplated.

3.0 Otter Lake Waste Processing and Disposal Facility

3.1 EXISTING OPERATIONS

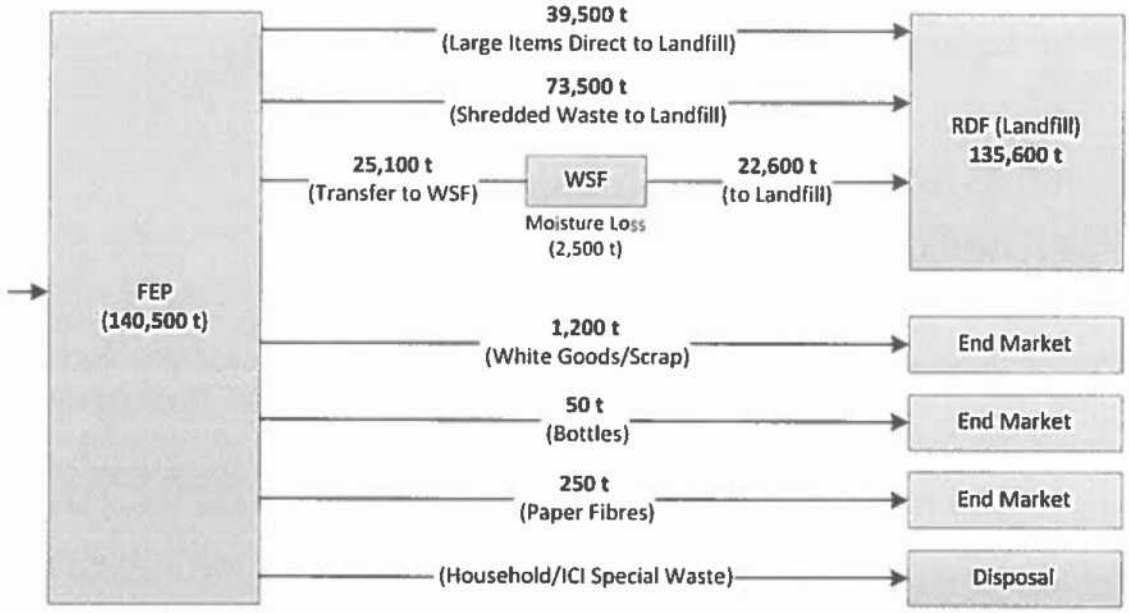
3.1.1 Front End Processing

All waste received at Otter Lake from both residential and ICI sources is weighed at an inbound scale and offloaded at a building described as a Front End Processing centre (FEP). Staff at the FEP removes white goods (household appliances) and other scrap metal from the residential and ICI wastestreams and segregates this scrap metal for recycling. Other large or bulky items such as couches, carpet and mattresses are also removed from the incoming wastestream and sent directly to landfill. Any unacceptable material such as propane tanks are also removed at this time. These activities are required as the initial stage of mechanical bag breaking at the FEP is not intended to process large items.

After removal of large items and white goods, waste passes through mechanical bag breakers and is screened with particles smaller than 50mm (2 inches) transferred by conveyer directly to the adjoining Waste Stabilization Facility (WSF) building. Particles between 50mm and 150mm (2 to 6 inches) are shredded and then transferred to the WSF. Material over 150mm (6 inches) in size passes over conveyers for final hand removal of any materials unacceptable for landfill. No significant effort is made to remove compostable materials such as wet paper, cardboard, or other recyclables from the conveyor lines.

The rationale for sending smaller particles to the WSF was the assumption that most compostable organics would be smaller than most non-compostable materials after coarse shredding. While this reasoning has some merit, the operational reality is that any smaller objects such as steel bottle caps and crushed glass, as well as plastic film, pass on to the WSF for stabilization rather than being sent to landfill. Likewise, larger compostables such as wet paper and cardboard are not sent to the WSF.

The following reflects the tonnage of materials entering and leaving the FEP and their destinations during 2011.



Material Flow through FEP, Calendar year 2011

HRM reports the annual cost to operate the FEP is $7.2 million. This amount includes some activities which would need to be retained if the FEP closed such as the scalehouse, roadways, and other shared services with the RDF.

All current operations at Otter Lake including the FEP are managed by Mirror under a long-term DBO contract with HRM. Stantec understands that the total staff complement at Otter Lake is approximately 100 staff. HRM owns the lands and buildings at Otter Lake. The scope of this assignment does not include an assessment of the Mirror contractual relationship except to acknowledge that any potential savings identified by Stantec need to be assessed further with respect to contractual obligations.

3.1.2 Waste Stabilization Facility

The WSF typically receives approximately 25,000 tonnes of organics and mixed waste per year after initial processing in the FEP. This operation is basically a conventional aerobic composting process utilizing a series of concrete channels and turning devices to maintain aerobic (with oxygen) conditions. Other municipalities such as the City of Guelph in Ontario installed similar technology in the 1990s to process food waste and other organics. This approach is effective at starting the composting process. Materials are retained in the composting channels for approximately 18 days and then sent directly to landfill.

The annual cost to operate the WSF is $1.7 million.

3.1.3 Residual Disposal Facility

The RDF is a conventional modern sanitary landfill equipped with a low permeability base liner, leachate collection underdrain, leak detection system, and landfill gas collection and flare system. Based on a review of background documents and a site inspection, Stantec is of the opinion that the RDF is generally well designed and operated, and efforts are taken to minimize nuisance impacts to the local community.

The annual cost to operate the RDF is $5.3 million.

3.2 COMPARISON OF CURRENT OPERATIONS TO 1995 STRATEGY

3.2.1 Front End Processing

The following is a direct excerpt from the 1995 Strategy related to the intended purpose and function of the FEP.

"The processing of mixed residues from both residential and ICI sectors is required to ensure that usable and/or inappropriate materials are removed before delivery to the residuals disposal facilities. Facilities for processing mixed residues are known as "front-end processing" facilities. The primary purpose of these facilities is to remove recoverable resources (i.e., recyclable and compostable materials) from the mixed residue stream. Their secondary intention is to remove substances, such as hazardous wastes, putrescibles and other materials that are banned from disposal at the residuals disposal facilities.

Recovered recyclable materials will be processed at the front-end processing facilities and routed to markets. Compostable materials that are recovered from the mixed residue stream will be processed in composting facilities separate from the source-separated compostable materials. While compost produced in these kinds of facilities is likely to be of lower quality than from source-separated composting, it will still be a valuable and useful resource."

The stated primary purpose of the FEP as noted above is the removal of recyclables and compostables from the mixed waste, with recyclables routed to end markets and compostables converted to a useful and valuable resource.

The context in which these statements were made is an important consideration at this point in time when evaluating whether these facilities are performing as intended. In 1995 there was no curbside collection of organics and it was in the early years of the curbside recycling program, although the 1995 Strategy contemplated the full-scale rollout of those programs. The current comprehensive province-wide deposit/return program had also yet to be implemented. That said, the wastestream in 1995 contained large amounts of both recyclables and compostables which the FEP was intended to remove.

Based on Stantec's review of historical tonnage data and an inspection of the actual operations, it is our opinion that the FEP does indeed process all waste received, but that there is little

benefit gained from this activity as few recyclables are recovered, and no useful or valuable compost is produced. The only significant diversion achieved is the removal of white goods and scrap metal from the waste. Beyond this unconventional method of white goods recovery, the following represents the total tonnage of recyclables and compostables recovered for sale or beneficial use in 2011 from the 140,000 tonnes of incoming material to the FEP. Given that $7.2 million per year is required to operate the FEP, the 300 tonnes of recyclables recovered represents a particularly poor return on investment.

Pop Bottles:	50 tonnes
Paper Fibres:	250 tonnes

The secondary intention of the FEP was to remove special wastes, putrescibles(organics capable of biological decay) and other materials banned from landfill. Once again, it is important to consider the context of these statements in 1995. With respect to special wastes, there were very limited municipal household special waste (MHSW) programs in place at the time, and household cleaning and lawn care products were far more toxic than today. With respect to organics, again the likely intention was to divert the greatest amount possible.

Based on Stantec's review of historical tonnage data and an inspection of the actual operations, it is our opinion that the FEP does provide some minor diversion of household and ICI special waste, but that the secondary intention of the FEP is also largely unrealized today. The following is a list of the materials recovered from the FEP in 2011 that could be described as MHSW or ICI special waste. With the exception of fire extinguishers, propane tanks and batteries, the volume of other products is low with no pesticides or oil-based paints recovered. Propane pressure tanks are better described as an operational hazard given that the risk is related to pressure release after puncture or shearing of the valve.

Type	Container	Total (items)
Alkyd Paint	Bulk Drum	0
	Labpack	0
	Triwall	0
Latex Paint	Bulk Drum	0
	Labpack	0
	Triwall	0
Flammables	Bulk Drum	0
	Labpack	27
Pesticides	Labpack	0
Methylacetate	Tank	3
Methylene Chloride	Tank	5
Waste Oil	Bulk Drum	0
Oil Filters	Drum	1
Lithium Batteries	Drum	1
Aerosols	Labpack	27
Acid Batteries	Item	183
	Labpack	25
Dry Batteries	Labpack	21
Nicad Batteries	Labpack	0
Wet Batteries		2
Fire Extinguishers	Item	256
	Drum	6
Propane	Labpack	147
	Tank	316
Compressed Argon	Tank	0
Compressed Nitrogen	Tank	11
Compressed Gas	Tank	0
Assorted Specialty Gases	Labpack	3
Acetylene	Each	0
Helium	Tank	0
Freon	Tank	3
Carbon Dioxide	Tank	13
Halon	Tank	4
Total		1,054

3.2.2 Waste Stabilization

The WSF was considered as a component of the FEP in the 1995 Strategy but subsequently was treated as a separate entity by HRM given that the FEP and WSF were contained in separate structures on site, and staffing and equipment costs could be easily segregated.

As previously identified in Section 3.2.1, the 1995 Strategy recognized that the output from the WSF would be low quality compost, but it was anticipated that it would still be a valuable and useful resource. In contrast, the 1997 Agreement between HRM and MIRROR specifically identifies that all WSF output is to be placed directly into the RDF. The WSF has been operated as specified in the 1997 Agreement with all compost landfilled since facility commissioning.

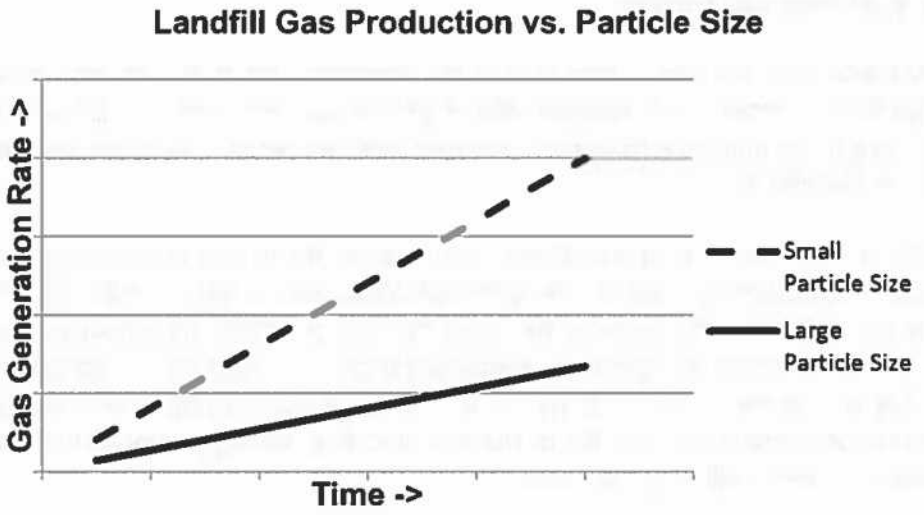
It is unclear at this time why such a fundamental change occurred between 1995 and 1997. The change brings into question the rationale for the FED/WSF combination. An 18 day period in the WSF does not necessarily improve landfill performance with respect to gas, odour and leachate.

3.2.3 Residual Disposal Facility

The RDF, in contrast to the FEP/WSF combination, is operating as envisaged in the 1995 Strategy. The landfill is well organized, well maintained and with no obvious evidence of poor housekeeping practices. The environmental performance of the landfill has also been acceptable compared to the expectations in the 1995 Strategy.

The only significant deviation from that contemplated in the 1995 Strategy is that all output from the WSF is sent to landfill. A potential unintended consequence of this change is increased production of landfill gas in the immediate months and years after the WSF product is placed. The multiple shredding and mixing of organic waste in the FEP/WSF combination have in fact increased the potential for community odour impacts compared to a scenario where the FEP/WSF did not exist and all material was sent directly to landfill. This is due to the homogeneity and significant reduction in particle size of the waste which increases the surface area available for anaerobic bacteria (gas producing) to thrive as shown on the following graph[1].

[1] McBean, Edward A. et al, Solid Waste Landfill Engineering and Design, page 80, 1995



An analogy which may assist in the explanation of this phenomenon is the difference in time for a tree trunk to decompose, compared to an equivalent mass of wood chips created from the tree truck. An intact trunk has a limited surface area for microorganisms to process the wood, whereas the wood chips offer a significant increase in surface area which increases the opportunities for bacterial decomposition.

3.3 COMPARISON OF CURRENT OPERATIONS TO INDUSTRY BEST PRACTICE

3.3.1 Front End Processing/Waste Stabilization

Stantec has been unable to find a direct comparison to current operations at HRM in North America. The closest concept to the HRM system is in the City of Edmonton. Through DBO contractor TransAlta, a combined mixed waste and sewage biosolids processing facility was constructed in 1997. The original intended end use for the compost product was backfill for spent open pit mines owned by TransAlta. The facility was sold to the City in 2000 for $97 million and various modifications have taken place. The City's current plans are to modify the process to produce biofuels.

No other comparable municipalities have added the HRM preprocessing and composting stage to their waste management system. In terms of best practices, this approach was simply not adopted by others. With the benefit of hindsight, it is now clear that the FEP/WSF concept yields few benefits if curbside diversion programs are in place; has the potential for unintended negative impacts with respect to odour production at the landfill; and is very costly compared to the benefits achieved.

3.3.2 Residual Disposal Facility

As previously discussed, the day-to-day operations and condition of the environmental control systems at the RDF compare well with landfills of similar size and age. The design requirements for this landfill are more stringent than most comparable jurisdictions and this will be discussed in more detail in Section 4.

Presuming that a site has minimal environmental impacts and is well organized, in-place waste density assists in determining relative effectiveness compared to other similar sites. In-place waste density per cubic is a measure of the mass of residual waste in a given amount of landfill airspace. Given that landfills are generally permitted based on volumetric capacity, and fees are charged per tonne, a greater density of waste both extends the life of the landfill, and increases the total revenue generated over the life of the site. In-place density performance for the RDF is compared below to other industry standards.

HRM Otter Lake Density (cells 1-4): 765 kg/m^3

Industry Density Expectations for Large Sites with Different Compactors:

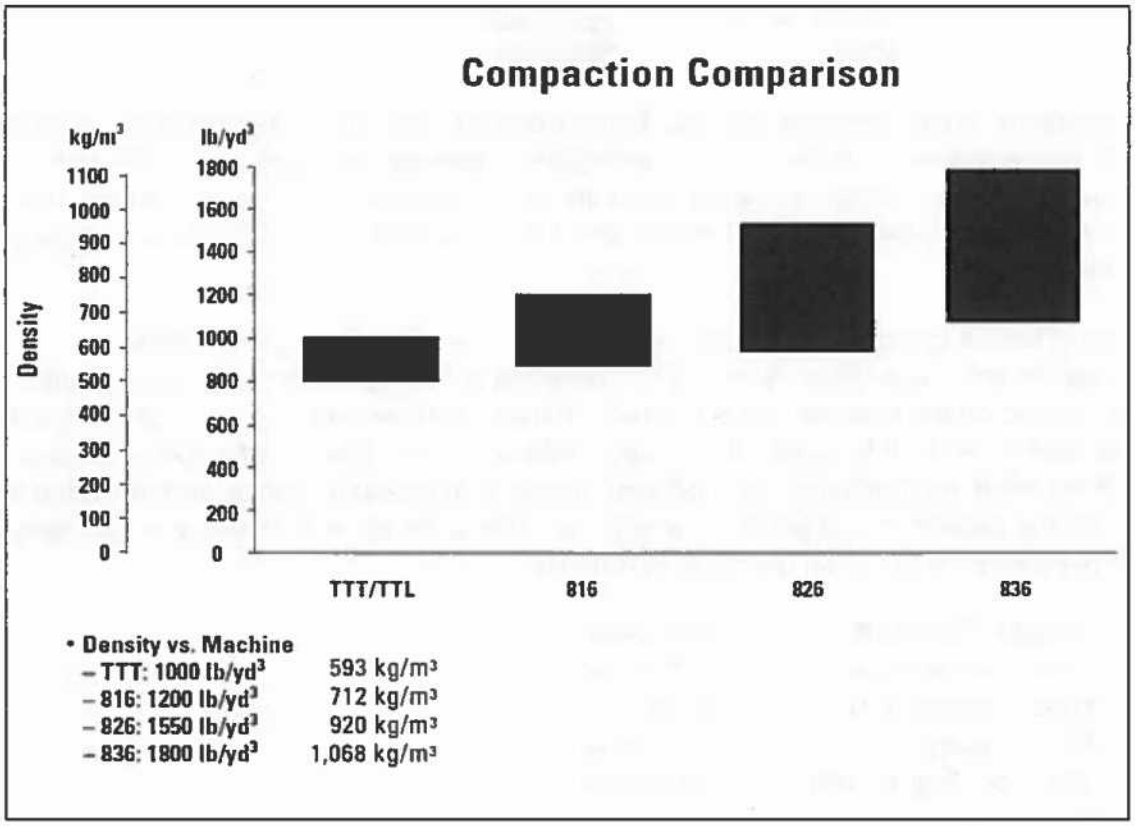
-25,000 kg Compactor: up to 700 kg/ m^3
-35,000 kg Compactor: up to 900 kg/m^3
-50,000 kg Compactor: up to 1,100 kg/ m^3

Typical year-to-year variability in density for a comparable municipal site (Waterloo Ontario) is shown below. HRM does not currently complete density calculations on an annual basis.

-2006; 837 kg/ m^3
-2007: 1079 kg/ m^3
-2008: 849 kg/ m^3
-2009: 808 kg/ m^3
-2010: 847 kg/ m^3

As can be seen from the above data, density is highly dependent on the mass of the compaction equipment utilized. The Waterloo example shows typical year-to-year variation. The initial filling of a cell is at a lower density, but very high density can be achieved as a cell reaches maximum height due to the combined effects of settlement and active compactive effort. Given that cells 1-4 at Otter Lake have only a 10 m depth of waste, performance to date is considered satisfactory.

The following graph was supplied by Caterpillar to show the relative performance of their landfill compactor units. HRM utilizes the 826 model at Otter Lake and is achieving compaction at the mid-range expected for that particular piece of equipment.



A second measure of operating performance is the capital and operating costs of a particular landfill. While the total annualized capital and operating costs/tonne for a site is reasonable performance measure. It should be noted that the following factors can greatly influence cost per tonne performance.

- *Relative Size of Site* – As a general rule, the larger the landfill, the lower the unit cost per tonne. There are tremendous economies of scale in landfill construction and operations. Scales, equipment and personnel are more effectively utilized when waste volumes are larger.

- *Local Soil Conditions* – There are some modern landfills that rely solely on clay base liners constructed from on-site materials. This greatly reduces capital costs for cell construction.

- *Leachate Treatment* – The ability to pump leachate to a local wastewater treatment facility greatly reduces both capital and operating costs compared to either on-site treatment or hauling to an off-site treatment facility.

The costs to construct and operate the RDF are noted below.

Otter Lake RDF	Operating Costs:	$22/tonne
	Capital Costs:	$47/tonne
	Total	$69/tonne

The operations of the FEP/WSF/RDF are highly integrated and HRM operational costs for the RDF do not necessarily include all items necessary to operate a standalone landfill. The $22/tonne may be understated. Capital costs are highly variable year-to-year. Stantec utilized an average annual capital cost of $7 million and a tonnage estimate of 150,000 tonnes/year to calculate this cost.

In terms of landfill operation, the operating cost per tonne as reported by six similar municipalities are noted below. It should be noted that landfill operations cost data is highly variable based on the tonnage received which changes from year to year. The following values are intended to be used to establish relative performance only. Data is reflective of 2010 or 2011 costs. Also, municipalities have different methods of allocating capital and operating costs, administrative expenses and general municipal overhead. Small landfills also typically have higher per tonne costs, but an overall small budget.

Greater Victoria, BC:	$46/tonne
Essex-Windsor, ON:	$15/tonne
Halton Region, ON:	$38/tonne
Brant County, ON:	$37/tonne
Waterloo Region, ON:	$30/tonne
Fredericton, NB:	$71/tonne

A more reliable method to establish the true all-inclusive cost of constructing and operating landfills is the published tipping fee at privately owned sites. A survey of average fees charged in 2012 for several US sites where design and environmental controls apply are noted below[2]. Lower fees than those stated are typically offered for larger customers as the following rates apply to single loads.

US National Average:	$45/ton (imperial ton)
Michigan:	$41/ton
Maine:	$84/ton
Ohio:	$42/ton
New York:	$49/ton

A recent cost example in Ontario is in Peel Region. Peel Region has accepted an offer for transportation and disposal of waste at an all-inclusive cost of $68.54/tonne. Round trip transportation of approximately 500 km is included in this total. While not precise, based on this distance, a tipping fee of $35-40/tonne can be inferred.

[2] Waste & Recycling News, July 9, 2012

3.4 OPPORTUNITIES FOR OPERATIONAL IMPROVEMENTS

3.4.1 Front End Processing/Waste Stabilization

Given the context of waste management in HRM in 2012, the FEP/WSF combination has far less relevance than when the 1995 Strategy was developed. Few materials are currently diverted from landfill through the FEP. Stantec has developed the following options for consideration by HRM.

Option 1 – Maintain current operations
Option 2 – Improve recovery of recyclables in FEP
Option 3 – Close and decommission FEP/WSF
Option 4 - Repurpose FEP/WSF to process source separated organics

Option 1 is considered unsatisfactory moving forward given the $8.9 million per year annual cost, and the lack of any meaningful recovery of recyclables (300 tonnes) or any usable compost. White goods can be more effectively segregated at the curb than removed from the mixed waste. While the precise amount of household and ICI special wastes removed is difficult to determine (total container volumes are recorded, not actual volume of product present) more effective means to divert special wastes are available to HRM. The multiple handling and shredding of FEP waste also can cause special wastes to be released from containers and absorbed by other materials destined for landfill. If even a small percentage of projected savings were dedicated to alternative special waste diversion methods, HRM could greatly enhance current programs. The total mass and toxicity of special wastes is also much different today than in 1995. Latex paints and other water-based products are in far more common use today than the solvent based products of the past. Residents are also making use of more "green" household cleaning products and lawn care strategies. This evolution is supported by recent data supplied by HRM and presented in a previous section. Stantec supports the recovery of special wastes in all municipalities, but suggests that the FEP is not the most effective means to achieve this goal.

Option 2 is also not considered feasible given the minor opportunity for improvement and the costs required to operate the FEP. In order for recyclables to be marketable, they must be separated into like commodities and be free of dirt, glass shards or other foreign matter. The two stage shredding process damages recyclables and causes contaminants to adhere to the containers or paper fibres. As previously stated, only 300 tonnes of recyclables were removed from 140,000 tonnes of incoming waste in 2011. Once recyclables are soiled, they are no longer acceptable to end markets.

Option 3 would result in the short term loss of recovery of a small tonnage of recyclables and special wastes. However, eliminating the shredding and composting processes will reduce the potential for odour incidents at the RDF and provide considerable budget capacity to enhance at-source recovery efforts of recyclables and special wastes. The potential multi-million dollar savings could enhance education for at-source recovery, and also provide potential tip fee or tax

levy relief. Stantec recommends implementation of Option 3 by the end of 2013, if HRM elects not to implement Option 4 below.

Option 4 involves the elimination of the current function of the FEP/WSF by the end of 2013, and repurposing the WSF to process source separated organics (SSO) during peak periods beginning in 2014. Final curing of compost would also occur at Otter Lake. In 2019, the WSF would serve as the primary processing centre for the Halifax collection zone. The existing organics processing centre in Goodwood south of Halifax would be decommissioned in 2019.

3.4.2 Residual Disposal Facility

There are opportunities to optimize the design and reduce capital costs at the RDF which are detailed in Section 4. The most significant opportunity for operational improvement at the RDF is to improve the utilization of the permitted landfill airspace. This can be achieved by increasing the density of waste per cubic metre of airspace. Gains in density have a direct and proportional impact on the life of the landfill. For example, a 10% increase in density will extend the remaining life of the landfill by 10%. Aside from greater diversion of waste at source, improving density is the best opportunity to reduce future landfill needs. Options for improving in-place density are presented below.

Option 1 – Consider advantages and disadvantages of larger compaction equipment at the next procurement opportunity

Option 2 – Utilize spray-on or other low volume consumption alternative daily covers whenever feasible

Option 3 – Utilize current WSF output exclusively as daily cover conditional on operational feasibility

All options presented above will contribute to improved waste density. Stantec recommends that HRM consider the implementation of some or all of the options presented. The first two options both require an increase in capital and operating costs with two potential long-term gains; deferred costs for cell construction, and deferred costs to develop a new disposal facility. No financial gain will be realized in the short-term.

The following is an example of the financial benefit accrued when increased density results in the deferral of new cell construction by one year. Assumptions used to calculate the Present Value of the two construction scenarios are listed below.

Current Year:	2012
Originally Planned Construction Year:	2017
Construction Year After Deferral:	2018
Construction Cost (2012$):	$15 million
Interest Rate:	3%
Inflation Rate:	1.5%

A financial gain of approximately $200,000 would be realized if cell construction was deferred one year.

4.0 Landfill Design

4.1 BACKGROUND

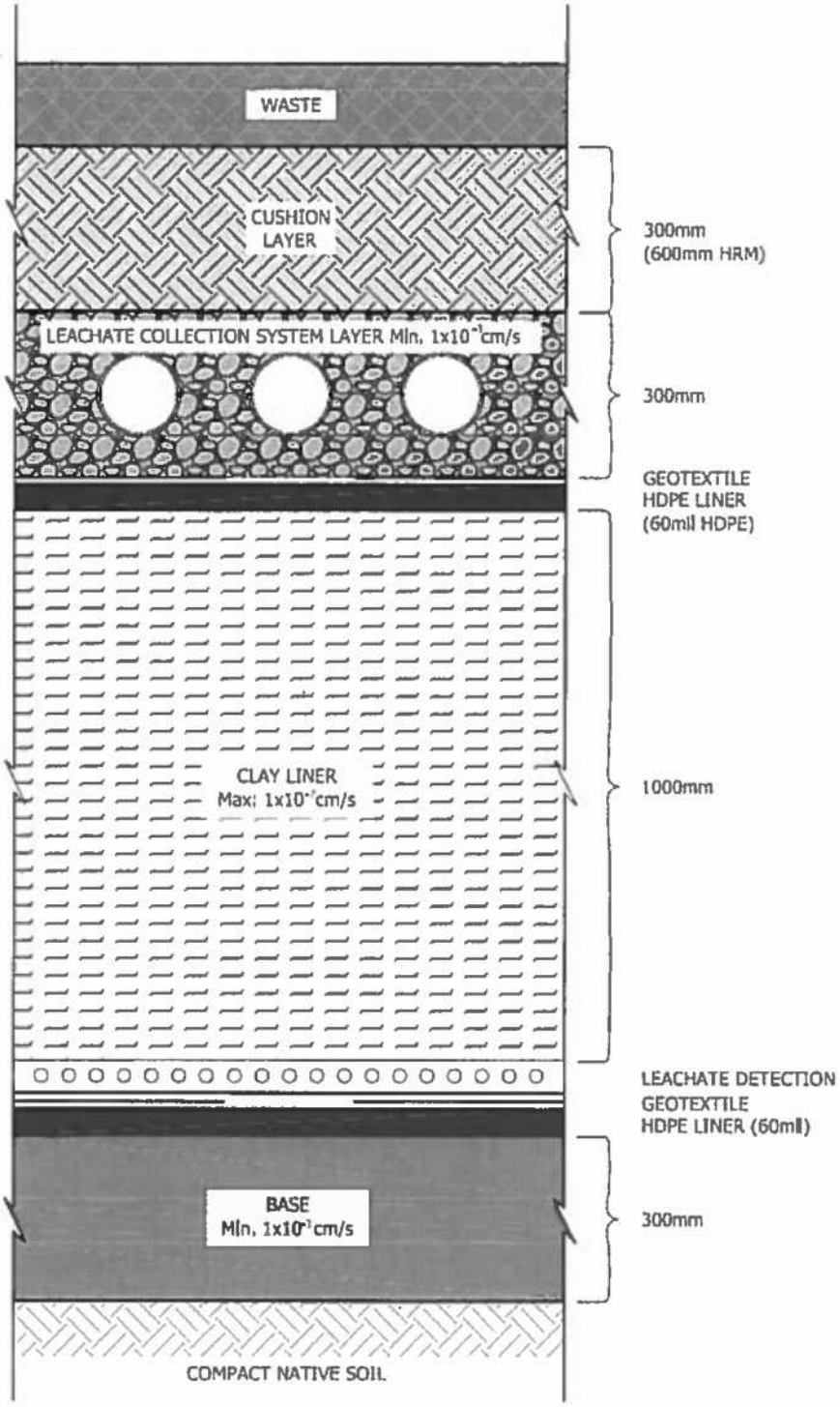
There are two design issues at the RDF which significantly affect the cost/tonne of operating the landfill. The first issue relates to the design specification for the landfill liner. Current provincial requirements for liner design are more stringent than most comparable jurisdictions. Section 4.2 describes opportunities to achieve landfill liner capital cost savings.

The second design issue affects both the expected life of the landfill and the overall capital cost/tonne for the RDF. The maximum vertical elevation of the RDF is consistent with the surrounding topography. Section 4.3 describes the potential net benefits of increasing the final elevation of the RDF.

4.2 LANDFILL LINER

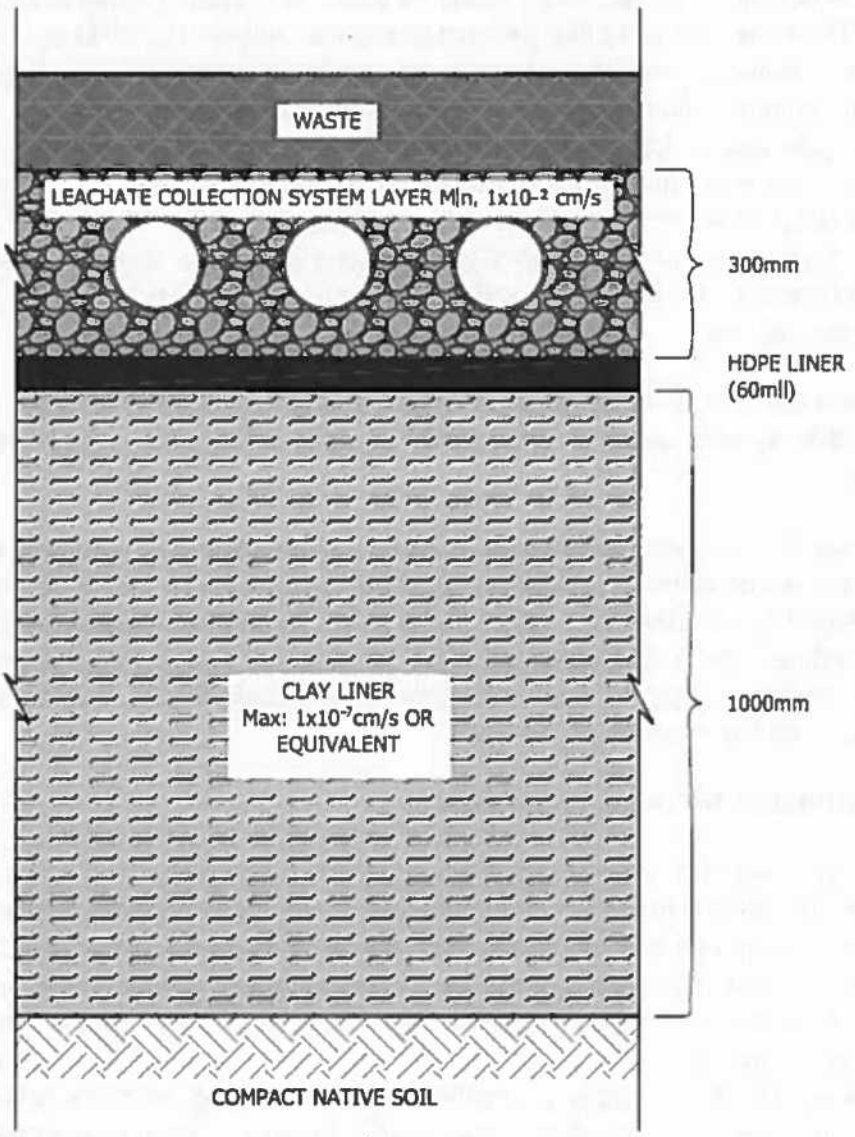
4.2.1 Current Nova Scotia Standards

The Province of Nova Scotia stipulates the design specifications for landfills in the province. All public and private landfill owners must conform to this specification. An illustration of the Nova Scotia base liner profile is shown below. Based on local conditions, designers have discretion to develop equivalent components when suitable materials are not reasonably available.


WASTE
CUSHION LAYER
300mm
(600mm HRM)
LEACHATE COLLECTION SYSTEM LAYER Min. 1x10⁻¹cm/s
300mm
GEOTEXTILE
HDPE LINER
(60mil HDPE)
CLAY LINER
Max: 1x10⁻⁷cm/s
1000mm
LEACHATE DETECTION
GEOTEXTILE
HDPE LINER (60mil)
BASE
Min. 1x10⁻¹cm/s
300mm
COMPACT NATIVE SOIL

4.2.2 Liner Standards in Other Jurisdictions

Stantec compared the current Nova Scotia standard to ten other provinces and states and the USEPA. The complete comparison is illustrated on Drawing 01 in a plan pocket at the back of this report. Most standards reviewed have a specification similar to that shown below.



4.2.3 Applicability of Other Standards to HRM

Given the environmental impacts seen at the Upper Sackville landfill in the 1990s, it is understandable that Nova Scotia would endeavor to develop one of the most stringent design standards in North America. While this standard is no doubt highly protective of the environment, there are certain design elements which are costly and which could possibly be described as redundant or unnecessary given 15 years of operating experience with the current specification. The experience of other jurisdictions is also relevant to HRM and Nova Scotia as all provincial and state governments have now recognized the need to protect groundwater resources from contamination, and have implemented policies and standards which they deem to be adequately protective based on field experience and empirical evidence. All landfill liners but one (British Columbia) shown on Drawing 01 have a primary composite containment system consisting of a layer of re-compacted clay with a permeability of 1 x 10-7 cm/s or less, with a synthetic high density polyethylene (HDPE) liner placed above the clay with typical thickness of 60 mils (0.060 inches or 1.5 mm). All standards also have a leachate collection system directly above the composite liner.

The Nova Scotia standard differs from most in that a "cushion layer" is required above the leachate collection system, and a "leak detection" system is required below the clay/HDPE composite liner.

The Nova Scotia standard also includes a 300mm high permeability base layer under the leak detection system. Its purpose is not entirely clear but it may be intended to reduce hydraulic pressure beneath the leak detection system from an elevated groundwater level. Modern sites are rarely placed near the water table so the precise purpose and function of this layer cannot be definitively confirmed. Stantec does not propose eliminating this component pending clarification from the Province of Nova Scotia.

4.2.4 Opportunities for Design Refinement

Regardless of the relative thickness of a clay and HDPE liner system, the maintenance and ongoing proper functioning of the leachate collection system has a significant impact on the environmental performance of a modern landfill. As rain falls onto an active landfill cell and filters through the waste, leachate is generated. This leachate migrates to the base of the landfill cell where it is collected in perforated HDPE collection pipes embedded in a clear stone drainage blanket which slopes towards the collection pipes. If all pipes are flushed regularly and the stone drainage blanket is properly specified to resist clogging, leachate is quickly removed and little hydraulic pressure is exerted on the clay/HDPE liner system located below the leachate collection system. If the collection pipes foul, the leachate level will build up within the cell thereby increasing the hydraulic head or pressure on the composite liner. This situation can cause seeping of leachate from the sideslopes of the landfill into surface water channels, and increase the potential for the base liner to be compromised.

Twenty years ago, many municipal landfills operated with no base liner at all, and no form of leachate collection system. All leachate passing through the waste eventually discharged to

surface water or the groundwater regime. Some of these sites installed buried leachate collection pipes along the perimeter of the landfill, but those retrofits were not completely effective.

All modern designs are highly protective of the environment compared to recent past practice. All systems described from other jurisdictions now include similar underdrains with layers of stone and collection pipes over 100% of the base of the landfill(leachate collection systems), with a low permeability liner below the collection system. This standard approach has proven to be effective at limiting groundwater impacts.

Stantec does not recommend any change to the Nova Scotia specification for the leachate collection layer, or the primary composite liner system of clay and HDPE. Where Stantec does see the opportunity to refine the current Nova Scotia design, is with respect to the "cushion layer" and "leak detection" system.

The cushion layer is required in few jurisdictions. The purpose of this layer is to provide a barrier to prevent the initial layer of waste from damaging the leachate collection system and the liners below. All landfill owners/operators share this concern. However, the operating methodology employed during the initial phase of waste placement within a new cell can equivalently protect the newly installed infrastructure. If the initial lift of waste is a relatively thick (5m) layer of loosely placed, bagged residential garbage with no intensive compaction, the leachate collection system can be adequately protected. A requirement for a minimum 300 mm stone layer directly over the top of the collection pipe, and no soil placed as daily cover until a 5m depth of waste has been achieved will complete the initial stage of landfill development while protecting the critical leachate collection and liner systems.

For the reasons presented above, Stantec recommends the HRM request the Province of Nova Scotia reconsider its requirement for a 300mm cushion layer.

Aside from confirming that the current RDF liner system is working effectively, the multi-layer leak detection system does not enhance the environmental performance of the site. This type of leak detection system is more typically required at hazardous waste sites where the potential impact of leachate migration is far more severe than at a modern municipal landfill. Detection of a small amount of leachate would also not necessarily warrant any action other than continued monitoring. Excavating and replacing liner systems at landfills of this size is rarely undertaken. A program of enhanced monitoring and groundwater containment are more frequently implemented if required.

The site operator reports that the leak detection sumps at the RDF are pumped out on a regular basis but that they believe the source of this water is not from the leak detection system. Water sample analytical results generally confirm this assumption but Stantec is not able to state with certainty that this is indeed the case without further investigation. Stantec suggests that HRM review the design and operation of these sumps and modify if needed to isolate these sumps from surface water or other sources.

If HRM can confirm that the leak detection system is not in a material way contributing to the presence of water in the leak detection sumps, then Stantec recommends that HRM request the Province of Nova Scotia reconsider its requirement for a leak detection system.

4.2.5 Financial Impacts of Liner Modifications

Based on the suggested changes to the Nova Scotia landfill liner specification, and HRM's most recent cost data on the construction of a new landfill cell and base liner, Stantec has developed the following cost comparison. As can be seen below, approval of a revised base liner could result in savings of $3.4 million in capital costs compared to current practice based on a typical 5 hectare cell. Three cells remain to be constructed at Otter Lake.

Cost of Cushion Layer per cell:	$1,270,000
Cost of Leak Detection per cell:	$2,130,000
Potential Savings per 5 ha cell:	$3,400,000

As a consequence of eliminating the existing 600mm cushion layer in the final 3 cells, an additional 90,000 m^3 of landfill capacity (150,000 m^2 x 0.6m) would be gained. This represents approximately six months of landfill site life extension. This added capacity will ultimately increase the total revenue generating tonnage placed in the landfill, but will not result in a revenue gain in the short term.

In summary, design modifications as suggested would result in the following positive impacts for HRM while maintaining a protective environmental control system consistent with other jurisdictions.

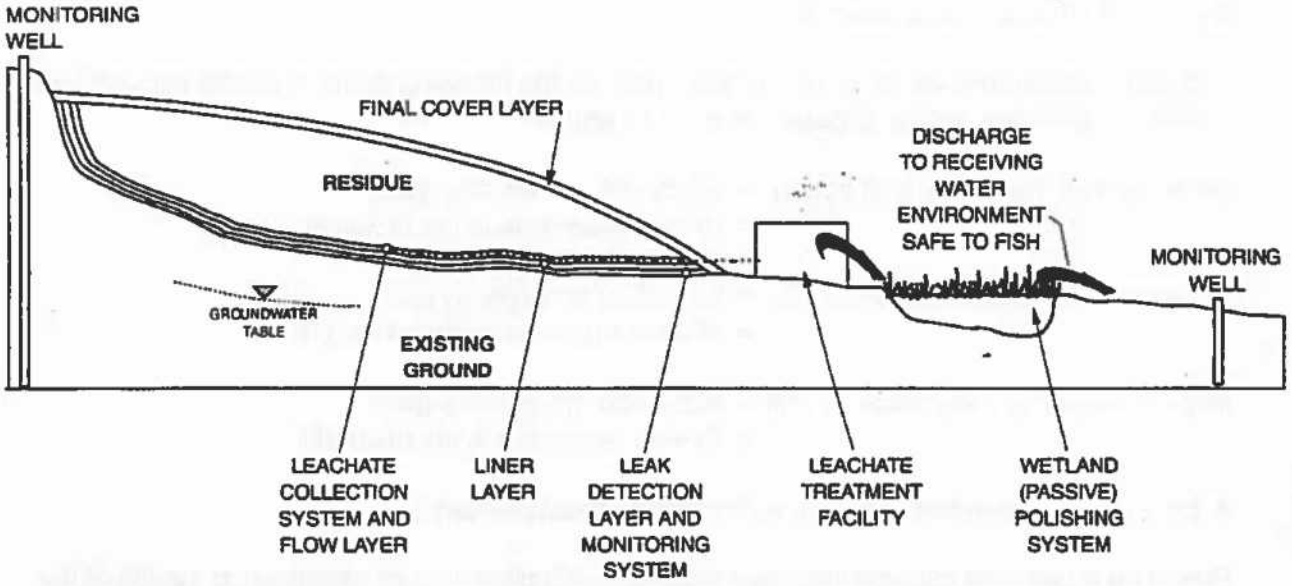
Reduced Capital Costs (2012$)	= $3.4 million for 5 ha cell base liner = $10.2 million total over remaining landfill life
Gained Landfill Capacity	= 90,000 m^3 = 6 months extension to landfill site life
Increased Revenue	= During the 6 months of landfill site life extension

4.3 LANDFILL CAPACITY

4.3.1 Current Limitations

The current maximum elevation of the RDF is 113m above mean sea level (amsl). The elevation selected during the initial site development creates a landform which blends with the local environment. The following illustration presented in the 1995 Strategy very closely reflects the

current design of the site.



Integrated Waste/Resource Management Strategy. Halifax County/Halifax/Dartmouth/Bedford. March 1995.

This type of profile is very rare in modern landfill design. Most current design concepts establish a landfill footprint (base area), then landfill capacity is maximized by increasing the vertical elevation of the site based on 4(horizontal) to 1(vertical) side slopes. Depending on the areal extent of the landfill footprint, a final elevation of 20-30m above the surrounding topography is not uncommon.

4.3.2 Impacts of Vertical Modifications

Dillon Consulting (Dillon) recently completed a two part assessment of a possible vertical extension of the RDF. The first letter report dated September 17, 2012, identified sightlines to the top of the landfill from residential properties in the vicinity. The second letter report dated September 26, 2012 provides an estimate of the volumetric gain in landfill capacity if the maximum elevation were increased by 1m, 5m, 10m and 15m. Both Dillon letter reports are provided in Appendix A.

Briefly, the September 17, 2012 Dillon report indicates that the landfill is currently visible to the public from the Bayers Lake Industrial Park, from apartment buildings in Clayton Park and houses in Timberlea.

This magnitude of setback from the RDF (as shown in photographs in the September 17, 2012 Dillon report) and visual buffering is rare. Technically, there is no engineering impediment to increasing the elevation of the landfill. Any increase of the current maximum elevation will result in an extension in the life of the landfill, and an increase in revenue from the additional material received. However, this increase in elevation will in some way increase the visual impact of the RDF on the local community. In general the current operation is well confined and in Stantec's opinion, not a major negative presence in the local community. This opinion is obviously

subjective and others may have a differing opinion. Stantec's opinion is based in part on visual impacts of other similar sites in other communities.

In Dillon's September 26, 2012 report, they indicate the following gains in landfill capacity and site life revenue for vertical expansions of 5, 10 and 15m.

