

**Terms of Reference**  
for  
**Environmental Assessment**  
of a  
**New Landfill Footprint**  
at  
**Beechwood Road Environmental Centre**  
**Town of Greater Napanee**

**Volume 3 of 3**

**Supporting Documents**



June 2010

**Terms of Reference**  
for  
**Environmental Assessment**  
of a  
**New Landfill Footprint**  
at  
Beechwood Road Environmental Centre  
Town of Greater Napanee

**Supporting Document #1**  
**Response to Minister's Refusal**  
**of Previous (2006) EA**



June 2010



## Table of Contents

<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>SD1-1</b>
<b>2.0</b>	<b>RESPONSE TO MINISTER’S REFUSAL OF PREVIOUS (2006) EA APPLICATION .....</b>	<b>SD1-2</b>
2.1	Page 2, Paragraph 5 .....	SD1-2
2.2	Page 3, Paragraph 3 .....	SD1-3
2.3	Page 3, Paragraph 4 .....	SD1-4
2.4	Page 3, Paragraph 5 .....	SD1-5
2.5	Page 4, Paragraph 2 .....	SD1-5
2.6	Page 4, Paragraph 2 .....	SD1-6
2.7	Page 4, Paragraph 5 .....	SD1-6
2.8	Page 4, Paragraph 6 .....	SD1-6
2.9	Page 6, Paragraph 3 .....	SD1-7
2.10	Page 6, Paragraph 5 .....	SD1-8
2.11	Page 7, Paragraph 6 .....	SD1-9
2.12	Page 7, Paragraph 7 .....	SD1-9
2.13	Page 8, Paragraph 1 .....	SD1-10
2.14	Page 8, Paragraph 2 .....	SD1-10
<b>3.0</b>	<b>RESPONSE TO PEER REVIEW COMMENTS FROM THE TOWN OF GREATER NAPANEE .....</b>	<b>SD1-11</b>
3.1	Page 1, paragraph 4.....	SD1-11
3.2	Page 1, paragraph 5.....	SD1-11
3.3	Page 2, paragraph 1.....	SD1-12
3.4	Page 2, paragraph 2.....	SD1-12
3.5	Page 2, paragraph 3.....	SD1-13
3.6	Page 2, paragraph 4.....	SD1-13
3.7	Page 2, paragraph 5.....	SD1-13





3.8 Page 2, paragraph 6 ..... SD1-14

3.9 Page 2, paragraph 7 ..... SD1-14

3.10 Page 2, paragraph 8 ..... SD1-14

3.11 Page 3, paragraph 1 ..... SD1-15

3.12 Page 3, paragraph 2 ..... SD1-15

3.13 Page 3, paragraph 7 ..... SD1-16

3.14 Page 3, paragraph 8 ..... SD1-16

3.15 Page 4, paragraph 1 ..... SD1-17

3.16 Page 4, paragraph 2 ..... SD1-17

3.17 Page 4, paragraph 3 ..... SD1-18

3.18 Page 4, paragraph 4 ..... SD1-18

3.19 Page 4, paragraph 5 ..... SD1-19

3.20 Page 4, paragraph 6 ..... SD1-19

3.21 Page 4, paragraph 7 ..... SD1-20

3.22 Page 5, paragraph 1 ..... SD1-21

3.23 Page 5, paragraph 2 ..... SD1-21

3.24 Page 5, paragraph 3 ..... SD1-21

**4.0 REFERENCES..... SD1-23**





## 1.0 INTRODUCTION

Between 1999 and 2006, our company, Waste Management of Canada Corporation (WM), sought approval, under the Ontario *Environmental Assessment Act* (EAA), to expand the Richmond Landfill in the Town of Greater Napanee by increasing the licensed airspace by approximately 25 million cubic metres (m<sup>3</sup>). Our application was met with very significant opposition and criticism from the surrounding community, residents and First Nations peoples, including challenges in court relating to approval of the Terms of Reference (TOR). In 2006, the Minister of the Environment (the Minister) refused our Environmental Assessment (EA) application, in a letter that provided reasons mainly related to groundwater protection, leachate control, air emission impacts and other environmental impact issues. In 2006, the Town of Greater Napanee also provided comments from their Peer Review Team.