Increase maximum elevation by 5m = 1,820,000 m³ capacity gain
= 10 year extension in life of landfill

Increase maximum elevation by 10m = 3,170,000 m³ capacity gain
= 17 year extension in life of landfill

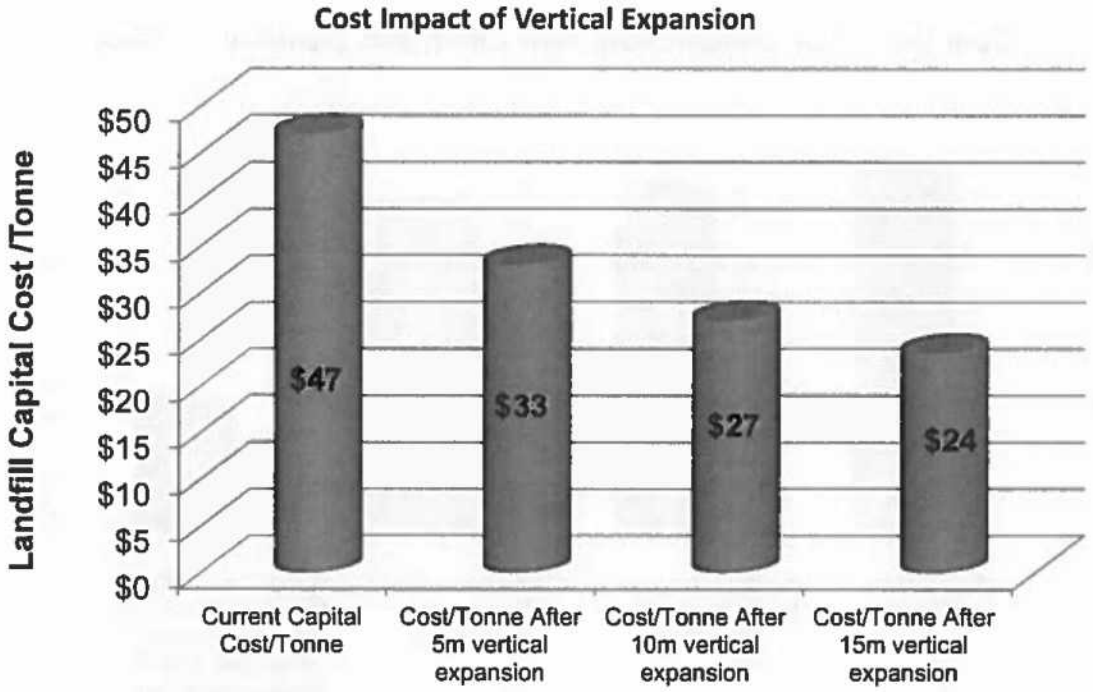
Increase maximum elevation by 15m = 4,280,000 m³ capacity gain
= 23 year extension in life of landfill

4.3.3 Recommended Process to Modify Vertical Design

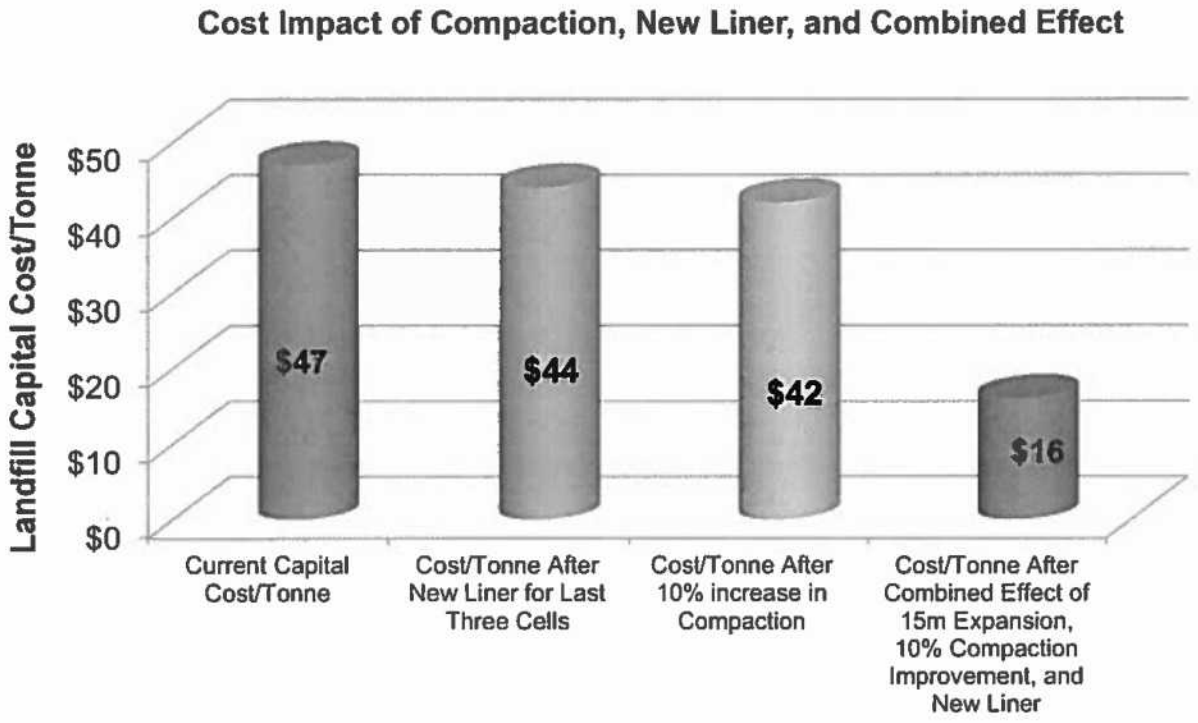
Based on a potential capacity increase of up to 4.28 million m³, an extension in the life of the landfill of up to 23 years, and an associated revenue gain with no significant increase in capital cost, Stantec recommends that HRM consider a 10 to 15m vertical expansion of the RDF subject to meaningful local community input on the issue. To put this potential volumetric increase in context, the total design capacity of all nine cells at the RDF is 4.24 million m^3, with over 2 million m^3 remaining. The final decision to expand the RDF vertically or to maintain the current design limits must weigh the broader community benefits of significantly extending the life of the landfill at minimal capital costs, compared to the impact of the increased visual presence of the RDF on its immediate neighbours. There are no technical constraints with either a 10 m or 15 m vertical expansion.

4.4 COMBINED IMPACTS OF LANDFILL CHANGES

Previous sections have discussed the individual impacts of changes to the density of the landfill, the base liner design, and the maximum elevation of the landfill. This section attempts to describe the impact of these changes on the basis of a capital cost per tonne. Capital costs generally refer to major one-time costs for "capital" construction. Landfill cell base liner and road construction are examples of capital costs. The current capital cost per tonne is estimated to be approximately $47/tonne. The following graph shows the revised capital cost per tonne for the landfill for the three vertical expansion scenarios. The reason for the dramatic change in capital cost per tonne is that no additional base liner or roads are required to expand vertically. Therefore, if the approved volume of the landfill doubles due to vertical expansion, the capital cost per tonne will decrease by roughly half.



The following graph shows the individual impacts of a revised base liner and increased compaction. Increased compaction has a direct and proportional impact on capital costs for a landfill cell. For example and as shown on the graph, if compaction increases by 10% the capital cost per tonne is reduced by 10%. The revised base liner for the final 3 cells (cells 7,8,9) may result in savings of $10.2 million, but the cost per tonne impact across the entire landfill may be smaller than expected given that two thirds of the cells are already constructed. The final bar graph on the right shows the potential capital cost per tonne if all options are implemented in combination. This lower cost is more typical of costs at similar sites.


Cost Impact of Compaction, New Liner, and Combined Effect
Landfill Capital Cost/Tonne
$50
$40
$30
$20
$10
$0
$47
$44
$42
$16
Current Capital Cost/Tonne
Cost/Tonne After New Liner for Last Three Cells
Cost/Tonne After 10% increase in Compaction
Cost/Tonne After Combined Effect of 15m Expansion, 10% Compaction Improvement, and New Liner

5.0 Opportunity to Create a Regional Waste Resource Campus

5.1 CHALLENGES OF CURRENT DE-CENTRALIZED MODEL

The current decentralized model for waste infrastructure is challenging whenever changes to the collection program are contemplated, and whenever certain facilities are operating at capacity or are in need of upgrading. For example, in the Dartmouth collection zone organics are delivered to a processing facility in a Dartmouth industrial park, while garbage is delivered to the Otter Lake facility south of Halifax. A common practice today is for garbage and organics to be collected in the same truck with split compartment percentages ranging from 70/30 to 50/50. This approach is not feasible in HRM given the distance between the two drop locations.

Another example of the challenges associated with decentralized infrastructure is when a certain facility reaches capacity. The current MRF in Halifax is in a location that cannot be easily expanded or retrofitted. A change in location would impact all 8 collection contracts, and a new facility would need to be fully commissioned before the existing facility could be decommissioned.

Scattered operations also necessitate underutilized scales at each location, operated by different contractors, and potentially utilizing different scalehouse software packages. This challenges HRM to maintain effective recordkeeping across all facilities and programs.

HRM staff is also not located at any of the four primary processing centres in the region. This limits the opportunity for oversight and quality control of operations. It also limits the potential for an enhanced promotion and education program. A single site could support a permanent education centre where multiple facilities could be toured.

A possible future need for HRM is outdoor windrow composting pads to improve the quality of the compost product when leaving HRM control. Siting such a compost curing facility is a challenge as there is no obvious existing location prepared to expand services, and a new parcel of land would again exacerbate current challenges with material movement.

These challenges are not insurmountable, but they do complicate operational decision making especially related to collection contracts and delivery of materials. For example, if a single site received all collected materials, modifying collection strategies would be simplified as the delivery point would be the same.

5.2 FLEXIBILITY OFFERED BY WASTE TRANSFER CAPABILITY

Within the scope of this assignment Stantec was to assess the feasibility and flexibility offered by a waste transfer facility. Part of the reason for this assessment was the shutdown of operations at Otter Lake caused by an extreme weather event. Receiving at Otter Lake was

suspended for several days as damage to the electrical systems supplying the FEP/WSF were repaired.

This topic was included in this section of the report as there is some inter-relationship with the development of a waste resource campus.

The severe weather event which suspended receiving at Otter Lake caused HRM to react to an unexpected situation. Disposal arrangements in other jurisdictions were quickly secured and trucks were re-routed on an interim basis. HRM has formal agreements with disposal facilities for receipt of waste in the event of another similar circumstance. The locations and fees to be paid (excluding trucking) are summarized below.

- Chester Landfill $80/tonne
- Queens Landfill $80/tonne

These types of fee arrangements are generally set at higher pricing levels than what could be negotiated for ongoing disposal contracts, but quoted rates are still considered very reasonable under the circumstances. In addition to the two sites noted above, a private disposal facility in West Hants is very close to the main population centres in HRM and would not represent a major inconvenience to waste haulers in an emergency situation.

Suspension of service at Otter Lake has occurred only once in 15 years and is unlikely to become a regular occurrence. An arrangement with the landfill in West Hants could mean that in the event of an emergency, most loads can be delivered directly for disposal while only incurring a roughly one hour increase in round trip travel time. In planning for future similar emergencies, HRM may wish to develop a protocol whereby collection contractors and the public are advised that no large items (mattresses/furniture/white goods) will be collected. This will reduce the volume of waste requiring disposal in the short term relieving some of the demand on collection contractors.

Constructing a transfer building and maintaining an on-call fleet of transfer trailers solely to address the very rare suspension of service at Otter Lake is not considered feasible especially when short term disposal capacity is available in West Hants. Depending on the location of the transfer site, it is questionable whether there would actually be any operational advantages or savings even during the emergency event.

An order of magnitude capital cost estimate to establish a standalone transfer capability is $5 million and can vary depending on the transfer trailer fleet size and on-call arrangements. Loading equipment and qualified staff would also need to be immediately available to fulfill the stated purpose. The facility would need to be maintained to a high standard at all times to ensure proper operation in the event of an emergency. Given the proximate location of a landfill in West Hants, Stantec does not recommend any further consideration of a standalone transfer facility.

If HRM at some point chooses to revisit its waste disposal strategy and export waste to other jurisdictions on a long-term or permanent basis, then a transfer facility would likely become a key component of that revised strategy. Likewise, if HRM develops a multi-purpose waste resource campus, the transfer capability can be easily integrated into the site-wide operation.

The concept of a local transfer facility to manage waste and other materials even if Otter Lake was still operating was also reviewed. This concept would involve individual collection tracks offloading waste, recyclables and organics at a given location and reloading materials onto trailers to haul to the final destination. Given the density of population in the immediate Halifax/Dartmouth/Bedford area and the decentralized processing facilities, it was determined that there was limited value in this approach at this time.

5.3 OPPORTUNITY TO CO-LOCATE INFRASTRUCTURE OVER THE LONG-TERM

Many of the challenges noted in Section 5.1 would be alleviated if HRM were to develop a location which had sufficient lands to co-locate multiple operations and HRM staff. Given that several facilities are at capacity and nearing the end of their useful life, it is timely to consider this concept. There is no particular need to rush implementation, but planning must begin in the near future to address the logistical challenges of developing the campus.

In Stantec's opinion, a decision regarding maintaining the current de-centralized model, or transitioning to a campus concept is a critical first step to modernizing current programs and services. Many of the recommendations in the following sections are contingent on the selected location for new or expanding infrastructure.

5.4 20-YEAR CONCEPT PLAN FOR REGIONAL WASTE RESOURCE CAMPUS

5.4.1 Scope of Regional Waste Resource Campus

Current infrastructure is located at four different properties in Dartmouth and Halifax. With the exception of the Otter Lake facility, sites are of limited size and prevent the consideration of co-collection of materials at the curb in a single truck. The benefits would include the potential to optimize collection routing and fleet size, lands for compost curing, a common location for infrastructure replacements when needed, and a location that could serve as a contingency transfer point for waste in the event of disruption at Otter Lake. Possible components for a new "greenfield" campus and timing are presented below.

• Secure lands, obtain approvals and complete site servicing	2013/2014
• Construct and operate compost curing pads	2014/2015
• Construct scales, offices and educational centre	2015
• Construct multi-use transfer facility for white goods/waste/MHSW	2015
• Construct anaerobic composter for ICI organics	2015/2016
• Construct replacement MRF	2017/2018
• Optional aerobic composting processing capacity	2018+

- Optional advanced waste reduction(gasification or other) 2020+
- Other long-term waste reduction infrastructure needs 2020+

5.4.2 Siting Considerations

A campus as described above would have considerable land needs. While the structures and operational areas are likely to only need 10-20 hectares, buffering needs would increase the minimum total required area to 30-40 hectares depending on the precise location of the property.

One possible location is the existing 300+ hectare Otter Lake facility. While Otter Lake may not be an ideal location for all infrastructure needs, many current operations could be relocated to that site especially if the recommendation to close the FEP and WSF is adopted.

The local geography in the Halifax/Dartmouth area limits suitable locations to lands east of the urban area. A transportation study has been completed to evaluate impacts of changing delivery points from the current locations, to a hypothetical location east of Halifax/Dartmouth. The study concluded that there would be little benefit gained.

Part of the difficulty in establishing a new "greenfield" campus is land availability. HRM would need to evaluate available lands and the likely community acceptance of such a concept. While 40 hectares (100 acres) is considered as a minimum, additional lands would provide enhanced community buffers. The exact process required to site and develop a new campus cannot be confirmed at this time as the actual proposed location will dictate the scope of community engagement and development planning needs.

5.4.3 Staging Plans Based on Current Infrastructure and Contracts

Likely timing for development of a campus is shown in a previous section. Proposed timing was based on current infrastructure needs and contract expiry dates. For example, the MRF is in satisfactory condition to continue operations until 2019 when the processing contract expires. That permits HRM to refine its long term recycling strategy until 2016 when procurement for a new facility should commence.

The suggested timing is preliminary only and HRM may wish to conduct a more thorough planning and scheduling process if the campus concept is endorsed by Council for further consideration.

5.5 DEVELOPMENT COSTS

Stantec has prepared the following estimate for greenfield development costs associated with the waste resource campus concept. Land acquisition costs have not been specified as the cost of more rural properties is not considered to be a large percentage of the total site development costs including all operational infrastructure. For example, if the MRF is relocated to the

campus, revenue from the sale of the MRF building and property in the industrial park will offset campus land purchase costs.

Development costs are based on full build-out of the property and can be staged. Operational waste processing infrastructure is shown with no cost as upgrades are required and actual locations do not materially affect the cost of the upgrade.

Site Preparation and Earthworks	$340,000
Water and Sewer Services (excludes treatment)	$550,000
Stormwater Control	$500,000
Street Construction	$3,200,000
Landscape/Fencing	$550,000
Electrical/Other(on site only)	$250,000
New MRF	N/A
New Composting Operations	N/A
Scales	$700,000
Office/Education Centre	$3,000,000
Engineering	$1,000,000
Estimated Development Cost	**$10 million**

5.6 REGIONAL WASTE RESOURCE CAMPUS AS CORNERSTONE FOR 20 YEAR STRATEGY

HRM is at an important point in the evolution of its waste management programs. There has been no major change in program direction since the 1990s and decisions made in the near future will dictate operations for at least the next two decades.

The scope and timing of this assignment did not permit an extensive evaluation of candidate sites or an examination of collection zone configuration based on a particular campus location. The de-centralized location of infrastructure in Dartmouth and Halifax, combined with the complications of bridge crossings, makes the evaluation all possible scenarios onerous.

The benefits of a campus concept cannot be fully quantified financially at this time. For example, if in 10 years HRM wishes to pursue waste gasification, then the campus concept would simply enable the new plant to be located on a large acreage site complete with scales, site services and delivery of the wastestream already organized at the property. Similarly, when the existing compost processing facility in Dartmouth is at end-of-life, a portion of the campus will already be reserved and prepared for the new plant utilizing then-current technology.

As can be seen since the 1995 Strategy was developed, much change has and will continue to occur in waste management. Planning for future flexibility is a prudent step in the short term to ensure that HRM is not unduly bound by numerous and unrelated contract commitments.

6.0 Materials Recycling Facility (MRF)

6.1 EXISTING MRF OPERATIONS

The HRM owned MRF is located at 20 Horseshoe Lake Drive, Bayers Lake Business Park and is co-located with HRM's household special waste depot. The daily operation of the MRF is contracted out to Miller Waste Systems, who also provide recyclable materials marketing services as part of the operations agreement. The MRF is operating in a manner envisaged by the 1995 Strategy. However, the recovery of recyclables from the wastestream is typical and there are opportunities for increased recovery which will be discussed in later sections.



This facility is a two (2) stream processing operation with two sorting (processing) lines; one for co-mingled fibres and one for co-mingled containers and a baler with two feed conveyors (one for the fibre materials and one for the container materials). In HRM's municipal curbside collection program, residential recyclables are collected in a two-stream plastic bag collection system. The co-mingled containers stream consists of mixed plastics, metal, glass, multi-material containers and film plastic placed together for collection in transparent blue bags or clear bags. The containers stream has recently (September 2011) been expanded to include a full range of plastic packaging. The co-mingled fibres stream consists of various mixed paper placed together for collection in grocery or retail type bags (or sometimes in a separate blue or clear bag) plus corrugated cardboard placed for collection in armload sized bundles or sometimes flattened pieces placed together in small boxes. Boxboard is collected in the organics program.

Material from the Industrial, Commercial, Institutional (ICI) sector is also received and processed at the MRF. This consists mostly of blue bags of co-mingled containers and some mixed paper.

The MRF building and original processing equipment was constructed and installed in 1991. The building is 21 years old and is approaching the end of its functional life (usually 25 to 30 years). The processing equipment in the MRF has undergone both upgrades and replacement since 1991. Most notably there were upgrades in 1999 when a new mechanical bag breaker and eddy current separator were added to the co-mingled containers processing line. A new fibre processing line, which included a star screen for newspaper separation and a garbage compactor for residue were also installed. A new baler was installed in 2004. These

installations are also approaching the end of their functional life (usually about 10 years of service).

The co-mingled containers processing line was upgraded in 2009-2010 with improvements to accommodate the addition of more plastic packaging types to the blue bag program. Upgrades also provided for increased sorting efficiency, improved capture rate of recyclable materials and reduced amounts of residue sent for disposal. The 2009/10 improvements included installation of:

- a new incline conveyor
- elevated pre-sort structure and platform
- plastic film transfer conveyors
- film plastic baler
- pre-sort conveyor
- transfer conveyor and new chutes
- residue transfer conveyor and new residue compactor
- glass disk screen
- additional bunkers (for the additional plastics)

The MRF has an estimated annual capacity of 28,000 tonnes per year (TPY) of throughput of recyclable materials. The annual capacity is based on the equipment and layout of the facility operating on one shift per day (8 hours per day) Monday to Friday. The facility is currently operating at about 90% capacity, processing about 24,500 tonnes of residential and ICI recyclable materials in 2011/12.

The operating agreement with Miller is based on a per tonne fee (charge) for the materials delivered to the facility. The operating fee is based on a sliding scale for the amount of recyclable materials delivered for processing. As the amount of material that is delivered increases above set thresholds, the cost per tonne paid out decreases. This sliding scale is a common type of arrangement for a processing operations service. The decreasing operating fee is due to economies of scale being realized with the higher throughput. As more materials are processed through the facility (within design parameters) the fixed costs for the MRF are spread over a greater tonnage which lowers the operating price on a per tonne basis. The current agreement is structured on 2000 tonne per year steps for pricing breaks. The agreement also has set incremental fees for the processing operations for additional services if they are implemented. The 2011/12 operating fee was $101.84/tonne.

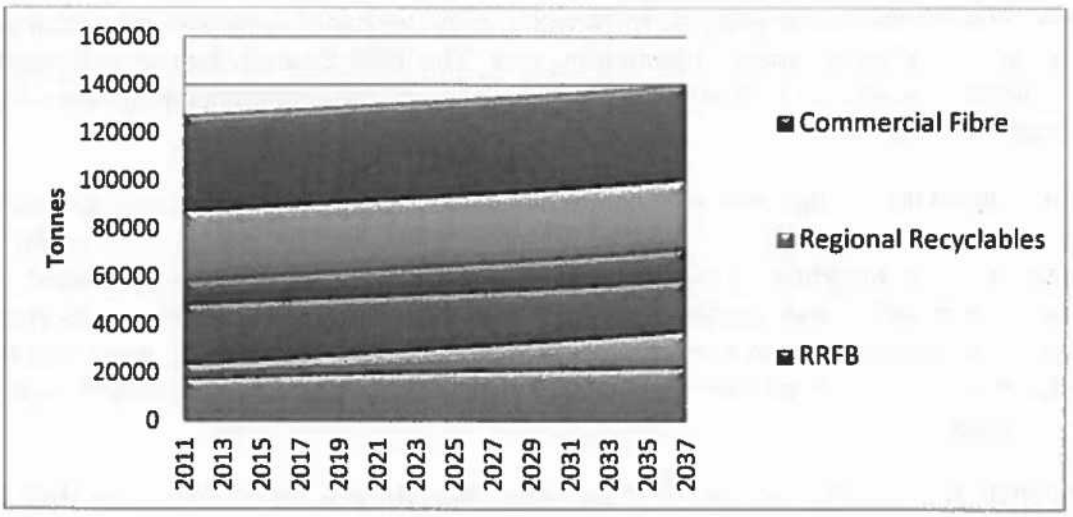
The sale of commodities from the MRF provides an offsetting revenue stream for HRM. The revenue varies due to the changing value of different commodities, which move up and down based on market forces. The revenue from the marketing of the materials is split with the operator as part of the agreement on a 75%/25% basis between HRM and Miller.

6.2 OPERATIONAL LIMITATIONS

Based on population projections alone the amount of recyclable material generated over time will grow from the current and approximate 17,500 TPY to about 25,000 tonnes of residential source materials (2037). If HRM continues to process ICI source recyclable materials along with residential recyclables, this current combined 24,500 TPY will rise over the planning period to somewhere in the order of 40,000 tonnes. There is also an additional and approximate 9,000 tonnes of residential recyclables and 16,000 tonnes of commercial source recyclable currently being received for disposal at Otter Lake. If HRM increases its diversion efforts through mechanisms described elsewhere in this report, the existing MRF will not suffice. The existing MRF also inhibits HRM from adopting a regional approach to recyclable materials processing in the province. Based on HRM's current capture rate of 127.44 kg/hhld/year, and notwithstanding capture rates will vary by community, for order of magnitude purposes this would represent 28,705 TPY available for processing from those outside of HRM if HRM served the entire province. A cost-benefit assessment would need to be undertaken to determine the feasibility of this from a transportation standpoint, that is, transfer and haulage operating and capital costs. This regional concept is discussed further below.

The current MRF does not handle any deposit return containers other than those received in the blue bags. If HRM were to manage these materials they would need to store and bale an additional 4,200 TPY and in a regional context an additional combined total of 10,000 TPY. Combined totals from all material sources described are shown below for the planning period. A further 40,000 tonnes of fibre (2011-2012) material not currently processed by HRM but by the private sector is also shown to demonstrate all available recyclable material tonnage.

Projected Recyclable Material Generation Over Planning Period (2011-2037) All Material Sources



Note: Due to varying population growth/decline rates for other municipalities in the province, Stantec has assumed a constant population growth rate over the planning period.

While operating hours can be extended to accommodate additional tonnage to the MRF, there is insufficient storage capacity to accommodate the same and the site is not suitable for expansion of the MRF to any significant extent. A detailed traffic flow assessment would also need to be undertaken to assess impacts associated with additional collection vehicle and transport trailer flow through the site in an already busy retail area.

6.3 COMPARISON OF OPERATIONS TO 1995 WASTE RESOURCE STRATEGY

The 1995 Strategy outlined four (4) key points as it related to recyclable materials processing:

1. The existing MRF would be utilized to process source separated residential containers
2. Source separated ICI source containers will be accepted.
3. Residential paper fibres will continue to be processed. If container volume were to bring the MRF to capacity, additional fibre processing would be developed.
4. Modifications to the existing facility would be delayed in order to determine the net volume and materials mix impacts of:

    a. Residential recycling program volumes based on participation and compliance
    b. Impact of provincial deposit regulation
    c. Volume of ICI containers
    d. Anticipated capacity utilization resulting from the designation of the MRF as a regional processing facility for containers captured in the provincial deposit program.

The 1995 Strategy addressed the concept of a dedicated Fibres Sorting Plant when additional capacity was required. A dedicated fibres sorting plant would be utilized to process the residential fibres collected by the municipality as well as that from ICI sources. The 1995 Strategy called for HRM to monitor private sector provision of processing capacity and if sufficient capacity was not developed, HRM would consider a joint public-private sector venture of some nature to ensure capacity needs were met. The 1995 Strategy further envisaged that HRM would be in control of its residential recycling program and infrastructure (processing) to handle collected materials.

HRM has fulfilled these objectives with respect to its MRF operation. HRM owns and so has a degree of control over operations. The facility has accepted and processed all collected residential recycling materials as well as those from ICI sources as originally envisaged. The MRF has been modified and upgraded accordingly to meet recycling program needs and as volumes have increased due to increased participation and material capture; most recently upgrades to accommodate plastics recycling. Private sector paper fibre processing capacity was also developed.

The regionalization concept was not realized in that the province did not utilize the MRF as part of its deposit program. HRM still, however, has an opportunity to address the concept of regionalization as it relates to the processing of recyclable materials from other municipal jurisdictions in the province and this is discussed further below.

6.4 COMPARISON OF CURRENT OPERATIONS TO INDUSTRY BEST PRACTICE

Best practices in recycling and operations are researched and employed across Canada. The Ontario Extended Producer Responsibility (EPR) funding program for municipal blue box programs has necessitated substantial efforts toward increased municipal program efficiency to lower costs. As such, a number of key findings for Ontario are discussed in this section as applicable to HRM.

The following table provides a comparison of various Key Performance Indicators (KPIs) between HRM and a number of other municipalities where data could be obtained.

	Halifax	Durham	Halton	Simcoe	Hamilton	Ottawa	London
Population	390,328	621,500	487,418	282,112	528,504	917,570	385,680
Total Single Family Households	140,821	185,024	147,203	125,920	150,231	259,243	115,537
Total Multi Family Households	23,000	22,635	29,019	0	59,734	117,854	50.100
Total BB tonnes marketed	17,946	45,743	43,776	24,060	39,841	62,961	26,247
Method of Collection	Bags	Boxes, bags not accepted	Boxes, bags not accepted	Boxes	Boxes no bags	Boxes, bags discouraged	Boxes, no bags
Frequency of Collection	Weekly some bi-weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly
Type of Collection	Two Stream	Two Stream	Single Stream	Two Stream	Two Stream	Two Stream	Two Stream
Capture Rate BB material (%)	63	77.3	85.3	68.9	71.1	62.6	57.3
Capture Rates (kg/hhld/yr)	127.44	215.85	244.54	191.55	189.33	164.44	154.47
MRF	Own	Own	Contract	Own and Contract	Own	Contract	Own
MRF Operation	Contract	Contract	Contract	Municipal & Contract	Contract	Contract	Contract
Processing Cost (All in)	$101.84	$113	$73	$34	$92	$86	$161**
Total Revenue	$2,128,259	$11,160,160	$8,995,391	$15,576,594	$24,291,817	$1,815,404	$779,345
Revenue per Tonne	$88	$147	$197	$168	$157	$41	$32
Total Waste Generation	131,448	229,630	194,787	112,808	214,897	337,894	149,900
Waste Generation per Cap	336.96	369.48	399.63	393.65	406.61	368.22	388.66

1. Population and number of households from WDO for Ontario municipalities.
2. Recycling Information from WDO Ontario municipal datacall for 2011.
3. Blue box capture rates are for 2010.
4. HRM capture rate does not include multi-residential sector that are collected by others and counted in with commercial recycling tonnage.
4. Waste Generation and per capita generation are based on GAP waste flow analysis for residential stream.
5. ** NOTE: WDO data shows a high amortization in year one of the MRF operation of over $20 M based on their standardized accounting method - London's processing fee is about $86.00/tonne.

Revenue Notes:

1. HRM revenue from R330 – Materials Recovery Facility spread sheet
2. HRM per tonne revenue calculated based on the total tonnage in facility (24,318) not just residential tonnage
3. Ontario revenue information is residential material only, no ICI

The cost that HRM is paying for the processing of the materials is $101.84 per tonne processed. In addition to the operating fee charge, there are additional (incremental) fees for additional services that have been implemented. The additional $3.39 per tonne for the expanded plastics recycling has been added to the operating fee. Along with the additional operating fee, there is also a capital amortization charge that HRM will incur at the end of the current contractual arrangement. Processing costs for comparable municipalities range widely but typically in the order of $75 to $100 per tonne which usually includes a revenue sharing arrangement where the full revenue is realized by the municipality from the sale of the materials. HRM's processing fee is in line with the industry but in the case of revenue only 75% comes back to HRM. While it is understood that revenue share provides an incentive for the operator to market commodities at the highest price, it cannot be high enough to apportion any significant risk to the contractor. Considerations including receipt of 100% of the revenue can be undertaken with the next Design, Build, Operating (DBO) contract to be let by HRM.

It should be pointed out that the revenue per tonne for HRM is showing lower than for some of these comparable municipalities, however Ontario does not have a beverage container return program and so all of those higher value commodities like aluminum and #1 PET are processed at Ontario MRFs, associated revenue recovered and reported in their revenue per tonne. In HRM's case this is reported as a separate revenue item ($301,393 in 2011/2012) which equates to an additional $12.39/tonne (based on all inbound tonnes not just residential which in fact the majority would be sourced from). This revenue represents HRM's 50% share of the deposit bearing beverage containers refund and handling fees. Further and as discussed above many Ontario municipalities receive 100% revenue share for the sale of their recyclable commodities.

Another operational expense that is incurred is the rebate to the operator for the disposal of the residue from the MRF operations. The rebate paid to the contractor is based on a sliding scale as to the residue rate of the operation with a higher percentage of the cost covered the lower the reside rate is. The residue rate for the processing operation was 9.26% for 2011/12. This resulted in 2,252 tonnes of material having to be disposed at the RDF at a cost of $258,980 (based on $115/tonne). As outlined in the contract, the contractor (Miller Waste Systems) pays for the disposal, but HRM rebates a percentage of the fee to offset the disposal charge. The rebate is on a sliding scale to incentivize the contractor to limit the residue, and at 9.26% HRM rebated 65% of the cost. This amounted to $168,337 which translates to an additional $6.92 per tonne.

The residue rate of 9.26% is high for a two-stream program. For example, the Region of Durham facility (two stream, municipally owned, contracted operation, processing 50,000 TPY+) in 2011 had a residue rate under 5% and the City of London facility had a residue rate of 4%. There are two main aspects that contribute to the residue rate of a facility. The first is that the inbound collected materials may have high rates of contamination, which have to be sorted out as garbage and non-recoverable recyclable material and/or there is some aspect of the operation that is allowing recyclable materials to go through processing but end up in the residue stream. An additional factor for HRM is the allowance of bags for recyclable materials collection and containment. Notwithstanding the evolution of bag breaking technology materials

can still get caught up in the bags and get lost as non-recovered residue in the process. Bag based MRF operations are also generally more expensive than non-bag based operations because of the additional processing equipment required and normally more manual sorting. It is not readily apparent to what extent any of these factors might be contributing to the residue rate.

The rebate that HRM provides the contractor for residue disposal is not a common feature for similar programs, municipally-owned facilities that are privately operated. The common (best) practice is for the contractor to bear the full cost of the disposal of the residue from the operations. In the agreements, there are targets set for capture of recyclables processed at the facility to ensure efficient facility operations, and have an upset limit on the contamination level of the incoming material (usually 5%). If the contamination level of the incoming material exceeds the upset limit, then compensation is provided to the processor to offset the cost of disposal of the excess contamination. The contractor will be penalized if they do not meet the capture rates for materials by having to pay for the residue disposal, as well there is a surcharge added for the lost revenue from the recyclables not captured and disposed of. The amount and quality (make up) of the residue stream is continually monitored, usually by regular audits, to ensure that recyclables are not ending up in the residue stream, to provide an indication as to the quality of the inbound materials and detect any aspects of the operation that may not be functioning properly.



Best practices in MRF operations range from facility design and degree of mechanization to matters of MRF standard operating procedures. In HRM's case the matters of specific operating procedures are not so relevant for discussion as are broader future facility design features to accommodate HRM's long term processing needs. HRM's current MRF employs various best practices including appropriate degree of mechanization versus manual sorting, the employment of appropriate technology, and is operating quite well. Matters discussed above; residue rates, revenue share, processing fees, and continued use of bags should be addressed in HRM's next DBO and/or operating contract.

From a broader perspective there are three key and relevant best practices that HRM can apply:

- Applicability of single versus two stream processing.
- Larger facilities have improved operating cost structures and efficiencies.
- Regionalization is a consideration to increase the volume of materials for the facility.

6.5 TWO STREAM VERSUS SINGLE STREAM PROCESSING

HRM has the opportunity to determine whether or not they should continue with a two-stream containers and fibres collection program or shift to single stream collection and processing over the long-term. There is no definitive "best practice" in this regard in that there are numerous factors that affect which is most suitable; tonnes per year throughput that dictate costs, market tolerance for contamination, opportunities for co-collection of materials at the curb, other curbside collection programs.

Single stream collection has most often (in Canada) been implemented in concert with the introduction of curbside organic waste collection programs to minimize the number of sorts (and containers) at the curb. That is, a number of municipalities (Peel, York, Halton, Toronto) shifted from two-stream to single stream recycling with organic waste program implementation. Almost all larger municipalities in Canada (Winnipeg, Edmonton, Montreal) have or are adopting (Regina) a single stream program and others continue to evaluate the option (Hamilton, Ottawa). This is also the trend in the United States and is the predominant form of processing now in many states including but not limited to New York, Wisconsin, California, Colorado, Maine, Vermont and Illinois. Single stream recycling is convenient, can result in additional material capture, is most appropriate for automated cart collection programs, can result in greater efficiencies in collection if collected on its own in that trucks completely 'pack out' with the material. There is no risk of one side of the truck 'packing out' before the other as in the case of two-stream recycling collection programs. Single stream processing provides greater flexibility to accommodate different collection methods including co-collection of other materials (garbage or organics) at the curb if receiving facilities for these materials are proximal to each other.

Single stream recycling can also attract greater participation in multi-residential and commercial sectors where there may be storage and space limitations for sorting containers, especially in the context of mandatory organics separation. It's also very applicable in the context of regionalization of recyclable materials processing in that transfer of single-stream materials from one jurisdiction to the other is more efficient than what would be the case with the current two-stream recycling system. From a processing perspective single stream MRFs can also receive and process recyclables collected in any manner, that is, recyclables that are collected completely co-mingled (single stream) or with any lesser degree of separation (two stream or more). A two stream MRF cannot effectively handle single stream material.

In general single stream processing does have a higher capital cost than comparable two-stream processing, however there are operational cost savings that can be realized with single stream as well as higher operating efficiency (productivity). A recently undertaken "Study of Optimization of the Blue Box Materials Processing System in Ontario" (Continuous Improvement Fund: Steward Edge and Resource Recycling Systems, June 2012) provides cost modeling for blue box recycling processing facilities. The cost modeling is based on the development of a new "greenfield" facility, taking into account all costs for building, equipment, capital amortization, operations costs, etc. The following table shows a number of cost scenarios that

were developed as part of that study and based on facility size (throughput) and sorting methodology (two-stream or single stream).

	Two-Stream	Two-Stream	Single Stream	Single Stream	Single Stream
Number of Shifts	1	2	1	2	1
Tonnes per Year	23,000	46,000	23,000	46,000	35,000
Throughput tonnes/hour	14	14	14	14	20
Capital Cost	$8.7 M	$8.7 M	$9.4 M	$9.4 M	$13.5 M
Productivity tonnes/hr/sorter	0.6	0.6	0.75	0.75	1.00
Capital Cost per tonne	$37	$18	$41	$20	$41
Operational Cost per tonne	$109	$98	$98	$83	$85
Total Cost per tonne	$146	$116	$139	$107	$126

Note: 1. Total Cost per tonne includes capital amortization cost. 2. Materials to be processed do not include plastic film, expanded polystyrene and plastic laminates.

Single stream processing is a viable option for HRM especially in the context of driving greater capture of recyclable materials known to be in the refuse stream received at Otter Lake from both residential and commercial sources (combined in the order of 25,000 TPY). This more convenient collection program could drive higher diversion and higher tonnage to a new single stream MRF. HRM's current capture rate for recyclable materials is in the order of 63% which when compared to other municipal jurisdictions is low. The benefits of increased tonnage to the MRF are discussed further below.

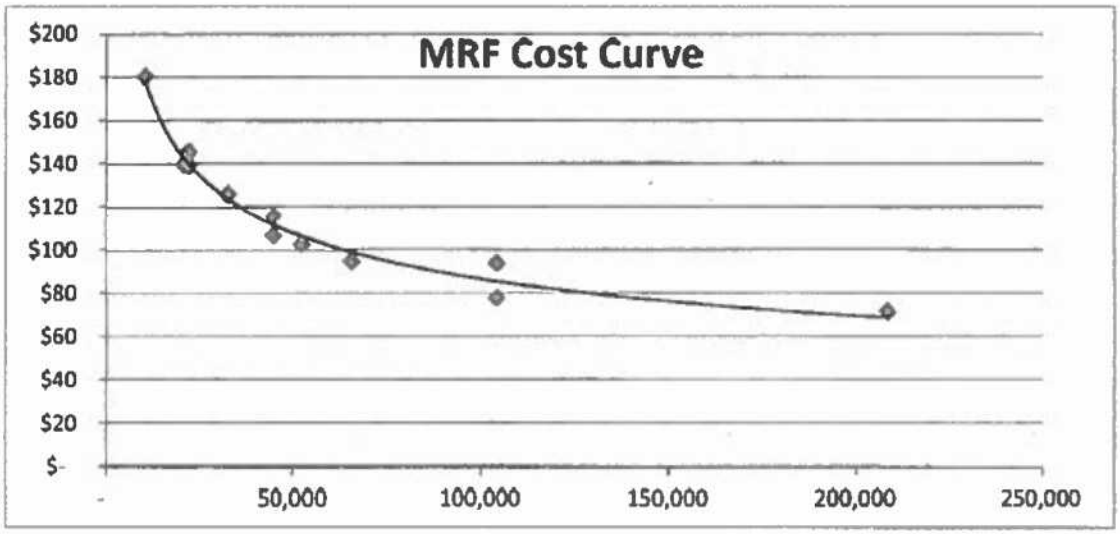
6.6 REGIONALIZATION

Regionalization of materials recycling facilities has come to be considered a better practice in municipal recycling because of the reduced need (cost) for smaller MRFs dotted across various jurisdictions, like Nova Scotia, that process only relatively small tonnages (and typically at a high cost per tonne) and the economies of scale associated with a larger regional MRF. For HRM to realize economies of scale more material would have to be sourced to be processed at a new MRF. This can be accomplished by driving added diversion as discussed above but also through regionalization; that is, processing recyclable material generated in other municipal jurisdictions. While this needs more consideration, the construction of a MRF by HRM that requires additional capacity for a surrounding region could be only incremental in nature. The cost modeling above shows that a 23,000 TPY single stream MRF has the same capital cost as a 46,000 TPY single stream MRF because the MRF is simply operated over two shifts. Overall cost per tonne (for both operating and capital are lower for all facility users). The simple modeling exercise provides order of magnitude differences in cost between various two-stream and single-stream scenarios and for illustrative purposes. It is probable however that with double the tonnage, the capital cost would be somewhat higher with respect to tipping floor area for storage (double the material received during the same receiving hours), possibly bale floor storage/space (building footprint) requirements and wear and tear on equipment will occur faster, but again, these costs are incremental when considered on a per tonne basis.

There is a particular benefit in regionalized single stream processing operations as opposed to dual stream operations to realize savings for transfer of materials for those municipalities within a reasonable transfer distance of HRM.

Research and practical experience has demonstrated that larger processing facilities have improved operating efficiencies, and lower cost per tonne than smaller facilities. A comprehensive study undertaken for Waste Diversion Ontario, the Blue Box Program Enhancement and Best Practices Assessment Project – Volume 1 – July, 2007 by KPMG and R.W. Beck determined that 40,000 tpy is a minimum size to begin to realize operating efficiencies and cost savings, and that as facilities do get larger, the operating cost per tonne decreases. HRM will process in the order of 40,000 TPY with no program changes by the end of the planning period, could process in the order of 60,000 TPY with significant increased diversion efforts and if HRM operated a regional MRF could process somewhere in the order of 80,000-90,000 TPY. This does not include processing of any additional commercial fibre or RRFB materials.

MRF Operating Cost by Tonnage Processed



As tonnage/volume throughput increases, there is better utilization of what is necessary and fixed infrastructure and the ability to use greater mechanization/technology which drives efficiencies. This applies not only to receipt of additional volume through other municipal sources in the context of a regional MRF but also as it relates to the current practice of processing a portion of ICI sector recyclable materials which has enabled the existing MRF to operate at near capacity and so with greater efficiency. Without ICI sector materials the fixed overhead costs associated with the MRF would still be realized, e.g. building maintenance, mobile equipment costs, administration, equipment maintenance, etc., only spread over less tonnes for a higher overall cost per tonne for HRM.

For example the City of London, Ontario which is similar to HRM in size, has recently (2011) constructed a new 75,000 TPY MRF. The City projected that it would require 40,000 TPY of capacity within 15 years (currently they generate 29,000 TPY). This is a similar prediction for HRM (current 25,000 TPY up to 40,000 TPY over the planning period with continued commercial recyclables processing and without any added diversion efforts). The decision to build the much larger facility than needed was based on being able to provide the excess capacity to other municipal programs (regionalization) and the larger size offered opportunities to install more mechanical sorting technology to improve efficiency (such as optical sorting). The result is the cost that what London now pays (they contract out the operation, similar to HRM) for processing is below what they were paying for the contracted services they had prior to the new facility. Also the tipping fee that other municipalities are offered for processing is lower than they were being charged by their processors due to the economies of scale at the new facility (in the order of $90-95/tonne).

The City of London is a good example of a MRF regionalization initiative and is a good model for HRM to adopt should this initiative be carried forward. The City also received $4,500,000 from the Ontario Continuous Improvement Fund (CIF) as part of a $15 million, 75,000 TPY two-stream Regional MRF undertaking. HRM should seek provincial funding to support any kind of regional undertaking as well. The initiative was undertaken based on preliminary estimates that suggested the Regional MRF would save $10 to $15 per tonne ($0.75 to $1.1 million per year) in net system costs. The City let a MRF design, build & operating RFP with two key options: for a London only facility and for a regional facility. This enabled them to fix the costs associated with either concept and to negotiate partnership agreements for a regional facility based on what could be determined to be reasonable cost-sharing arrangements. HRM could adopt a similar approach in this regard however discussions with other municipalities should ensue sooner than later to assess their program status, tonnage projections and timing with respect to the ability to commit. It should be noted that while London constructed the MRF for two-stream processing (to accommodate the City's two-stream collection system) they constructed the MRF to be able to later retrofit the front-end to accommodate single-stream processing should that be deemed more suitable in the context of a Regional MRF.