From the previous EA experience, we recognized that these outstanding concerns and technical questions relating to the safety and performance of the existing Richmond Landfill site must be addressed in order for us to move forward with a new proposal. To meet this goal, we engaged in a lengthy process discussing the previous EA study and resolving outstanding issues and concerns raised in the Minister’s refusal letter and Town of Greater Napanee’s Peer Review.

This Supporting Document contains our responses to the Minister’s letter and the peer review. It should be noted that the comments and responses described herein relate to the previous proposal. Many comments/concerns do not apply to the new proposal.





## 2.0 RESPONSE TO MINISTER’S REFUSAL OF PREVIOUS (2006) EA APPLICATION

The Minister’s letter, dated November 3, 2006, provided the rationale for the refusal of the previous EA application [1]. This section addresses the Minister’s comments contained in the letter. For convenience, the Minister’s comments are reproduced in the subsequent sections, and our response is provided below the comment.

### 2.1 Page 2, Paragraph 5

#### Comment

The Minister wrote:

*“The Government Review concluded that the landfill site is located in a susceptible subsurface environment where there are significant environmental risks associated with expanding the landfill site. The Review stated that WM did not:*

- a. adequately describe existing baseline conditions;*
- b. meet regulatory requirements for meeting Reasonable Use Limits (RUL) at the property boundary; and*
- c. provide for a viable leachate control option.”*

#### Response

Since the previous EA was submitted and a decision rendered, WM’s first technical priority has been to demonstrate to the Ministry of the Environment’s (the Ministry) satisfaction that the existing landfill is safe and that it is not causing off-site impacts to groundwater. To achieve this, it was necessary for WM to address the Ministry’s concerns regarding the site physical hydrogeology (conceptual model). A prerequisite to addressing the concerns of the Ministry, the Mohawks of the Bay of Quinte (MBQ), the Town of Greater Napanee and the community was to further develop and describe a conceptual model of site geology and groundwater flow conditions that explains existing groundwater conditions to the Ministry’s satisfaction, and to prove that it was possible and practicable to monitor groundwater flow and quality at the Site and in the Site-vicinity.





During 2007, 2008, and 2009 WM participated in extensive technical meetings with the Ministry in Kingston to discuss their concerns and the results of investigations and technical analyses completed since 2006. In October 2009, we submitted a report titled *Site Conceptual Model Report, Richmond Landfill* [2] that was the result of an extensive field investigation performed in 2009. This report describes the site hydrogeologic conceptual model and specifically describes the two active flow zones beneath the site, including groundwater flow directions. This report, now accepted by the Ministry as per their letter of April 28, 2010, forms the basis for preparation of a revised environmental monitoring plan (EMP) for the existing landfill site [3]. This revised EMP will provide the background and specific details regarding the evaluation of groundwater monitoring locations and chemistry to meet regulatory requirements for Reasonable Use as contemplated by the Ministry Guideline B-7.

The findings and conclusions as summarized in the Site Conceptual Model Report will be utilized together with additional investigations to define the hydrogeological baseline conditions in the area of the new landfill footprints and serve as the basis for design of leachate management and control systems. The EA will demonstrate that Reasonable Use Limits in the groundwater at the property boundary will be met, as required by the Ontario Regulation (O. Reg.) 232/98.

## 2.2 Page 3, Paragraph 3

### Comment

The Minister wrote:

*“The Government Review identified that the Hydrogeologic Baseline Assessment did not adequately assess the existence or absence of major fractures which could convey leachate off-site. The Ministry also identified that the sample grid density in the north portion of the property was insufficient to assess the impact of a liner failure. ... WM failed to establish to the satisfaction of the Ministry that the proposed expansion would not result in conveying leachate off-site through fractures.”*





## Response

The Site Conceptual Model Report, referred to above, addresses the Ministry’s concerns related to the presence or absence of major fractures that could convey leachate off-site from the new landfill footprint. The revised EMP will address the appropriate vertical and horizontal locations for monitoring potential off-site migration of leachate.

As part of the EA of a new landfill footprint, a new investigation will be performed to evaluate the site hydrogeology in the proposed new landfill area in context of the new Site Conceptual Model. This investigation will be designed and performed in consultation with the Ministry to ensure that concerns related to grid density are addressed.

## 2.3 Page 3, Paragraph 4

### Comment

The Minister wrote:

*“On July 18, 2006 WM submitted additional geophysical survey results to validate their description of major fracture features. WM used a different technique from what was described in the EA. The Ministry’s preliminary review indicated that the geophysical survey did not look at the south west portion of the site, which the Ministry believes may contain a critical flow path. Furthermore, this additional analysis was not included in the EA and therefore the public and other members of the GRT did not have an opportunity to comment or be consulted on those additional results.”*

### Response

As discussed in response to previous comments, extensive investigative work has been done at the site since 2006. A portion of this work was designed to specifically address the Ministry’s concerns related to the southwest portion of the existing site. The resultant Site Conceptual Model is the culmination of all the work done to date.







## 2.4 Page 3, Paragraph 5

### Comment

The Minister wrote:

*“WM failed to establish to the satisfaction of the Ministry that the proposed expansion would not result in conveying leachate off-site through fractures.”*

### Response

As part of the EA for a new landfill footprint, a hydrogeologic investigation will be performed in the development envelopes for the new landfill footprint alternatives to address the Ministry’s concerns related to potential leachate migration from the new landfill footprint.

## 2.5 Page 4, Paragraph 2

### Comment

The Minister wrote:

*“The EA did not use the method described in O. Reg. 232/98 to calculate RUL; instead WM used an alternative method in the EA. The alternative method produced numerical values which were not protective of local drinking water quality. The Ministry concluded that WM’s RUL would not prevent impairment of domestic-use groundwater resources by a number of contaminants.”*

### Response

As indicated in response to a previous comment (Section 2.1), the revised EMP will address the Ministry’s concerns regarding the establishment of RUL. In the EA for the new landfill footprint, we will use methodology acceptable to the Ministry to calculate RUL (i.e., the approach described in O. Reg. 232/98), and demonstrate that the Ministry’s regulatory requirements will be met over the contaminating lifespan of the landfill and document the assessment in the EA Study Report.





## 2.6 Page 4, Paragraph 2

### Comment

The Minister wrote:

*"WM has failed to establish how groundwater will be protected at the property boundary based on either the methodology prescribed under O. Reg. 232/98 or an alternative that is suitable to the Ministry."*

### Response

See response 2.5 above.

## 2.7 Page 4, Paragraph 5

### Comment

The Minister wrote:

*"The Government Review found that the EA did not provide the Ministry with sufficient environmental rationale for the proposal to reclaim the south footprint. Based on the Government Review, the Ministry concluded that the long term benefits of reclamation did not offset the environmental risk associated with reclamation and therefore, it should not be considered for approval."*

### Response

The current project (undertaking) does not involve any proposed reclamation activities. The south footprint (i.e., current landfill) will be closed in June 2011.

## 2.8 Page 4, Paragraph 6

### Comment

The Minister wrote:

*"The Ministry noted that the [cracks and fissures] analysis was incomplete, but it did highlight the Ministry's concern that the site has resulted in off-site odour impacts, and the importance of calculating calm air data in the air quality impact analysis."*



## Response

As noted in the previous responses, WM has worked with the Ministry to address outstanding technical issues at the current landfill site.

In 2003, WM was receiving numerous odour complaints mainly due to leaking above ground landfill gas collection flex piping. This situation was rectified by WM by replacing and burying the above ground gas flex piping system with HDPE piping. Every year since the remediation took place, odour complaints have decreased. By 2007 they were down to a few dozen. In the past two years WM has installed dewatering pumps, which has lowered complaints even further. A number of odour surveys have been conducted by a consultant and last year the Ministry participated in an odour survey and verified that there was little to no issue now. The Ministry also conducted their own Trace Atmospheric Gas Analyzer (TAGA) of the landfill survey and reported no that there were no issues. Capping with 1 metre (m) of clay soil and leachate seep repairs over the past few years has also resulted in improvements. Yearly scans over the landfill surface have shown a tremendous improvement of ‘hot spots’; concluding with zero ‘hot spots’ identified in 2009.