6.7 OPPORTUNITIES FOR OPERATIONAL IMPROVEMENTS

There are some short-term changes that can be undertaken to improve system efficiencies but moreover many underlying considerations that can be taken into account when planning or developing options for a new recyclable material processing facility in the future.

6.7.1 Short Term Addition of Boxboard to the Recycling Program

** Calculation is based on: The 2011/12 tonnage 24 318 plus estimated recovery of 40% of available boxboard (based on waste audit data there is 3842 tonnes of boxboard in waste stream) = 1,540 tonnes; 24,318+1540 = 25,858 * $4.42= $114,292.00

HRM should now consider the addition of boxboard to the current recycling program and it was one of the additional services detailed in the operating agreement. This would move the facility closer to exceeding the operating capacity, but should be manageable in the short term. There would be an additional cost to HRM in the order of $4.42/tonne as well as an expense of $52,900 (based on adding boxboard in 2013 and ending the agreement in 2019) to buy out the improvements to the MRF needed to handle the material. If boxboard was removed from the organics to the recycling program, that would amount to an increase of approximately $114,000 per year for the incremental processing charges above the current rate**.

There would be a revenue realized from the sale of boxboard which would offset some of this additional processing cost, but the amount would depend on how the material is marketed (mixed into existing products or as a separate grade) and the commodity value (which varies). An additional consideration for adding boxboard to the recycling stream is that it would remove that material from the organics stream (at an average processing cost of $150 per tonne x 1540 = $231,000). Not including revenue, this implies a savings of somewhere in the order of $117,000 per year. Also there would likely be an improvement in the residential diversion rate for HRM, as the capture rate for boxboard is currently estimated at 25% while in the organics stream. The balance goes unrecovered at Otter Lake.

6.7.2 Construction and Operation of a New MRF – New Location in Mid to Long Term

It is recommended that HRM continue to operate the existing MRF only until the end of the operating contract (2019) because of the various disadvantages associated with continued operations beyond 2019:

- Limited space available for expansion
- Potential value of the sale of the property given adjacent retail land use
- Greater maintenance required for upkeep of older equipment over time; equipment would need to be replaced over the long term
- Limited opportunities for regionalization
- Limited if any opportunity for co-locating with other waste management operations
- Site may not accommodate additional traffic associated with tonnage growth over time; new diversion initiatives

If a waste management campus can reasonably be developed, then ideally a new MRF would be co-located with other waste management infrastructure for the reasons outlined in Section 5. However, a MRF can also be reasonably sited by itself (e.g. on industrially zoned property in a central location within HRM). Operations are almost exclusively indoors and issues associated

with MRF operations; litter, noise can be managed accordingly. Obtaining approvals for a new MRF should be a fairly straightforward process.

The major advantage in maintaining status quo operations in the short term and developing a new facility in the mid-term is that it gives HRM the opportunity to evaluate and site the most appropriate processing option; single stream or continued dual-stream processing and with and without a bag-based program. As discussed above it also presents an opportunity for regionalization of the new MRF, again to increase operating efficiency and offer lower processing cost for HRM as well as other municipalities.

A MRF can feasibly be constructed and operational within two to three years but formal procurement should be undertaken no later than 2016.

6.7.3 Flexibility in Operations in the Mid to Long Term

A new MRF should be appropriately designed to accommodate HRM's long term processing needs but another consideration is that a new MRF should have flexibility in processing operations to adjust to the ever changing recyclable materials make up. The overall proportions and the actual materials included in the program have changed significantly over the past 15 years. The major trends that are being observed are the decrease in the amount and weight of fibre in the recycling stream. Newspaper is decreasing dramatically, with some increases in the amount of cardboard and mixed fibre materials to be handled.

A current trend for recyclable materials composition is greater composition of plastic packaging/ made from different resins that will have to be separated and processed. While the weight of the container stream will not increase significantly with the changes the volume and actual number of containers will increase. The use of technology, such as optical sorting, and new facility process flow should allow for easy transition to add, take away or mix different items as circumstances dictate.

Single stream recycling can support this need for flexibility and also offers greater flexibility and convenience in the delivery of processing services across a range of sectors; residential, multi-residential, commercial and in a regional context.

6.8 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Based on the review of the HRM recycling operations, the following conclusions can be made:

- That HRM is meeting the objectives and principles laid out in the 1995 Solid Waste/Resource Management Plan Strategy for the processing of recyclable materials.
- The current MRF is operating very close to its single shift operating capacity, but it is reasonable to expect that boxboard can be added to the program with limited short term impact.

- There are 'economies of scale' benefits to HRM by processing recyclables from the ICI sector.
- Removing boxboard from the organics stream and adding it to the recycling stream could save HRM (not including revenue) somewhere in the order of $117,000 per year.
- The MRF is nearing the end of its operational life expectancy, both building and the majority of the equipment in the MRF.
- The recent upgrades have allowed for the processing and capture of more packaging (plastic) recyclables.
- The single shift capacity limit will be exceeded within the next 3 to 5 years due to increasing population growth and enhanced capture of recyclable materials.
- There is capacity to handle the short term growth for recyclable material processing by expanding the operating hours (utilizing a second shift).
- There is limited to no footprint space available at the current site to expand the MRF to allow for expansion and upgrades to handle longer term growth.
- A larger sized MRF is required for the longer term needs of HRM.

6.9 RECOMMENDATIONS

- In the short term to 2019 continue with status quo operations with the exception of the addition of boxboard to the program.
- In the short-term and in concert with the objectives discussed in Section 8 commence with promotion and education initiatives and modified MRF operations to eliminate boxboard from the organic wastestream - 2013
- Between 2013 and 2016 evaluate concept and opportunities for provincial and/or federal funding for a new regional MRF.
- Between 2013 and 2016 determine to implement single stream or dual stream processing option however preliminary considerations show that capital costs are only slightly higher in higher tonnage ranges for single-stream recycling as opposed to the current program, operating costs can be significantly lower, single-stream can provide greater collection efficiencies and drive greater diversion across all sectors. These factors suggest that HRM would be well suited to a single stream recycling program.
- Based on tonnage predictions as presented in Section 6.2 and the unknowns associated with a number of factors: real increased capture rates associated with increased diversion in the residential sector, additional capture for HRM (from current fibre processors) from the IC&I sector because of the convenience of single-stream recycling, and whether or not a regional MRF concept will be applied in the province, it is recommended that HRM consider the construction of a single-stream MRF with an initial (one shift) capacity of 35,000 TPY to manage increased tonnage associated with long term population growth. The MRF can simply be operated with increased hours, e.g. 10

hour shifts or over two shifts to accommodate any tonnage increases as described. It is estimated the MRF would cost in the order of $12M to $14M and operating costs would rnage in the order of $100-$130/tonne (lower cost per tonne with increasing tonnage).

- In 2016 commence with formal procurement process for new MRF; approvals, equipment fabrication, construction, commissioning by 2019.
- Include known 'best practices' in the new procurement process and the development of new operating contract arrangements; residue, revenue, recovery rates, by 2016.

7.0 Organics Waste Processing Facilities

7.1 EXISTING OPERATIONS

HRM was the first municipality in Canada to implement an organics program in 1998 in response to a provincial ban on organics disposal in landfills. In order to address the ban HRM, in September 1996, let an RFP for Organics Composting Facilities; specifying that two facilities would be required to handle 30,000 TPY of source separated residential organics (with additional 10,000 TPY surge capacity) and produce marketable compost. These facilities were constructed on HRM owned land.

The first facility, owned and operated by Miller Composting Corporation, is located at 80 Gloria McCluskey Ave. in Burnside Business Park. This facility utilizes the Ebara open channel in-vessel technology and was constructed for a capacity of 25,000 TPY.

The other facility, owned and operated by New Era Technologies, is located at 61 Evergreen Pl. in Ragged Lake Business Park (Goodwood). This facility utilizes a multi-container in-box system (Stinnes Enerco enclosed aerated container system) with a separate tip floor, processing facility and curing building. It too has a capacity of 25,000 TPY and both plants have a weekly capacity limit of 480 tonnes per week.

Both operators utilize aerobic technology to process organics for about three months onsite and then send the material to a secondary final curing site at Elmsdale Landscaping Ltd. located at 113 Elmsdale Rd, Elmsdale where the material is cured in windrows for between six months and a year prior to use/sale. Both Miller along with New Era, currently sell the compost for approximately $1/tonne and including transportation costs to Elmsdale. There are no provisions for any final product to be made available to HRM for municipal or for community use purposes.

The following materials are accepted in HRM's Green Cart program:

- Fruit & vegetable peelings
- Table scraps, meat, fish, bones
- Dairy products
- Cooking oil & fat
- Bread, rice, pasta
- Coffee grounds, filters, tea bags
- Eggshells
- Boxboard & Soiled Paper
- Paper towel rolls
- Food napkins
- Paper towels and soiled paper

Residents are not permitted to use plastic bags in the Green Cart including those labeled 'biodegradable' or 'compostable'.

Residents may "top up" their green cart with Leaf and Yard Waste (LYW); excess LYW can be placed out with the green carts in orange or clear plastic bags or kraft paper bags. There is a

20 bag limit with a 25 kg (55lb) maximum weight per bag. Branches must be tied in armload-sized bundles with a maximum of 5 bundles accepted, each not exceeding 34 kg (75 lb), 1.2m (4 ft) or 0.2m (8 in) in diameter.

The following materials are acceptable:

- Grass, leaves & brush
- House & garden plant waste
- Sawdust & wood shavings

Since the implementation of the program the amount of organic waste being captured has steadily increased with corresponding decreased amounts of waste being landfilled at Otter Lake. The success of the program has exceeded the capacity of the two original processing facilities, forcing HRM to look elsewhere for overflow capacity and capacity for peak LYW and Christmas tree processing.

In 2011/2012 the residential and commercial sectors produced a combined 51,328 tonnes of organic waste; 34,713 tonnes from the residential sector and 16,615 tonnes of organics from the ICI sector. Organic waste materials received at these facilities that exceed capacity are shipped without processing to Fundy Compost at a cost of $143,500 per year (fiscal year 2011/2012) or in the order of $64/tonne.

During peak LYW season (spring and fall), extra LYW material is diverted from the composting stream and directed to an alternate windrow site through separate contract. Separate collection of this material, as well as a separate Christmas tree collection program was intended to reduce the impact of the peak surge periods on the two primary composting facilities.

In order to manage all organic waste HRM has the following contract arrangements:

- Organics processing contracts with Miller and New Era which end in 2019 with residual buy-out provisions.
- Processing of separately collected LYW material by Kel-Ann Organics commenced in October 2010 for a two year period with an optional one-year extension.
- Processing of Christmas trees by Owen Davis & Sons Contracting Ltd. commenced in December 2010 for a two year period with an optional one-year extension.
- Processing of additional organics during peak season by Fundy Compost commenced in April 2010 for a two year period with an optional one-year extension.

Fundamental to the successful operation of these facilities is their ability to meet 2005 Canadian Council of Ministers of the Environment (CCME) Guidelines for Compost Quality.

Nova Scotia Environment (NSE) revised their Composting Facility Guidelines in 2006 to reflect the revised 2005 CCME Compost Quality Guidelines. These guidelines were again revised in September 2010. Although the Guidelines only deal with aerobic facilities (LYW Composting Facilities under 10,000 tonnes, In-vessel Composting Facilities, Open Windrow Composting

Facilities and Secondary Curing Areas), Anaerobic Digestion (AD) facilities must apply 'best management practices' of the Guidelines including quality control criteria for end products, should digestate be composted. The NSE Guidelines also set out the requirements for composting facility operation and compost classification and use.

While the NSE Guidelines set out numerous requirements as they relate to facility design, leachate, surface and ground water management, odour control, separation distances etc., one component of the Guidelines creating a challenge for Miller and New Era is Section 4 (e) of the guidelines that specifies that "*for immature compost to be transported to a secondary curing* area, it must achieve one of the following maturity requirements:

i. Cured for at least 21 days and must not reheat above 20°C
ii. Cured for at least 21 days and organic matter is reduced by at least 60% by weight; or
iii. Able to germinate 90% of cress seed vs. control and has a plant growth rate of compost/soil at least 50% of control.

If the compost achieves one of the above requirements, it may be accepted at an open windrow composting site as specified in Section VI of these guidelines."

NSE has extended the use of the previous 1996 CCME Guidelines for Compost Quality at existing facilities to allow time for comprehensive testing of existing Nova Scotia composting facility produced compost. The extension was intended to allow time for completing comprehensive testing and the identification of required program changes to meet guideline standards by 2015.

HRM must develop and submit a plan to the Province by January 2014 detailing the revised program plans, where required, to implement potential modifications, process or facility upgrades and/or technology changes to achieve compliance with the 2005 guidelines. Compliance with the guidelines is just one of the drivers of the review of HRM's waste management programs.

7.2 OPERATIONAL LIMITATIONS

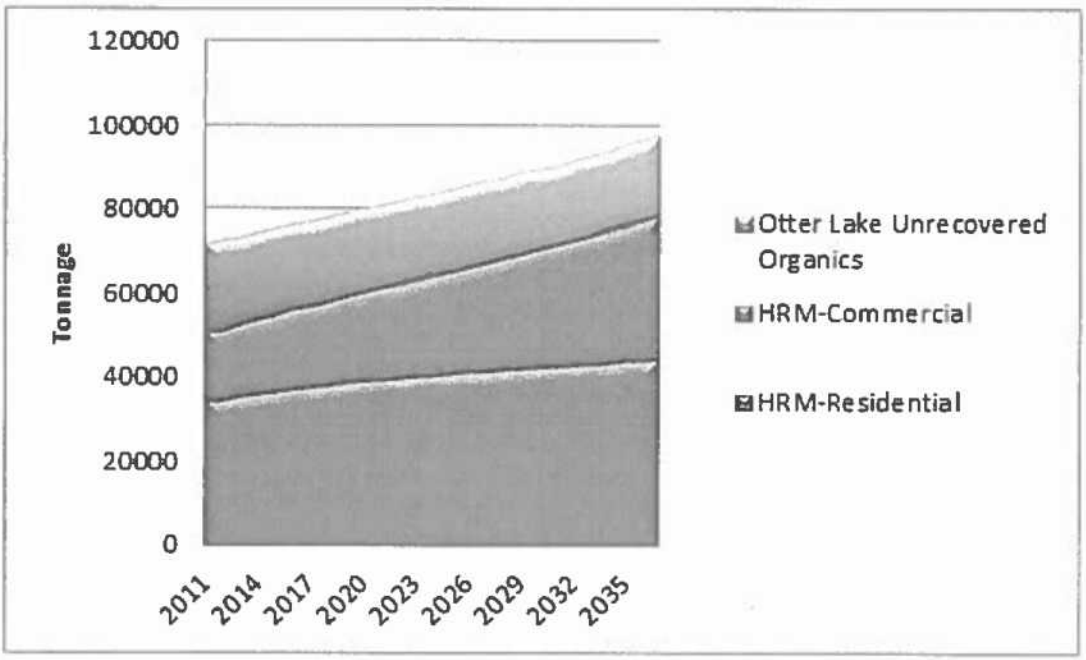
HRM is facing two major issues associated with the successful adoption of the organics program by both the residential and ICI sector. The volume of organics generated has exceeded the capacity of the two original processing facilities and both facilities are struggling to meet 2005 CCME guidelines. This section discusses those issues.

7.2.1 Lack of Capacity

The two organics processing facilities, originally constructed to process 25,000 TPY each, are at full capacity. It is estimated based on population growth and waste generation trends that some 80,000 TPY of organic waste will require processing by the end of the planning period if both residential and ICI organics continue to be processed by HRM. This does not include any estimates associated with increased diversion initiatives that HRM might undertake and

discussed elsewhere in this report. That is, it is also estimated (2012) that an additional and approximate 25,000 TYP of organics from these sectors is lost to disposal (in the order of 7,500 TPY from the residential sector and the remaining 12,500 TPY from the ICI sector and not including boxboard currently in the organic waste program). Projected tonnage over the planning period is shown below. Current operating practice includes the shipment of overflow organic waste from Miller and New Era to a third party which is not sustainable (practical nor cost-effective) as these volumes increase over time. A number of potential solutions to this are discussed below.

Projected Organic Waste Generation Over Planning Period (2011-2037)



7.2.2 Compliance with CCME Guidelines

The HRM compost program is currently non-compliant in terms of consistently meeting newly adopted Canadian Council of Ministers of the Environment (CCME) guidelines for compost maturity prior to transfer to unmonitored open windrow sites for final curing. These maturation guidelines are intended to manage pathogens within SSO and minimize the potential for odour prior to transfer to a secondary curing site.

In 2008, NSE contracted HMJ Consulting Limited assess nine composting facilities with respect to their ability to meet the compost maturity standards specified in the 2006 *Nova Scotia Compost Facility Guidelines*. Of the nine facilities, only one failed the temperature rise test, and three failed the respiration test. HRM contracted for a similar set of tests to be conducted at the Miller and New Era composting facilities on outgoing processed compost material and the transferred material to a secondary final curing open windrow site operated by Elmsdale Landscaping. These tests were conducted at the six month and one year maturity points for

compost over four (4) sampling periods in 2010 and 2011. The results of the tests indicated that the compost leaving the phase one facilities had greater respiration rates than that allowed under the 2005 CCME guidelines[3].

The two organics processing facilities are required to meet the original 1996 Guidelines as they were built under the 1998 NSE Compost Facility Guidelines that adopted those 1996 CCME Guidelines. Both facilities can continue to meet the 1996 requirements but neither facility can consistently meet the requirements of the 2005 CCME guidelines. Miller has been undertaking a number of studies and adjustments to their process and New Era has proposed replacement of their Stinnes Enerco enclosed aerated container system (discussed further below).

7.3 COMPARISON OF CURRENT OPERATIONS TO 1995 WASTE RESOURCE STRATEGY

The following excerpts are taken from the 1995 Strategy related to the intended purpose of HRM's source separate organic waste processing program.

"Source separated composting is a significant component of the Integrated Resource Management Strategy. In fact, source separated composting is essential to meeting or exceeding the diversion targets, as these targets cannot be achieved with source reduction and recycling alone."

The composting system should also include the collection of unrecyclable paper; the paper will improve the composting process and enhance the purity and quality of the finished product.	✓This was implemented but is discussed further below as problematic; the practice is not actively promoted by most municipalities.
Some portion of the organics from the ICI sector can be delivered to the municipally sponsored composting facilities.	✓ HRM has encouraged and processed organics from this sector.
As a long-term strategy, it is desired that centralized source-separated composting will increase, and that both the portion of the wastestream routed through the front-end processing facilities, and ultimately disposed of in the residuals disposal facilities will decrease.	✓Program has been successful in reducing the amount of residuals requiring processing.

[3] CBCL Limited, Results of RFP for Professional Consulting Services for Sampling and Testing Compost, January 2012

Multiple sites and compost operators will be encouraged.	✓ Two main processing facilities in operation, along with a number of smaller operators to process peak materials.
The system will encourage ICI activities in source reduction and will promote on-site ICI composting	✓Community group support for waste reduction initiatives, trialed on-site systems
The charging system adopted for ICI wastes will be designed to encourage this.	✓ HRM implemented a differential tipping fee structure for this sector.
Facilities should be located close to the centres of generation.	✓ One facility in Halifax and one in Dartmouth.
A number of small facilities may be designed to work synergistically, thereby creating less overall nuisance if problems arise.	✓ / X Completed but in essence increases overall buffer zone requirements; both facilities have experienced nuisance issues; economies of scale are also better realized with larger facilities but transportation must be factored in.

The program has met and exceeded the goals of the 1995 Strategy and in some ways is a victim of its success.

At the time of development of the 1995 Strategy, it was envisioned that material generated by residents would be collected and processed at a number of smaller facilities, located in such a fashion that residents would become familiar with composting activities. Ultimately, two processing facilities were constructed in Halifax and Dartmouth but both facilities have created off site impacts that have had to be addressed from time to time and through operating and infrastructure modifications.

It was not originally envisioned that HRM's facilities would process all ICI organics but the system has evolved this way for many reasons including the provincial ban on organics from disposal, HRM's solid waste by-law #S-600 Section 16.3 which prohibits both garbage and organic waste generated within HRM from being exported from HRM, and due to the significant efforts HRM has made to enforce and promote the program.

The success of HRM's program has driven the existing system to capacity. Not unlike the MRF, HRM's organic waste processing facilities were driven to capacity by the ICI sector. Without that sector's organic waste HRM would have operated these facilities at far less than capacity for many years but again and like the MRF, would still have realized the same overhead costs to operate but without any offsetting tipping fee revenue from that sector.

Overall, the program has fulfilled the intent of the Strategy having implemented all original recommendations and having diverted a significant amount of organics from the landfill from both residential and ICI sectors.

7.4 COMPARISON OF CURRENT OPERATIONS TO INDUSTRY BENCHMARKS

7.4.1 Organics Waste Program Performance Comparison to other Municipal Jurisdictions

The number of organic waste processing facilities in Canada is ever increasing as municipalities look for capacity to process materials from either existing or newly implemented municipal organic waste collection programs. While composting has historically occurred all across Canada in most cases this has been for leaf and yard waste or in the case of British Columbia also the composting of municipal bio-solids. While BC is now heavily focused on processing municipal organics and other larger jurisdictions are also starting to implement these programs (e.g. Calgary and Winnipeg) the most aggressive and longest running programs are found in Nova Scotia and Ontario. As Ontario has aggressive provincial reporting programs and as various municipalities in Ontario represent a similar sized jurisdiction as HRM the focus of this section is on performance comparisons between Ontario municipalities and HRM. HRM's performance as it relates to other municipal jurisdictions in Nova Scotia who are also subject to the provincial landfill ban on organics was discussed previously in Section 1.4. It is appreciated that for most of these comparisons there can be no direct 'apples to apples' comparison given the high degree of variation in demographic and geographic (e.g. rural versus urban) characteristics between municipal jurisdictions however relative performance with respect to broader program indicators can be generally discussed.

The following table provides an overview of some key indicators for comparison to HRM's program. Information was taken from council reports from various municipalities, municipal survey work, and WDO Gap Analysis for Ontario municipalities. It is important to note that although other municipalities have entertained/are entertaining organics bans at their landfills, HRM is the only municipality in Canada that has implemented and enforced that form of regulatory compliance. Organics diversion in Ontario, for example, is driven more by overarching principles of sustainability coupled with the practical lack of landfill capacity issue, that is, the difficulty in siting new landfill capacity due to both cost and historical public opposition and not as the result of any regulatory requirement. This distinction partly explains HRM's high organics diversion rate in comparison to most of the other municipalities profiled below.

Key Performance Indicators for Various Municipalities (2010)

	Halifax	York	Durham	Halton	Simcoe	Hamilton	Ottawa	Notes
Population	390,328	1,061,983	621,500	487,418	282,112	528,504	917,570	1
Total Single Family Households	139,341	283,491	185,024	147,203	125,920	150,231	259,243	
Total Multi Family Households	23,000	34,890	22,635	29,019	0	59,734	117,854	
Total tonnes generated (residential)	51,116	92,048	50,668	54,131	23,131	49,627	63,203	
SSO	31,902	53,090	27,593	26,786	11,459	37,696	53,348	
LYW	2,645	38,957	23,075	27,345	11,581	4,762	9,855	
Average weekly curbside participation rate (%)	90	85-90	70	77		71		
SSO Residual Rate (%)	6.4 -7.7	15	4	7-8		~5		2
Year SSO Program Commenced	1999	2004	2003	2008	2008	2006	2010	
Frequency of Green Cart Collection	Biweekly, seasonal weekly	Weekly	Weekly	Weekly	Weekly	Weekly	Weekly	3
Capture Rates (kg/hhld/yr)	248	318	151	179	103	200		
% residential organics diverted	27.01	22.35	21.68	26.38	24.79	20.87	15.9	
Total residential diversion rate (%) (2010)	52	52	52	54	59	48	39	4
Organics Processing Fees ($/tonne)	153.22	121 - 158	n/a	~82	~90	n/a	~90	5
LYW Processing Fees ($/tonne)		~66						

1. Population and number of households from WDO for Ontario municipalities.
2. Residual rates for HRM include material from both the residential and ICI sector as the residue rate could not be isolated; it is highly likely this residue rate is lower for the residential sector alone.
3. Certain areas of HRM have weekly collection in July and August. Edmonton does not have separate collection – Garbage is collected weekly March to October and every 10 to 12 days from November to February.
4. Diversion rates for Ontario municipalities from WDO.
5. Processing fees for York and Toronto from Council Reports. Processing costs for HRM from Appendix G Table of Expenditures, Revenues and Net Cost per Tonne Recent 6 Years (includes cost of processing for peak LYW, Christmas trees, surplus SSO).

HRM's program compares quite favourably to other municipal programs. HRM's participation rates are high and overall per household capture rates are significantly higher than most. York Region's capture rate is quite high however it should be noted that that program allows for heavier pet waste and diapers/sanitary material in their program and at the time these data were gathered (2010) allowed the use of small grocery style plastic bags for collection (noting their residue rate of 15%). The percent of organics diverted by HRM is higher than every other municipality considered in this comparison. HRM is the only major municipal jurisdiction that does not offer all year round weekly collection of organic waste and the overall average processing cost per tonne realized is significantly higher in comparison to most other jurisdictions. The overall diversion rate for HRM is in line with other municipalities.

7.4.2 ICI Sector Organics

Most municipalities across Canada have rolled out the Green Bin program to the single-family residential sector, which remains the primary focus for most jurisdictions. Some municipalities offer collection and processing of organic waste from the multi-family and/or ICI sector, subject to municipal by-laws and on existing collection routes, however, provision of service to these sectors is being phased in over time. The majority of ICI waste including organic waste is collected and managed by the private sector and processed at privately-owned and operated facilities.

HRM, as required by the Provincial landfill ban on organics and administered through the By-law Number S-600, diverts a considerable amount of waste from the ICI and multi-family residential sector. During fiscal 2011/2012, 51,238 tonnes of source separated organics were diverted from landfill, of which 16,615 tonnes, or 32%, consisted of waste from the ICI (and some multi-family) sector.

By comparison, in 2011, in the City of Toronto, only 20% of waste from multi-family residences was diverted.[4] The City of Toronto offers twice weekly Green Bin collection from those commercial customers approved under the Yellow Bag program (smaller commercial establishments) for $320.00/year with a charge of $62.15 for each 35 gallon organic bin. The City estimates there is another 60,000 to 70,000 tonnes of green bin waste available once all multi-family and schools are on board (currently only 8% of multi-family buildings have Green Bin service). It is anticipated this waste will be processed at the facilities currently being constructed. It is unknown what the uptake of this program is for the ICI sector. This program is available mostly to smaller ICI generators who are not eligible for bin service or do not generate enough waste to warrant front-end bin service and are on an established collection route.

The City of Hamilton is actively targeting Multi-residential facilities to increase diversion and participation[5]. They are also implementing a Green Cart program for all municipally owned and operated facilities in order to increase waste diversion rates which have stagnated since the

[4] http://www.toronto.ca/garbage/residential-diversion.htm

[5] City of Hamilton, Report PW11096b, Multi-Residential Waste Diversion Plan and Green Cart Program for City Buildings.

implementation of the Green Cart Program in 2006. The City of Hamilton has rolled out recycling and green cart programs to all multi-residential facilities (approximately 1,000 buildings). Participation rates were initially high, but have fallen to 69% in 2011 with an estimated capture rate of 18%. Contamination rates are 46%. The City recognizes that additional outreach activity is required to maintain and improve the performance of the program and has developed a plan to achieve better results; the City is also developing an enforcement strategy, possibly incorporating garbage limits and performance standards as an additional way to obtain compliance.

An example of another Canadian municipality who has regulations controlling disposal of organics is the Regional District of Nanaimo (RDN). In 2005, RDN banned commercial organics from their landfill. RDN's organics, as well as those from surrounding areas are processed at a facility utilizing in-vessel bio-reaction technology, which was recently upgraded to convert organic waste to energy solutions (heat and electricity[6]). The plant is currently processing over 90 TPD of organic waste and LYW from commercial and residential sources. In 2006, 4,178 tonnes of commercial food waste and compostable paper was diverted from the landfill[7], this amount has increased to approximately 6,000 TPY. The commercial sector must arrange for service provision and provide their own containers. Tipping fees for commercial waste (as posted on the operator's website[8]) are as follows;

- grocery/food waste: $90.00/tonne,
- fish waste; $45/tonne;
- LYW: $45/tonne

With the intent of eventually establishing a total ban on organics from landfill, RDN has conducted a residential pilot study and has rolled out a Green Bin program to single family homes in Nanaimo and surrounding areas.

In summary, it is evident that no municipality is providing the level of service that HRM provides to the ICI sector. HRM processes a significant amount of ICI waste at a reasonable cost (tipping fee approximately $75/tonne) and diverts a considerable amount of ICI waste from their landfill. HRM diverts approximately 16,000 TPY of a total estimated 28,000 TPY generated in this sector representing a capture rate of 57%. HRM has achieved what many other municipalities in Canada are now attempting to do as it relates to diversion of waste from ICI sector generators within their jurisdiction.

7.4.3 Leaf & Yard Waste (LYW) Programs

Part of the scope of this report is to consider the separation of all leaf and yard waste from the Green Bin program for collection and processing (discussed in Section 7.6.1.). As Stantec undertook a survey of municipalities in Ontario in 2010 with SSO programs and part of that

[6] http://www.iccgroup.ca/index.php/technology2/waste-to-compost-wcompost/nanaimo-facility
[7] http://www.rdn.bc.ca/cms.asp?wpID=1068
[8] http://www.iccgroup.ca/index.php/technology2/waste-to-compost-wcompost/nanaimo-fees-a-schedules

survey was focused on LYW programs that research is discussed for HRM comparative purposes. Of those municipalities surveyed almost all, except some of the larger municipalities (Toronto, Durham, Niagara, London, York Region) compost their own leaf and yard waste at their own landfill or other municipally owned sites. Most of these municipalities are quite small and don't operate Green Bin programs. Where they do they have integrated the Green Bin material into their LYW windrow operation when the Ministry of Environment has permitted.

The City of Guelph (7,250 tonnes/year) and Niagara Region (28,800 tonnes/year) contract LYW composting. Niagara combines much of their LYW with their Green Bin program. Only 5,700 tonnes per year approximately is processed separately. Guelph has historically processed LYW separately but now intends to allow residents to add that material in their new Green Bin program to be phased in between 2011-2013. Peel Region also permits LYW in their Green Bin program and like Niagara contracts the processing of the balance (separate seasonal LYW).

York Region, Toronto, Durham and Halton Regions do not allow LYW in their Green Bin Programs and contract for private sector capacity to compost that material.

The City of Hamilton initially allowed residents to top up their Green Cart with LYW and/or setting out bags of LYW along with their Green Cart but they found that as the quantity of organics requiring management at their composting facility increased that LYW would be better collected separately and processed at an open windrow site and that capacity should be saved for the Green Cart program. The City is actively encouraging residents to place LYW separate from the Green Cart so it can be collected separately. Collection costs in 2009 were approximately $182/tonne.

Much like HRM the City of Ottawa allows LYW in their Green Bin program, however also provides separate LYW collection to residents weekly during peak seasons and bi-weekly for the remainder of the year. The City's contract with Orgaworld allows for the processing of up to 540 tonnes/day of material, however historically, during peak LYW production periods, more than 700 tonnes is collected daily. To manage the excess LYW material, during peak LYW production seasons, the collection contractors use a separate collection vehicle to collect the LYW separately from the Green Bin organics, and deliver the material to the City's own composting pads.

The table below provides a brief summary of leaf and yard waste processing capacity requirements, and processing fees for a few municipalities in Ontario to give HRM an idea of processing fees for LYW only in the jurisdiction noting that some also include the cost of haulage. HRM itself has a current contract for excess LYW that costs in the order of $28.00/tonne.

Existing Leaf & Yard (L&Y) Waste Programs in Ontario (2010)

Municipality	Current Tonnage	Current Processing Fee
City of Toronto	100,000	$45.00 - $52.00/tonne
York Region	31,200	$66.00/tonne
County of Norfolk	1,100	$50.00-$55.00/tonne including haulage
City of London	22,000	$48.00/tonne

In summary, there is really no 'best practice' as it relates to the management of LYW waste as part of a Green Bin/Cart program. Each municipality has its own logistical and infrastructure and cost related reasons for processing LYW either in or out of the Green Cart; e.g. Hamilton because of capacity issues and Toronto in part because they have elected anaerobic digestion. Others have long since had their own landfill site facilities for LYW processing like Halton and within their jurisdiction while their Green Bin waste must be exported for processing. It makes no economic sense for them to combine these wastestreams.

7.4.4 Compost Materials Marketing

The following provides some background on how other jurisdictions market their finished compost. All facilities discussed with the exception of TRY Recycling (LYW only) receive SSO or an SSO/LYW blend. This information was obtained through surveys (2011) of composting facility operators in Ontario. The majority of respondents indicated that the markets for their final product are agricultural; landscaping; soil blenders; and landfill final cover.

- All Treat Farms indicated that compost is marketed in both bag and bulk throughout various retailers in Ontario. Potting soils and soil amendments are marketed through garden centres and major retailers. Bulk is sold to topsoil blenders, soil manufacturers and garden centres.

- TRY Recycling indicated that their finished compost products are marketed to national brands for distribution as bagged compost or mixed as TRY-soil mixes. Compost is also marketed to independent landscape contractors, private homeowners through residential sales outlets, and to municipalities or governmental bodies such as the Ministry of Transportation for use in planting, bed stabilization projects, etc.

- Orgaworld, for both their facilities in London and Ottawa, markets their finished product through Orgapower Compost Corporation, primarily to the agricultural industry.

- Walker Industries markets their finished compost at a retail outlet on-site to residents and landscaping contractors.

- The Miller Group, through their Miller Compost division, actively markets finished compost to the residential and commercial sector through direct and online sales. They market finished

compost at $3.99/bag or $20/yd^3 and also create soil blends, mulch, and top dressing using compost. These products are available for ordering online and are available for pickup in Ontario only.

A brief overview of some of the end-markets for finished compost for those municipalities who do not depend on merchant capacity is presented below:

- The City of Toronto sends its digestate to All Treat Farms for processing and does not market any finished product.
- The Region of Peel sells bulk compost through their CRCs for 3.5 ¢ per kilo or $35 per tonne; delivery is offered for a fee at certain times of the year. Peel also sells compost to the agricultural sector.
- The City of Hamilton sells finished compost to area farmers.
- The City of Edmonton markets their finished compost, Second Nature, as a bagged product (30L bag sold for $6.00/bag available at all eco-stations and at the Edmonton Waste Management Centre) and through a variety of outlets, including retail stores and landscaping supply companies, markets bulk compost, bagged compost, garden mix and bulk delivery.

In general, compost that is less mature is marketed to the agricultural industry. Less mature, potentially more odorous compost is sold to the agricultural sector who, in general, are not willing to pay the price that more mature, stable compost can command for retail sales. More stable, mature compost is typically blended with soil for consumer use.

7.5 OPPORTUNITIES FOR OPERATIONAL IMPROVEMENTS

7.5.1 General

Stantec has evaluated a number of potential options with respect to meeting HRM's long term organic waste processing capacity requirements; both in the context of managing increased tonnage due to growth and to accommodate any efforts toward increased diversion of organic waste. Long term capacity requirements are also addressed with respect to the fundamental need to meet 2006 CCME composting quality guidelines.

Consideration of the various options is predicated on the use of existing, and already permitted composting infrastructure. HRM has already made substantial capital investment in existing facilities, in some cases quite recently, and where deemed feasible the continued operation of this infrastructure is recommended as part of the long term system, that is, the next 20 year planning horizon.

Options and combination of options discussed in this section include the use of existing infrastructure either through continued use or by re-purposing, the use of other technology

options (specifically anaerobic digestion) and changes to the feedstock for existing facilities including the removal of LYW, ICI organics, boxboard and the inclusion of bio-solids.

HRM is interested in exploring options for regional partnerships; this will have been discussed in other sections of the report (e.g. in the context of a Regional partnership for a MRF), however regional partnerships for organics is discussed below.

7.5.2 Options to Meet Both Short Term and Long Term Capacity Needs

There are a number of options which could be implemented in the short-term to provide additional capacity to meet long term processing capacity needs and that will support necessary compliance with CCME. These include:

- Continued Operation of Miller Ebara and New Era Sites to 2019
- Repurposing the WSF at Otter Lake (end of 2013)
- Construct and operate compost curing and storage pads (2014/2015)
- Construct and operate an anaerobic digestion facility (2015/2016)

7.5.2.1 Continued Operation of Miller Ebara and New Era Sites to 2019

In the short-term, it is envisioned that the Miller and New Era facilities will both continue to be operated as other recommended changes are made to HRM's organics waste processing system and as discussed in detail below. These facilities are operating reasonably well and in the case of both Miller and New Era there have been some fairly significant and very recent capital upgrades paid for by HRM as a portion of the operating per tonne fees.

The more immediate concern with respect to these facilities (e.g. well before the 2019 end of operating contract date) is their ability to meet CCME guidelines. Both operators have put forward operating/infrastructure change concepts to address this problem.

Miller would need to employ added aeration for material prior to being loaded into the Ebara vessel, an additional curing area with aeration to provide the capacity to meet the minimum 21 day curing requirement and upgrades to the bio-filters to handle additional air from the additional curing area. It is estimated these upgrades/facility modification will cost in the order of $1,200,000 (and assuming difficult to process boxboard and ICI organics are directed elsewhere relative and the new curing area requirement would be lower).

New Era Technologies has proposed the use of HotRot technology as an upgrade and expansion to address both compliance with CCME Guidelines and the need for increased processing capacity. HotRot is a fully-enclosed high-rate in-vessel composting system which claims to produce neither leachate nor foul odours during processing. The technology proposed requires a 5/6 day processing period through the HotRot composting unit(s) followed by a minimum three-month curing period in aerated windrows. Each HotRot 3518 unit is typically able to process between 10.5-11.5 TPD. The composting units have central shafts passing longitudinally through the main vessel which rotate periodically to provide mixing and aid

aeration. Primary aeration is provided by air injection nozzles positioned along the length of the hull. Excess air is continually drawn from the composting vessel and treated through a set of bio-filters. The estimated capital cost to accommodate existing through-put is in the order of $7,100,000.

In the short term if HRM initiates the recommendations discussed below just over 10,000 TPY per facility could be directed elsewhere leaving each facility in the order of a 15,000 TPY of clean residential source organic waste to process[9]. The removal of these more difficult to process materials could have a significant positive impact on compost quality and material testing should occur post-implementation to determine that impact prior to any significant capital investment (e.g. in 2015 and as part of the HRM plan necessary for 2014) unless there are other factors that determine necessary and sooner investment.

The continued operation of these facilities to the end of their contract term enables HRM to manage population growth and increased organics tonnage during that time period, manage additional tonnage associated with any new diversion initiatives, construct and transition ICI organics to a new anaerobic digestion facility, gives sufficient time to repurpose the WSF as discussed below and to determine if either the Miller Ebara or the New Era facilities are necessary past 2019. Further, these facilities are older and any required long term infrastructure replacement requirements (past 2019) should also be determined sooner than later.

HRM has an opportunity to ensure sufficient processing capacity over the planning period with the combined use of a new anaerobic digestion facility and the use/repurposing of existing aerobic composting facilities. Some 80,000 TPY could be captured for processing by the end of the planning period and there is another 20,000 TPY in the wastestream that could be targeted for diversion. Preliminarily, between the WSF, New Era, Miller and a new AD facility HRM would have an approximate 125,000 TPY of processing capacity. While it is clear that not all these facilities may be necessary to support HRM's long term needs various and more detailed considerations are necessary in the very short term (by 2014) to determine which combination of facilities is optimum from a system efficiency (e.g. collection, locating of curing and storage) and cost-effectiveness standpoint; capital costs for new facility and for existing facility upgrades in both the short and long term; negotiation of revised minimum annual tonnage throughout ("put or pay" terms with Miller Ebara and New Era and new processing fee negotiations. Existing and new facility capacity is determined as follows:

Miller Ebara	25,000 TPY
New Era	25,000 TPY
WSF Re-Purposed	49,000 TPY
New AD Facility	27,000 TPY

[9] Note that if the anaerobic digestion process described below does require aerobic composting of digestate then 4,000 TPY would need composting and could be composted at the Miller Ebara site.

As such, any of the following options would likely meet HRM's long term capacity requirements and in no particular order of preference:

1. Miller Ebara, New Era, new AD Plant
2. WSF, Miller Ebara, New Era
3. WSF, new AD Plant
4. WSF, Miller Ebara OR New Era

It should be noted that in any consideration that HRM owns the sites that both Miller and New Era are operating on and that those may also have potential to be re-purposed as part of the system, for example, if HRM can't find a suitable size property for a campus a MRF could be relocated to one of these sites depending on size and other factors.

7.5.2.2 Repurpose the WSF

The existing WSF is no longer an asset to HRM's landfill operation. An opportunity exists for HRM to repurpose the WSF to compost clean, source separated organic waste.

The WSF was designed to meet an annual processing requirement of 49,100 TPY of solid waste. The WSF has 14 bins with a capacity of $30m^3$ per bin per day which allows for 420 m^3 per day (189 TPD based on original density calculations). The retention time originally envisioned for the WSF was 21 days with the FEP operating at its average design capacity.

The WSF is comprised of a 4,784 m^2 facility with 4 main processing areas (receiving, agitated bin system, intermediate screening and curing area, load out area).

In order to utilize this facility for clean organic waste processing some reconfiguration may be necessary at the FEP and the front portion of the WSF. The FEP tipping floor could still be utilized and there is existing and suitable equipment like the shredder, conveyors and the screens however only coarse shredding may be necessary (a second screening may not be necessary and that occurs with the current operation). The front end of the system should be configured to address anticipated degree and type of contamination, continued inclusion of boxboard (discussed below), and any other factors that may affect design.



A detailed engineering review should also be undertaken to assess the capability of the WSF to process clean organic materials over a new long term (e.g. 20 year) period from the perspective of any new equipment that may be necessary (e.g. additional turning units, upgraded misting system, upgraded structural to accommodate much higher moisture levels and the like) as well as other equipment replacement that may need to occur over a new long term period. A bio-filter adequacy assessment should also be undertaken.

A detailed mass balance calculation should also be determined based on current waste composition once determined (with or without boxboard, with or without ICI source waste as discussed below) and associated density with respect to new anticipated retention times, through-put and so plant capacity. Determination should be made with respect to these requirements as they relate to CCME Guideline compliance. It is reasonable to expect that a re-purposed WSF, given its design, would be able perform in accordance with CCME. The design of this facility is identical to the now decommissioned Guleph, Ontario facility which consistently met CCME guidelines for its entire operating life (1996-2006). An order of magnitude cost to operate the WSF for composting purposes is estimated to be in the range of $55-$75/tonne.

7.5.2.3 Compost Curing Pads

As part of a Regional Waste Resource Campus concept, compost curing pads could be constructed and operated to provide HRM with greater control over the process, finished product and marketing. Currently, all immature compost is sold to and cured by Elmsdale. HRM has no control over the process, nor is HRM able to access any finished product for beneficial end-use (by residents, for municipal use etc.) and cannot derive any revenue for the end-product.

In the context of using existing Miller Ebara and New Era facilities for continued aerobic composting and in the event that those facilities may not meet CCME Guidelines through other endeavours (feedstock changes, capital upgrades) the HRM owned site could be constructed in a more robust way (covers, leachate, ground and surface water controls etc.) to receive immature compost from those processors to be brought to final maturity at the HRM site. (In this case that material would have to be transported and received as unfinished compost). This option could be considered in the context of relative capital and operating cost.

It is anticipated that in 2013/2014, the process of securing lands, obtaining approvals and completing the site servicing could be completed. Capital costs associated with this facility are discussed in Section 5.0.

Capacity for curing the compost produced by the aerobic processing facilities is required, as well as additional capacity for contingency and future growth.

HRM's original intent was to derive revenue from finished compost, it was estimated that would be in the order of $5-$10/tonne. That revenue has never been realized. It is understood that HRM receives no finished compost back for various end-uses. Many municipalities have a condition for a certain amount of finished product to be made available to the community as well as for municipal operations.

There is revenue potential from finished compost which would offset a nominal portion of processing costs; typically municipalities do not make a lot of money from finished compost. Use of finished compost is seasonal takes sufficient space to store quantities of finished compost for extended periods of time until it is required for gardening seasons. A new and sufficiently sized curing and storage area would provide that opportunity for HRM.