The EA of the new landfill footprint will be undertaken according to the approved TOR. During the preparation of the TOR, WM will consult and work with the Ministry and other regulatory agencies to ensure that the work plans, data sources and assessment methodologies for the EA of the new landfill footprint are acceptable and meet all EA requirements. The assessment methodology will utilize the Ministry's pre-processed meteorological data for the area that does not remove calm wind speeds. This is as per the directions from the Ministry that came out after the original assessment.

## 2.9 Page 6, Paragraph 3

### Comment

In responding to WM's request for a hearing, the Minister stated:

*“Some members of the GRT, comprised of federal, provincial, municipal, and conservation authority, representatives found that the EA resulted in the recommendation of a preferred undertaking whose environmental risks raised significant concern or were not clearly understood.”*





## Response

Since 2006, WM has worked with the Ministry to address outstanding technical issues at the current landfill site, most notably groundwater and odour. As a result, there is agreement with the Site Conceptual Model, which is fundamental to predicting and assessing environmental risks at the site. Further technical studies will be conducted during the EA of the new landfill footprint for all components of the environment as identified in the TOR. The scope of these studies will be determined during the development of the TOR in consultation with the Government Review Team (GRT).

## 2.10 Page 6, Paragraph 5

### Comment

The Minister wrote:

*“In reflecting on WM’s request to withdraw its EA, I note that WM has not been able to demonstrate either scientifically or technically that implementation of the proposed undertaking could be done in a manner that would protect human health and the environment. The Government review of the EA found that the scientific underpinnings of WM’s work could not adequately describe the baseline conditions for groundwater. It also found that the proposal failed to provide for a technically viable leachate control option that would protect ground water and could not demonstrate whether the project would have environmental impacts beyond the boundaries of the landfill site.”*

### Response

As noted in the previous response, WM has worked with the Ministry to address outstanding technical issues at the current landfill site. Further technical studies will be conducted during the EA of the new landfill footprint for all components of the environment. The scope of these studies will be determined during the development of the TOR and will include consultation with the GRT.





## 2.11 Page 7, Paragraph 6

### Comment

The Minister wrote:

*“From my review of the information on hydrogeology/geology, groundwater reasonable use limits, and air quality impacts I have concluded that approving the EA would be inconsistent with the purpose of the EAA ...”*

### Response

As noted in several other responses, WM has listened and learned from the previous EA process. The current BREC proposal is much different and improved over the previous one. Technical issues and uncertainties regarding the previous baseline studies for groundwater related to the existing landfill have been resolved. Technical studies conducted during the current EA will be detailed and sufficient to ensure that the EA will be consistent with the purpose of the Ontario Environmental Assessment Act (EAA).

## 2.12 Page 7, Paragraph 7

### Comment

The Minister wrote:

*“I conclude that the undertaking would not meet the regulatory requirements for protecting groundwater. In addition, the EA does not provide a viable leachate control plan.”*

### Response

The response provided to comment 2.11, above, also applies to the Minister’s conclusion. The current EA will fully address leachate control and management and groundwater protection. The Ministry, the Town of Greater Napanee and the public will be consulted during the EA on these issues.



## 2.13 Page 8, Paragraph 1

### Comment

The Minister wrote:

*“I also find that the impacts of the existing landfill operation on the environment are not adequately described in the EA.”*

### Response

Studies and reports conducted by WM since the Minister’s refusal of the EA in 2006, as well as further studies that are being undertaken now, will fully describe the impacts of the existing landfill operation.

## 2.14 Page 8, Paragraph 2

### Comment

The Minister wrote:

*“Finally it is my opinion that the EA does not include a sound plan to mitigate air emissions.”*

### Response

The new landfill footprint, which is one component of the BREC, does not include excavation of wastes from the current landfill, which was a major cause of concern for air emissions associated with the previous EA proposal. The EA for the current proposal will fully address air emission impacts and mitigation measures.





### **3.0 RESPONSE TO PEER REVIEW COMMENTS FROM THE TOWN OF GREATER NAPANEE**

This section of the Supporting Document addresses each of the Town of Greater Napanee’s Peer Review Team (PRT) comments [4]. For convenience, the PRT’s comments are reproduced in the subsequent sections, and our response is provided below the comment.

#### **3.1 Page 1, paragraph 4**

##### **Comment**

PRT stated:

*“The EA documents, as submitted to the Ministry, contain significant deficiencies and do not meet best practice standards for environmental assessment in Ontario.”*

##### **Response**

This comment pertains to the previous proposal. The TOR for the EA of the new landfill footprint is in conformance with the Ministry Code of Practice Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario [5]. The TOR proposes additional assessments that exceed the requirements of the Ontario EAA, including assessment of cumulative effects and an assessment of the effects of the environment on the project. The proposed TOR, which has received broad consultation, is intended to produce EA documents that meet currently accepted standards.

#### **3.2 Page 1, paragraph 5**

##### **Comment**

PRT stated:

*“The air quality assessment concludes that there will be unacceptable exceedances of health-based and nuisance criteria, but fails to provide a sufficiently strong commitment by the proponent to further mitigation, INCLUDING reductions to the fill rate until exceedances disappear.”*





## Response

The current proposal is significantly different from the previous one. The size of the new landfill footprint is smaller and there will be no reclamation of the south footprint, which will be closed. The proposed TOR includes new air quality assessments that will be completed to meet the current Ministry standards. Should the EA identify that mitigation measures are required, WM will make clear commitments as appropriate.

### 3.3 Page 2, paragraph 1

#### Comment

PRT stated:

*“The human health risk assessment does not meet best practice standards for such studies in the Province of Ontario.”*

#### Response

See response to 3.1.

### 3.4 Page 2, paragraph 2

#### Comment

PRT stated:

*“The EA provides insufficient data points to create a defensible conceptual model of the site hydrogeological setting, particularly in the northern portion of the site.”*

#### Response

Since 2006, significant investigative work has been completed to address concerns related to the Site Conceptual Model. The October 2009 Conceptual Model Report provides an updated conceptual model based on this recently completed work.

As indicated in response 2.2 above, as part of this project additional hydrogeologic investigation will be performed in the new landfill footprint area to evaluate the hydrogeology in the context of the revised Site Conceptual Model.







### **3.5 Page 2, paragraph 3**

#### **Comment**

PRT stated:

*“WM has failed to conduct sufficient hydrogeological investigations in the immediate vicinity of Marysville Creek and beyond.”*

#### **Response**

See response 3.4 above.

### **3.6 Page 2, paragraph 4**

#### **Comment**

PRT stated:

*“WM’s efforts to accurately monitor critical groundwater conditions at the site, using observation wells, is compromised by the presence of localized tortuous conduits (LTC) with indeterminate preferential flow paths.”*

#### **Response**

The Site Conceptual Model Report discusses groundwater flow in both the shallow and intermediate groundwater flow zones. The revised EMP will describe groundwater monitoring locations required to monitor potential leachate impact to groundwater based on the revised Site Conceptual Model.

### **3.7 Page 2, paragraph 5**

#### **Comment**

PRT stated:

*“WM has failed to evaluate the risk to off-site ground and surface water users beyond the 500 metre distances from the site.”*

#### **Response**

Potential effects of the undertaking on down-gradient groundwater and downstream surface water users will be addressed in the EA of the new landfill footprint.





### 3.8 Page 2, paragraph 6

#### Comment

PRT stated:

*“Residential lands adjacent to the south limit of the proposed landfill site are potential receptors of contaminated groundwater due to southerly flow of groundwater in the bedrock.”*

#### Response

As there is a southerly component to groundwater flow in both the shallow and intermediate flow zones, the revised EMP will require the proper placement of groundwater monitoring wells to evaluate the migration of potentially impacted groundwater between the existing landfill and residential lands to the south.

Potential effects on down-gradient groundwater receptors will be assessed in the EA of the new landfill footprint.

### 3.9 Page 2, paragraph 7

#### Comment

PRT stated:

*“WM has failed to make sufficient contingency assumptions in the EA about the concentration of leachate contaminant to be treated; the quantity of the leachate that may be generated; and the timing of when peak flows may arrive.”*

#### Response

The EA of the new landfill footprint will address these issues.

### 3.10 Page 2, paragraph 8

#### Comment

PRT stated:

*“WM’s selected preferred leachate treatment alternative has not been subjected to a full comparative evaluation in the same manner as other treatment alternatives.”*





### **Response**

In the current proposal, leachate collected at the site will be transported to the Napanee Water Pollution Control Plant for proper treatment and disposal according to regulatory requirements. No comparison of alternative methods to address leachate treatment is contemplated in the EA of the new landfill footprint. Potential impacts of leachate collection and treatment will be assessed in the EA of the new landfill footprint.