Many municipalities also have "compost give-a-way days" for residents to promote and reinforce the importance of the program and to thank residents for their efforts. These events are often timed to coincide with other events such as "Earth Day" or are combined with other initiatives such as food drives or other charitable organizations.

If HRM remains with the status quo (composting residential and ICI organics) and composts approximately 51,000 tonnes of organic material, this would result in around 6,000 tonnes of finished compost (this does not account for the removal of boxboard which is recommended). . Had HRM realized revenue from the sale of finished compost and assuming an average of $7.50/tonne as originally envisioned this amounts to a current $45,000/year. Local sellers of finished compost have recently quoted in the order of $22.00/cubic yard. At an assumed average of 900 lbs (408 kgs)/cubic yard for finished compost this equates to $54.00/metric tonne. At 6000 finished tonnes per year this would equate to somewhere in the order of $324,000/year if all material could be sold.

A curing and storage area would be an ideal addition to HRM's system particularly in the context of a new Waste Resource Campus and if at Otter Lake even more ideal if the WSF is repurposed as discussed above. If the WSF is repurposed for aerobic composting than all composting, curing and storage could occur on one site with no secondary transfer necessary. This would put HRM in compliance with CCME Guidelines and would enable efficiencies in the composting system including but not limited to cost-effective materials movement on the same site from composting to curing and stockpile areas of the site. Excess leaf and yard waste collected could also be composted on the same pad and/or fed into the aerobic composting process as necessary.

7.5.2.4 Anaerobic Digestion Processing Facility for ICI Sector Organics

The water content and level of contamination in organics from the ICI sector have been identified as issues for processing and achieving compliance with CCME guidelines using current aerobic processing technology. Anaerobic digestion technologies are now, and very recently, being constructed (as opposed to aerobic composters) to process wetter, less homogenous (than residential) and/or more contaminated organic waste materials.

One example is Canada Composting Inc. that operates the Dufferin Organics Processing Facility in Toronto utilizing single stage, wet, mesophilic BTA technology. The Dufferin facility has a capacity of 25,000 TPY and opened in 2002 to coincide with the launch of Toronto's Green Bin program. The City chose this technology due to a compact size which allowed the facility to be located within the City, the ability to remove fine contaminants and plastics, achievement of significant mass reduction which reduces transportation costs and carbon footprint. Toronto's program accepts a wide variety of materials from both the residential and ICI sector, resulting in a challenging mixture of organics, plastics (reported to be up to 15%) (grocery bags are accepted for containment of organics in both single family and multi-family sectors) and other contaminants requiring processing.



The City of Toronto is currently constructing a new 55,000 tonnes/yr wet AD facility at its Disco Road transfer station utilizing the same technology. The Dufferin facility is planned to be expanded from 25,000 TPY to 55,000 tonnes TPY once the Disco Rd facility is operational. Toronto's plan for biogas utilization is for the generation of biomethane which will be used in city buildings and for waste collection vehicles. It is anticipated that the processing of 110,000 tonnes/yr of SSO will generate 13.6M m^3/yr of biogas.

In light of issues with processing ICI source organics and the capacity issues associated with the Miller Ebara site, Miller undertook a search for more suitable technology for processing this waste. Miller's investigation included a review of anaerobic digestion technologies and came to favour the technology provided by Finsterwalder Umwelttechnik GmbH & Co., located in Germany. The technology has been successfully utilized in two facilities in Austria and England. The actual company, Finsterwalder Umwelttechnik, was founded in 1997 and their technology is distributed in North America by Yield Energy (offices in Toronto and Washington).

The technology employs two treatment steps for the organic waste as follows;

1. Primary removal of physical impurities by BIOSQUEEZE - The waste is crushed and blended with minor amounts of water to obtain a total solid content of 25% which allows the first separation of contaminants to take place. Contaminants can be composted, dried or disposed of.

2. Secondary removal of physical impurities through use of floor scraper and skimmer - The liquid/slurry fraction is heated and fed into the digesters where additional separation of contaminants takes place utilizing floor scrapers to remove grit and skimmers to remove floating plastic. Biogas is produced in the digester, biogas can be used for electricity and heat in a CHP (combined heat and power) or it can be cleaned and injected in the natural gas grid as RNG (Renewable Natural Gas). Another product resulting from the anaerobic digestion process is digestate which can be used as a liquid fertilizer.

This technology results in an end-product (digestate) which is much more concentrated compared to the digestate produced through other wet anaerobic digestion systems. Liquid digestate could be used for agricultural applications. The digestate is very clean and stable due to the long retention time and removal of contaminants through the skimming and scraping systems. Preliminary discussions with farmers indicate some willing to

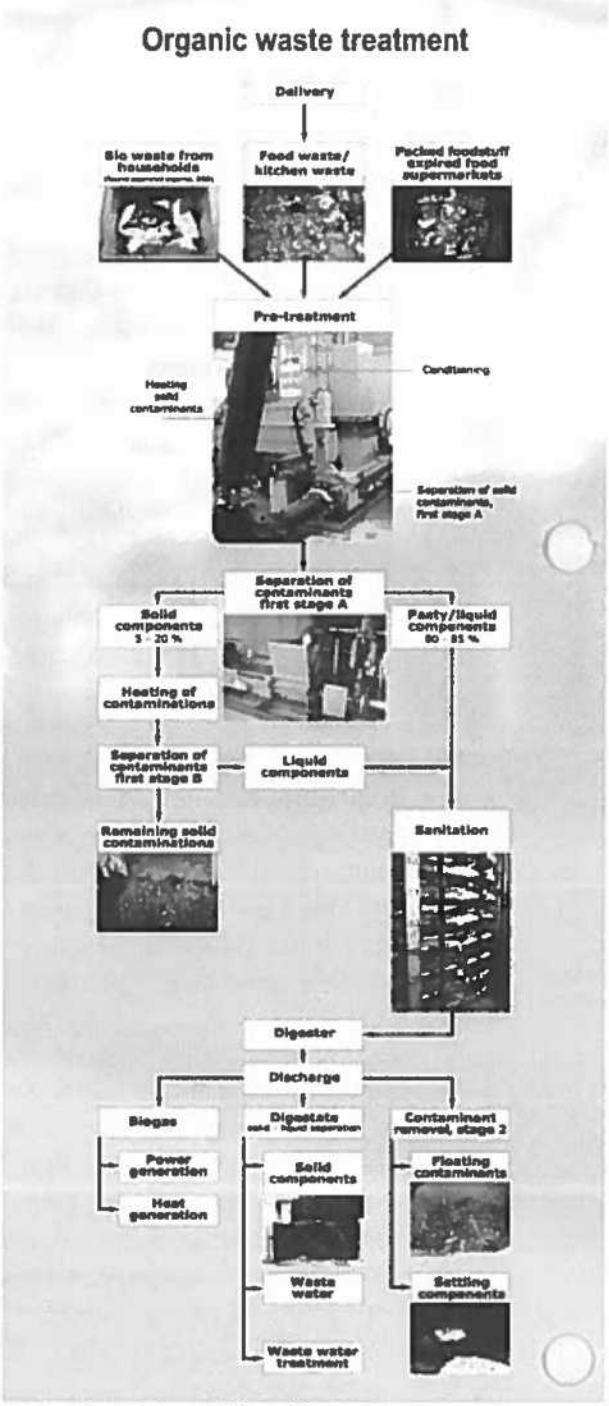
> Finsterwalder Umwelttechnik GmbH & Co technology has been utilized for the new Langage facility in England which has a permitted capacity of 20,000 TPY, initially processing 16,000TPY; 3,000 tonnes farm slurry, 1,000 tonnes factory waste, 12,000 tonnes food waste.
> Source: wrap.org.uk (Langage farm case study)

host on-farm storage tanks which will store the digestate; a stable, low odour, pathogen free high nutrient "manure like" product. It is more cost effective to truck the liquid digestate to storage facilities (tanks) built at the farms than it is to dewater, compost the solids and treat the liquid from the dewatering through a treatment plant. Utilizing the digestate as a nutrient in a sustainable farming model is consistent with Nova Scotia's Homegrown plan (http://www.gov.ns.ca/agri/elibrary/homegrownsuccess.pdf).

If all organics from the ICI and Multi-family sectors (also typically more contaminated) were to be processed, an initial facility could be designed to process 27,000 TPY, producing about 24,000 m³ of liquid digestate per year. In the future, should additional capacity be required, the facility could be expanded in increments of 9,000 tonnes for digester volume. Agreements would only be required with three (3) mid-sized farms to consume all the digestate produced; approximately 1,000 acres of corn per year would be required to use all digestate. If the digestate is approved for use on organic crops there is an opportunity for increasing the revenues from the farmer. The digestate could be approved by CFIA as a product and sold as a fertilizer to farmers.

A facility can also be supplied that does dewatering, solids composting and water treatment but the capital and operating costs would be higher, somewhere in the order of an estimated $15 per tonne. If dewatering is necessary and wastewater treatment facilities are constructed instead of delivering to farms approximately 4,000 tonnes of cake/solids could be composted at the existing aerobic composting facility. There are some advantages if anaerobic digesters are constructed at the existing Miller Ebara site or at the Otter Lake site with a repurposed WSF:

- The site is already approved for the processing of organic waste; it would be potentially easier and more expeditious to obtain an amendment to the current permit than to get a new site approved.
- Material can be fed into either facility as it is received, that is, more contaminated and wet material to the digesters and cleaner material to the existing aerobic composter.



Overview of Anaerobic Facility Waste Treatment Process

- Additional capacity for contingency purposes would be available, that is if one side of the system was interrupted the other could still be used if necessary.
- Efficiencies in already existing infrastructure and equipment (e.g. truck scales, operating staff, loaders etc.)

The conceptual area requirement for this facility is approximately two (2) acres. It should be noted that there are other items that may increase the size requirement (e.g. flare separation to digesters and other buildings, property lines can increase sizing depending on local requirements).

Based on a 27,000 t/year AD facility it is estimated that enough biogas will be produced for approximately 1MW of electrical power. Miller is applying for the COMFIT rate for the electricity; however, at present, the Nova Scotia COMFIT program does not clearly identify/list anaerobic digestion facilities. Miller has received verification from NSE and Department of Energy that the project would meet their requirements for green energy rates (in comparison, in Ontario, green energy rates are $0.147 per kWhr of power produced – this would return about $1 million per year in electricity revenues above what the plant would consume itself). At present, the biomass COMFIT rate in Nova Scotia is $0.175 per kWhr; however, it is unknown if this rate would apply to the AD facility. This requires more formal communication between HRM and NSE.

Miller has indicated that if the facility is not eligible for funding through COMFIT, the biogas can be cleaned up to pipeline natural gas grade for injection into the grid. This option would enable the marketing of green "natural gas", similar to what Bullfrog Power has done across Canada. Alternatively, HRM could replace their existing brown gas purchases. Several municipalities are starting to consider the benefits of running their garbage or transit fleets on natural gas in which case they could consume the green cleaned up biogas produced at the facility. HRM would acquire associated GHG reduction credits.

Based on some preliminary work that Miller has done to date, the capital cost for biogas clean up technology to treat the biogas the facility would produce is more expensive and the revenues received when compared to green electricity rates are lower. The final decision whether to utilize the biogas in a CHP to generate electricity versus cleaning the biogas and injecting it into the natural gas grid would be determined by final consideration of the green energy rates received. These matters would need to be addressed through discussion with Miller or in a formal Design, Build, Operate (DBO) Request for Proposal (RFP) process for a new anaerobic digestion facility. There may be further synergies with respect to biogas production if it were to occur at a facility at Otter Lake.

Further to aiding HRM in the achievement of CCME Guidelines the use of an anaerobic digestion process may enable greater diversion of organics from multi-family and ICI sectors as the tolerance for contamination is much higher. There is an opportunity to target organic waste still being delivered to Otter Lake but as we "reach deeper into the garbage bag" the organics material presented is even harder to manage (the materials easiest to separate have already been separated in the context of the material ban); those materials will have high moisture

content and have physical impurities that are difficult to remove in an aerobic composting system (glass, film plastic and other packaging) and that is more applicable for an anaerobic digestion system, an anaerobic digestion system can complement the existing aerobic composting system in place. This program could drive additional organics from Otter Lake which would be complimentary to repurposing the FEP and WSF.

Stantec developed an estimate for the anaerobic digestion technology discussed above. To be conservative Stantec included costs that would be associated with low rate composting and curing of digestate (as opposed to storage and management on farm as discussed) and with a robust cover system and including windrow turners, screening equipment etc. The Stantec estimate was in the order of $25,600,000 with $4,400,000 of that dedicated to aerobic composting and curing. Stantec is in no way endorsing this or any particular technology for application by HRM. It is however recommended that HRM, along with other agencies discussed in this section, continue discussions with respect to the feasibility of applying this technology. At minimum if HRM intends to pursue this option they should conduct their own due-diligence review of the technology intending to be applied through site-visits and the determination of suitability, demonstrated ability (e.g. length of time operating), application for an approximate 27,000 TPY and 'lessons learned'. The proponent should also provide a detailed engineering and cost proposal for HRM and it should undergo a third-party engineering review. Alternatively HRM could engage in a more formal Request for Expression of Interest (REOI) process and then if more suitable a Request for Proposal process for a new anaerobic digestion facility at a new Waste Resource Campus or at another HRM owned site if more appropriate.

7.6 CHANGES TO FEEDSTOCK TO AEROBIC COMPOSTING FACILITIES

As part of this review, HRM wishes to examine changes to the feedstock to the two organic waste processing facilities to identify options for cost savings and/or operational efficiencies. Accordingly, discussion about removing certain materials (LYW, boxboard, ICI waste) from the feedstock as well as adding material to it (biosolids) is presented below.

7.6.1 Removal of LYW

HRM currently collects LYW either in the Green Carts or along-side the Green Cart in bags. Additionally, there is some separate collection of bagged LYW during peak seasons. HRM is interested in exploring the option of removing more LYW from the residential Green Cart so that it may be processed separately. The removal of LYW from the residential organics stream would reduce processing costs since this material could be more cost-effectively composted at an open windrow site. These costs are usually in the order of $45.00-$50.00/tonne compared to the current average processing fee at Miller and New Era of $153.00/tonne.

Further to the opportunity for more cost-effective processing is the potential to reduce the current strain on capacity at both Miller and New Era. It is estimated that somewhere in the order of 9,500 TPY of LYW is generated each year with in the order of 6,500 to 7,000 TPY processed through these facilities on an annual basis. Overflow organics capacity is necessary

(2150 TPY in 2011/2012) for a portion of the year and currently provided by Fundy Compost ($64.00 plus net HST per tonne in 2011/12, so $143,500). The cost for processing separate LYW during peak seasons (3,100 TPY in 2011/2012) is an additional $57,900 for 2011/12 with delivery to Kel-Ann Organics. While LYW would continue to be processed separately and for much less cost (more akin to the cost/tonne charged by Kel-Ann), overflow of organic waste from New Era and Miller could be avoided.

A significant amount of LYW is currently set out in separate bags alongside the Green Cart, collected with the Green Cart material and sent to Miller and New Era for processing. A certain portion of LYW material could remain in the Green Cart (i.e. 'top-up' material) as it is beneficial to the process to have some LYW collected and processed along with food waste. LYW processed along with organics can help support proper C:N ratio and can act as a bulking agent depending on composition. However, the LYW material set out in separate bags next to the Green Cart could be collected separately from Green Cart material and could be sent to a separate composting pad for processing (it is unknown the exact proportion of LYW in the Green Cart versus set out at the side but if the ration were 50:50 this would represent approximately 3,500 TPY). Additional LYW could be diverted to New Era or Miller on an 'as needed' basis.

Alternatively HRM could place a full-on ban of LYW in the Green Cart program and still deliver to these facilities on an 'as needed' basis. If 7,000 TPY of LYW were diverted from the Green Cart program this could represent in the order of $700,000 ($100 less per tonne for processing) in operational savings on an annual basis (not accounting for the cost of directing some materials to New Era and Miller) as well as the avoided cost (currently an approximate $171,000.00 per year) of managing overflow organics.

In the case of Otter Lake and if the WSF is re-purposed it would be ideal to have an adjacent/near composting pad for LYW in that LYW needed for composting organics could be stockpiled and fed into the process as needed and the remainder could be conventionally windrow composted. Further synergies exist with respect to the joint operation of a LYW composting pad near a compost curing and stockpiling area (shared staff, equipment; loaders, windrow turners, screeners, shredders and the like). This scenario further creates an opportunity for co-collection of organics and LYW (separate compartments) for delivery to a single location. Discussion with respect to collection of LYW is provided in Section 8.0.

The benefit of freeing up capacity at New Era and Miller is the opportunity in the shorter term for HRM to make more practical use of these facilities through increased household organic waste capture that would result with various initiatives described elsewhere in this report (e.g. weekly collection of organics on a year round basis).

7.6.2 Removal of ICI Organics

As discussed above material from the ICI sector is a very wet stream and can be highly contaminated. Removal of this material (approximately 30% of current feedstock is ICI source organics) from the existing aerobic composting facilities to anaerobic digesters (discussed

above) would leave a lighter and more homogenous feedstock which would positively contribute to meeting compost maturity requirements per CCME guidelines.

7.6.3 Removal of Boxboard

HRM actively promotes the inclusion of boxboard in the organics stream, rather than in the blue bag program. This material has a high lignin content which slows down the maturation process as it is fairly dense and does not break down as quickly as food waste. The boxboard increases the C:N ratio. In the survey undertaken by HMJ Consulting Ltd. as part of the *Compost Maturity Study*, boxboard was mentioned as a material causing operational difficulties and contributing to issues regarding quality by two of the nine respondents. In a case study authored by Dr. Paul Arnold for the University of Acadia Institute of Case Studies, the challenges of producing unrestricted use compost by Miller Composting included a discussion on feedstock and contamination. In this case study, the inclusion of woody yard wastes and paper products were reported to increase the C:N ratio to between 300 and 400 which suppresses microbial activity and slows down the rate of decomposition. This requires the material to have a longer residence in the compost bed of 120 days instead of the designed residency of 80 days.

The requirement for extended retention times combined with the volume of material requiring processing can result in material not getting sufficient residence time in the beds and associated decomposition to be compliant with CCME guidelines.

Removal of boxboard from the organics wastestream would therefore likely contribute to the ability of these processing facilities to meet CCME Guidelines.

Additional benefits of removing boxboard from the organics stream were discussed in Section 7.0 – Materials Recovery Facility with respect to potential cost-savings and diversion. HRM is only achieving a capture rate of approximately 25% for boxboard. Given the low capture rate and the issues boxboard is causing for processing facilities, HRM should consider removing boxboard from the Green Cart and collecting it with other Blue Bag materials. This would alleviate the issue in composting, likely increase capture rates and also generate some offsetting revenue through the sale of material. With sufficient promotion residents would likely very easily make the transition. Most municipalities in Canada promote boxboard in the recycling program instead of their Green Cart programs.

7.7 REGIONAL PARTNERSHIPS

With respect to other municipal partnerships for organics waste processing (e.g. in the context of HRM providing a regional composting facility(s)) there are a number of processing facilities that already serve jurisdictions within a reasonable haul distance from Halifax. Within approximately an hour's drive from Halifax are the Cities of Bridgewater, Lunenburg, Truro, and Kentville that generate SSO that could be processed by HRM. Bridgewater and Lunenburg are served by the facility in Lunenburg which was recently upgraded in 2010 so is likely to be operational for some time. A new facility is currently planned for Kemptown which will serve the

Northern Region so it is unlikely that additional capacity will be needed from HRM. The Northridge Farms facility serves the Valley Region (including Windsor and Kentville).

Fundy Compost, located in Brookfield approximately one hour away has excess capacity with the construction of the new facility in Kemptown (it had previously been composting material from Colchester County). Reportedly, 8,500 tonnes of capacity is available at this facility at the time of this report.

It appears that a regional partnership with another municipality is not a feasible option given the distances material would need to be shipped and the prevalence of SSO processing facilities in Nova Scotia, however partnership operations with these facilities for processing should continue to be an option for excess capacity or separate seasonal LYW processing in the event that there are no changes to the 'status quo' system.

7.8 CONCLUSIONS AND RECOMMENDATIONS

7.8.1 Conclusions

Based on the review of HRM organic waste processing operations the following broad conclusions can be made:

- There is a real opportunity to make use of existing processing infrastructure through upgrades and re-purposing to meet all of HRM's long term organic waste processing capacity needs; both to meet demands associated population growth and commercial waste generation trends but also to divert additional materials from the garbage stream.
- There are various system upgrades and configurations, program changes that can be implemented to enable HRM to meet CCME Guidelines.
- Application of anaerobic digestion technology as part of the system can reduce the harder to manage organics from the conventional aerobic composting process to assist in meeting CCME Guidelines, achieve objectives as it relates to Nova Scotia's Homegrown plan and also permit processing of additional organic waste currently being disposed of at Otter Lake.
- There may be real financial benefit to removing all or some LYW from the Green Cart program and there are particular synergies to this in processing if both are processed separately at the same site e.g. Otter Lake.
- Boxboard should be removed from the Green Cart program.
- There does not appear to be any opportunity for large-scale regional partnering for organics waste processing given the extent and age of infrastructure in the province.

7.8.2 Recommendations

- Evaluate the condition of the FEP and WSF for the purposes of long term aerobic composting of clean organic waste; necessary upgrades, new equipment, cost, timeline for modifications, 2013.
- Detailed evaluation of system configuration options and costs; opportunities and constraints:
    - Miller Ebara, New Era, new AD Plant
    - WSF, Miller Ebara, New Era
    - WSF, new AD Plant
    - WSF, Miller Ebara OR New Era
- Conduct due-diligence and determine detailed costs for a new anaerobic digestion facility, 2013-2014. A new facility could be operational in 2015.
- Determine site and construct and operate a secondary curing area to provide more control over the curing process and finished product; status quo until land secured, permits obtained and curing pads constructed.
- Undertake compost quality testing upon removal of boxboard and ICI source organics to determine compliance with CCME and next steps.

8.0 Collection Programs and Container Considerations

8.1 INTRODUCTION

The 1995 Strategy was not highly prescriptive with respect to collection contracts and details of collection. The emphasis at that time was to establish separate collections for recyclables and organics to maximize diversion from landfill. These separate collection activities were implemented in the 1990s and remain in place today. It can be simply stated the intended enhancements were implemented. The following sections describe the current program, compare the current program to municipal benchmarks, and present options and recommendations for improvement.

8.2 CURBSIDE COLLECTION CONTRACTS, ZONES, AND COSTS

8.2.1 Residential Collection Contracts

HRM currently provides curbside collection services to approximately 132,500 homes in eight defined collection zones. Recyclables, organics, and garbage are recovered in separate collection vehicles and delivered to the following facilities. All collection services are provided every two weeks except for weekly recyclable collection in the urban and suburban areas, and weekly organic collection in urban and some suburban areas in July and August.

- Organics – Dartmouth or Halifax Composting Facility
- Recyclables – Halifax Material Recycling Facility
- Garbage – Otter Lake FEP/Disposal

Financial data presented in the 1995 Strategy forecasted a minimum of $4M in capital and variable operating costs to be allocated to annual collection costs. However when the Strategy's finances were revisited, HRM council acknowledged and approved an estimated annual collection cost of $6.9M for 1998. Collection zones were determined in 1996 and have not been updated.

The current collection contracts commenced on July 1, 2008 and expire June 30, 2013. Five separate bidders were awarded contracts to provide waste collection services in eight collection zones within HRM. As seen in the table below, there are differences in the pricing put forward by the various contractors, as the collection zones differ significantly in the amount of serviced units, housing density, type of residential housing, and geographical area. For residential waste collection, costs were calculated on a per unit basis. A summary of the per unit as well as 5 year pricing at contract award is presented below.

Collection Zone	Proponent	Serviced Units	Price Per Unit/Year	5 Year Pricing (excl. tax)[1]
1 - Halifax	Waste Management	29,876	$80.48	$12,022,797.42
2 - Dartmouth	Waste Management	21,577	$81.03	$8,742,776.41
3 - Bedford, Hammond's Plains	Miller Waste Systems	10,407	$94.90	$4,938,350.02
4 - Western	Waste Management	14,708	$76.52	$5,627,502.57
5 - Sackville, Fall River	Miller Waste Systems	20,769	$85.49	$8,877,817.96
6 - Cole Harbour, Eastern Passage	Miller Waste Systems	13,228	$87.60	$5,793,766.28
7 - Preston, Lawrencetown	Leo J. Beazley	7,692	$161.66	$6,217,362.56
8 - Eastern	Eastern Shore Cartage	7,430 + 2 Waste Depots	$123.55 (including staffing 2 waste depots)	$5,706,409.72

i. Note: The 5 year pricing shown in the table is the price evaluation total which includes the sum of monthly and other unit pricing combinations over 5 years. Regular bi-weekly garbage and organics collection as well as recyclable collection is included along with estimates for the number of separate leaf and yard waste and Christmas tree trucks and the optional weekly organics services in all areas/zones. Seasonal weekly organics collection has been in place since 2004.

The table below documents blended collection (both curbside and condominium collection).

	2008-09	2009-10	2010-11	2011-12	2012-13 (projected)
Annual Collection Cost/ Serviced Unit	$83.81	$84.88	$89.19	$92.62	$95.87
Tonnes of all material collected/ serviced unit	.836	.842	.812	.805	.808
Cost/Collected Tonne	$100.25	$100.80	$109.84	$115.05	$118.65

8.2.2 Condominium Collection Contract

The current condominium collection contracts in three service areas have a term of November 1, 2010 to October 31, 2013. HRM services 8,333 condominium units (larger than 6 units). The curbside collection services and condominium collections services are tracked at the HRM waste facilities as residential materials including garbage, organics and recycling.

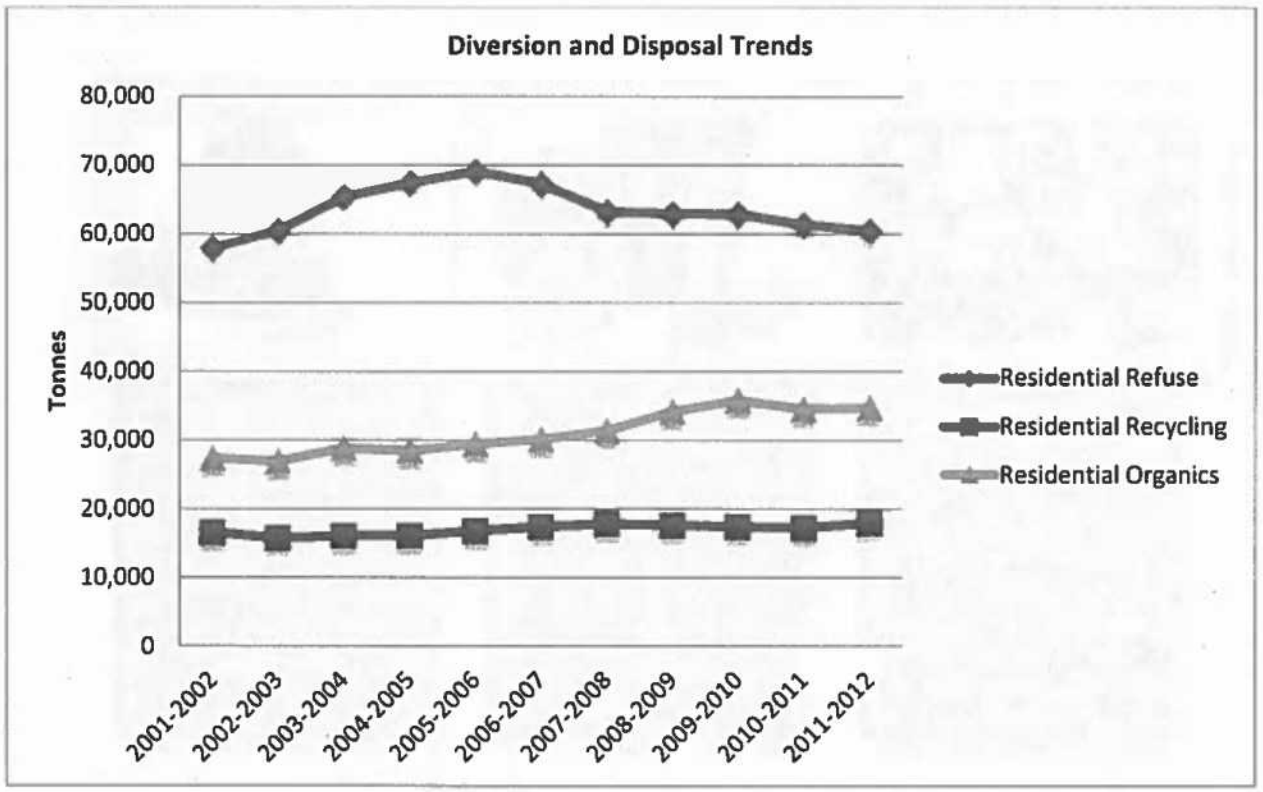
8.2.3 Garbage Collection

Bi-weekly curbside garbage collection (including bulky items) is provided to all eligible residential dwellings including single family households, multi-unit residences up to 6 units, and some condominium locations.

For single unit households, there is a bi-weekly six (6) bag limit for garbage, which was reduced in 2007 from the previous ten (10) bag limit in an effort to impact diversion. The amount of divertible materials in the residential residual wastestream decreased following implementation of this policy change.

Apartment buildings serviced through municipal collection are allowed up to 5 bags per unit. Commercial locations and large apartment buildings are required to arrange for collection through the private sector.

In 2011/2012, a total of 60,500 tonnes of residential garbage was collected in HRM compared to the 1995 Strategy's original projections for the mature system in the year 2000 of 57,100 tonnes. The tonnage of refuse generated by the residential sector has fluctuated over the past 10 years, peaking in 2005/06 at 69,100 tonnes. The figure below presents the tonnage of recycling and organics captured from the residential sector and the correlation to the amount of residential garbage generated between 2001 and 2012.



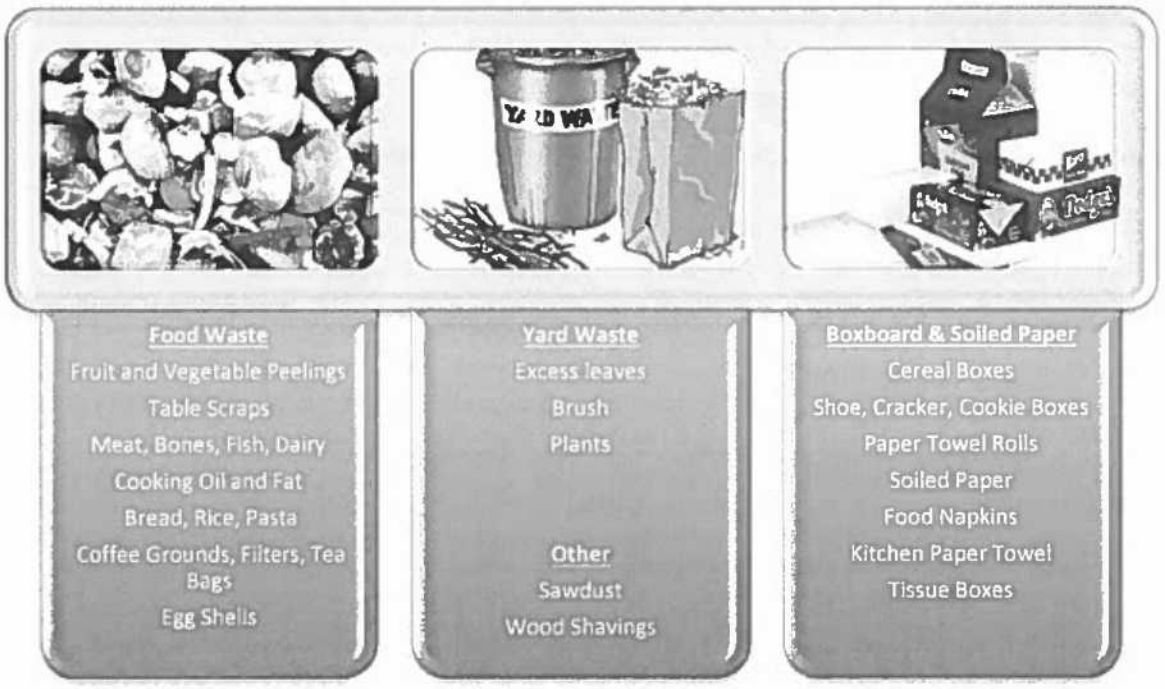
8.2.4 Source Separation

Green Cart Program

Organics are currently collected in green carts on a bi-weekly basis from eligible residences, including all single family residential dwellings and multi-unit dwellings less than 6 units in size.

In 1998, HRM launched the organics program and distributed 100,000 green carts to eligible properties. In the summer of 2003, HRM piloted a weekly organics collection program in selected areas in response to odour and nuisance concerns experienced in the warm weather. As a result of the pilot program findings, HRM now provides weekly organics collection in July and August to urban residents. This enhanced service is revisited and assessed annually by Council.

Since the implementation of the green cart program, there have been no changes to the materials accepted in the program. The following materials are currently divertible through the green cart program:



The introduction of the green carts and curbside source separated organics program has been successful. Since the launch of the program, a progressive annual increase in the amount of organics diverted from the wastestream has been realized. The mature system presented in the 1995 Strategy targeted a diversion rate of 33% of organic waste from the residential and commercial sectors combined. More specific to the residential sector, the 2004 HRM Solid Waste/ Resource Management System Review indicated that of the wastes collected at

curbside, an estimated 21.9% of the residential wastestream was targeted to be diverted through the curbside organics program.[10] The performance of the system has exceeded the original strategy goal of 21.9% under the mature system, indicating that the organics program has exceeded expectations in performance. The table below presents the trends in residential organics diversion throughout the 'mature system' phase. Note that the diversion rate in the following table only accounts for residential curbside collection programs including refuse, recyclables and organics.

	Strategy Projected for 2000	2001-2002	2004-2005	2007-2008	2010-2011	2011-2012
Residential Curbside Organics (tonnes)	24,000	27,394	28,452	31,371	34,547	34,713
Residential Waste Diverted Through Organics Program	21.9%	26.9%	25.4%	27.9%	30.5%	30.7%

8.2.5 Recycling

HRM currently provides curbside collection service to eligible residences using a blue bag system. Residents are currently able to place unlimited quantities of recycling at the curb, however they are required to separate the material into three streams. Containers are to be collected in the blue bag, paper fibres are contained in a retail (grocery) bag, and cardboard is to be gathered in small bundles and placed beside other recyclable materials outside of the bags. HRM utilizes side-load, two compartment collection vehicles to collect the recyclable materials, where paper fibres and cardboard are separated from containers. Recycling is currently collected bi-weekly from residences in rural areas and is collected weekly in urban and suburban areas.

The following table presents the tonnage of recyclable materials collected through the curbside residential collection program, and the respective amount of waste diverted through the recycling program in comparison with the 1995 Strategy's recyclable diversion goal. Note that the diversion percentage presented in the table includes only the residential curbside refuse, organics, and recycling tonnages.

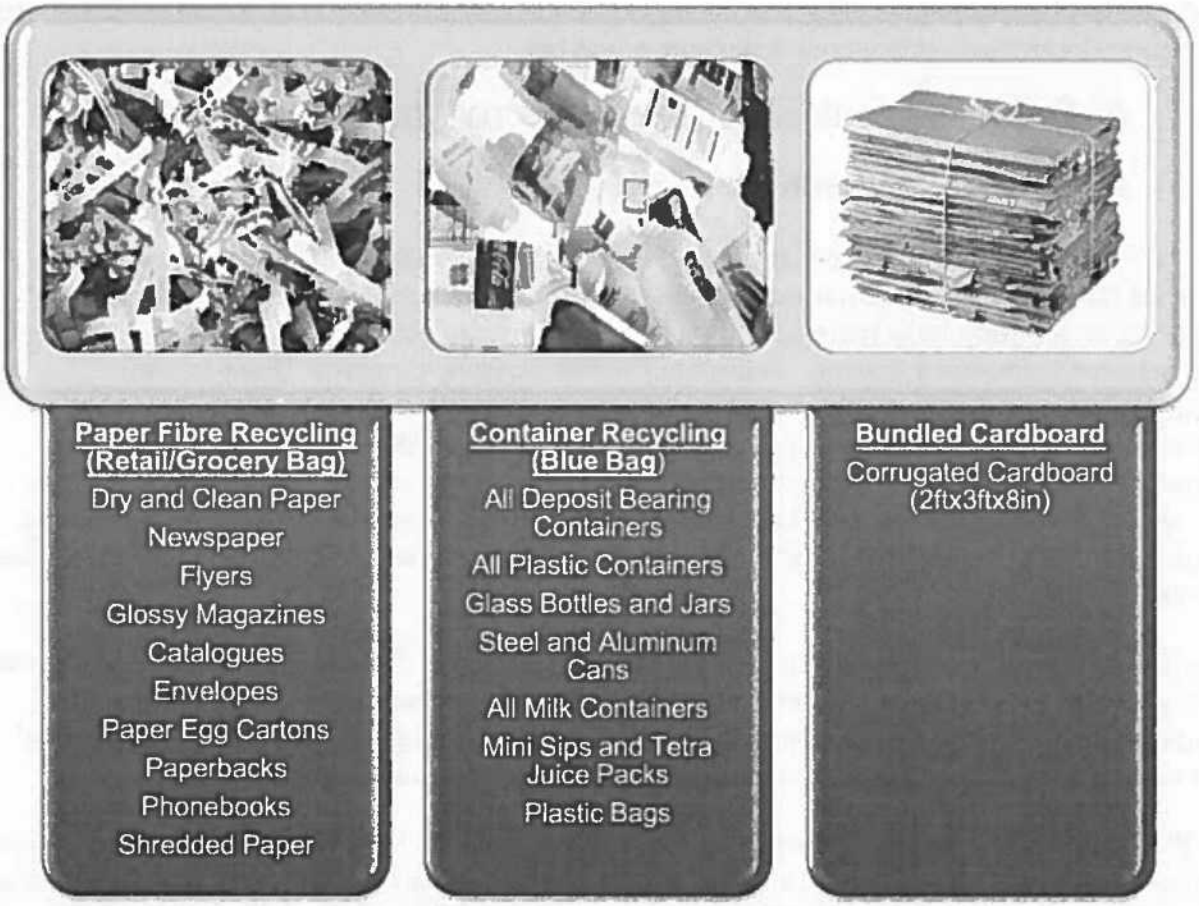
[10] O'Halloran Campbell Consultants Ltd. January 2004. HRM Solid Waste/Resource Management System Review.

	Strategy Projected for 2000	2001-2002	2004-2005	2007-2008	2010-2011	2011-2012
Residential Curbside Recycling (tonnes)	28,000	15,294	16,756	17,852	17,258	17,946
Residential Waste Diverted Through Recycling Program	25.7%	15.0%	15.0%	16.4%	15.1%	15.9%

The performance of the recycling program has not increased significantly over the past decade. Since the province's Beverage Container Deposit-Refund System came into effect in 1996, a portion of residential recyclable materials that previously would have been managed by the recyclable collection program are instead diverted through the deposit program, which could be a contributing factor to the low capture rates of the residential recycling program.

In 2011, mixed plastics (3, 4, 5, and 7) were added to the blue bag recycling program. These additions were made to support the overall vision of the 1995 Strategy and to increase the current recycling diversion rate.

As a result of these changes, the following items are currently accepted in the curbside recycling program:



8.2.6 Solid Waste Resource Collection and Disposal By-Law

In January 1999, By-Law S-600 came into effect to support in part, the goals of the 1995 Strategy. The by-law provides the guidelines for the preparation and collection of solid waste, as well as prohibitions, offences and penalties. The by-law further defines which premises' are eligible for collection, and the specific requirements for ICI locations including commercial bin and disposal requirements.

The bylaw also addresses waste disposal fee structure for the HRM waste management facilities, vehicle requirements, and fee payment methods. Since the inception of By-Law S-600, there have been 8 amendments, the last of which took effect in September of 2010.

8.2.7 Curbside Give Away Weekend

To support the 1995 Strategy's focus on reducing the amount of waste generated and promotion of reuse initiatives, Curbside Give Away events are held twice annually. During these events, residents can place re-usable household items at the curb, which can then be taken for free by other residents. Any leftover items are to be removed at the end of the event.

Curbside Give Away Events were first introduced to the public in June of 2010 with success and have since been held twice yearly in the spring and fall.

8.3 CURRENT PERFORMANCE COMPARED TO INDUSTRY BENCHMARKS

8.3.1 Single vs. Two Stream Recycling Collection

The current collection system for recyclables involves two stream sorting in the collection vehicles (paper and cardboard in one compartment, containers in the other). Requiring residents to sort recyclable material into multiple streams can sometime lead to discouragement and act as a disincentive towards participating in the recycling program. "Easy to use" programs such as single stream recycling can often address this issue and result in higher participation and capture rates. Single stream recycling is considered a best practice as it is generally a more efficient collection approach for collection from single family and multi-family households, and is often regarded as an improvement in the level of service by residents. The negative implications of single stream programs are higher processing costs and higher residue levels.

Many of the larger municipalities in Ontario (Toronto, Region of Peel, Region of York) and in the United States (over 40 new programs in 2008) have switched from dual stream systems to single stream systems over the past ten years, as they encourage residential participation and improve capture rates. This was discussed in much greater detail in Section 6.0.

In 2010, the rural Bluewater Recycling Association (BRA) in southwestern Ontario changed from a dual stream blue box system to a single stream automated cart system. With the change to a single-stream, cart based system, the BRA has cut their collection times from 31 hours per week to 14.5 hours per week, and has reported a 17% increase in materials collected. Although the cost to operate and maintain their automated vehicle including the cost of carts is 40.4% more per hour than the traditional manual top loader vehicles, due to the efficiencies saved with switching to a single stream, automated system, the net cost is 34.3% less than the traditional system. In addition to collection cost savings, the BRA has also experienced a 17% increase in capture rates for recyclable materials at the curb.

In August 2011, the City of Timmins moved from a dual stream to single stream automated cart recycling system. Since the move to the new collection system (including an expansion to the recyclable materials list), the City has experienced a 32% increase in recyclable material tonnage and approximately 15% decrease in refuse generation.

8.3.2 Recycling Collection Containers

The concept behind increasing recycling container volume is that increased container capacity provides more space for additional recyclables, therefore reducing the chances that recyclables will be placed in the garbage. HRM has a very mature recycling program in place utilizing a bag system in which blue bags, retail bags and bundles are used to separate materials for collection at the curbside. The performance of the system results in a 15.9% residential curbside

diversion rate for recyclables which is low in comparison to other municipalities shown in the table below. However, HRM also does not include boxboard in the collected fibre stream and so the tonnage of boxboard and the impact of the Nova Scotia deposit return program would likely raise HRM's performance to be comparable to other municipalities. HRM also does not collect recyclables from most apartment buildings as this is managed by the ICI sector.

Municipality	Container Type	Residential Recyclables Diverted (2010)[11]
Halton Region	Blue Box Only	23.10%
York Region	Blue Box Only	23.74%
City of Hamilton	Blue/ Clear Bag, Blue Box or Both	20.56%
City of Toronto	Automated Cart Only	19.29%
Peel Region	Blue/ Clear Bag, Blue Box or Both	24.32%
City of London	Blue/ Clear Bag, Blue Box or Both	22.10%
County of Simcoe	Blue Box Only	33.39%
Durham Region	Blue Box Only	21.84%
Waterloo Region	Blue Box Only	20.22%
Niagara Region	Blue/ Clear Bag, Blue Box or Both	19.35%
City of Ottawa	Blue/ Clear Bag, Blue Box or Both	18.89%
Essex-Windsor Solid Waste Authority	Blue Box Only	16.89%
Municipal Average		**21.97%**

A variety of approaches are used to manage recyclable materials at the curb in communities across Canada (shown below).

Container Type	Municipal Program
Blue Bag Only	Edmonton, Charlottetown, HRM, Guelph
Blue/ Clear Bag, Blue Box or Both	Peel, Niagara, Muskoka, London, Hamilton, Ottawa
Blue Box Only	York, Durham, Waterloo, Windsor
Automated Cart Only	Calgary, Toronto, Kelowna

Many municipalities have found that moving to an automated cart recycling program is the most efficient and economical when operating a single stream collection system. There are several municipalities in Canada who operate single-stream cart-based recycling systems including the Cities of Gatineau (and in fact many Quebec jurisdictions), Calgary, and Kelowna. Cart based systems have become a best practice in waste collection as they protect recyclable material from the elements (less snow and water present in the materials sent to the MRF and to market), reduce scavenging of valuable recyclable materials, and increase collection efficiency resulting in long term cost savings.

[11] WDO Datacall. 2010. Residential GAP Diversion Rate by Municipal Groups. http://www.wdo.ca/content/?path=page82+item35931

An automated recycling cart system produces the greatest benefits to municipalities who combine the system with single stream collection. Generally, due to the large volume of materials that recycling carts are able to manage, recycling can be provided on a bi-weekly basis without compromising the diversion rate. Municipalities who operate single stream automated recycling cart collection are able to provide the service bi-weekly in combination with bi-weekly garbage collection and weekly organics collection to provide residents with convenient diversion opportunities and operate an efficient, cost-effective collection system. Guelph in Ontario is currently converting to this program. As a result, the municipalities operating single stream automated cart recycling programs typically have low overall collection costs with high diversion rates. It is generally advisable to allow one year to procure carts including fabrication and delivery, not including the formal tendering process.

8.3.3 Automated Garbage Collection

As discussed above, automated waste collection is considered to be an emerging best practice in waste management where efficiencies can be gained in collection of any wastestream. Automated collection provides better working conditions for vehicle operators and can also be more efficient than manual collection.

In October, 2012, the City of Winnipeg began phasing in the change to automated garbage and recycling cart collection from manual collection. The City offers 2 sizes of garbage carts to residents, 240L, which holds approximately 3 regular sized garbage bags and 360L which holds approximately 5 regular sized garbage bags. Winnipeg provides the carts as part of their waste collection program levy but charge for replacement or upgraded (larger or additional) carts. Although results of the program are yet to be tabulated, Winnipeg expects to improve the current diversion rate of 15% by reducing the amount of waste going to landfill by up to 50%[12].

In 2009 the City of Toronto reported that in one area of the City they will reduce from 22 recycle/organic trucks and 17 garbage trucks to a total of 18 trucks for all wastestreams. Automated collection facilitates the collection of a much larger route than manual collection in the same amount of time e.g. 1000 to 1200 stops compared to around 700 stops for manual collection. There are significant ergonomic and health and safety benefits associated with automated collection including injury prevention (slip and fall), and injury from lifting (e.g. back injury). This combined with the sheer efficiency of automated collection makes it an industry best practice.

The switch to automated collection is fairly new for most municipalities e.g. Toronto, 2009, Bluewater, 2010, Timmins, 2011, Winnipeg, 2012, Guelph 2012 and these programs should be monitored with respect to efficiencies gained, cost and 'lessons learned'.

[12] Winnipeg News Release. April 2012. http://winnipeg.ca/cao/media/news/nr_2012/nr_20120426.stm#1

8.3.4 Co-Collection of Materials

Co-collection of waste in the same vehicle can offer savings in fleet size and fuel as well as reducing emissions and vehicular traffic (with the associated reduction in wear on roads). Many municipalities are utilizing a co-collection model to achieve efficiencies in collection. Material streams can be collected in a separate vehicle or co-collected, that is, two-streams collected at the same time in the same vehicle. Typically, in co-collection, a truck is divided into two or more compartments to keep the streams separate. This method of collection works best when there is transfer capacity (i.e. material is dumped at a transfer station and transferred to a processing facility when enough material is collected) or when processing/disposal facilities are geographically proximal (usually on the same site) physically located close to each other so trucks do not have to drive long distances half empty.

Some examples of municipalities in Ontario utilizing co-collection are as follows:

- The City of Toronto co-collects organics and either recyclables or garbage on alternate weeks. Toronto uses a cart-based system and single stream recyclables.
- The City of Hamilton co-collects garbage and organics weekly; two-stream recyclables is also collected weekly.
- The Region of Halton co-collects organics and single stream recyclables.
- The Region of York co-collects organics and single stream recyclables.
- The City of Ottawa recently (October 2012) moved to a system where organics and recyclables are co-collected (alternating weeks blue and black box).
- The City of Guelph currently co-collects organics with single stream recyclables and will co-collect both organics with single stream recyclables and garbage with organics (alternating weeks) when their cart system has been fully rolled out.

Each of these municipalities use either transfer stations to transfer various materials or their transfer station with some processing facilities (MRF, composter, landfill) are on the same site. HRM's processing facilities are not geographically located in such a way that co-collection would appear to be able to drive greater efficiencies in its current collection system. Co-collection however becomes a real opportunity for HRM in the context of a Waste Resource Campus with multiple processing facilities located on one site.

8.3.5 User Pay Programs and RFID Technology

HRM currently operates a tax-based system, in which a certain portion of residential and commercial taxes in combination with revenues from tipping fees at Otter Lake, Miller, and New Era are used to fund waste management programs and operations. An alternative regarded by some as a best practice are full user pay programs, in which residents are required to pay by

the quantity of garbage they produce. Generally, the jurisdictions that have implemented full user pay programs are smaller urban or rural municipalities that have implemented the systems without a container limit.

The City of Toronto's program operates a user-pay system by choice of cart, that is, the fee is levied as a charge per household based on the size of the garbage cart (range of three cart sizes) chosen by the household rather than on a per bag basis. To improve efficiencies and address some of the challenges faced with user pay programs and/or cart based programs, numerous municipalities are utilizing Radio-frequency identification (RFID) technology to improve their collection systems:

- Positively identifying which residence generated the waste
- Keeping track of their valuable assets (the carts)

As well as other challenges commonly encountered by all waste collection programs:

- Proving that garbage was collected to avoid double collection
- Proving that the truck was on the route at the specified time to avoid sending a truck back for customers who forgot to put out their garbage
- Determining if customers are putting out more garbage than allowed[13]

RFID systems are generally implemented alongside cart-based full user pay programs, where the manufacturers of the carts embed an RFID tag to hold a unique identification number, which is then assigned to a specific household. Collection trucks are generally outfitted with an RFID reader, which reads the information off of each cart as it is emptied. The systems are advantageous in that they do not require a 'line of sight' as a barcode scanner does, and enable collection staff to efficiently record large amounts of information, which can be used to address common collection complaints such as missed collection or refused wastes. The City of Toronto, City of Timmins, City of Winnipeg and City of Guelph are currently using RFID technology to enhance their automated collection systems.

8.3.6 Level of Service

Residents are currently provided with varying levels of service (e.g. bi-weekly vs. weekly recycling) dependent on where they reside within the region. Urban areas are currently provided with a different level of service for recycling collection than rural areas. This is consistent with many municipalities where rural areas are sparsely populated and travel distances are great. During the summer months (July and August) there are currently varying levels of organics service provided, as residents in urban/suburban areas are typically provided with weekly service during these months, while rural residences continue to receive bi-weekly collection, however this service is subject to change every year, as Council chooses which level of service to provide each year.

[13] Impinj Asset Management. Monroe County Cleans Up with RFID: Impinj RFID Technology Enables Automated Waste Recovery.

Some municipalities in Canada have recently began switching their collection systems to provide a uniform level of service to eligible residences in efforts to impact diversion rates through increasing the convenience and accessibility of diversion programs. Particularly where organics programs are in place, weekly collection throughout the year to all residents is the norm for most communities as this allows for maximum diversion of organic material and is generally the most accepted practice by the public as it ensures that potentially odorous material is collected frequently.

For example, in 2008, the Regional Municipality of Halton switched to a uniform level of service for the 4 member municipalities alongside the launch of their green cart program and a move to bi-weekly garbage service. Previously, Halton provided varying levels of service, in which urban areas were provided with weekly garbage collection service, while some rural areas were provided with bi-weekly service. Since Halton has moved to a uniform level of collection service and launched the green cart program alongside a move to bi-weekly garbage collection, the residential diversion rate has increased from 41% in 2006[14] to 60% in 2011[15]. In 2011, Halton reported a 93% overall participation rate in the blue box program and an 80% urban household participation in the organics program and 60% rural participation[16].

In 2012, The County of Simcoe moved to a uniform level of special collections where all residents are now provided with leaf and yard waste collection, Christmas tree collection and a call-in, user pay bulky service. Although the contract term has not yet begun, the County is expected to experience considerable savings in comparison to the previous system where varying levels of service were provided depending on the sub-municipality residents live in, and bulky drop-off vouchers were provided free of charge.

8.3.7 Bag Limits

Bag limits have been found to be an effective tool to increase waste diversion (as long as diversion programs are adequate to support the established bag limits). As the bag limit decreases, it forces residents to either increase their participation in diversion programs or find an alternative means of disposal (i.e. take the material to a drop-of themselves). Implementing a bag limit of less than 3 weekly (or 6 bi-weekly) has become a best practice, and many municipalities have benefitted from such initiatives as waste generation typically decreases and residential diversion increases from this low cost initiative.

HRM currently has a 6 bag limit (5/unit for multi-unit locations), which was reduced from the previous limit of 10 in efforts to increase participation in the curbside diversion program. The current HRM bag limit is higher than other Nova Scotia municipalities. HRM could consider gradually reducing their residential bag limit to a prescribed number of bags per week which could be established using available waste audit data/waste quantities, known current curbside

[14] WDO 2006/2010 GAP by Municipal Grouping. http://www.wdo.ca/content/?path=page82+item35931

[15] Halton Region Spring 2011. WasteLess News.

[16] Halton Region Spring 2011. WasteLess News.

set-out behaviours, and known residential support for varying levels of bag limits (e.g. annual CRA waste surveys). A recent curbside survey undertaken by HRM indicates that over 75% of households put out less than 4 bags of garbage every two weeks.

There are many different approaches that are successfully used by other municipalities including bag limits, bag tags or a combination of both. Many other municipalities have moved to a lower limit, especially with the implementation of organics programs. The City of Hamilton gradually reduced its two-bag limit over a 3 year period to a voluntary one-bag limit to a mandatory one-bag limit in 2010. While the exact effect on diversion for Hamilton has yet to be measured (the next curbside audit has not yet be undertaken), generally, experience indicates that diversion can be increased by an additional 1 to 5% with such initiatives. Most municipalities have implemented a gradual decrease over time. It should be noted that there is a risk of greater contamination in both recycling and organics streams as some residents may overflow garbage (above the bag limit) to those streams and these programs need to be carefully monitored and enforced.

The County of Simcoe implemented a one bag limit and has demonstrated great success in achieving almost 60% residential diversion[1] when residents have access to both an organics and recycling program. Municipalities that have focused on a one-bag (or container) limit may have partial user pay programs in effect (e.g. pay for additional bags) such as Simcoe, or may not have that option, such as Hamilton.

The City of Peterborough, ON has also demonstrated great success in reducing the residential bag limit. The bag limit policy for the City was phased in since 1990. In 1990, residents were limited to six bags of garbage, then four bags in 1991, three bags in 1994 and finally two bags of garbage in 1995, which remains the limit to date. There is no option to place out more bags however residents can take additional garbage to the landfill, where they are charged $5.00 to dispose of waste. Over the period since 1990, the City has steadily lowered its waste generation rate and more than doubled the diversion of waste to 50%.[17]

8.3.8 Leaf and Yard Waste Management

Currently, residential leaf and yard waste (LYW) is collected as part of the Green Cart program with LYW either in or beside the cart where they must be contained in clear/orange plastic bags or kraft paper bags, up to a maximum of 20 bags weighing no more than 55lb each. Residents are directed to arrange branches into armload-sized bundles, and are allowed to dispose of a maximum of 5 bundles bi-weekly. Bundles must not exceed 75lb and can be no larger than 1.2 m long or .2m in diameter.

The current LYW generation rate is in the order of 9,500 TPY for the residential sector. Material is received mixed with organics at either Miller or New Era. In the fall and spring during peak season HRM engages contractors to send out separate additional collection vehicles to manage

[1] 2010 GAP Diversion Summary. Waste Diversion Ontario.

[17] June 2004. Ontario Centre for Municipal Best Practices. Best Practices Summary Report.

increased volumes. This LYW material is delivered to an outdoor windrow composting facility (currently Kel-Ann). As discussed at length in Section 7.0 there is also occasion where the weekly tonnage of organic and LYW material combined exceeds composting facility weekly capacity and in that case those materials are shipped to another separate composting facility (currently Fundy Compost).

Also as discussed in Section 7.0 there are no prescribed 'best practices' with respect to the management of LYW in concert with a household organics collection program but typically LYW is collected separately from organics in the larger municipalities because the sheer volume of material warrants separate collection and processing. Some allow 'top up' of LYW in Green Bins/Carts and others do not. Hamilton is now endeavoring to remove LYW for separate collection from its Green Bin program and while Ottawa allows the blend of materials they have a put-or-pay contract for minimum tonnage to their facility and current organics tonnage does not meet that minimum without LYW. HRM also has "put or pay" contracts for minimum annual tonnages at Miller and New Era, so would have to review implications of further diversion of separately collected LYW and movement of boxboard to recycling. Guelph is going to allow 'top up' of LYW in its new automated cart based system. Again, there are no prescribed 'best practices' in this regard with LYW managed on a 'case by case' municipal basis.

Some examples of how larger municipalities are dealing with collecting LYW are provided below. Collection costs have been provided where possible.

- The City of Hamilton had been operating a dedicated seasonal bi-weekly LYW collection program from mid-April to the end of July and from the beginning of September to the end of November (providing each household with 13 weeks of collection). Collection costs per tonne range between $133 and $221 depending on the collection zone and service provider.

  The City recently negotiated a new collection contract; effective April 2013, unlimited year round LYW collection will be provided. Part of the rationale for offering this enhanced level of service was to maintain the merchant capacity at the composting facility; allowing separately collected LYW to be processed at the City's LYW composting facility at a lower cost.

- The City of Ottawa allows LYW in their Green Bin program, however also provides separate LYW collection to residents weekly during peak seasons and bi-weekly for the remainder of the year. In 2009, collection costs for this service ranged from $117 to $184/tonne depending on the collection zone and service provider.

- The City of Toronto collects LYW bi-weekly (on the same week as garbage collection) from mid-March into December.

- The Region of Durham provides seasonal LYW collection, bi-weekly in April, June, July, August and September, and weekly in May, October, November. No collection is provided in January, February or March.

- The Region of York collects yard waste with recycling biweekly from April to November.
- The Region of Peel provides bi-weekly yard waste collection from July to September, weekly collection is provided from April to June and in October and November.

As can be seen from the examples above, there is no standard for collection of LYW; municipalities have developed different schedules to accommodate the volume of LYW generated, the capacity of Green Bins and the capacity of the processing facility. In general, LYW is collected separately as the processing fees are lower than those for SSO.

A benefit of separate leaf and yard waste collection may also be the ability to switch from the larger carts to a smaller Green Bin (e.g. with new residents and container replacements) which could result in cost-savings for HRM. This could also occur in concert with year-round weekly collection of organics.

One best practice in LYW collection that is almost universal among municipalities across Canada is the exclusive use of kraft paper bags for collection. This decreases processing costs associated with the handling of plastics in the composting process. Residents in HRM are permitted to use kraft paper bags but the elimination of the plastics should be considered further.

8.3.9 Expanded Multi-Residential Sector Collection

Increasingly, municipalities have identified that the next frontier in waste diversion is providing the multi-family sector with access to the same waste management and diversion programs as the single family sector. Many municipalities across the country are making efforts to identify innovative methods to increase the convenience of waste diversion programs for this sector. Currently, HRM provides collection service to approximately 8,300 multi-family condominium units within the Region, however a large portion of the multi-family sector (primarily high rise apartment buildings) are required to make arrangement for separate collection through the private sector. As per by-law S-600, all locations, regardless of whether they are serviced municipally or privately are required to place source separation bins at their sites, however since there are no reporting requirements stipulated in the by-law, it is difficult for HRM to track the diversion rates of multi-family homes separately from ICI locations.

If HRM were to increase the current level of collection service to include all multi-family locations, there would be greater opportunity to monitor and control the performance of the diversion programs in this sector. Other municipalities including the City of Vancouver, the City of Toronto, Port Coquitlam, B.C, and York Region have successfully implemented multi-family collection programs and have found that they are able to increase the performance of the diversion programs in this sector through various initiatives such as the provision of containers to each household, increasing ownership of waste (e.g. discontinuing use of garbage chutes), and through on-going promotion and educational materials/activities. Typically, the diversion rate in this sector is 20%, however that would be expected to increase with the implementation of various initiatives mentioned above, and with program maturation (as has been the case with

HRM). This can be achieved through regulatory and reporting requirements, but is more typically associated with financial incentives or disincentives to drive programs.

Best practices[18] for multi-family sector waste collection stipulate that successful programs should consist of the following:

- Create and maintained a database of multi-family properties.
- Establish benchmark performance measures and methods for monitoring of the program on a regular basis.
- Provide adequate collection capacity for all wastestreams, specifically divertible materials.
- Provide P&E materials, tools and program support – engage in out-reach activities including training for stakeholders.

HRM already employs these best practices with existing multi-family curbside collection and condominium property collection programming and would simply extend these practices to the balance of the multi-family sector. Most municipalities focus on the collection of recyclables and organics from this sector and not so much on front-end garbage collection for larger buildings that is left to the private sector.

8.4 OPPORTUNITIES FOR IMPROVEMENT

8.4.1 Impact of Decisions Regarding Campus Concept and Recyclables Processing

Clear direction as to whether HRM will maintain a de-centralized infrastructure model, or transition to a campus concept is required before collection contracts can be re-organized. The following sections describe several potential contract changes including modifications to collection zones and collection frequency. Other initiatives such as partnering with neighbouring waste regions also have the potential to impact collection contracts especially in the rural areas.

It may be many years before all program and infrastructure issues are resolved and a completely revised and optimized collection program can be implemented. It is not unusual that a period of 5-10 years is required to fully implement a revised collection strategy.

Another factor which will impact the collection program is the decision to either maintain a two stream recyclables program, or convert to single stream processing and collection. There is no urgency to reach a quick decision as the existing two stream MRF will remain operational until 2019. However, a decision by 2015 is required to appropriately plan for the new facility.

8.4.2 Contract Timing and Duration

Stantec understands that HRM has successfully extended the eight collection contracts until 2014. This will enable some minor modifications to be made prior to retendering. Ideally,

[18] Continuous Improvement Fund. Guidelines for Implementing Best Practices in Municipal Multi-residential Recycling Programs. November 2009.

collection tenders are advertised at least one year prior to contract commencement date. This is intended to provide sufficient time for bid evaluation and award, and lead time for new truck delivery. Depending on economic conditions, six months is not an unusual delivery schedule.

An ideal scenario would include resolution of all infrastructure and program issues, in all zones, all at a particular time. That is unlikely. The reality is that certain infrastructure elements will come on line earlier than others. HRM should not attempt to force contract alignment earlier than a reasonable infrastructure plan permits. Re-zoning collection to 4-6 areas from the current 8 areas is also likely advantageous, but again re-zoning will be contingent on other decisions. Finally, the optimum term for a collection contract is often considered to be the expected life of the collection vehicles. Modern vehicles operate with low maintenance for at least 7 years. Therefore, a longer contract term requiring all bidders to purchase new vehicles will better utilize the purchased fleet.

All 8 collection zones are now bid at the same time. It is completely acceptable to bid individual zones if certain unknowns are resolved. The long term goal would be to re-align the tender dates, but this can be done as part of a long term strategy.

8.4.3 Short Term Collection Program Changes

Stantec recommends the following three collection program changes in the short term:

- Remove white goods from garbage collection and implement segregated collection
- Ban all plastic bags from the yard waste and organics collection program
- Remove clean boxboard from organics wastestream and add to recyclables.

Detailed reasons for these changes are provided in previous sections. Briefly, these changes are proposed to provide a cleaner feedstock (ban plastics bags), recognize product value (boxboard), and avoid double handling of appliances. Stantec does not recommend a particular date for these changes except that all should be implemented by June 30, 2014 when the next set of collection contracts become effective.

8.4.4 Collection Zones

Stantec recommends that HRM consider reducing the number of collection zones, but only after outstanding program and infrastructure decisions are resolved. Determining appropriate bidding zones is based on several factors including maintaining competition in the marketplace and geographic constraints. Stantec suggests that a total of 4-6 zones would be satisfactory with 2-3 zones in urban areas and 2-3 zones in rural areas. This still maintains a healthy industry (more than one potential winning bidder) while reducing the administrative burden on HRM staff.

A subsequent section of this report describing partnership opportunities in Nova Scotia highlights the potential for drop-off arrangements with neighbouring waste regions. For example, if an outlying area of HRM can have materials collected delivered to an adjacent region, greatly

reducing travel distances, then considerable savings should follow and such opportunities should be explored in areas most remote from the Dartmouth/Halifax drop-off locations.

8.4.5 Frequency of Collection

The current collection program strategy of more frequent collection in urban areas is consistent with similar regions with an urban/rural mix. Stantec suggests that this cost containment strategy remain in effect for future contracts.

Stantec does however recommend that urban areas receive weekly organics and recyclables collection throughout the year with a maintained bi- weekly garbage collection cycle. Best practice in this regard is to have recyclables and organics collection at least as frequently as the garbage stream. While HRM collects organics and recycling on an 'as frequent' basis as garbage, the requirement to store divertable materials (especially organics) for more than one week is still a disincentive to participation, and affects recovery. Space constraints often drive resident behavior with respect to which container to place an object. The tendency is to disposal of materials in the stream that will get collected sooner which for HRM means that some organics and recyclables (based on capture rates previously discussed) are likely included in the garbage stream the week the garbage stream is collected.

While weekly collection of all wastestreams is very convenient the reality is that once organics and recyclables are properly diverted the amount of waste requiring collection is greatly diminished. Weekly collection of garbage at that point can be thought of as a high level of service. Numerous jurisdictions, with the implementation of their organics collection programs have shifted to bi-weekly collection of garbage as an appropriate level of service, as a means to drive diversion and to provide cost-effective curbside collection. While best practice for organics collection is weekly, recyclable materials can still be collected on a bi-weekly basis e.g. alternating with bi-weekly garbage because in this scenario collection of recyclables and garbage is on an as-frequent basis. This is particularly easy to accommodate with single-stream recyclables collection.

8.5 CONCLUSIONS AND RECOMMENDATIONS

8.5.1 Conclusions

Based on the review of HRM collections programming the following broad conclusions can be made:

- That there are opportunities to realize further efficiencies in HRM's collection system through various mechanisms including but not limited to collection re-zoning, automated collection and single-stream recycling.
- There are potential opportunities for even further efficiencies e.g. co-collection with a new campus with centralized waste processing infrastructure.

- There are opportunities to drive greater diversion through more frequent collection of organics, decreased bag limits or clear garbage bags, and expanded multi-family sector collection.

8.5.2 Recommendations

- The next collection RFP should request pricing for separate LYW collection (either materials set beside the Green Cart and seasonal peak material or all LYW). An audit of these materials to determine quantities should be undertaken – 2013.
- Plastic bags should be eliminated from the LYW collection and processing system.
- Separate white goods collection pricing should be sought and collection program implemented.
- More detailed collection modeling could be undertaken to assess the benefits of automated versus manual collection, separate collection of LYW, single stream versus dual stream collection.
- Modeling should also be undertaken to determine collection area re-zoning once long term processing facility location(s) are determined.
- The next collection RFP should reflect the collection of boxboard in the recyclables stream not the organics stream as discussed in both Section 6.0 and 7.0.
- Future collection contracts should be seven (7) years in length – considered to be a typical life for a curbside collection vehicle and optimum contract term.

9.0 Review of Energy From Waste Opportunities

9.1 BACKGROUND

Currently, HRM has no Energy from Waste (EFW) system in place. The 1995 Strategy did not include EFW as a component of the overall plan. Many EFW technologies, including gasification and pyrolysis, were in the early stages of development when the 1995 Strategy was developed and therefore, were not considered in the analysis. With EFW technologies becoming more widespread, it would be reasonable to reconsider whether EFW technology is a viable alternative for HRM in the future.

EFW technology can be categorized into combustion (incineration), gasification, pyrolysis and plasma arc gasification. Within each category there are many different subtypes, each at varying levels of development. Industry analyses will focus on Canada-based facilities whenever possible though some commercialized technologies can only be found elsewhere.

It should be cautioned that this review was not exhaustive, and that some subtle changes may have occurred since this information was gathered. This review is not intended to be a definitive opinion and analysis, but rather an overview on which a recommendation can be made as to whether Energy-from-Waste should be made a strategic short term priority for HRM.

9.2 COMBUSTION

9.2.1 Background

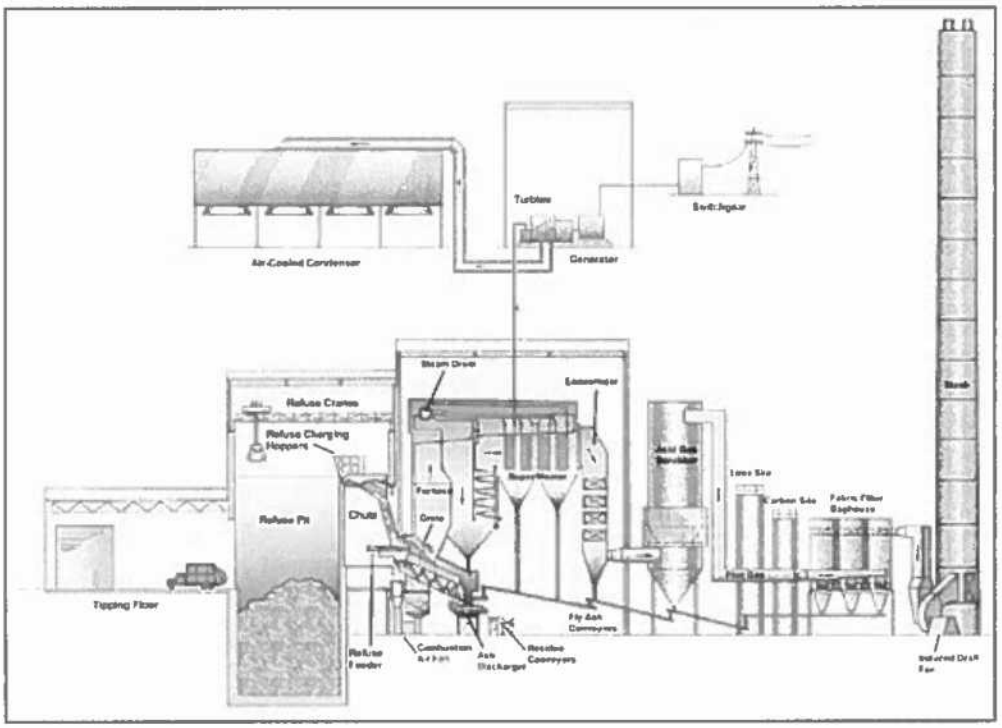
Conventional combustion is a well-established technology developed over 100 years ago for energy generation from municipal solid waste (MSW). The first attempts to dispose of solid waste using a furnace are thought to have taken place in England in the 1870s. Since that time, vast technological improvements have been made making conventional combustion the most common Energy from Waste technology currently being used to treat MSW.

The most conventional combustion approach is called single-stage combustion or mass burn incineration (sometimes referred to as grate-fired technology). Over 90% of EFW facilities in Europe utilize mass burn incineration technology with the largest facility treating approximately 750,000 TPY[19].

The following paragraphs discuss the mass burn combustion process. The following figure provides a conceptual overview of a modern single-stage EFW facility[20].

19 Malkow, T. (2004). Novel and innovative pyrolysis and gasification technologies for energy efficient and environmentally sound MSW disposal. Waste Management, 53-79.

20 Stantec Consulting Limited. (2009). Durham/York Residual Waste Study Environmental Assessment. Edmonton: Stantec.

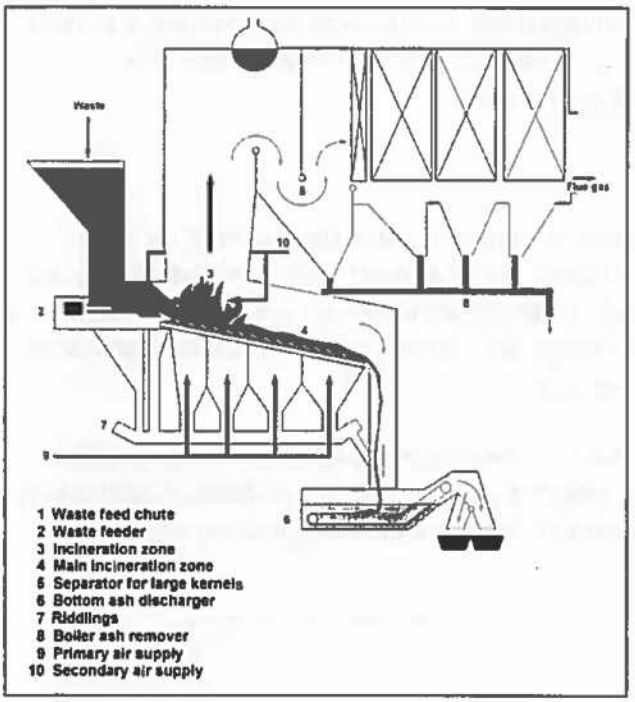


At a mass burn facility, minimal pre-processing of MSW is required. Normally, trucks carrying refuse enter a building where they discharge their waste into a pit or bunker. From the pit, the waste is transferred into a hopper by an overhead crane. The crane is also used to remove large and non-combustible materials from the wastestream. The crane transfers the waste into a waste feed hopper which feeds the waste onto a moving grate where combustion begins.

Several stages of combustion occur in mass burn incinerators. The first step reduces the water content of the waste in preparation for burning (drying and degassing). The next step involves primary burning which oxidizes the more readily combustible material while the subsequent burning step oxidizes the fixed carbon. In single-stage combustion, waste is burned in substoichiometric conditions, where sufficient oxygen is not available for complete combustion.

The oxygen available is approximately 30 to 80% of the required amount for complete combustion which results in the formation of pyrolysis gases. These gases are combined with excess air and combusted in the upper portions of the combustion chamber which allows complete oxidation to occur. The following diagram shows an example of an inclined grate incinerator with a heat recovery boiler[21].

21 German Federal Environment Agency. (2001). Draft of a German Report for the creation of a BREF-document "waste incineration". Umweltbundesamt.



Mass burn technology applications provide long residence times on the grate(s) which in turn results in good ash quality (i.e., less non-combusted carbon). Newer facilities have greatly improved energy efficiency and usually recover and export energy as steam and/or electricity. Typical mass burn facilities have energy recovery efficiencies of 14% to 27% (assuming that the energy from combustion is being converted into electricity)[22]. Higher energy recovery efficiencies are achieved through the recovery of heat either in conjunction with or in lieu of electricity.

Mass burn facilities can be scaled in capacity anywhere from approximately 36,500 to 365,000 TPY per operating unit[23]. These facilities generally consist of multiple modules of furnaces and can be expanded through addition of more units and supporting ancillary infrastructure as required. Generally it is preferred to design such facilities with multiple units allowing for individual modules to be shut down for maintenance or if there is inadequate feedstock[24]. Multiple modules can often be accommodated on a single site with some sharing of infrastructure (e.g., share tip floor, ash management areas, stack).

The capacity of a mass burn incinerator is dependent upon the calorific value of the waste being treated. In Europe, the normal maximum size of a facility is 280,000 TPY, assuming that the waste has a calorific value of 11 MJ/kg. That said, over recent years, the trend in Europe has

22 AECOM Canada Ltd. (2009). Management of Municipal Solid Waste in Metro Vancouver - A Comparative Analysis of Options for Management of Waste After Recycling. Burnaby.

23 GENIVAR Ontario Inc. in association with Ramboll Danmark A/S (2007). Municipal Solid Waste Treatment in Canada.

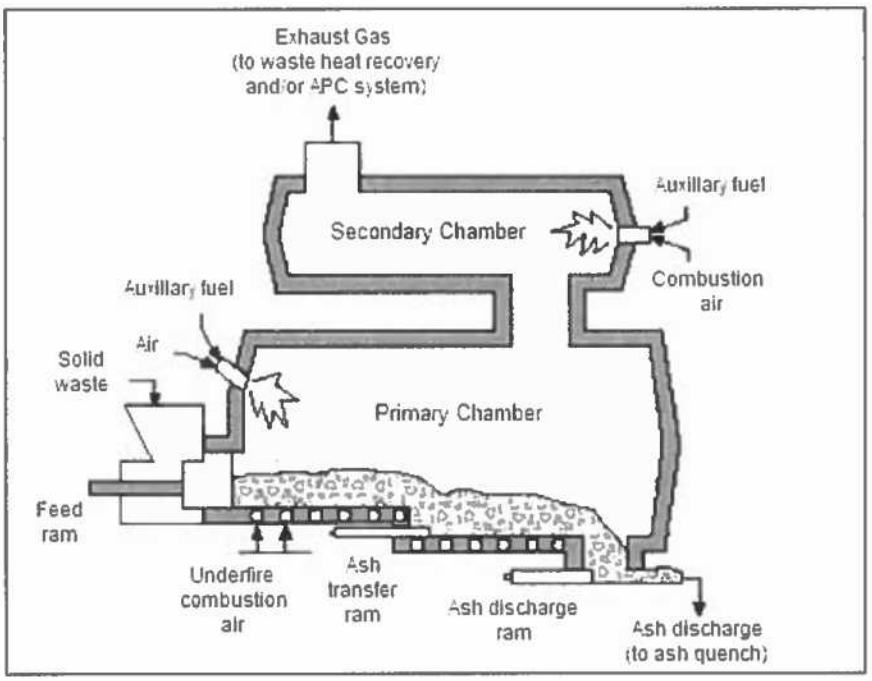
24 AECOM Canada Ltd. (2009). Management of Municipal Solid Waste in Metro Vancouver - A Comparative Analysis of Options for Management of Waste After Recycling. Burnaby.

been to build slightly larger facilities. Two other conventional combustion approaches are used to manage MSW, but are less common. These two other conventional approaches are modular, two stage combustion and fluidized bed combustion.

Modular, Two Stage Combustion

In modular, two-stage combustion, waste fuel is combusted in a controlled starved air environment in the first chamber. Off-gases are moved into a second chamber where they are combusted in an oxygen rich environment. The heat generated in the second stage is fed into a heat recovery boiler. Ash is generated in the first stage and is managed in a similar manner as that from moving-grate systems (mass burn incineration).

The following figure provides a schematic overview of a two-stage incinerator[25]. It should be noted that two-stage incinerators are sometimes referred to as a type of gasification technology. However, they are not true gasifiers and are therefore normally classified as a conventional combustion technology.

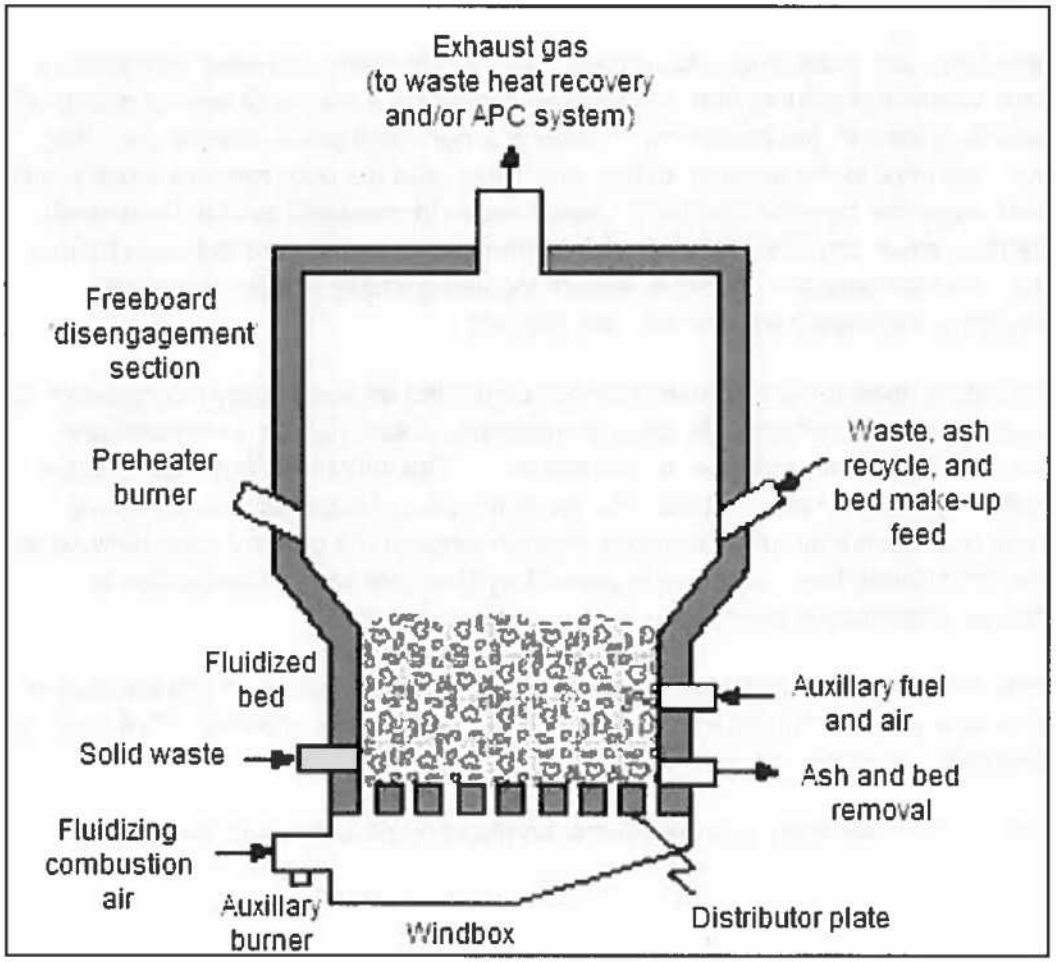


[25] A.J. Chandler and Associates Ltd. (2007). Review of Dioxins and Furans from Incineration in Support of a Canada-wide Standard Review. Ottawa.

Fluidized Bed Combustion

In fluidized bed combustion waste fuel is shredded, sorted and metals are separated in order to generate a more homogenous solid fuel. This fuel is then fed into a combustion chamber, in which there is a bed of inert material (usually sand) on a grate or distribution plate. The inert material is maintained in a fluid condition by air blowing upwards through it. Waste fuel is fed into or above the bed through ports located on the combustion chamber wall.

Drying and combustion of the fuel takes place within the fluidized bed, while combustion gases are retained in a combustion zone above the bed (the freeboard). The heat from combustion is recovered by devices located either in the bed or at the point at which combustion gases exit the chamber (or a combination of both). Surplus ash is removed at the bottom of the chamber and is generally managed in a similar fashion as bottom ash from a moving grate system (mass burn incineration). The following provides a schematic overview of a fluidized bed incinerator[26].



[26] A.J. Chandler and Associates Ltd. (2007). Review of Dioxins and Furans from Incineration in Support of a Canada-wide Standard Review. Ottawa.

Both two-stage combustion and fluidized bed combustion approaches can be used to manage MSW, however, for fluidized bed applications the waste must be processed into a more homogenous feed. Both processes generally are more complex than single-stage mass burn incineration. For that reason, generally when considering conventional combustion systems in planning processes, single stage combustion systems are usually assumed.

Of the approximately 450 EFW facilities in Europe, 30 of them utilize fluidized bed technology. Most of these use a feed stock mixture of MSW, sewage sludge, industrial waste, pre-sorted organic waste, Refuse Derived Fuel (RDF) or woodchips. Very few facilities are using only MSW as feed stock because of the availability of supplemental fuels. One of the disadvantages of the fluidized bed systems is that a larger portion of fly ash is generated by the fluidized bed process (6% compared to 2% for mass burn systems) due to the particulate present in the fluidized bed itself[27].

Batch Combustion

In addition to mass burn, two stage and fluidized bed incineration, there are other incinerators referred to as batch waste incinerators that are capable of treating a variety of wastes including MSW. Batch waste incinerators are those that operate in a non-continuous manner (i.e., they are charged with waste prior to the initiation of the burn cycle, and the door remains closed until the ash has cooled inside the primary chamber). Batch waste incinerators tend to treat smaller amounts of waste than other conventional approaches (they are usually sized between 50 and 3,000 kg per batch) and are typically utilized in remote locations where landfill alternatives and/or wildlife concerns associated with landfills are present.

Batch waste incinerators normally utilize dual chamber controlled air technology (comparable to two stage combustion but more simple). In batch incinerators, waste (which is normally pre-mixed) is charged into the primary chamber by the operator. The initial heat required to ignite the waste is supplied by a burner which shuts off once combustion becomes self-sustaining. Controlled amounts of underfire air are introduced through holes in the primary chamber and as combustion gases are created they move to the secondary chamber where combustion is completed with the air of additional over-fire air or a secondary burner.

Batch waste incinerators do not typically utilize heat recovery or air pollution control equipment but are still capable of meeting stringent emissions limits (e.g., Ontario Guideline A-7) if they are designed and operated in a proper manner[28].

The table below provides a summary of conventional combustion processes, costs, scalability and reliability.

[27] Stantec. (2010). Region of Bonnyville - Service Level Review Technical Memo - Thermal Treatment Technolgies Review. Burlington: Stantec Consulting.

[28] Environment Canada. (2010). Technical Document for Batch Waste Incineration.

Conventional Combustion Summary
Traditional mass burn incineration is a well-established technology developed over 100 years ago for energy generation from municipal solid waste.
There are hundreds of plants in operation, including approximately 450 in Europe (420 mass burn, 30 fluidized bed), 87 in the United States and over 400 in Asia. There are seven conventional combustion facilities in Canada.
Conventional combustion facilities have reasonably good energy efficiency (up to 30% for electricity only and 60% or more for combined heat and power or just heat recovery systems) and usually export their energy as either steam and/or electricity.
The largest facility in Canada is a mass burn facility, processing approximately 300,000 TPY of waste. (Quebec City). There are several mass burn facilities in Europe that treat over 300,000 TPY.
At least 20 companies offer mass burn incineration technology or components of this technology, or services to develop such facilities in North America and elsewhere. There are four primary suppliers of the combustion (grate) systems active in the EU and North America.

Other Summary Points	
Median Reported Capital Cost	▪ $775/annual design tonne +/- 50% (2009$ CDN)
Median Reported Operating Cost	▪ $65/tonne +/- 30% (2009$ CDN)
Feedstock	▪ MSW, biomass ▪ Minimal waste preparation/pre-processing required by technology ▪ Designed to process variable wastestreams
Residual to Disposal	▪ 5% (by weight) if the majority of bottom ash can be marketed for other applications ▪ Up to 20 to 25% by weight if there is no market for recovered materials from the ash (0.2 to 0.25 tonnes per input tonne) ▪ Landfill capacity consumption reduced by 90 to 95%
Potential Energy and Revenue Streams	▪ Revenue potential for: electricity, heat (steam and/or hot water), recovered recyclable metals, construction aggregate ▪ Electricity production, 0.5 to 0.6 MWh/annual tonne of MSW for older facilities ▪ Electricity production rates of between 0.75 to 0.85 MWh/annual tonne for newer facilities

Conventional Combustion Summary	
Scalability	• Various sizes of mass burn units; use of multiple units also possible
Reliability	• Numerous facilities operating worldwide with proven operational success. • Less complex than other WTE approaches • Scheduled and unscheduled downtime reported as <10%.

9.2.2 Benchmark Analysis

In Canada there are currently seven operational conventional combustion incinerators that treat MSW at capacities greater than 25 tpd. These seven facilities are located in British Columbia (1), Alberta (1), Ontario (1), Quebec, (3), and PEI (1). Of these seven facilities, two are larger mass burn incinerators (L'incinérateur de la Ville de Québec, Quebec and Greater Vancouver Regional District Waste to Energy Facility, British Columbia), one is a smaller mass burn incinerator (MRC des Iles de la Madelaine, Quebec), two are defined as two-stage starved air modular incinerators (PEI Energy Systems EFW Facility, PEI and Algonquin Power Peel Energy-From–Waste Facility, Ontario), and one is defined as a three-stage incinerator (Wainwright Energy from Waste Facility, Alberta). Neither L'incinérateur de la Ville de Québec nor MRC des Iles de la Madelaine have any sort of energy recovery from their combustion processes and therefore will not be discussed.

Metro Vancouver Waste to Energy Facility

The Waste-to-Energy Facility is located in south Burnaby, British Columbia and was opened in 1988. Waste is received from Burnaby, New Westminster, and the North Shore and processed at the facility, which is accountable for safely disposing of >25% of the Region's waste through incineration. On an annual basis, the Waste-to-Energy Facility converts 285,000 tonnes of garbage into steam and electricity. The steam produced is sold to a paper recycling facility, while the power is sold to BC Hydro. In a typical day the facility is capable of producing 2,740 tonnes of steam to supply a turbo generator, where 600 tonnes is extracted and sold to the paper recycling facility; 400 megawatt-hours of electricity used to power 15,000 homes; 130 tonnes of bottom ash used in road building and landfill cover; 25 tonnes of metal, which is recycled into reinforcing steel; and 30 tonnes of fly ash that must be landfilled[29].

L'incinérateur de la Ville de Québec

Located in Limoilou, Quebec, this incineration facility has been in operation since 1974. The incinerator receives garbage from residential, institutional, commercial and industrial areas of Quebec City and its surrounding municipalities. Annually, the facility can process up to 312,000

[29] Metro Vancouver. (2011, August 1). *Waste-to-Energy Facility*. Retrieved October 9, 2012, from Metro Vancouver: http://www.metrovancouver.org/about/publications/Publications/WasteEnergyFactsheet.pdf

tonnes of waste. Heat produced from the incineration is partially used for drying sludge, which is also processed by the incinerator. The remaining heat is converted into steam and is then sold. Approximately 810,000 tonnes of steam are produced annually. Treatment of the smoke produced results in 11,000 tonnes of solid waste per year while the sludge incineration results in 3,000 tonnes of ash annually that is landfilled[30].

Algonquin Power Peel Energy-From-Waste Facility

Operating since 1992, the Algonquin Power Peel EFW Facility in Brampton, Ontario processes approximately 174,000 tonnes of solid waste annually. 160,000 tonnes is residential waste while the remainder is made up of international airport waste and industrial, commercial and institutional waste. Up to 9 MW of electricity can be produced using a steam turbine[31]. Annually, approximately 40,000 tonnes of bottom ash is produced while fly ash and Air Pollution Control (APC) residue can account for roughly 6,000 tonnes[32].

PEI Energy Systems EFW Facility

Charlottetown's energy-from-waste facility processes approximately 26,000 tonnes of waste each year to produce 58,000 tonnes of steam. The steam that is generated is used in Charlottetown's district heating system. Roughly 12,000 tonnes of bottom ash is produced annually is landfilled. 680 tonnes of fly ash and APC residue is also produced and disposed as hazardous waste. Heat is recovered in the facility using an ABCO heat recovery steam generator, producing 400psig saturated steam and hot water. Air pollution is controlled by employing a spray humidifier, dry lime injection, powdered activated carbon addition and a fabric filter.

Wainwright EFW Facility

Located in Wainwright, Alberta and operated by GM Pearson Biomedical Waste, the Wainwright EFW facility has been operating since 1994. It processes about 4,500 tonnes annually, 72% of which is medical waste. This waste is converted into roughly 49,000 tonnes of steam and is sold to Bunge Canada. The Wainwright EFW facility employs a basic model 1500 pulse hearth for heat recovery and uses a 3-stage starved air modular system for thermal treatment. Air pollution control is performed using dry lime injection, powdered activated carbon addition and fabric filtration.

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[30] Ville de Quebec. (2012). *Ordures ménagères - Incinérateur.* Retrieved October 9, 2012, from Ville de Quebec: http://www.ville.quebec.qc.ca/environnement/matieres_residuelles/ordures_menageres/incinerateur.aspx

[31] Dodds, B. (2005, June 8). *Energy from Waste Facility.* Retrieved October 9, 2012, from County of Simcoe: http://gilford.county.simcoe.on.ca/ClearFrame/Production/eGenda/eGenda.nsf/0/cb954d8a3061e417852570110066f46a/$FILE/Algonquin%20EFW%20presentation.pdf

[32] Environment Canada. (2010, April 6). *MSW Thermal Treatment in Canada 2006.* Retrieved October 9, 2012, from Environment Canada: http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=D54033E4-1&offset=5&toc=show

There are also several mass burn incineration facilities currently in the planning or development stages, one by the Region of Durham in Ontario. Recently, ground has been broken for the Durham York Energy Centre (DYEC) and the facility is now in the development stages. The mass burn incineration facility will be sized initially to treat 140,000 TPY (436 tpd), however the facility design will allow for future expansion up to 400,000 TPY (1290 tpd). The vendor supplying the technology for this facility is Covanta. While at operating capacity, it is expected that the electricity sold to the grid will be sufficient enough to power 10,000 homes.

Energy production via combustion or incineration is much more widespread in Europe. A recent projection developed by the European Confederation of Waste to Energy Plants estimates that over 550 plants with a combined capacity of 80 million TPY will be in operation by 2016.

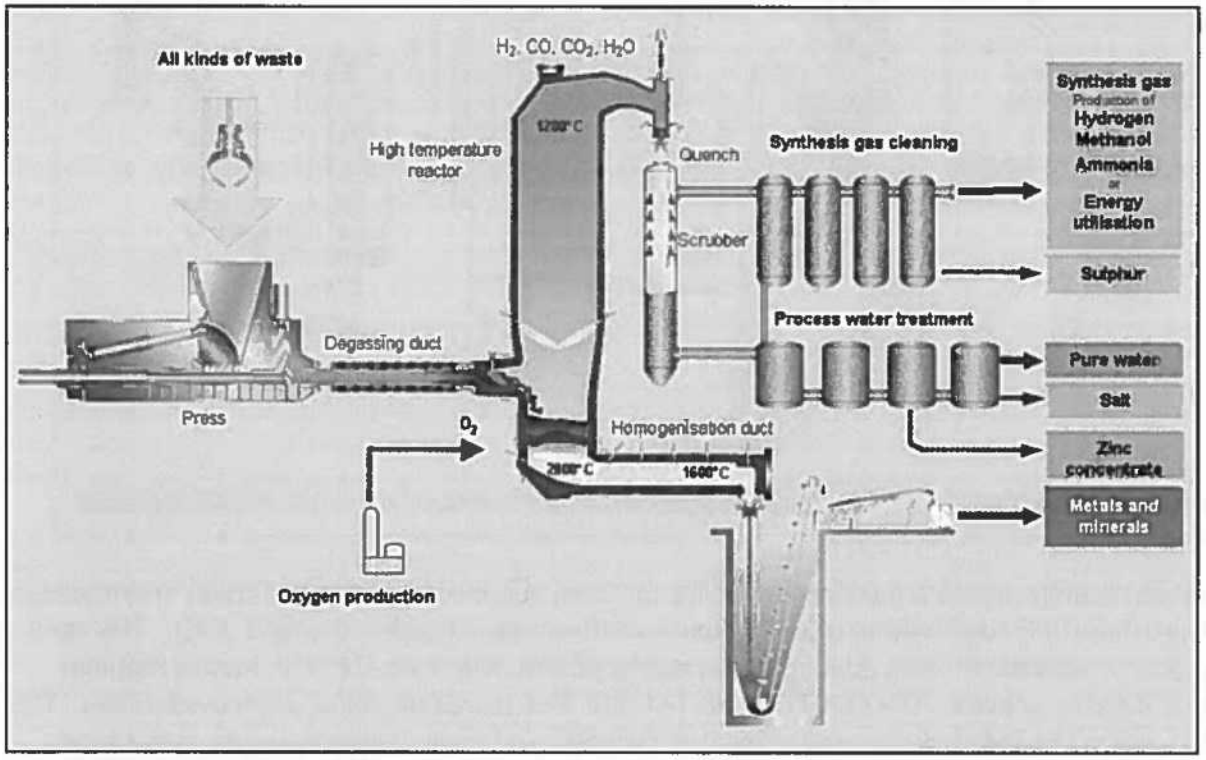
9.3 GASIFICATION

9.3.1 Background

Gasification is the heating of organic waste (MSW) to produce a burnable gas (syngas) which is composed of a mix of primarily H_2 and CO along with smaller amounts of CH_4, N_2, H_2O and CO_2. The syngas produced can then be used off-site or on-site in a second thermal combustion stage to generate heat and/or electricity. Gasifiers are primarily designed to produce usable syngas.

There are three primary types of gasification technologies that can be used to treat waste materials, namely fixed bed, fluidized bed and high temperature gasification. Of the three types of gasification technologies, the high temperature method is the most widely employed on a commercial scale. The waste passes through a degassing duct in which the waste is heated to reduce the water content of the waste (drying and degassing) and is then fed into a gasification chamber/reactor where it is heated under suitable conditions to convert the solid fuel to syngas. Oxygen is injected into the reactor so that temperatures of over 2,000°C are reached. The amount of oxygen required is just enough to maintain the heat that is necessary for the process to proceed. The high temperature causes organic material in the MSW to dissociate into syngas. The syngas is processed to remove water vapour and other trace contaminants, so that it can be used for power generation, heating or as a chemical feedstock.

The Thermoselect technology (which is licensed to JFE Environmental Solutions Corp. of Japan and Interstate Waste Solutions in the United States) is one gasification technology used to treat MSW. As of 2009, there were six plants operating in Japan which utilize the Thermoselect technology to treat MSW[33]. The following figure provides a conceptual overview of a high temperature waste gasification process used to treat MSW, based on the Thermoselect process[34].

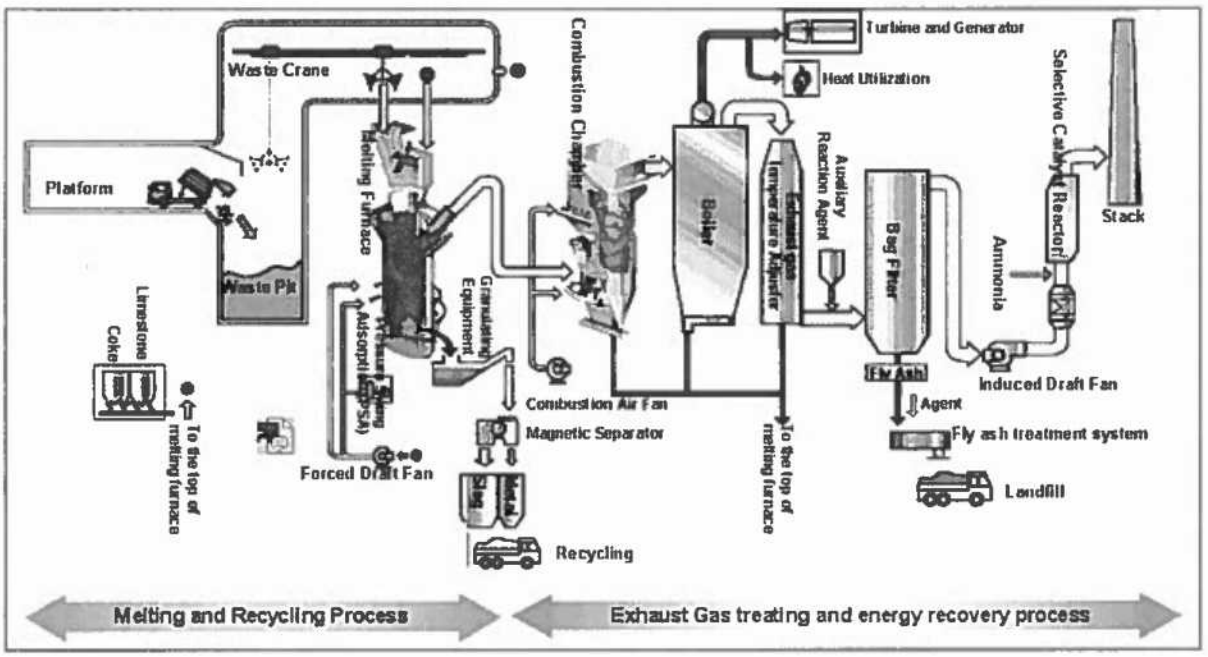


Nippon Steel employs a high temperature gasification, which they call a "Direct Melting System" (DMS). The process produces a syngas that is combusted in a steam boiler, driving a steam turbine to produce electricity. The heating process begins by feeding waste into a gasification chamber/reactor. The high temperature causes organic material in the MSW to dissociate into syngas. The syngas is transferred to a combustion chamber which heats a boiler that in turn powers a turbine and produces electricity. The flue gas produced via combustion is then cleaned using a bag filter and an SCR (to reduce NOx) before it is released into the atmosphere. The Air Pollution Control system is similar to that used for conventional combustion with the exception that no provisions for the control of acid gases have been identified in the information that is available. The ash management system is also similar to that

[33] University of California. (2009). Evaluation of Emissions from Thermal Conversion Technologies Processing Municipal Solid Waste and Biomass. Riverside: University of California.

[34] Thermoselect. (2003). Thermoselect - High Temperature Recycling. Retrieved February 3, 2010, from Thermoselect: http://www.thermoselect.com/index.cfm?fuseaction=Verfahrensuebersicht&m=2

required for conventional combustion. This system does have similarities to modular, two-stage combustion. The diagram below provides a conceptual overview of the high temperature waste gasification process employed by Nippon Steel[35].



Ramboll recently visited a gasification facility in China supplied by Kawasaki Steel Thermoselect System (now JFE Engineering after the fusion of Kawasaki, Nippon Steel and JFE). The plant has been in operation since 2000 and was designed with two lines, 2x15 t/h (actual capacity 250-260 tpd or between 159,000 TPY and 171,000 TPY based on actual plant availability). The APC system includes the cleaning of syngas by water and catalyst before usage at the steel work. Waste received is made up of 50% industrial waste and 50% pre-sorted plastic. The facility used MSW feedstock for the first six months, and now uses only more homogenous separated industrial waste and plastic as noted earlier. The facility appears to consume more energy than it produces, with a net energy output of approximately -3%. JFE indicated in the site tour that they did not intend to build any further gasifiers with the Thermoselect technology in Japan.

Outside of Japan, gasification is only used at a few facilities to treat MSW. This is primarily due to operational issues that arise due to the heterogeneous nature of MSW as the gasification process generally requires a fairly homogenous feedstock. In addition, gasification tends to have a much higher range of operating and capital costs in comparison with conventional combustion facilities, given the requirement for waste pre-processing and the added complexity

[35] Dvirka and Bartilucci Consulting Engineers. (2007). Waste Conversion Technolgies: Emergence of a New Option or the Same Old Story? *Federation of New York Solid Waste Associations Solid Waste and Recycling Conference.*

of the technology. Gasification also tends to have higher net costs, given that generally less energy (and thus less revenue) is recovered from the wastestream[36].

Gasification facilities require APC systems to reduce unwanted emissions to air, although the APC approach will vary based on how the syngas is processed as discussed below. Gasification systems and mass burn systems are not directly comparable as the point in the process where combustion takes place differs, as does the APC approach. Although, gasification systems generally appear to have (or report to have) somewhat lower stack emissions than mass burn EFW plants, these results are based testing from pilot-scale facilities, not actual commercial-scale operations[37].

There are two key differences between APC systems for gasification systems and conventional mass burn combustion: first, some gasification approaches focus on cleaning of the syngas prior to combustion, so that emissions control is based on the control of syngas quality; second, based on the composition of the syngas, it may be directly combusted and have some form of more conventional APC system, however these systems may be sized smaller and/or may not require certain APC components that would normally be necessary for a conventional approach.

The table below provides a summary of gasification processes, costs, scalability and reliability. It should be noted that the available costing information for gasification technologies is generally provided through informal processes and not on the basis of any contractual commitments to the parties involved. Therefore, it is not clear that reported capital costs address all capital and construction cost elements, nor is it clear that reported operating costs address all real costs associated with such facilities. The cost for each facility will vary on a site-by-site basis.

Gasification Summary	
Gasification combusts fuel to create syngas.	
The technology has been in use for over a century, but only recently has MSW been used as a feedstock.	
At least 42 companies offer gasification technologies or components of this technology that are capable (or claim to be capable) of treating mixed MSW in North America and elsewhere.	
The earliest example of this technology being used for MSW was in 1991 in Taiwan.	
Other Summary Points	
Median Reported Capital Cost	• $850/annual design tonne +/- 40% (2009$ CDN)

[36] Fichtner Consulting Engineers. (2004). The Viability of Advanced Thermal Treatment of MSW in the UK. London: ESTET.

[37] RPS-MCOS Ltd. (2005). *Feasibility Study of Thermal Waste Treatment/Recovery Options in the Limerick/Clare/Kerry Region.*

Gasification Summary	
Median Reported Operating Cost	▪ $65/tonne +/- 45% (2009$ CDN) (this reported cost by vendors seems well below the range of expected operating costs based on performance of gasification in the EU and Japan)
Feedstock	▪ Automobile shredder residue (ASR), biomass, black liquor, coal, hospital waste, MSW, organic wastestreams, plastics, PVC, refinery residues, sludge, tires ▪ Waste preparation/pre-processing required by technology ▪ Difficulties in accepting variable (heterogeneous) wastestreams
Residual to Disposal	▪ <1 % if bottom ash can be marketed for other applications ▪ 10 to 20% if it is not marketable (0.1 to 0.2 tonnes of residue per 1 tonne of input waste) ▪ Landfill capacity consumption reduced by 90 to 95%
Potential Energy and Revenue Streams	▪ Revenue potential for: electricity, syngas, aggregate recovered from ash ▪ Electricity production, 0.4 to 0.8 MWh/annual tonne of MSW
Scalability	▪ Usually built with a fixed capacity; modular ▪ Individual modules range in size from approximately 40,000 to 100,000 TPY
Reliability	▪ At least seven plants in operation in Japan at a large scale with over two years of operating experience ▪ Limited data available in other jurisdictions to assess operational success with MSW feedstock in regards to technical reliability ▪ Complex operation ▪ Scheduled and unscheduled downtime reported as approximately 20%, However other reports indicate potential for up to 45% downtime.

9.3.2 Benchmark Analysis

Over 42 companies currently offer gasification technologies or technology components that are capable of treating mixed MSW in North America and elsewhere. The earliest example of this technology was in 1991 in Taiwan.

Japan

There are several (6-7) new gasification facilities operating at a commercial scale in Japan which have been constructed within the past 10 years. The use of gasification in Japan is partially driven by the regulatory environment which favours high temperature treatment (slagging) of the bottom ash/char due to the presence of low levels of dioxins. The Japanese regulatory approach is somewhat different from other jurisdictions as it regulates net dioxin

emissions to the environment from all sources (air, waste water, ash). Such an approach has not been applied in other jurisdictions for EFW (e.g., the EU) as other regulatory approaches related to ash and effluent management have been used to minimize health and environmental impacts as discussed in later sections of this report.

Several facilities are currently being operated in Japan on MSW or blends of MSW and other feed stocks. These facilities utilize Interstate Waste Technologies high-temperature gasifiers. Each facility is capable of processing up to 170,000 TPY and produces approximately 900kWh/tonne. By-products of these technologies include slag, sulfur, metal hydroxides, mineral salts, and metal aggregate[38].

According to Juniper Consultancy Services, the technology utilized by Nippon Steel in Japan is the most proven waste gasification technology even though it is not well known outside of the country[39]. As of 2009, Nippon Steel was operating 28 facilities that utilize MSW as a feed stock[40].

Asia

Over twenty EFW facilities have been developed throughout Asia using MSW feedstock and technology provided by Entech Renewable Energy Systems. Plants are designed to process 42,000 TPY of MSW and generate approximately 750 kWh/tonne. Associated byproducts are slag, and emission control wastes.

Edmonton Waste Management Centre

The City of Edmonton is currently working with Enerkem Inc. of Montreal, Quebec to produce an EFW facility. Original plans involved the use of syngas for power generation, but later were changed to use syngas to produce methanol. The future plant is estimated to use 100,000 TPY of feed stock and produce approximately 30 million litres of methanol per year. The methanol can then be converted to ethanol to be used as a fuel additive[41].

Europe

In Europe, there are currently no commercially operating gasification facilities that treat MSW as the technology is considered too expensive and unproven. The only larger scale commercial gasifier using MSW as feedstock was a Thermoselect gasification plant that was operated in

[38] CH2M Hill. (2009, May). *Waste-to-Energy Review of Alternatives.* Retrieved October 9, 2012, from Durham Environment Watch: http://www.durhamenvironmentwatch.org/Incinerator%20Solutions/WastetoEnergyReviewofAlternativesBC.pdf

[39] Juniper Consultancy Services Inc. (2007). *Nippon Steel Gasification Process Review.* Retrieved February 3, 2010, from Juniper Consultancy Services Inc.: http://www.juniper.co.uk/Publications/Nippon_steel.html

[40] University of California. (2009). *Evaluation of Emissions from Thermal Conversion Technologies Processing Municipal Solid Waste and Biomass.* Riverside: University of California.

[41] CH2M Hill. (2009, May). *Waste-to-Energy Review of Alternatives.* Retrieved October 9, 2012, from Durham Environment Watch: http://www.durhamenvironmentwatch.org/Incinerator%20Solutions/WastetoEnergyReviewofAlternativesBC.pdf

Karlsruhe, Germany for a few years, but it was shut down in 2004 due to technical and financial difficulties[42].

9.4 PYROLYSIS

9.4.1 Background

Pyrolysis is the thermal decomposition of feedstock at a range of temperatures in the absence of oxygen. The end product is a mixture of solids (char), liquids (oxygenated oils), and syngas (consisting of CO_2, CO, CH_4, H_2). The pyrolytic oils and syngas can be used directly as boiler fuel or refined for higher quality uses such as engine fuels, chemicals, adhesives, and other products. The solid residue is a combination of non-combustible inorganic materials and carbon.

Pyrolysis requires thermal energy that is usually applied indirectly by thermal conduction through the walls of a containment reactor since air or oxygen is not intentionally introduced or used in the reaction. The transfer of heat from the reactor walls occurs by filling the reactor with inert gas which also provides a transport medium for the removal of gaseous products.

The composition of the pyrolytic product can be modified by the temperature, speed of process, and rate of heat transfer. Liquid products (pyrolytic oils) are produced by lower pyrolysis temperatures while syngas is produced by higher pyrolysis temperatures. The syngas produced can be combusted in a separate reaction chamber to produce thermal energy which can then be used to produce steam for electricity production.

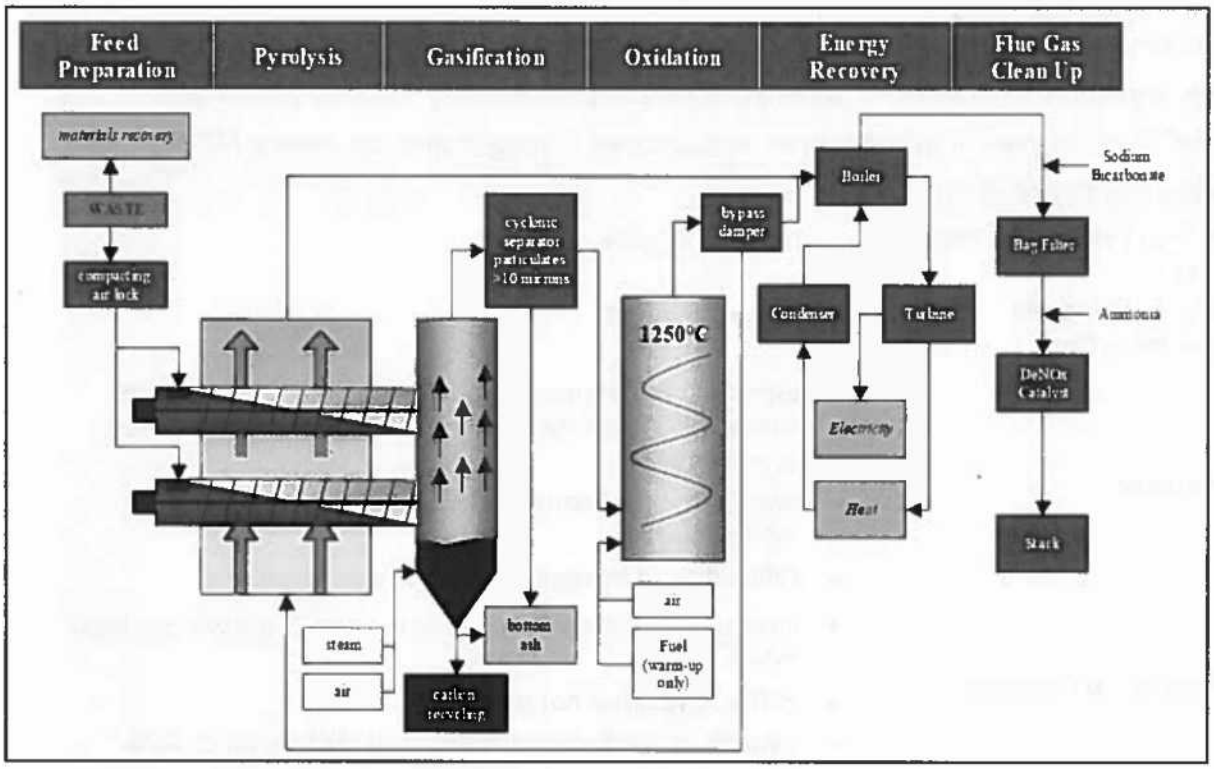
Overall, the operators find the grate fired plant more reliable and flexible with higher availability in comparison with the pyrolysis plant. Due to the pre-treatment of waste and the fuel burned in the high temperature chamber, the electrical output from the pyrolysis process is almost balanced with the internal energy consumption.

Pyrolysis generally takes place at lower temperatures than used for gasification which results in less volatization of carbon and certain other pollutants, such as heavy metals and dioxin precursors. The relatively low temperatures allow for better metal recovery before the residual pyrolysis products enter the high temperature chamber where they are vitrified.

Issues identified in relation to the pyrolysis process include: low energy outputs; the requirement for a properly sealed reaction chamber for safe operation, (the pyrolysis process is highly sensitive to the presence of air and accidental incursions of air can result in process upsets and increase the risk of explosive reactions); the requirement for pre-treatment of the MSW. The following figure, presents a schematic overview of the Compact Power pyrolysis technology as developed by Compact Power Ltd. In the Compact Power process, sorted MSW is conveyed by

[42] AECOM Canada Ltd. (2009). *Management of Municipal Solid Waste in Metro Vancouver - A Comparative Analysis of Options for Management of Waste After Recycling.* Burnaby.

a screw through the heated tubes for pyrolysis, followed by gas combustion in a cyclone where energy is captured to produce steam and then electricity. It should be noted that the Compact Power technology utilizes a gasification step following pyrolysis – this does not necessarily occur in all pyrolysis based EFW facilities[43].



The following table provides a summary of the pyrolysis process. Cost data obtained was less reliable than the costs presented in this report for other technologies. It is unclear if the reported capital costs address all capital and construction cost elements.

[43] Malkow, T. (2004). Novel and innovative pyrolysis and gasification technologies for energy efficient and environmentally sound MSW disposal. *Waste Management*, 53-79.

Pyrolysis Summary	
Pyrolysis is the thermal decomposition of feedstock at high temperatures in the absence of oxygen.	
The longest operating pyrolysis facility is located in Burgau, Germany and has been operating since 1987.	
The largest facility (located in Japan) processes approximately 150,000 TPY of SRF.	
Over 20 companies market pyrolysis technologies or approaches for treating MSW.	
Other Summary Points	
Median Reported Capital Cost	▪ No reliable data
Median Reported Operating Cost	▪ No reliable data
Feedstock	▪ Biomass, automotive shredder residue, coal, hospital waste, MSW, plastics, polyvinyl chloride, sludge, tires, wastewater ▪ Waste preparation/pre-processing required by technology ▪ Difficulties in accepting variable wastestreams
Residual to Disposal	▪ If treated, residues reduced to 0.1 to 0.3 tonnes per input tonne ▪ >30%, if residue not treated ▪ Landfill capacity consumption reduced by up to 90%
Potential Energy and Revenue Streams	▪ Revenue potential for: electricity, syngas, pyrolysis oil ▪ Electricity production, 0.5 to 0.8 MWh/annual tonne of MSW

9.4.2 Benchmark Analysis

The concept of pyrolysis of MSW gained much popularity in the 1960s due to its organic composition being assumed to be well suited for pyrolytic treatment. However, by the late 1970s, technical and economic difficulties surrounding the pyrolysis of MSW arose, which resulted in a decreased interest and expectations for the technology. Since that time, pyrolysis has been further investigated, although it still faces some technical limitations.

Intrinergy Coshocton, LLC

Located in Coshocton, Ohio, Intrinergy uses GEM Thermal Cracking Technology to process an undisclosed amount of blends of crumb rubber, shredded carpet fluff, wood chips and biomass to produce approximately 4MW of energy via GE-Jenbacher reciprocating engines and one boiler. Associated by-products include char and ash.

Scarborough Power

Scarborough Power's pyrolysis facility in Seamer Carr, United Kingdom, was first opened in 2008. This facility also uses GEM Thermal Cracking Technology and processes 18,000 TPY of MSW and produces 1.8 MW using a Deutz reciprocating engine. Associated by-products include char and ash.

Japan

Between 2000 and 2003, six commercial pyrolysis facilities were opened in Japan using Mitsui R21 Pyrolysis Rotating Drum technology. These plants process between 50,000 and 120,000 (raw, unprocessed) TPY of MSW to produce between 1.5 and 8.7 MW at approximately 300 kWh per tonne. Associated by-products include char and ash.

9.5 PLASMA ARC GASIFICATION

9.5.1 Background

Plasma arc gasification uses an electric current that passes through a gas (air) to create plasma which gasifies waste into simple molecules. Plasma is a collection of free-moving electrons and ions that is formed by applying a large voltage across a gas volume at reduced or atmospheric pressure. The high voltage and a low gas pressure, causes electrons in the gas molecules to break away and flow towards the positive side of the applied voltage. When losing one or more electrons, the gas molecules become positively charged ions that transport an electric current and generate heat.

When plasma gas passes over waste, it causes rapid decomposition of the waste into syngas. The extreme heat causes the inorganic portion of the waste to become a liquefied slag. The slag is cooled and forms a vitrified solid upon exiting the reaction chamber. This substance is a potentially inert glassy solid. The syngas is generally combusted in a second stage in order to produce heat and electricity for use by local markets. In some cases, alternative use of the syngas as an input to industrial processes has been proposed.

Currently, plasma arc gasification is not commercially proven to treat MSW. The primary reason appears to be the high capital and operational costs for such facilities. The wear on the plasma chamber is very high and to keep the process operating redundant plasma chambers are needed.

Plasma technology for MSW management has been discussed in Europe since the late 1980s but full scale facilities for MSW have not yet been implemented. At some Japanese facilities, a back-end plasma component has been added to vitrify the bottom ash produced from conventional mass burn combustion facilities. Ramboll recently visited the plant in Shinminto, Japan, where MSW combustion is undertaken by a traditional grate fired EFW facility with a back-end ash melter. The downstream ash melter is operated by JFE and consists of two, 36 tonnes per day units. Melting of the ash is undertaken by a plasma arc, operating at

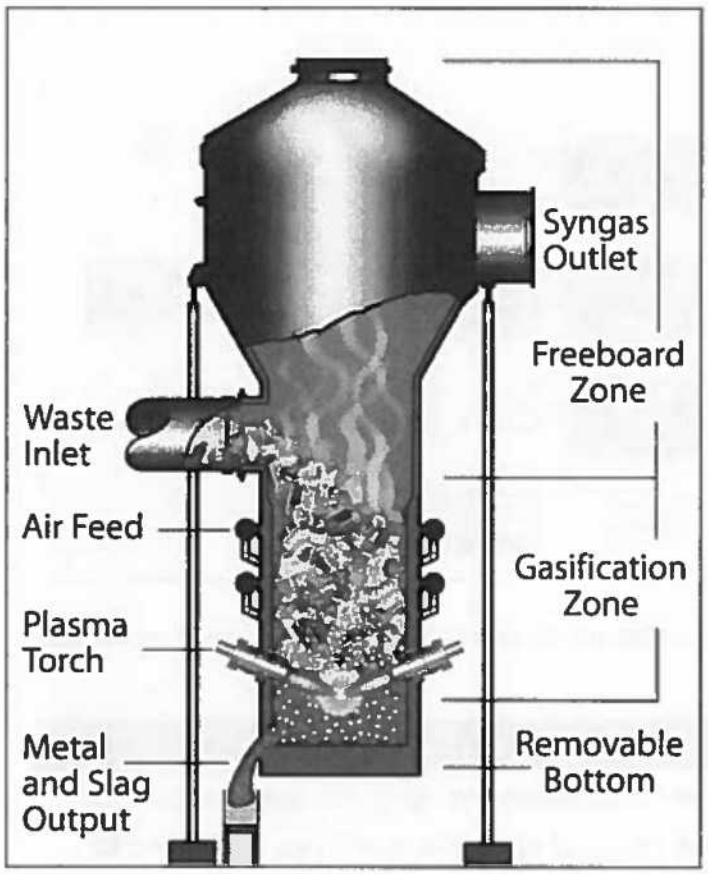
approximately 2,000°C. The melted ash is water quenched. The total amount of vitrified residues represents 50% by weight of the incoming ash. Approximately 1/3 of the material is used for construction purposes and the other 2/3 is used as landfill cover. The process consumes significant energy, generally producing net energy of only 100 kW per tonne of incoming ash, due to the limited fraction of remaining carbon left in the ash which limits the production of any syngas and thus limits energy production. Note that most ash management processes are net consumers of energy. Plasma chambers in operation in Japan experience a three-month cycle where the chamber has to be taken out of operation for repair every three months mainly to change the refractory lining.

There are no large scale commercial plants in operation in North America or Europe but there are number of plasma arc systems that are being tested or proposed to treat MSW. Two technologies which are currently being tested in Canada are the Alter NRG process and the Plasco process.

In the Alter NRG process, a plasma torch heats the feedstock to high temperatures in the presence of controlled amounts of steam, air and oxygen. The waste reacts with these constituents to produce syngas and slag[44]. The figure below provides a conceptual overview of the Alter NRG plasma gasification process[45].

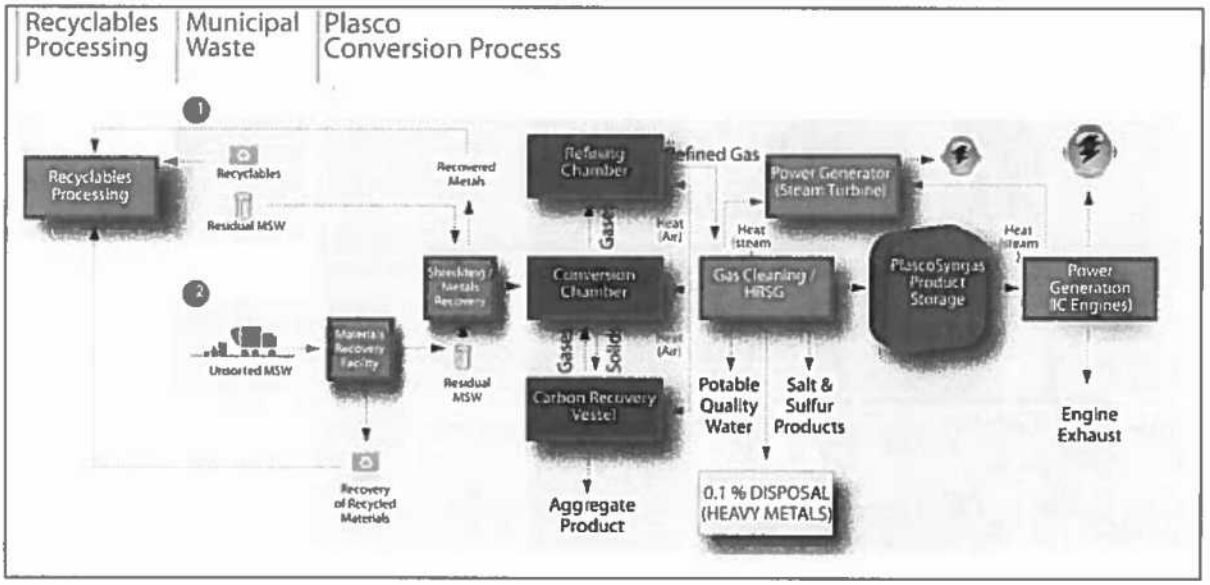
[44] Stantec. (2010). Region of Bonnyville - Service Level Review Technical Memo - Thermal Treatment Technolgies Review. Burlington: Stantec Consulting.

[45] Westinghouse Plasma Corporation. (2007). Westinghouse Plasma Corp. - Technology and Solutions - PGVR. Retrieved February 3, 2010, from Westinghouse Plasma Corporation: http://www.westinghouse-plasma.com/technology_solutions/pgvr.php



Plasco Energy Corp. (Plasco) has also developed a plasma arc gasification technology capable of treating MSW. The following figure presents a conceptual overview of the Plasco process[46].

[46] Plasco Energy Group. (2010). Environmental Performance. Retrieved February 22, 2010, from Plasco Energy Group: http://www.plascoenergygroup.com/images/Plasco_conversion_process_big.gif



The table below provides a summary of the plasma arc gasification process, costs, scalability and reliability.

Plasma Arc Gasification Summary	
Plasma gasification uses an electric current that passes through a gas to create plasma.	
Plasma arc is not a new technology; it has industrial applications and has been used for treating hazardous waste.	
The earliest facility found to use plasma arc gasification was a test facility which operated from 1987 – 1988.	
The largest facility currently operating in the world is located in Japan (Eco-Valley Utashinai Plant) and processes over 90,000 TPY of MSW and automobile shredder residue (ASR).	
24 companies supplying Plasma Arc gasification technologies and/or services have been identified that indicate use of MSW as a portion of their feedstock.	
Other Summary Points	
Median Reported Capital Cost	▪ $1,300/annual design tonne +/- 40% (2009$ CDN)
Median Reported Operating Cost	▪ $120/tonne +/- 50% (2009$ CDN)
Feedstock	▪ MSW, ASR, hazardous waste, hospital waste, organic wastestreams, shipboard waste, tires ▪ Waste preparation/pre-processing required by technology ▪ Difficulties in accepting variable wastestreams

Plasma Arc Gasification Summary	
Residual to Disposal	▪ Estimated at >1 to 10% (0.1 tonne of residue per 1 tonne of input waste), varying due to the nature of the waste and efficiency of the conversion process. ▪ Inert Slag, APC residue ▪ Landfill capacity consumption reduced by up to 99%
Potential Energy and Revenue Streams	▪ Revenue potential for: electricity, syngas, aggregate substitute ▪ Electricity production, 0.3 to 0.6 MWh/annual tonne of MSW ▪ **NOTE:** Plasma arc facilities tend to consume more energy to operate than other types of facilities
Scalability	▪ Modular facilities; multiple modules can be accommodated on a single site with some sharing of infrastructure.
Reliability	▪ Limited data available to assess operational success with MSW feedstock in regards to technical reliability ▪ Eco-Valley Utashinai Plant, Japan processes over 90,000 TPY of material but feedstock is not 100% MSW ▪ Only two plants (Japan) with 2 or more years of operations ▪ Canadian facility (Plasco in Ottawa) has not been in regular (24/7) operation as of early 2010 ▪ Complex Operation, scheduled and unscheduled downtime, unknown.

9.5.2 Benchmark Analysis

Ontario

In April 2006, Plasco Energy Corp. entered into an agreement with the City of Ottawa to develop a demonstration facility next to the City's Trail Road Landfill. Construction began in June 2007, and the first waste was received at the facility in January 2008. The plant is permitted to process 75 tonnes per day of solid waste provided by the City using Plasco's conversion technology. Plasco claims that the process would produce 1,150 kWh of power per tonne of waste when fully operational.

In the first year of operations (2008), the plant processed approximately 2,000 tonnes of MSW (6% of the permitted annual quantity of MSW), operating for 890 hours[47] or approximately 37 days (10% plant availability). In the Plasco process, the syngas produced in the primary conversion chamber is refined and cleaned. No emissions to air from the process are from the combustion of the syngas from MSW. The emissions to air from the process are associated with the combustion of the syngas in gas engines to produce electricity. These emissions must

[47] Plasco Energy Group. (2010). Environmental Performance. Retrieved February 22, 2010, from Plasco Energy Group: http://www.plascoenergygroup.com/images/Plasco_conversion_process_big.gif

meet requirements in the operating permit that are more stringent than those set out in Ontario guidelines for PM, organic matter, HCl, NO_x, mercury, cadmium, lead and dioxins/furans.

In 2011, the City of Ottawa negotiated a 20-year garbage processing deal with Plasco wherein the City will supply 300 tonnes per day of residential waste to Plasco. The deal is contingent on Plasco securing financing by 2013 and completing the construction of their facility by 2016.

Spain

In addition to the Ottawa plant, Plasco owns and operates one other facility in Castellgali, Spain. The Spain facility is a research and development scale model of the full system developed in Ottawa. The facility has been operating since 2003 and has a capacity of 5 tonnes per day. Between 2004 and 2007, the pilot plant was used almost solely to refine the design and operations for the commercial scale facility in Ottawa, Ontario.

In January, 2011, the Salinas Valley Solid Waste Authority selected Plasco's waste conversion technology to be the focus of an Environmental Review. Plasco has proposed to finance, build and operate a waste conversion facility that will convert approximately 100,000 TPY into green energy[48].

9.6 LEGISLATIVE REVIEW

To construct an Energy from Waste facility, one must seek "Municipal Waste Approval: Solid Waste". This Approval is issued by the Nova Scotia Department of Environment. When an application is accepted as complete by the Department, the form and supporting information are then subjected to a technical review and evaluation in order to decide if the proposed activity meets all minimum standards, policies, guidelines, procedures and regulations that are administered by the Department. If an applicant does not meet the suitable criteria, they will be informed by the staff as to which specific criteria have not been met to the satisfaction of the Department. If an applicant does meet the suitable criteria, the Department will issue an Approval, which will list any terms and conditions that the applicant must satisfy.

There is a possibility that the construction of an EFW plant may be able to receive grants, loans or financing from the government. Two different programs appear to be applicable to the project. The first of these is referred to as "Value-Added Manufacturing". The purpose of the Value-Added Manufacturing program is to provide financial assistance to Nova Scotia-based businesses to support the development of value-added products from materials recovered the wastestream to capitalize on business development opportunities created from the Nova Scotia Solid Waste-Resource Management Strategy. Eligible projects include:

a) "Prototype, pilot or demonstration of new technology for the collection, diversion, processing, manufacturing and distribution of materials diverted from the

[48] Stantec. (2010). Region of Bonnyville - Service Level Review Technical Memo - Thermal Treatment Technolgies Review. Burlington: Stantec Consulting

wastestream. Pilot or demonstration refers to the technical and commercial validation of a technology, process or service not previously available in Nova Scotia."

b) "Commercialization of new technology, products or services for materials diverted from the Nova Scotia wastestream, preferably with export potential. Favourable projects include those that possess market development potential and are designed to commercialize new technology, products or services in the following areas:
   i. Value-added manufactured products from solid waste;
   ii. Development of new solid waste processing and handling technologies; and,
   iii. Development of new or enhanced markets for waste materials."

Eligible applicants include individual businesses, business associations or industry groups, and industry-led collaborative partnerships between the private and public sectors and two or more businesses or consortia. Costs that are eligible are those that are considered to be essential to the startup and success of the project. These costs must be incremental, arms' length, represent fair market value and not qualified for sufficient assistance through other programs. Up to $300,000 in funding can be obtained by qualified projects through this program[49].

The second opportunity is a Research & Development Program. The purpose of this program is "to assist research and development initiatives that support the Province's Solid Waste-Resource Management Strategy and the mandates of Resource Recovery Fund Board Incorporated (RRFB Nova Scotia)". This program provides research funding to investigate, design and develop:

i. Materials or products that incorporate solid waste resources;
ii. Technologies that will facilitate the separation and recovery of solid waste resources; and,
iii. Enhanced market opportunities for solid waste resources and/or recycled materials.

Eligible projects under this program include:

- Projects that are comprised primarily of original work undertaken to acquire new knowledge with a specific practical application in view; or
- Projects involving systematic work, using existing knowledge gained from research and/or practical experience that is directed to producing new materials, products or devices; or
- Projects that install new processes, systems and services or improve substantially those already produced or installed.

Applicants that are eligible for this program include businesses, business associations, private and/or public partnerships, organizations, agencies, municipalities, universities and individuals.

[49] RRFB Nova Scotia. (2010, July 21). *Value-Added Manufacturing Program Guidelines*. Retrieved October 8, 2012, from RRFB Nova Scotia: http://www.rrfb.com/uploads/file/funding/RRFB_Funding_VAM.pdf

Applicants or project activities must be based in Nova Scotia unless otherwise approved by RRFB Nova Scotia. Up to 50% of approved eligible costs to a maximum of $50,000 can be provided. Where in the opinion of the Committee the project is of particular strategic value, a higher level of assistance may be offered[50].

9.7 RECOMMENDED FUTURE DIRECTION

EFW is considered as a mid to long-term waste management alternative for HRM to be considered in more detail in the 5-10 year range after local efforts to improve current facilities and operations are well under way. Aside from mass burn incineration, few EFW facilities are fully operational on a commercial scale in North America. Gasification of waste and several other technologies hold promise, but in the context of priority setting at HRM, Stantec recommends that HRM address clearly identified opportunities for improvement first, before staff and financial resources are expended on what is considered a mid to long term alternative.

The next five year period will be very challenging for HRM as a major infrastructure renewal program will be underway for waste management facilities. Operational changes will also consume resources. As previously discussed EFW does hold some promise, but with considerable landfill capacity available, HRM has no immediate need to pursue implementation of EFW technologies.

[50] RRFB Nova Scotia. (2010, July 21). *Research & Development Program Guidelines*. Retrieved October 8, 2012, from RRFB Nova Scotia: http://www.rrfb.com/uploads/file/funding/RRFB_Funding_RnD.pdf

10.0 Local Industrial/Commercial Waste Needs and Opportunities

10.1 EXISTING OPERATIONS

The ICI sector for the HRM includes the private collection and hauling of waste from local industrial, commercial, institutional businesses, and large apartment buildings. ICI waste is source-separated by commercial bins under the municipal by-law No. S-600 which provides HRM control over all waste generated within the municipality.

The 2008-2009 Solid Waste Characterization Study by SNC Lavalin revealed that 50% of ICI materials sent to landfill could be recovered as recyclables or compostable organics. With 60% of the total HRM wastestream originating from the ICI sector; this represents a significant opportunity to increase diversion in the HRM.

To support and further enhance diversion to reach the Provincial goal of achieving more than 60% diversion as outlined in the 1995 Solid Waste-Resource Strategy, HRM's solid waste program should provide for the delivery of education and communications programming through the conduct of curbside monitoring, ICI property education, inspection and use of policy tools to support diversion success.

10.2 COMPARISON OF CURRENT OPERATIONS TO 1995 STRATEGY

10.2.1 By-Law S-600:

HRM currently operates a four-stream ICI waste system consisting of recyclables, compostable organics, residual waste, and special wastes. This management model has not significantly changed since the1995 strategy which initiated the separation of ICI waste into recyclables, compostable organics, remaining mixed waste, and construction and demolition debris. The 1995 strategy also indicated that waste could be processed at municipal facilities or approved private sector facilities. The following statement summarizes the ICI objective from the 1995 strategy:

> *The Industrial, Commercial and Institutional (ICI) sector can use the municipally-sponsored recycling, composting and screening facilities or they can provide their own equivalent. User fees will encourage source-separation. Existing ICI collection systems should suffice with only slight modifications. Non-residential ICI hazardous waste will continue to be managed separately from the municipal system.*

The current HRM by-law No. S-600 discourages and prohibits in some ways the ICI sector from developing their own parallel system as encouraged in the 1995 strategy. By-law S-600 states that:

No person shall export or remove solid waste material generated within the Municipality outside the boundaries of the Municipality and all such solid waste shall be disposed of within the boundaries of the Municipality and in accordance with this By-law.

The by-law prohibits the ICI sector from developing a parallel system outside of the HRM for waste management. A parallel system may be more practical if haulers were able to ship certain wastestreams to existing facilities outside of HRM boundaries for final disposal or processing.

Although the current ICI sector uses the HRM-sponsored disposal and processing facilities as encouraged by the 1995 Strategy, this waste accounts for significant operational challenges for HRM facilities due to the improper sorting of waste at the source. It is difficult however for the HRM to enforce and ensure source separation of materials at collection points for the ICI sector.

Despite these challenges, it is not recommended that HRM eliminate ICI processing altogether. The current revenue from ICI tipping fees is approximately $11million annually. Eliminating this revenue stream would be a significant loss to HRM. Potential operational savings and spared landfill space from not having to process ICI waste would not compensate this loss of revenue.

10.2.2 Waste Characterization Studies

Several Waste Characterization Studies have been conducted since 1995 and results are summarized in the table below.

Year	% of Total Sample Acceptable for Disposal	% Either Unacceptable for Disposal or Targeted for Diversion	Largest Component of ICI Sample
2003	31.2	68.8	14.6% Food
2003	39.4	60.6	17.9% Food
2004	41.5	58.5	-
2008	53.3	46.7	12.7% Food

As shown in the table above, the percentage of acceptable material for disposal at HRM facilities has increased steadily since 2003. However, despite this increase, there is still contamination of ICI loads.

10.2.3 Tipping Fees

The 1995 Strategy also encouraged the (tipping) fees to reflect the level of source separation. Based on observations of the current program, the ICI tipping fee structure has not been encouraging further source separation. By applying a higher fee for mixed loads, there would a great incentive for source separation. Similarly, by not accepting any mixed loads at the FEP facility, it would enforce and ensure source separation. Implementing such a fee structure would have to be phased in to give waste haulers and ICI waste generators time to adjust.

Similarly for organics, to encourage source separation, higher fees for mixed loads could be charged, as well as not accepting mixed loads altogether, or a separate composting process could be warranted based on the varying nature (wetter) of ICI organics. With respect to compostable material handled at the FEP, ICI waste represents a large portion of the organics processed that are eventually landfilled due to contamination.

10.2.4 Diversion Targets

The 1995 Strategy set forth specific diversion targets for the ICI sector to reach by the year 2000. To support increased diversion, in coordination with the implementation plan set forth in the Strategy, tipping fees for commercial waste and organics were adjusted. Since 1990, tipping fees for waste have increased from $27.50/tonne to $125/tonne. Since the introduction of the source separated organics program in 1999, tipping fees for organics have only increased by 10.5% from $68/tonne to $75/tonne. As a result, the rate of diversion from landfill has also increased. The following table shows the increase in diversion rate from 2000 to 2010 based on tonnage data.

	Strategy Projected for 2000	2002-03	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Private Diversion (incl. C&D)	42,000	75,000	70,099	76,575	89,802	93,920	92,528	92,268
Organics	14,333	12,862	14,333	14,937	15,386	16,291	16,569	16,615
Recycling (Private and MRF)	35,000	47,500	47,102	46,465	47,381	48,312	49,157	49,372
Refuse	48,300	88,481	89,444	88,665	87,795	84,356	80,678	80,059
Total	**145,300**	**223,843**	**220,031**	**226,642**	**240,364**	**242,879**	**238,932**	**238,314**
Diversion Total	**91,333**	**135,362**	**131,534**	**137,977**	**152,569**	**158,523**	**158,254**	**158,255**
Diversion	**62.9%**	**60.5%**	**59.5%**	**60.8%**	**63.5%**	**65.2%**	**66.2%**	**66.4%**

10.3 BENCHMARK ANALYSIS

In order to fully assess the current performance of the HRM Waste Resource System, a comparison to similar jurisdictions in Canada was conducted. Jurisdictions used were chosen primarily based on similarities in population and geography to HRM.

It should be noted however, that comparison to other jurisdictions is difficult and sometimes skewed due to a number of factors including:

- Diversion percentages are calculated using different methods;
- Accepted materials differ;
- Markets for finished compost and recyclables vary;
- Inclusiveness of system costs varies;
- Age of facilities, equipment, and technology varies;

- Performance of systems varies;
- Level of provincial involvement, legislation, targets and objectives varies; and
- Unique features of the HRM system where all refuse is processed and stabilized prior to disposal.

The results of the analysis showed that most jurisdictions do not provide waste management collection services to the ICI sector. In some jurisdictions waste collection is provided only to certain small ICI establishments while others accept ICI waste at municipally operated facilities but do not offer collection (like the HRM).

Where services are provided to a portion of the ICI sector, waste is not processed prior to disposal. The HRM model is unique in this regard. Other landfills in Nova Scotia do not operate a FEP and therefore cannot process materials on a tipping floor. They do however inspect loads at the tipping face of the landfill and reject loads that are not in compliance. There are currently 6 approved landfills in Nova Scotia and most accept waste from the local as well as neighboring municipalities. In some cases, where municipalities find themselves too far from the landfill, they operate waste transfer stations. Most of these waste transfer stations do conduct some level of pre-processing of waste before loading and transferring to the landfill for disposal.

10.4 RECOMMENDATIONS

One of the objectives identified in the most recent Business Plans and Budget reports to Council is to deliver an efficient and sustainable resource oriented solid waste program for both residential and ICI sectors by expanding existing education and compliance operations. This includes implementation of multi-year business park inspection program. As directed by Council, it was recommended that a public engagement plan to educate and communicate with the public on evolving the waste management program be developed and revisions to By-law S-600 in support of increasing diversion from landfill for both the residential and commercial sector be considered.

A recommendation to Council was made in February 2007 to amend By-law S-600 to prohibit the mixing of source separated materials (recyclables and organics) from ICI properties by haulers in the same collection vehicle compartment as waste. The effectiveness of that By-law change should be assessed and re-evaluated. Consideration to further amend By-law S-600 to require waste haulers to provide services that support HRM's waste management strategy throughout the entire collection process will help increase waste diversion.

Consideration should also be given to allow a cash transaction payment option for ICI organics customers delivering to the composting facilities that are currently not on account. This could increase the diversion of organics delivered by small ICI haulers collecting from lawn maintenance companies and small apartment properties.

Many cities in the US use a permit/franchise arrangement for waste collection, using private service providers for collection of single family and multi-family residential waste, as well as commercial waste. The following are just two examples of cities employing this business model.

The State of California mandates that all apartment and condo complexes of five or more units must recycle. The City of San Diego operates with a mixture of City-certified recyclers or franchise waste haulers that serve multi-family locations. All multi-family locations are required to report on their diversion programs on an annual basis. The City maintains a list of City-certified recyclers or franchise waste haulers who will report building compliance on behalf of the owner. Owners who contract with companies that are not City-certified must submit an annual Recycling Reporting Form to demonstrate compliance themselves.

The City has developed a certification process for private recycling collectors which is voluntary; however, certified recyclers are listed on the City's website. Certification is valid for up to two years; and involves completion of an application form, an application fee of $130.00, provision of proof of insurance and an agreement to comply with certain requirements of the Municipal Code. Garbage collection is provided by the City of San Diego.

The City of Portland has operated a "Pay as you throw" program and recently moved to bi-weekly garbage collection. The City regulates the residential collection of garbage and recycling by local companies who have specific boundaries in which they can provide services to residents. Since 1992, residential collection has been undertaken through the franchise system; subsequently the program was expanded for collection of ICI waste (including multi-family). There are now about 52 companies serving this sector.

This business model is not commonly used in Canada as in many provinces licensing is a provincial responsibility and is not under the control of municipalities. Notwithstanding, HRM has waste flow control within its jurisdiction and this is a mechanism that could be employed/evaluated further toward enforcement.

Other recommendations for the ICI program include:

- Continuing to provide processing services for the ICI sector to support existing operational costs, generate economies of scale, and assist in the compliance with provincial legislation.

- Continuing to carefully evaluate the results of waste characterization studies to prioritize the types of materials to target for increased diversion through education, partnerships, monitoring and enforcement.

- Encouraging ICI diversion through continued education programs and other initiatives. Larger organizations could be targeted initially and new legislation could be considered to require compliant programs. All new developments should be required to implement a compliant source separation program. Consideration should also be given to the inclusion of source separation programs in development agreements or zoning requirements for apartment building development.

- Potentially increasing ICI Diversion through enhanced inspections/education. The Diversion Planning Officer(s) currently administer all reports of ICI properties violating By-law S-600. Expanding enforcement requirements for the Diversion Planning Officer is not an option as the current workload is being maximized. Ensuring that an adequate amount of Diversion Planning Officer positions are filled and active is integral to the ongoing success and further diversion.

- Revising By-law S-600 to include proper communication and utilization of commercial bins to support source separation. For example, HRM has encountered ICI haulers using green tote bins and blue recycling bins for garbage. There is currently no requirement for the commercial sector to use proper colored bins for organics or recyclables, but signae is required. Many private commercial waste haulers are using containers for organics and recyclables without signage or consideration of the bin color or size. This leads to confusion for the property owner/tenant. The hauler is also not obligated to provide their clients with information on the requirements for source separation. The client, in many cases, is only provided one bin for garbage, resulting in By-law violation.

11.0 Waste Resource Partnership Opportunities in Nova Scotia Beyond HRM

11.1 BACKGROUND

In 1995, the Government of Nova Scotia released a comprehensive solid waste management plan. The plan was adopted as an initiative to place Nova Scotia at the leading edge of solid waste management in Nova Scotia and corresponded to the renewal and upgrading of landfills in several locations across the province.

The Provincial plan approached waste as a resource and included comprehensive curbside collection programs for diverting organics, paper waste, and plastics from traditional solid wastestreams. It also sought to develop economic opportunities from these former wastestreams. The end goal of the strategy was to reduce solid waste directed to landfills in the province to 50 per cent of 1989 levels by 2000 consistent with objectives set by Canada's Provincial Ministers of the Environment in 1989 to have the quantities of waste sent to incinerators or landfills. In 1989, Nova Scotia sent 641,375 tonnes of waste to landfills or incinerators or 726 kg per person. The consequent objective set by the Strategy was therefore to reduce waste to 363 kg per person.

The strategy paralleled the Waste Resource Management Strategy developed for HRM at the same time, which committed to the development of a no organics landfill that was eventually sited in Otter Lake to the west of Halifax. To reduce waste to be disposed in the new landfill and ensure that it received no organic material the newly amalgamated municipality expanded programs for separation of paper and recyclables and source, and to divert organic materials to composting. These initiatives were consistent with provincial objectives and have been emulated by other municipal units across the province.

The key to addressing the goals set by the Province has been separation of wastes at source. Paper waste, cardboards, glass and plastic recyclable (excluding refundable containers), and compostables are all separated from the general wastestream. Waste generators are expected to deal with each stream separately in accordance with prescribed procedures (e.g., blue bag for recyclables, bundling for cardboard, and compost containers for compostables). Municipalities generally pick up each waste type from residential properties at the curb. Larger multi-unit residential properties and non-residential properties normally contract for delivery to the appropriate processing facility recognizing the same separation requirements.

In addition to curbside initiatives, the Province has banned a variety of materials specified in regulations under s. 102 of the *Environment Act* (S.N.S. 1994-1995, c.1) from landfills and has established additional facilities and/or processes to deal with each. A network of 83 Enviro-depots, for example, accepts refundable containers. The Enviro-depots also accept waste paint, as do some specialized municipal facilities. The Atlantic Canada Electronics Stewardship

(ACES) Program has been established between electronics vendors in Atlantic Canada and the non-profit Resource Recovery Fund Board Inc. (RRFB) to collect, free of charge, waste electronics (e.g., televisions, stereos, and computers) at several designated locations throughout Nova Scotia. ACES does not address municipal costs of handling electronics. Cellular phones are collected free of charge through Recycle My Cell, an initiative led by the Canadian Wireless Telecommunications Association. Household Hazardous Waste (e.g., batteries, fuel oil, and other flammables; sharps; and fluorescent light bulbs) can be dropped off free of charge to many private and public handling centres throughout the province. Tire vendors are required to accept, old tires free of charge,. Construction and Demolition (C & D) waste materials are received at private landfills, although some public facilities (e.g., the two Waste Management Centres in the Valley region) also accept small amounts (less than five cubic yards) of C & D material.

In 2006, in coordination with the *Environmental Goals and Sustainable Prosperity Act of 2007*, new legislation was enacted to renew the Nova Scotia Waste Resource Management Strategy and achieve both an absolute reduction in province-wide solid waste to 300 kilograms per person per year by 2015 in addition to a 50 per cent waste diversion rate. The "renewal" of the Strategy is meant to identify which initiatives have been the most successful from the previous strategy, and what new opportunities may be available for further solid waste reduction and diversion.

EPR Canada issued an EPR Report Card[51] (2011) reporting on and grading the various EPR initiatives in each province.

Overall, the province of Nova Scotia scored a B, along with Manitoba and Quebec. British Columbia scored an A-, Ontario and PE scored a C+, Alberta scored a C, Saskatchewan, New Brunswick, Newfoundland and Labrador each scored a C-.

Comments about Nova Scotia's programs highlighted efforts to working to transition stewardship programs for most other CCME CAP materials to EPR, the renewed 2011 waste management strategy publicly commits to EPR, mandatory source separation program and landfill bans for many materials, and commitments to harmonizing with other provinces in the Atlantic region.

11.2 BENCHMARK ANALYSIS

Biennial surveys of the waste management industry conducted by Statistics Canada provide a good overview of Nova Scotia's position relative to the rest of Canada through summary tables compiled in the CANSIM database. CANSIM provides five tables corresponding to the headings in Table 1 identifying materials diverted from landfill, waste sources, and diversion by source, sector employment, and municipal costs. Survey data from the 2002, 2004, 2006, 2008 surveys has been posted by Statistics Canada. Stantec has divided numbers in each grouping by Statistics Canada population estimates for each province for each year. Population estimates

[51] EPR Canada, July 2012, 2011 EPR Report Card

are for individual years and include adjustments for undercount relative to Census counts taken in 2001 and 2006.

Stantec ranked the provinces by each measure available from CANSIM to benchmark Nova Scotia's performance in the sector relative to the rest of Canada. Data dealing with waste disposal and diversion show the impressive success of the Province through its solid waste management initiatives. While Nova Scotia ranks at about the middle at fourth among eight reporting provinces for overall quantity of waste diverted (i.e., the row labeled "All materials diverted" in Table 1), the province ranks last in all categories of waste disposed (see Waste by Source). The ratio between materials disposed and all materials diverted indicates that Nova Scotia diverted a larger proportion of its waste than any other province in all four years recorded and that the Nova Scotia's rate of diversion rose substantially over the years from 2004 through 2008, widening its gap over other reporting provinces. In 2004, the ratio of 2.03 suggests that Nova Scotia disposed slightly more than two times as much waste as it was able to divert. At the time, Nova Scotia's ratio between disposal and diversion was 78.8 per cent better than the ratio for all reporting provinces combined (3.63). Nova Scotia's ratio, however, fell dramatically over the next six years to just 1.22 (a 39.9 per cent decline) at which point it was only 40 per cent of the ratio recorded by all the reporting provinces, which also fell but to only 3.05. Gains were largely attributable to increased diversion of materials from non-residential sources, which doubled from 2002 to 2008 (see Materials Diverted by Source).

On the business side, Nova Scotia has a relatively high number of workers employed in waste management businesses, ranking third among 11 reporting provinces and territories. The province also has a relatively high ratio of full-time to part-time employees. Operating revenues were however low at eighth, and particularly relative to operating expenditures, by which Nova Scotia ranked sixth. The province's solid waste businesses also ranked fifth highest in terms of capital expenditures among eight reporting provinces. Operating revenues, however, were weak, ranking eighth among the provinces and territories. The difference between operating and capital expenditures and revenues, although positive in all four years recorded, ranked sixth among eight provinces for which all necessary data was available.

Municipal expenditures most clearly reflect the cost of maintaining Nova Scotia's system. Nova Scotia ranks second in terms of municipal employees per capita engaged in solid waste resource management and, as with the private sector in the province, shows a high ratio of full-time to part-time employees. In terms of overall expenditure on solid waste operations, Nova Scotia ranks first of nine reporting provinces with current expenditures that in 2008 were 28.3 per cent more than the second highest ranked province, British Columbia. Revenues to Nova Scotia municipalities, on the other hand, ranked fourth among nine reporting provinces in 2008. The deficit between revenues and expenditures for Nova Scotia was nevertheless the largest of any province in all four years surveyed. Based on calculations by Stantec based on the CANSIM data, the shortfall recorded by Nova Scotia municipalities grew from $33.4 million to $41.3 million from 2002 to 2008 (23.7 per cent). At $44.11 per 1,000 residents this cost was 77.3 per cent higher than the combined shortfall recorded by all reporting provinces ($24.88).

	Quantity				Per 1,000 Population	
Type of materials diverted	2002	2004	2006	2008	Rank 2008	No. Ranked
Materials Diverted by Type (tonnes)						
All materials diverted	192,006	239,845	275,983	289,950	4	8
Newsprint	31,031	26,972	33,128	34,771	4	8
Cardboard and boxboard	15,416	30,485	31,373	27,271	7	8
Mixed paper	3,027	7,657	8,592	7,399	6	7
Glass	3,224	2,126	1,511	1,222	4	4
Ferrous metals	5,775	2,951	2,962	4,244	5	8
Copper and aluminum	x	x	x	581	5	5
Mixed metals	x	6,105	x	1,462	6	8
White goods	0	4,584	4,700	x	2	6
Electronics	0	x	0	x	4	7
Plastics	2,460	3,846	4,540	6,303	6	8
Tires	0	x	x	x	x	7
Construction, renovation & demolition	38,871	59,355	51,263	40,368	2	9
Organics	82,341	93,458	133,934	158,419	2	8
Other materials	7,000	1,737	1,808	2,400	2	8
Waste by Disposed by Source (tonnes)						
All sources of waste for disposal	389,194	399,967	359,105	354,231	9	9
Residential sources of waste for disposal	169,649	179,262	169,337	148,060	9	9
Non-residential sources of waste for disposal	219,546	220,705	189,768	206,171	9	9
Materials Diverted by Source (tonnes)						
Residential sources of diverted materials	122,707	148,542	138,869	149,961	1	8
Non-residential sources of diverted materials	69,299	91,305	137,114	139,989	4	8
Business Sector Characteristics						
Number of businesses	87	90	56	63	4	11
Total employees	811	952	804	863	3	11
Full-time employees	743	871	716	x	3	11
Part-time employees	68	81	88	x	5	11
Operating revenues (x 1,000)	$89,468	$100,891	$120,663	$129,278	8	11
Operating expenditures (x 1,000)	$80,059	$90,856	$110,850	$116,422	6	11
Capital expenditures (x 1,000)	$8,226	$8,714	$5,688	$6,956	5	8
Local Government Characteristics						
Total employees	295	320	315	308	2	9
Full-time employees	239	271	276	275	2	9
Part-time employees	56	49	39	33	8	9
Operating revenues (x 1,000)	$32,028	$37,692	$41,092	$62,041	4	9

Type of materials diverted	Quantity				Per 1,000 Population	
	2002	2004	2006	2008	Rank 2008	No. Ranked
All current expenditures (x 1,000)	$65,453	$77,292	$89,276	$103,392	1	9
Collection and transportation, current expenditures (x 1,000)	$19,101	$21,242	$22,183	$26,579	4	9
Tipping fees, current expenditures (x 1,000)	$2,875	$2,729	$9,158	$10,933	2	8
Operation of disposal facilities, current expenditures (x 1,000)	$29,077	$27,864	$26,985	$26,757	1	9
Operation of transfer stations, current expenditures (x 1,000)	$1,006	$935	$4,056	$6,581	2	7
Operation of recycling facilities, current expenditures (x 1,000)	$6,213	$6,945	$7,735	$7,635	2	11
Operation of organics processing facilities, current expenditures (x 1,000)	$5,429	$5,425	$7,341	$8,511	1	8
Contributions to landfills post closure and maintenance fund, current expenditures (x 1,000)	$0	$0	$0	$4,283	1	9
Other current expenditures (x 1,000)	$1,753	$12,153	$11,818	$12,112	1	7
Capital expenditures (x 1,000)	$2,385	$11,791	$35,373	$20,851	2	8

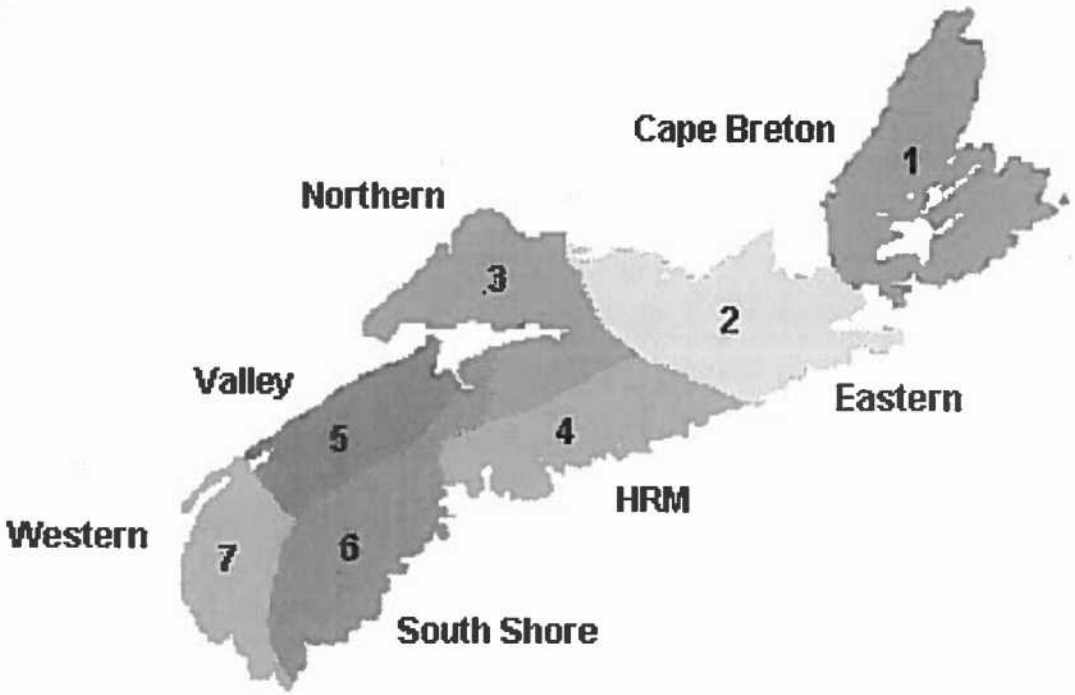
	Ratio of Materials Disposed to Materials Diverted				Rank			
	2002	2004	2006	2008	2002	2004	2006	2008
Canada	3.63	3.55	3.36	3.05	N/A	N/A	N/A	N/A
Newfoundland and Labrador	12.39	11.33	x	x	9	9	x	x
Prince Edward Island	X	x	x	x	x	x	x	x
Nova Scotia	2.03	1.67	1.30	1.22	1	1	1	1
New Brunswick	3.16	3.18	2.03	1.79	3	4	2	2
Quebec	3.35	3.03	2.60	2.50	4	3	4	4
Ontario	4.26	4.06	4.05	3.43	7	5	5	5
Manitoba	4.15	5.89	5.92	5.67	5	7	7	7
Saskatchewan	6.84	6.96	7.80	6.03	8	8	8	8
Alberta	4.19	4.96	5.85	5.53	6	6	6	6
British Columbia	2.21	2.29	2.14	1.87	2	2	3	3
Yukon, Northwest Territories and Nunavut	x	X	x	x	x	x	x	x

11.3 STRUCTURE OF THE NOVA SCOTIA WASTE MANAGEMENT SYSTEM

One of the key decisions made by the Province in 1995 was to organize municipal units across Nova Scotia into waste management regions in the province. It was evident to authorities that many small municipal towns and rural municipalities in Nova Scotia were not capable of efficiently managing solid waste. In an effort to explicitly encourage cooperation among rural

municipalities, the province created seven solid waste management districts that combined rural municipalities and towns within their limits. The seven districts with their component rural municipalities are as follows:

1. Cape Breton – Cape Breton Regional Municipality, and the Municipal Counties of Inverness, Richmond, and Victoria
2. Eastern Region – the Municipal Counties of Antigonish and Pictou, and the Municipal Districts of Guysborough and St. Mary's
3. Northern Region – The Municipal Counties of Colchester and Cumberland, and the Municipal District of East Hants
4. Halifax Regional Municipality – HRM alone
5. Valley Waste – The Municipal Counties of Annapolis and Kings
6. South Shore/West Hants Region – The Municipal Districts of Chester, Lunenburg, Shelburne, and West Hants, and the Region of Queens.
7. Western Region – The Municipal Districts of Argyle, Barrington, Clare, Digby, and Yarmouth.



The Government of Nova Scotia provided resources for each district, and facilitated the development of several regional solid waste resource management partnerships, such as Valley Waste Resource Management and Region 6 Solid Waste Management. The Government of Nova Scotia has also established the non-profit Resource Recovery Fund Board Inc. (RRFB) to provide educational and awareness programs for solid waste reduction and diversion, develop stewardship opportunities with the private sector and municipalities, and to manage 83 Envirodepot locations throughout the province. A report prepared in 2011 by William Hagg for

the Province of Nova Scotia highlighted opportunities for improvement within the current program.

Each region, furthermore, manages a range of solid waste management facilities (Table 2). Not all regions provide a full suite of required facilities. Many municipal units transfer waste materials and/or recyclables to other regions. Several facilities have become particularly prominent in this role, most notably the Lincolnville landfill in Guysborough and the Little Forks Landfill in Cumberland County. Following is a summary of the key facilities operated by each of the province's seven regions:

Cape Breton

Cape Breton has one C&D facility, one municipal household special waste (MHSW) facility, two composting facilities, and three recycling facilities, as well as three waste transfer locations. Solid waste is collected at transfer stations in Sydney, Port Hood, and Baddeck from which it is delivered to the Lincolnville Landfill Site in the Municipal District of Guysborough.

Eastern

Eastern Region contains four C&D facilities, two MHSW facilities, three composting facilities, and four waste transfer locations. The Lincolnville Landfill Site is a second generation landfill accepting solid waste from 20 municipalities in the Eastern and Cape Breton Districts. Fees range from $38.50-$45.10/tonne for solid waste, C&D waste, and composting material, to $210.68/tonne for recyclables. Recycling is consolidated at the landfill site, and transferred to the Colchester County Recycling Centre. Residents of the District of Guysborough can drop off waste free of charge.

Northern

Northern Region has five C&D facilities, two MHSW facilities, three composting facilities, two recycling centres, one balefill site, one landfill, and 11 waste transfer locations. Fees for the balefill site in Kemptown, Colchester County, range from $30/tonne for C&D, scrap metal, wood, and organics, to $75/tonne for commercial and residential wastes, to $100/tonne for asbestos and tires. Similar fees apply at the landfill site in Little Forks in central Cumberland County; however, recyclables, and yard waste can be dropped off for no cost. The Colchester Recycling Centre received all recycling material from Eastern District.

HRM

HRM has three C&D facilities, one MHSW facility, two composting facilities, one recycling facility, one landfill, and two transfer locations. The Otter Lake Disposal Facility charges a $5 flat rate for waste weighing less than 100 kg; material weighing 100 kg or more is charged $115 per tonne.

South Shore

South Shore has one C&D facility, four MHSW facilities, three composting facilities, five recycling centres, three landfills, and two transfer locations. West Hants landfill at Walton Woods charges $40/tonne to residents, and $65/tonne to institutions, and allows scrap metal, yard waste, and HHW to be disposed free of charge. Kaizer Meadow operated in Chester charges $68.85/tonne, $51.50/tonne of C&D, and $35/tonne scrap metal, and allows organics and recyclables free of charge. Queens Municipal Landfill north of Liverpool charges $77.41/tonne of residual waste, roughly $54 for C&D and $171 for recyclables generated outside the District or by commercial operators. Residential wastes are not charged, except for unsorted C&D materials.

Valley

Valley Waste has three C&D facilities, two MHSW facilities, one composting facility, and two waste transfer locations. Solid waste is collected at transfer stations in Lawrencetown and Kentville from which it is taken to the Kaizer Meadows landfill in Chester. the two waste transfer facilities charge $77/tonne for recyclables and organics, $52/tonne of scrap metal and sorted C&D waste, and $98/tonne of solid waste or mixed C&D. individuals disposing waste from outside the Valley district are subject to a 30 per cent premium per tonne of waste. A local bylaw also forbids wastes "generated" in the Valley district to be disposed of outside the district. It's worth noting that other than the Otter Lake Disposal Facility in HRM, all nearby landfill sites have significantly lower premiums (e.g., ~$75/tonne for residual solid waste).

Western

Western has four C&D facilities, one MHSW facility, two composting facilities, one recycling facility, and three transfer facilities. Clare Transfer station charges $98/tonne of solid waste, Yarmouth charges $128/tonne of solid waste, and $98/tonne of composting, and Digby charges $100, tonne of solid waste. Waste collected at the transfer stations is taken to the Queens Municipal Landfill near Liverpool.

C&D	HHW	Organics	Recycling	Landfill	Waste Transfer
Cape Breton					
Baddeck Sydney	Edwardsville	Baddeck West Arichat	Baddeck Sydney Inverness		Baddeck Port Hood Sydney
Eastern					
Broadway Beech Hill TCH Exit 25 Mount William	Lincolnville Mount William	Lincolnville Tracadie Mount William		Lincolnville	Beech Hill Lincolnville Mount William Sherbrooke
Northern					
Stewiacke Little Forks	Georgefield Kemptown	Kemptown Brookfield	Kemptown Little Forks	Kemptown Little Forks	East Hants Advocate

	C&D	HHW	Or anics	Rec clin	Landfill	Waste Transfer
	Georgefie d		Little Forks			ross oa s (Parrsboro)
	Dixon					Greenville
	Kemptown					Oxford
						Port Howe (Seasonal)
						Pugwash
						River Hebert
						Southampton
						Wallace
						Wentworth
HRM						
	Goodwood	Bayers Lake +4 mobile events	Burnside	Bayers Lake	Otter Lake	Musquodoboit
	Westphal		Ragged Lake			Sheet Harbour
	Harrietsfield					
Valley						
	Hampton	Lawrencetown	Demsey Corners	Lawrencetown		Lawrencetown
	North River	Kentville		Kentv le		Kentville
	Tourbrook					
South Shore/West Hants						
	Whynott	Kaizer Meadow	Whynott	Shelburne	Scotts Village	Whynott
		Whynott	Brook yn	GTI	Kaizer Meadow	Queens
		Cogmagun	East River	Whynott	Queens	
		10 Mile Lake		Falmouth		
				10 Mile Lake		
Western						
	Barrington	Shelburne	South Ohio	Yarmouth		Yarmouth
	Meteghan		Church Point			West Green Harbour
	Digby					Little Brook
	South Ohio					

The financial performance of HRM as a waste region relative to the other six regions in Nova Scotia can be assessed by reference to the annual publication *Nova Scotia Municipal Statistics*, which is compiled by Service Nova Scotia and Municipal Relations. The primary value of the document is to compare expenditures on solid waste management services. Unfortunately, tables breaking down revenue sources lump solid waste services with other Environmental Health Services (i.e., Sewage Collection and Disposal as well as Garbage and Waste Collection and Disposal), which provides little value for the current analysis. Expenditures on "Garbage and Waste Collection and Disposal" by municipal units comprising each waste management region are, nonetheless, a valuable indicator of the cost effectiveness of each regional operation. The most recent available editions of the publication are for 2009 and 2010, although the 2010 version is identified as preliminary and does not have data for Annapolis County,

which has apparently not filed financial information for 2010, and Bridgetown, which was under the administration of the Province during 2010.

Expenditure data for 2009 and 2010 compiled for each solid waste region by Stantec is presented in the table below. Stantec calculated expenditures as a percentage of total expenditure as well as per capita and per dwelling unit (including unoccupied as well as occupied dwellings) to assess cost effectiveness. HRM expended a smaller proportion of its total expenditure on garbage and waste collection and disposal than any of the other six solid waste management regions in the province in 2009 and 2010. On a per capita basis in 2009, however, it ranked second and on a per dwelling unit basis in ranked third. Data for 2010, which are not official and exclude Annapolis County and the Town of Bridgewater from Valley Waste totals, found HRM fourth in per capita terms and sixth by dwelling units.

HRM tends to appear more costly by dwelling unit measures because it has a much lower proportion of unoccupied dwellings than other areas of the province where cottages and seasonal homes are a more significant component of local housing stock and where, in some cases, a noticeable portion of housing has been abandoned. HRM also has considerably more large residential, commercial, and institutional development than other areas but this should not significantly influence its costs as apartment owners with more than six units and all non-residential waste generators are responsible for contracting the pickup and disposal of their waste. Contractors handling this waste must pay tipping fees at the disposal site.

The least expensive region based on both per capita and per dwelling unit measures is the Eastern Region. Municipal units in the Eastern Region enjoy the benefits of a relatively inexpensive landfill located at Lincolnville, near the western edge of Guysborough County. Lincolnville is very accessible to the Town and County of Antigonish, as well as the Town of Mulgrave and most areas within Guysborough. In all, Lincolnville has contracts for waste disposal with 17 Nova Scotia municipal units within the Eastern Region and on Cape Breton Island. Most notably, it is the main disposal site for waste generated in CBRM.

Pictou County, which forms the western half of the Eastern Region and has the larger proportion of the waste region's population, largely relies on a second landfill at Mount William. The Mount William landfill, which is operated by the Pictou County Shared Services Authority, an inter-municipal body serving the Towns of New Glasgow, Pictou, Stellarton, Trenton, and Westville, as well as the Municipality of the County of Pictou, is the primary disposal site for all six municipal units.

The Northern and Valley Regions are also notable for lower costs. The Northern Region, like the Eastern Region benefits from two landfills. Colchester has concentrated its balefill, MRF, and composting facilities in Kemptown north of Truro. Cumberland provides a second facility in Little Forks, between Amherst and Springhill near the centre of the county. The Valley Region also maintains two strategically located disposal sites: one in Kentville serving the eastern portion of the region and the other in Lawrencetown for the western area. Both are sorting sites, however, and materials are ultimately disposed elsewhere.

	Cape Breton	Eastern Region	Northern Region	HRM	Valley Waste	South Shore/ West Hants	Western Region
TOTAL EXPENDITURE 2009	$130 million	$63 million	$84 million	$485 million	$60,million	$75 million	$43 million
Garbage and Waste Collection and Disposal	$16 million	$5 million	$10 million	$37 million	$6 million	$13 million	$6 million
% of Total Expenditure	12.3%	8.5%	11.9%	7.6%	10.5%	17.2%	14.0%
Per Capita	$120.16	$73.78	$97.53	$96.87	$99.42	$156.58	$115.54
Per DU	$250.94	$146.23	$193.63	$209.49	$211.70	$298.46	$228.82
TOTAL EXPENDITURE 2010	$148 million	$71 million	$97 million	$600 million	$55 million	$85 million	$49 million
Garbage and Waste Collection and Disposal	$15 million	$5 million	$11 million	$43 million	$5 million	$14 million	$6 million
% of Total Expenditure	10.1%	7.6%	11.1%	7.2%	9.5%	15.9%	12.7%
Per Capita	$114.08	$73.76	$103.94	$112.39	$82.90	$164.34	$120.12
Per DU	$235.66	$145.76	$206.69	$245.26	$176.77	$312.94	$235.74
[1] 2010 figures for Valley Waste do not include the Municipal County of Annapolis or the Town of Bridgetown							
Source: Nova Scotia Municipal Statistics, 2009 and 2010							

11.4 OPPORTUNITIES FOR PARTNERSHIPS

As the most populated waste management region in the province, HRM benefits from some operational economies of scale compared to more rural regions. As the 1995 Strategy was being implemented and refined over the years, there was little in the way of shared services between HRM and other waste regions. This was understandable given the long haul distances and the fact that each region was in the process of a major overhaul of its waste management infrastructure. One recent example of cooperation with waste authorities beyond HRM is the development of agreements for "contingency" waste disposal at landfills beyond HRM. These agreements establish tipping fees for disposal of HRM generated waste in the event that the Otter Lake disposal facility is not operational for any particular reason.

As HRM begins the planning process to renew its infrastructure, it is timely to enter into discussion with other waste regions on the possibility of sharing capacity in modern to-be-constructed facilities. For example, if a new HRM MRF is planned to be operational in 2019, there is time to establish partnerships to share recyclable processing capacity with another region. Other regions may also be considering MRF replacement and sharing one facility could represent significant capital savings.

Similarly as HRM expands its organics processing capacity, smaller regions may benefit by utilizing available capacity. HRM would charge a fee which is both fair to the neighbour, but provides a financial net gain to HRM.

Stantec recommends that HRM Council provide staff with authorization to commence preliminary partnership discussions with other waste regions to establish the general level of interest, and to identify specific opportunities requiring more detailed negotiations.

These partnerships could involve certain materials moving in one direction, and other materials being shipped back (backhaul) in the other direction. This approach fully utilizes transportation resources. Initial negotiations should not exclude any particular materials as recyclables, organics and waste residue are all shared challenges in each region.

HRM is also likely to benefit by having material generated in its most distant zones, received by adjacent regions with facilities near the waste region border. Transporting all materials generated in HRM to the Halifax/Dartmouth area may not be the most cost-effective transportation solution for the relatively small quantities generated. These types of arrangements must of course have the agreement of all parties involved. Each party must have a clearly defined benefit or the partnership is unlikely to be established or maintained.

12.0 Conclusions and Recommendations

12.1 CONCLUSIONS

The Halifax Regional Municipality (HRM) has over the last 15 years implemented an effective waste resource and reduction strategy. Its residential diversion rate from landfill has increased from approximately 5% in 1995 to 52% currently. Program implementation was guided by an *Integrated Waste Resource Management Strategy* report (1995 Strategy) which was developed by community volunteers. While the principles described in the 1995 strategy remain valid today, most of the program elements have now been implemented.

Much of the physical infrastructure constructed to support the 1995 Strategy will be nearing the end of its useful life in the next five to ten years. HRM has retained Stantec Consulting Limited (Stantec) to review current programs and services and to recommend an updated strategy to guide HRM decision making over the next 20 years. A key element of this review is to compare local program costs to similar municipal operations. An example is the per tonne cost to operate the Otter Lake processing and disposal site. At a current cost of $170/tonne (including capital, operating and perpetual care), expenses at Otter Lake far exceed more typical industry costs of $50 to $100/tonne for all costs related to landfill disposal. Pre-processing of waste is rarely undertaken elsewhere.

While maintaining the original principles of the 1995 Strategy, the three stated goals of this review are as follows:

- *Reduce program costs through the implementation of service delivery efficiencies;*
- *Upgrade or replace necessary infrastructure to meet existing and near to mid-term capacity and regulatory requirements; and*
- *Maximize the opportunity for program revenue generation from recovery of and/or processing of waste resource materials and increased diversion.*

The following specific constraints were identified which restrict the range of program choices available to HRM over this planning horizon:

- Organic wastes are banned from landfill in Nova Scotia;
- The industrial/commercial/institutional (ICI) sector have no reasonable option currently available for processing organics except for HRM facilities;
- HRM by-law No. S-600 provides HRM with legal control of the import and export of waste generated within the municipality;

- Existing facility locations, capacities and operating agreements; and
- The current waste system in HRM is highly integrated with many interdependencies.

Based on a comprehensive review of HRM's complete waste resource systems, Stantec has generated the following conclusions:

1) The total diversion rate is high in HRM compared to other municipalities, but realistic opportunities exist to improve the recovery of residential and ICI recyclables and organics in accordance with provincial legislation.

2) The front-end processing (FEP) and waste stabilization facility (WSF) at Otter Lake do not provide a useful function compared to their stated purpose in the 1995 Strategy.

3) The landfill liner design specification in Nova Scotia is more stringent than most comparable state and provincial jurisdictions, and potential modifications could significantly reduce future capital costs.

4) An opportunity exists to significantly extend the life of the landfill at Otter Lake, and reduce the site per tonne capital costs by increasing the finished grade by 10-15 metres.

5) The two composting operations in Halifax and Dartmouth do not provide a sufficiently finished product to meet applicable guidelines which become effective in the near future.

6) Composting facilities are at capacity and additional processing capacity is required in the short and longer term.

7) Alternative composting technologies may improve the processing of ICI organics.

8) Collection programs are cost effective and meet most customer needs however there are opportunities to improve diversion by increasing the frequency of collection.

9) Opportunities exist for more collaborative use of resources with other waste management regions in Nova Scotia.

10) Energy-from-Waste and developing waste reduction technologies are not considered appropriate investments for HRM at this time.

11) Overall program costs in HRM are high and represent a greater financial burden on both the private and public sectors compared to similar communities.

12) HRM would benefit from the creation of a centralized waste resource campus, rather than having facilities at four different locations in Halifax and Dartmouth. Development can be staged over time to match the end-of-useful-life of current infrastructure and incorporate new elements for HRM such as outdoor windrow compost curing pads;

permanent educational and household hazardous waste facilities; and the development of a materials transfer capability.

12.2 RECOMMENDATIONS

Stantec has developed recommendations for an updated HRM waste resource strategy (Waste Resource Strategy Update) to guide program and service implementation over the next 10-20 years. Consistent with the three stated goals of this assignment, recommendations have been grouped into three sections below. The following list identifies issues representing fundamental change. Other more minor recommendations are included within the body of this report. As discussed previously, an integrated waste system such as that currently operating in HRM includes many program interdependencies. The following recommendations cannot necessarily be addressed in isolation, and contingent activities are noted where applicable. A conceptual implementation schedule on Figure 12.1 based on the these recommendations follow.

Opportunities for Cost Reductions

A1 – Closure of the FEP and WSF by the end of 2013

The FEP and WSF do not function in a manner envisaged in the 1995 Strategy. These facilities were intended to stabilize organic wastes and produce a low grade compost product. Few organics are now actually processed, and the multiple shredding of the waste prior to disposal may actually increase the generation of landfill gas over the short term in the period before gas collection systems can be installed. This may contribute to additional odours from the site. Implementation of this recommendation is contingent on HRM implementing a separate collection for white goods (stoves; refrigerators) rather than the current practice of loading these items in with the regular curbside waste and then removing the appliances from the waste at the FEP. The annual cost to operate the FEP and WSF is reported to be $8.9 million per year. Most of this amount could be recognized as sustainable savings less any contractual commitments.

A2 – Request Modification of the Nova Scotia Landfill Liner Specification

The current landfill liner specification is more stringent than most comparable state and provincial jurisdictions. Given the context in HRM and Nova Scotia in the 1990s, this conservative specification was considered prudent at the time. However, the current specification results in relatively high capital construction costs which in turn lead to increased expenses for the ICI sector and HRM. Based on examples from other jurisdictions, HRM capital costs for liner construction could be reduced by approximately $3.4 million for a typical cell ($10.2 million over the remaining life of the site) if Nova Scotia were to adopt a specification consistent with most similar jurisdictions.

A3 – Extend Life of Otter Lake Landfill through Vertical Expansion

The current design for the finished elevation of the landfill will result in a landform that will be consistent with surrounding topography. While this approach has merit, an extension of approximately 17-23 years to the life of the landfill can be achieved by a 10-15 metre increase in the finished grade of the site. Given the potential benefit to the broader community and the remote locale of the site, Stantec recommends that HRM consider a vertical expansion of the landfill subject to input from the immediate neighbours of the landfill.

Upgrade and Replacement of Infrastructure

B1 – Create a Centralized Waste Resource Campus

Current infrastructure is located at four different properties in Dartmouth and Halifax. With the exception of the Otter Lake facility, sites are of limited size and prevent the consideration of co-collection of materials at the curb in a single truck. Stantec recommends HRM establish a large acreage waste resource campus (Campus) in a location of sufficient size to meet changing infrastructure needs (excluding landfill disposal) for on the order of 50 years. The benefits would include the potential to optimize collection routing and fleet size, lands for compost curing, a common location for infrastructure replacements when needed, and a location for contingency waste transfer. Possible components and timing are presented below.

• Secure lands, obtain approvals and complete site servicing	2013/2014
• Construct and operate compost curing pads	2014/2015
• Construct scales, offices and educational centre	2015
• Construct multi-use transfer facility for white goods/waste/HHW	2015
• Construct anaerobic composter for ICI organics	2015/2016
• Construct replacement MRF	2017/2018
• Optional aerobic composting processing capacity	2018+
• Optional advanced waste reduction(gasification or other)	2020+
• Other long-term waste reduction infrastructure needs	2020+

B2 – Relocation of MRF to Campus

The existing MRF in Halifax is operating satisfactorily and equipment is suitable for current needs and until the expiry of a contract extension to 2019. As identified above, it is recommended that this activity be relocated to the Campus in anticipation of a 2019 contract start date.

B3 – Increase Organics Processing Capacity

The aerobic composting facility south of Halifax is not considered a strategic asset and could be decommissioned at the end of the current contract in 2019. Equivalent organics processing

capacity for the Halifax collection zone is recommended to be realized at Otter Lake by repurposing the WSF. The Dartmouth organics processing facility can meet Dartmouth area needs until at least 2030 by constructing an anaerobic processing facility by 2015/2016 at either the current site or at an alternative location.

Maximize Program Revenue and Increase Diversion

C1 – Improve Recovery of Recyclables and Organics

Based on the results of annual waste composition studies completed recently by SNC Lavalin and CBCL, 30% of residential and up to 50% of ICI materials currently sent to landfill could be recovered as recyclables or compostable organics. This is an opportunity for HRM to optimize existing programs and increase diversion.

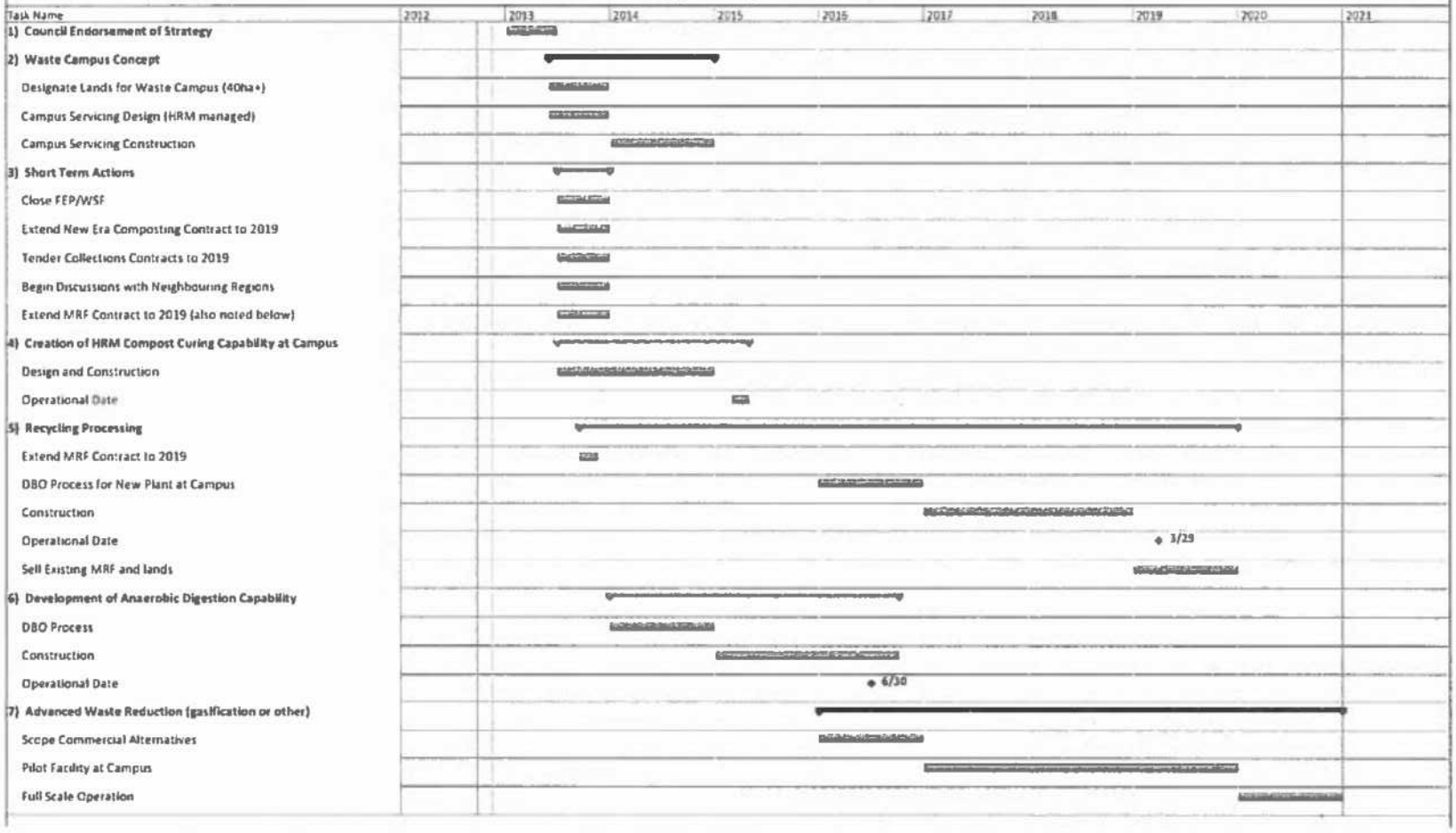
C2 – Control Curing and Sale of Finished Compost

Once organics are processed at facilities in Dartmouth and Halifax, the unfinished product is sold at a nominal fee of $1/tonne at both facilities. HRM has no control over the final maturation process and foregoes the potential for an increase in net revenue generation. The final maturation (also termed "curing") process typically requires a period of up to one year in outdoor open windrows to meet CCME guidelines and become a saleable product. It is recommended that HRM control the final curing process to ensure guidelines are being met with its compost, and also to gain the benefit of enhanced product value at final maturation.

C3 – Improve Curbside Collection Frequency

Challenges with recovery of divertible materials at the curb are often linked to the frequency of collection. Whether the entire collection system is weekly or every 2 weeks, this does not change the amount of material to be collected on a monthly basis. Residents are far more likely to divert organics and recyclables if collection is performed on a weekly basis so that odour and storage constraints do not affect participation.

Figure 12.1
HRM Waste Resources Strategy Update
Recommended Long-Term Implementation Schedule



13.0 Signatures

This document entitled Waste Resource Strategy Update was prepared by Stantec Consulting Ltd. for the Halifax Regional Municipality. The material in it reflects Stantec's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

All of which is respectfully submitted;

STANTEC CONSULTING LTD.





James Archibald, P. Eng.
Principal
Tel: (519) 575-4115
james.archibald@stantec.com

Catherine Smith, M.A.
Senior Consultant, National Solid Waste Leader
Tel: (519) 836-6966
cathy.smith@stantec.com

APPENDIX A

Dillon Consulting Memo dated September 17, 2012

Dillon Consulting Memo dated September 26, 2012

MEMO

DILLON CONSULTING

TO: Steve Copp –MIRROR NS

FROM: Christopher Shortall

DATE: September 17, 2012

SUBJECT: Potential Maximum Height of the Residuals Disposal Facility – Desktop Viewplanes' Sitelines

OUR FILE: 12-5940

As part of the review of the potential maximum height of the Residuals Disposal Facility (RDF) a desktop exercise of the potential viewplanes from the surrounding communities was completed.

The current permitted maximum elevation of the top of the RDF is 113.0 metres. To determine what the potential visual impact could be if the maximum elevation of the RDF was increased by 1.0 m, 5.0 m, 10.0 m and 15.0 m five view positions were established in the surrounding communities. These locations (assumed a widow on the second floor of a two storey house) along with the sitelines, as identified in **Figure No.1**, were located at:

- McDonald Lake Drive in Hatchet Lake;
- Old Coach Road in Goodwood;
- 4th Street in Lakeside;
- Sprucewood Avenue in Greenwood Heights; and
- Charles Road in Timberlea.

The top of Cell 6 was used as the RDF view position. Five metre mapping from Municipal Services was used to provide contouring. Representative vegetation between the RDF and the view position included tree heights ranging from 8.0 to 12.0 m.

Sightline profiles from the five view positions are discussed below and are presented in **Figure No. 2**.

- McDonald Lake Drive in Hatchet Lake – Line 1
    - The view position is lower in elevation than the RDF with undeveloped land consisting of mature forest between the view position and the RDF. Topography along the profile consists of a gradual slope toward the RDF from the view position with the land leveling off and sloping toward the RDF. Presently, the RDF does not appear to be visible. However, if the height is increased and a different view position selected, the RDF may become visible.
- Old Coach Road in Goodwood – Line 2
    - The view position is lower in elevation than the RDF with undeveloped land consisting of mature forest between the view position and the RDF. Presently, the RDF does not appear

to be visible. However, if the height is increased and from a different view position the RDF may become visible.

- 4th Street in Lakeside – Line 3
    - The view position is somewhat lower in elevation than the RDF with undeveloped land consisting of mature forest, Highway 103 and hilled topography between the view position and the RDF. With a potential increase in height the RDF should not be visible. However, from a different view position selected, the RDF may become visible.
- Sprucewood Avenue in Greenwood Heights – Line 4
    - The view position is lower in elevation than the RDF with undeveloped land consisting of mature forest and Highway 103 between the view position and the RDF. Topography along the profile consists of a gradual slope from the view position to the RDF. Presently, the potential exists that the RDF may now be visible from different view positions in the area. It is probable that the RDF would be visible from this or other view positions if the height is increased.
- Charles Road in Timberlea – Line 5
    - The view position is slightly lower in elevation than the RDF with undeveloped land consisting of mature forest, the Nine Mile River and Highway 103 between the view position and the RDF. Houses in this area are currently visible from the top of Cell 5 as shown in **Photo No. 1**. Buildings in Bayers Lake Industrial Park are visible from the back of Cell 5 as shown in **Photo No. 2** and apartment buildings in Clayton Park are also visible from the back of Cell 5 as shown in **Photo No. 3**. An increase in height would increase the visibility of the RDF to the selected and other view positions in this area.

Please do not hesitate to contact us if you have any questions regarding this submission.

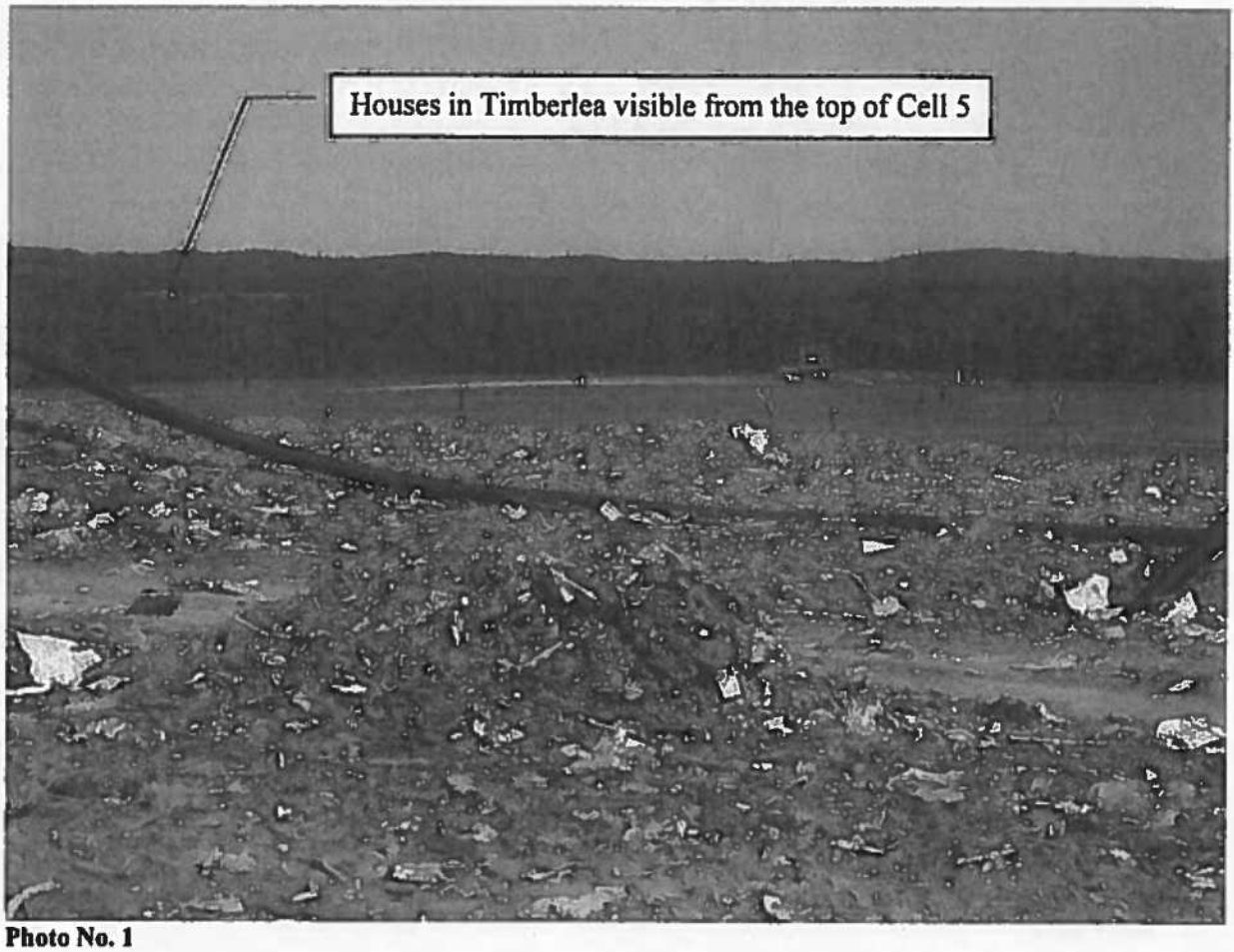


Photo No. 1

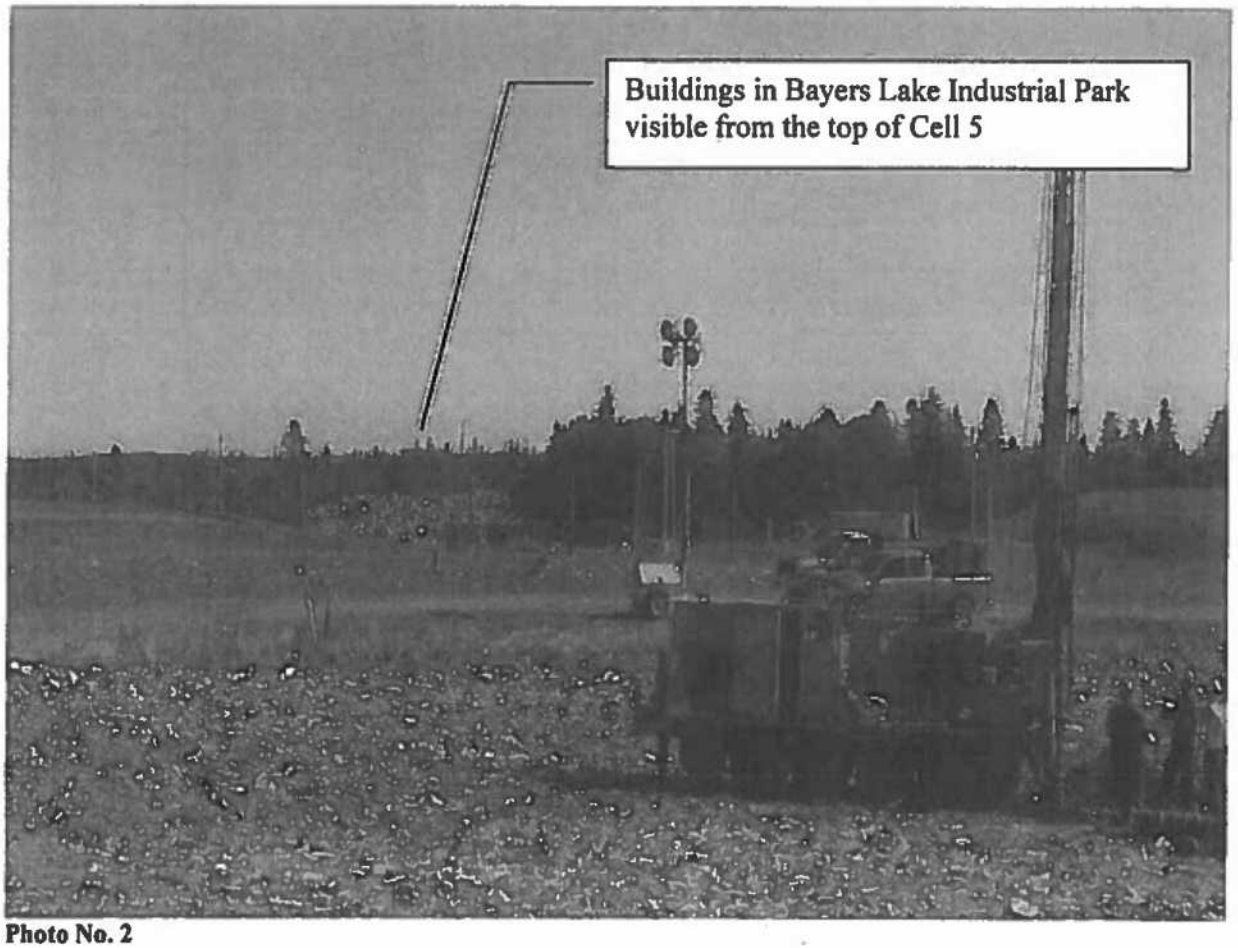

Buildings in Bayers Lake Industrial Park
visible from the top of Cell 5

Photo No. 2

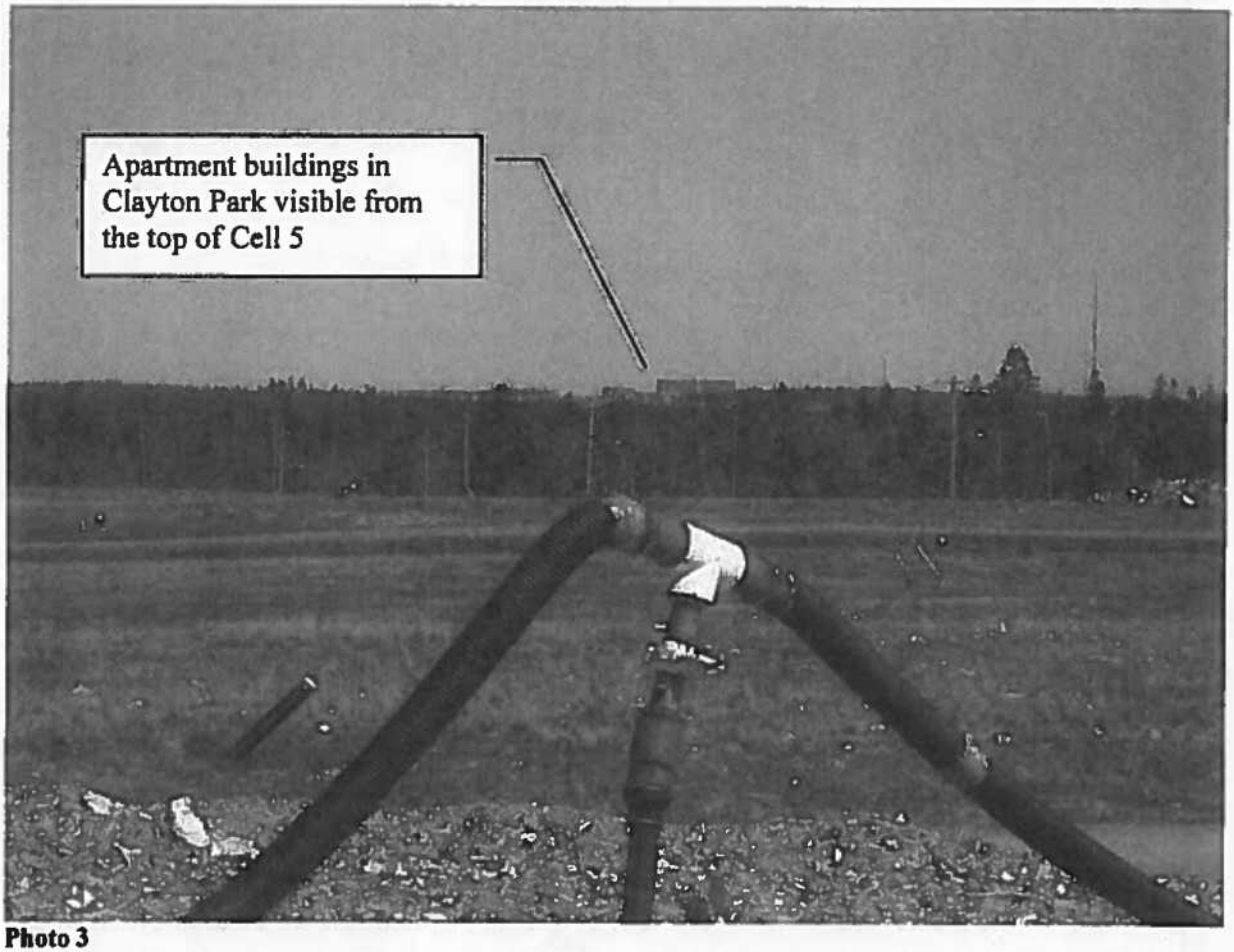
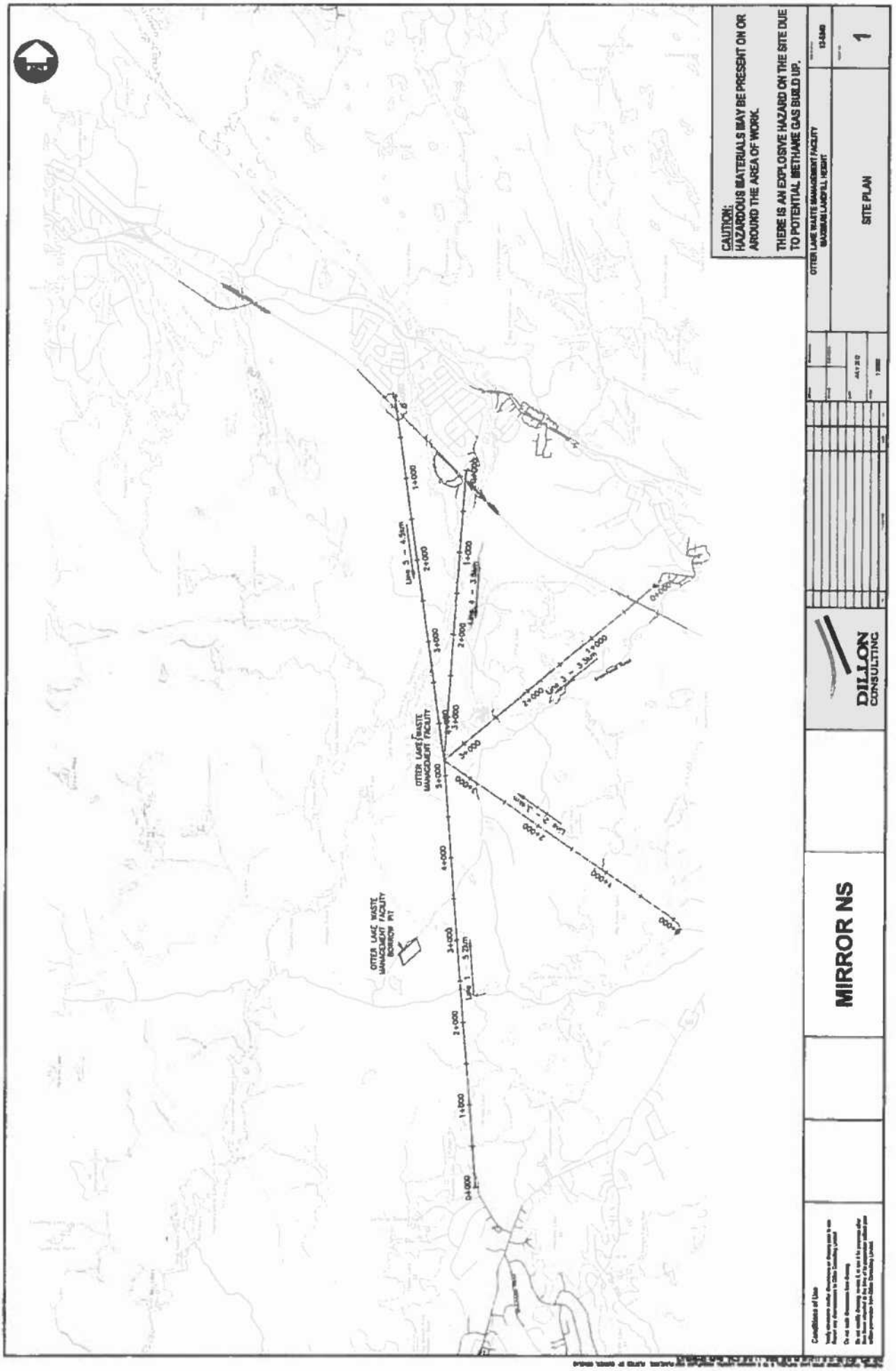
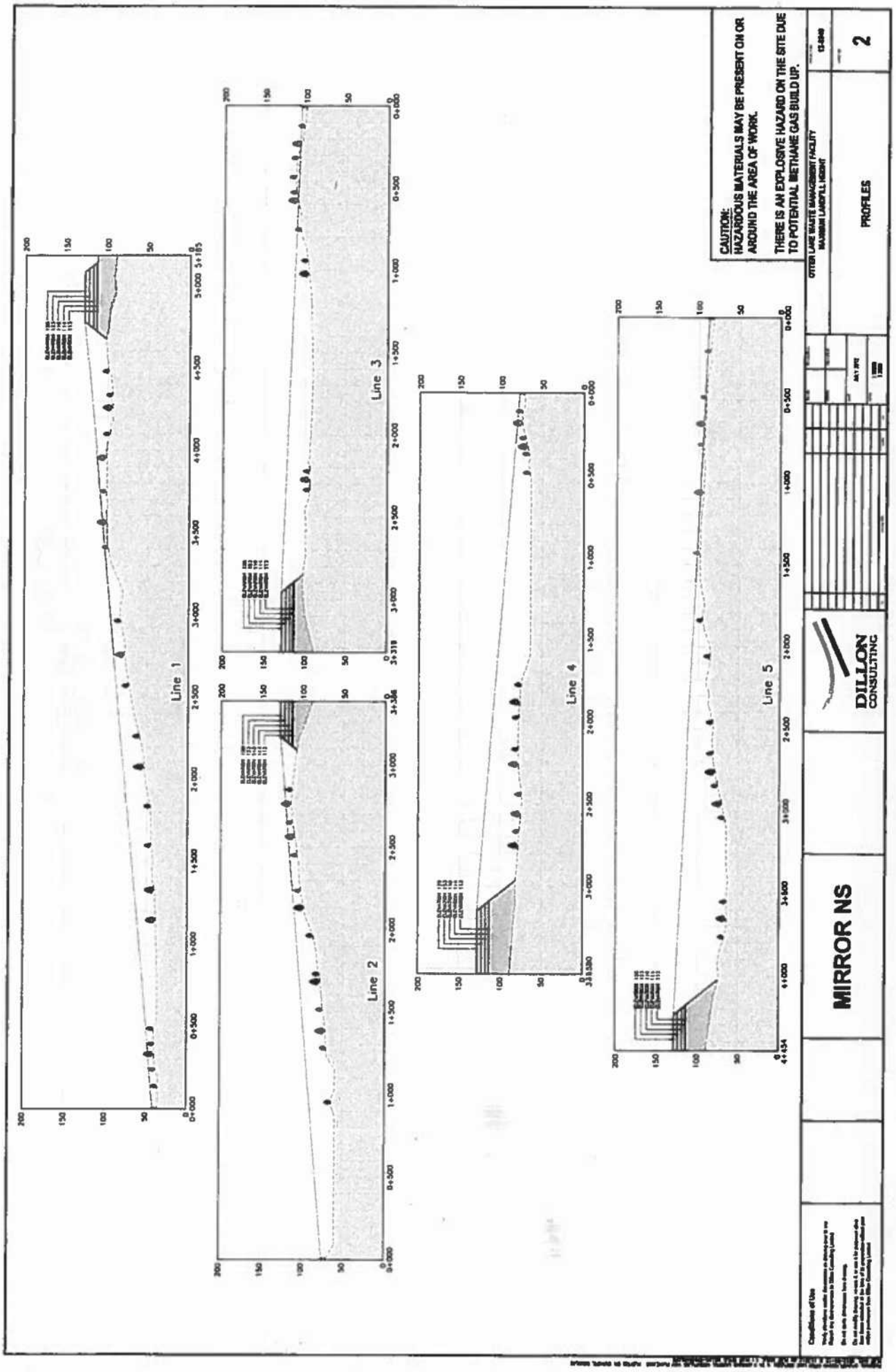

Apartment buildings in Clayton Park visible from the top of Cell 5

Photo 3


CAUTION:
HAZARDOUS MATERIALS MAY BE PRESENT ON OR AROUND THE AREA OF WORK.
THERE IS AN EXPLOSIVE HAZARD ON THE SITE DUE TO POTENTIAL METHANE GAS BUILD UP.
OTTER LAKE WASTE MANAGEMENT FACILITY
SITE PLAN
1
MIRROR NS
DILLON CONSULTING
OTTER LAKE WASTE MANAGEMENT FACILITY BORROW PIT
Line 1 - 3.2km
Line 2 - 3.4km
Line 3 - 4.5km
Line 4 - 3.5km
Line 5 - 3.3km


Line 1
Line 2
Line 3
Line 4
Line 5
CAUTION:
HAZARDOUS MATERIALS MAY BE PRESENT ON OR AROUND THE AREA OF WORK.
THERE IS AN EXPLOSIVE HAZARD ON THE SITE DUE TO POTENTIAL METHANE GAS BUILD UP.
OTTER LAKE WASTE MANAGEMENT FACILITY
NAVAN LANDFILL HEIGHT
PROFILES
2
MIRROR NS
DILLON
CONSULTING

MEMO

DILLON CONSULTING

TO: Steve Copp – MIRROR NS

FROM: Christopher Shortall

DATE: September 26, 2012

SUBJECT: Potential Maximum Height of the Residuals Disposal Facility – Potential Capacity Modifications

OUR FILE: 12-5940

As part of the review of the change to the potential maximum height of the Residuals Disposal Facility (RDF) a desktop exercise was completed to determine the impact on the potentially available volume/tonnage if the height of the RDF was increased.

The current permitted maximum elevation of the top of the RDF is 113.0 meters. To determine what the potential impact on the available volume/tonnage would be the height of the maximum elevation of the RDF was increased by 1.0 m, 5.0 m, 10.0 m and 15.0 m. The change the potentially available volume and associated tonnage was based on the following information and assumptions.

- Topographic survey of April 2011 of the top of cover in Cell 1 to 4;
- Designed top of Cell 5;
- Topographic survey of December 2010 of the existing ground for Cell 6;
- Topographic survey based on 1996 Air Photo contours for Cells 7 to 9;
- Liner system in Cells 7 to 9 based on the existing liner system;
- Cover in Cells 1 to 4 is removed;
- RDF has 4:1 side slopes
- Density of 800 kg/m^3; and
- A monthly tonnage of 12,000 tonnes.

Based on the above information and assumptions the following tables outline the potentially additional tonnages in Cells 1 to 5 and Cells 6 to 9.

Table 1

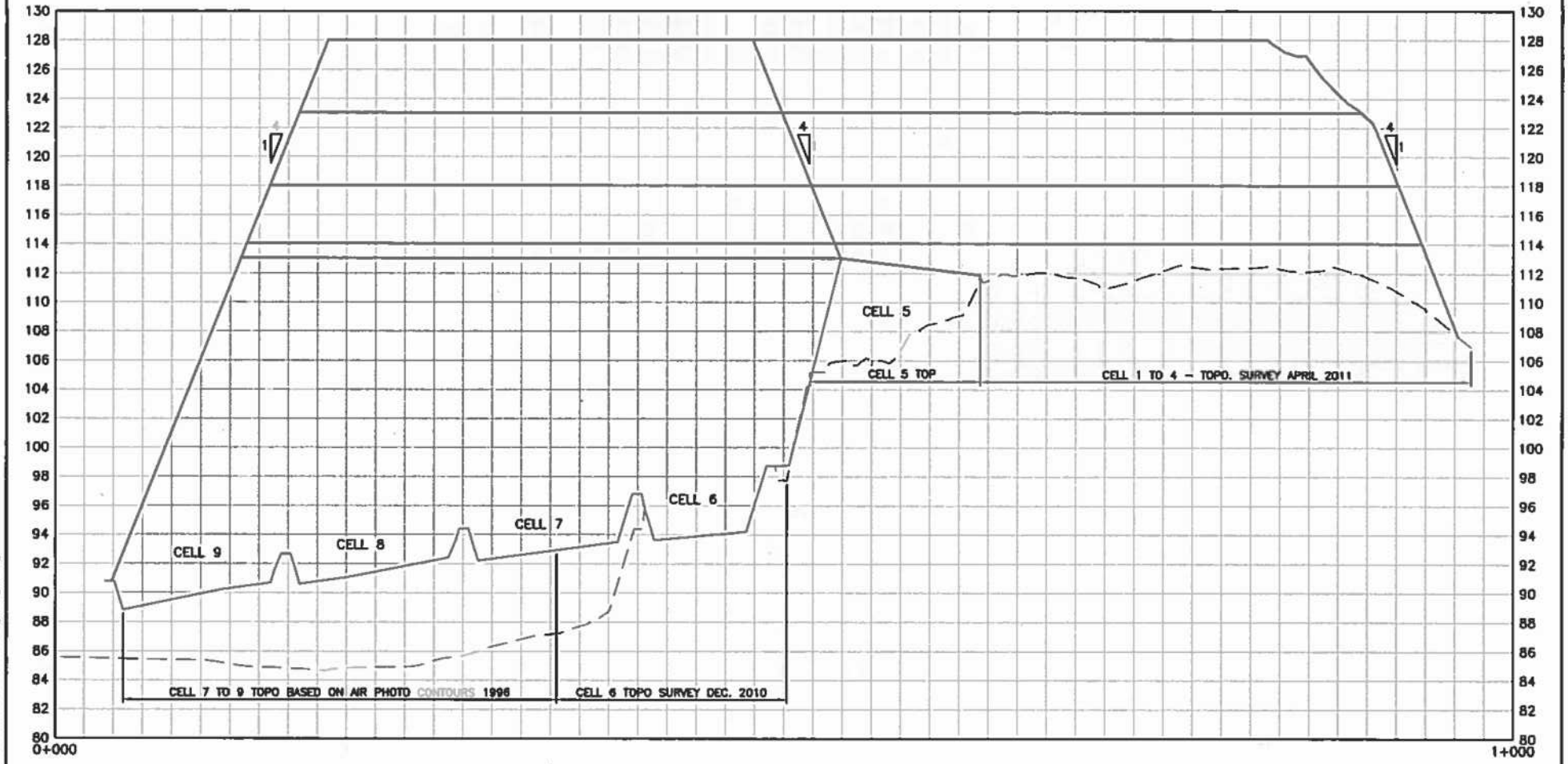
Option	Opinion of Potential Change to Available Tonnage (tonnes)	Opinion of Potential Additional Time (months)
Top of RDF Cell 1 to 5 at elevation 114	294,000	25
Top of RDF Cell 1 to 5 at elevation 118	795,000	66
Top of RDF Cell 1 to 5 at elevation 123	1,350,000	113
Top of RDF Cell 1 to 5 at elevation 128	1,830,000	152

Table 2		
Option	Opinion of Potential Change to Available Tonnage (tonnes)	Opinion of Potential Additional Time (months)
Top of RDF Cell 6 to 9 at elevation 114	140,000	12
Top of RDF Cell 6 to 9 at elevation 118	660,000	55
Top of RDF Cell 6 to 9 at elevation 123	1,190,000	99
Top of RDF Cell 6 to 9 at elevation 128	1,603,000	134

It should be noted that an increase in the height of the top of the RDF may have the following impacts that should be addressed prior to any decision being made to increase the height of the RDF and/or open the existing closed cells:

- Cells 6 to 9 will take longer to fill, increasing the operating duration of each cell.;
- An increase duration between capping events, as Cells 6 to 9 will take longer to reach final grade;
- View-plane impacts for Cells 1 to 5 and Cells 6 to 9;
- Raising the elevation in Cells 1 to 5 essentially requires the replacement of the existing cap systems; only the vegetative cover soils would be reusable. Accordingly, raising the elevation by only one meter would likely not be economically feasible.
- Change in the timeline of the installation and operation of landfill gas collection wells, possibly requiring:
    - the installation of horizontal collection wells,
    - additional vertical wells,
    - longer periods utilizing the temporary collection piping, and
- Operational challenges including:
    - longer and steeper access roads possibly on the top of existing cells increasing differential settlement in the cover,
    - increased leachate production, and
    - tighter coordination of the cell construction and capping cycle.

If you have any questions regarding this submission please do not hesitate to contact us.



N.T.S.

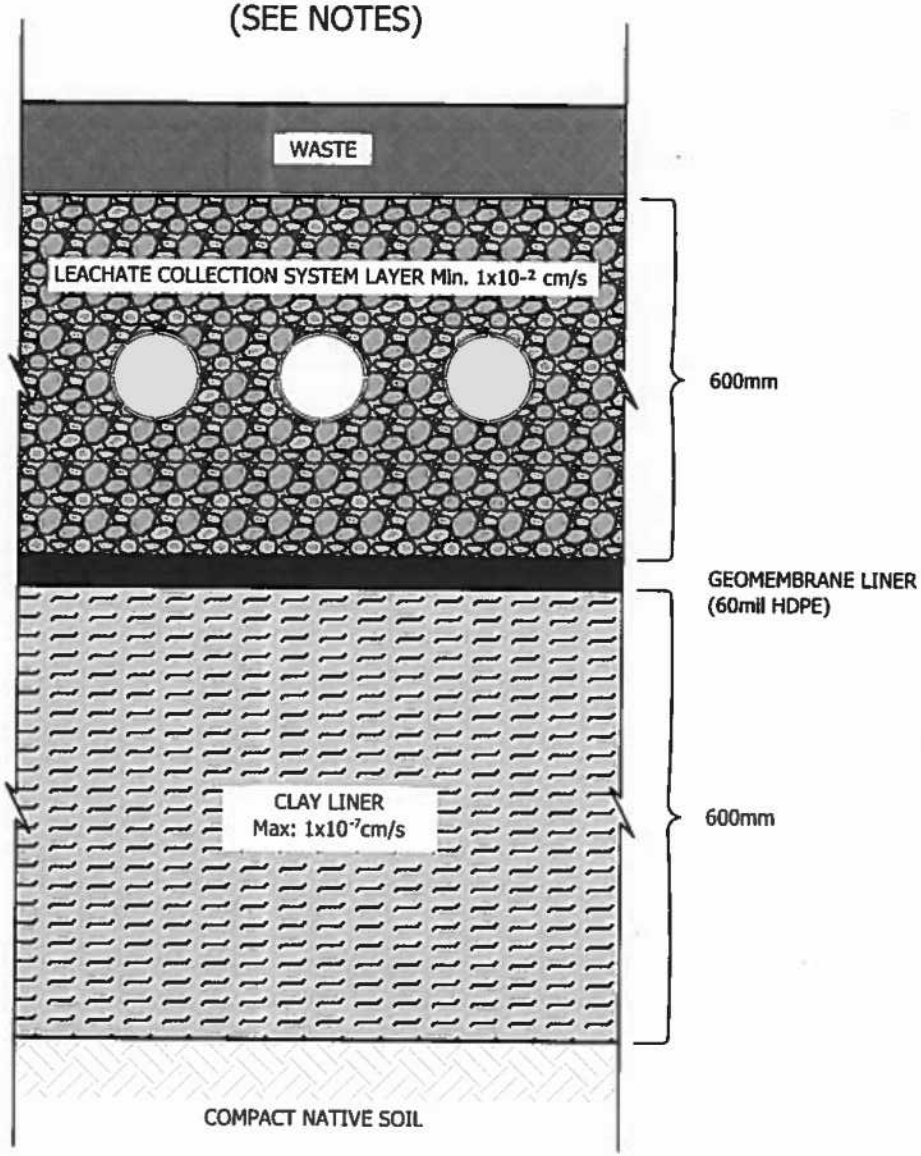
DILLON CONSULTING	PROJECT: OTTER LAKE WASTE MANAGEMENT FACILITY OTTER LAKE RDF WORK - MAXIMUM LANDFILL HEIGHT	PROJECT NO.: 12-5940
DATE: SEPTEMBER 2012	TITLE: PROPOSED INCREASE IN THE MAXIMUM ELEVATION OF THE RDF	FIGURE NO.: 1

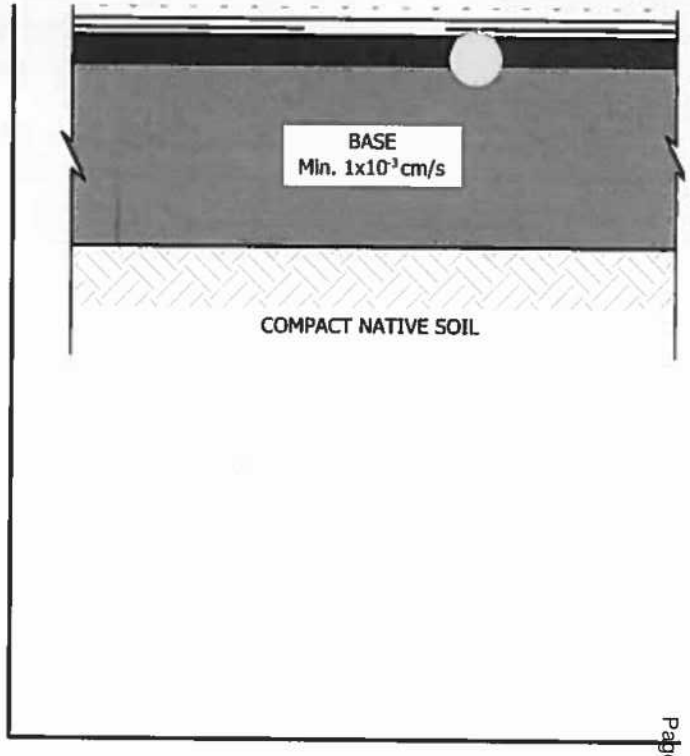
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APPENDIX B

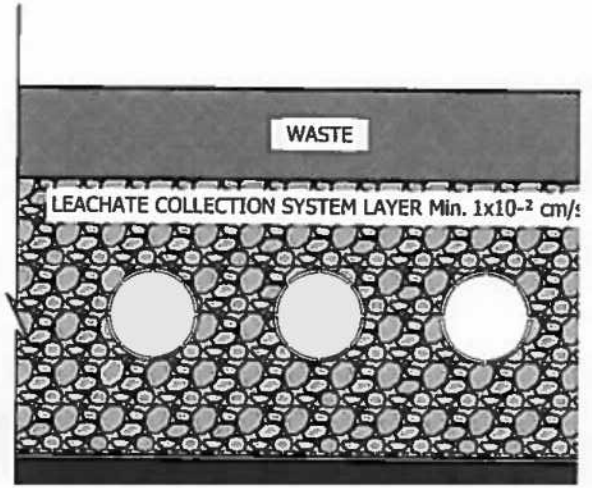
Drawing No. 01 – Landfill Liner Designs

ONTARIO
(SEE NOTES)





PENNSYLVANIA



USEPA