### **3.11 Page 3, paragraph 1**

#### **Comment**

PRT stated:

*“Many of WM’s impact assessments suffer from a lack of detail and data and also from internal inconsistencies.”*

#### **Response**

The EA of the new landfill footprint will be undertaken according to the approved TOR. WM will consult and work with the Ministry and other members of the GRT to ensure that the work plans, data sources and assessment methodologies for the EA of the new landfill footprint are acceptable, sufficiently detailed and consistent, and meet all EA requirements.

### **3.12 Page 3, paragraph 2**

#### **Comment**

PRT stated:

*“WM’s natural environment baseline characterization study contains major deficiencies. Specifically, it fails to provide sufficient mapping of the terrestrial, wetland and aquatic resources surrounding the landfill site to allow for impact prediction, and does not provide for monitoring of terrestrial or aquatic ecology during site development and operation.”*

#### **Response**

Additional aquatic and terrestrial surveys were completed in 2009 and further studies are scheduled for the EA of the new landfill footprint to characterize the natural environment baseline conditions. During the development of the TOR, the scope of natural environment technical studies to be conducted during the EA will be determined through discussions with regulatory agencies.



WM will consult and work with the Ministry and other regulatory agencies to ensure that the work plans, data sources and assessment methodologies for the EA of the new landfill footprint are acceptable and meet all EA requirements

### **3.13 Page 3, paragraph 7**

#### **Comment**

PRT stated:

*“The EA does not provide sufficient data to properly verify the noise assessment or sufficient detail to describe the noise mitigation commitments...”*

#### **Response**

During the development of the TOR for the EA of the new landfill footprint alternative, which is one component of the BREC, the scope of noise technical studies to be conducted during the EA will be determined through discussions with regulatory agencies. Technical studies will meet the requirements of the Ministry. The public will also be consulted on the scope of these studies. Commitments to any mitigation measures considered necessary will be confirmed in the EA.

### **3.14 Page 3, paragraph 8**

#### **Comment**

PRT stated:

*“The EA fails to recognize the significance of noise impacts between 45 and 55 dB and the appropriateness of compensating affected residents for these impacts.”*

#### **Response**

As stated in response 3.13, the noise assessment for the EA of the new project will be in accordance with the Ministry’s requirements. WM will consult and work with the Ministry and other regulatory agencies to ensure that the work plans, data sources and assessment methodologies for the EA of the new landfill footprint are acceptable and meet all EA requirements





### **3.15 Page 4, paragraph 1**

#### **Comment**

PRT stated:

*“The Economics assessment does not provide sufficient data and analysis to support the conclusions drawn.”*

#### **Response**

Similar to previous responses, the scope of work for the economics assessment of the proposed new landfill footprint will be developed during the TOR stage in consultation with the Ministry and public.

WM will consult and work with the Ministry and other regulatory agencies to ensure that the work plans, data sources and assessment methodologies for the EA of the new landfill footprint are acceptable and meet all EA requirements

### **3.16 Page 4, paragraph 2**

#### **Comment**

PRT stated:

*“WM has not fulfilled the Terms of Reference approved by the MOE for this EA.”*

#### **Response**

The determination of whether the EA meets the requirements of the TOR is made by the Ministry. In 2006, the Minister refused WM’s EA. Since 2006, WM has carefully considered the comments and criticisms made by the public and regulatory agencies. The proposed EA for the new landfill footprint is very different from the previous one.

The TOR for the EA of the new landfill footprint has been prepared using the Ministry’s Code of Practice for Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario (October 2009). WM will consult and work with the Ministry and other regulatory agencies to ensure that the work plans, data sources and assessment methodologies for the EA of the new landfill footprint are acceptable and meet all EA requirements.

The EA of the new landfill footprint will be carried out in accordance with the approved TOR and this will be clearly documented in the EA Study Report.





### 3.17 Page 4, paragraph 3

#### Comment

PRT stated:

*“The proposed expansion is not consistent with the Official Plan of the Town of Greater Napanee.”*

#### Response

The EA for the new landfill footprint will include land use studies. The scope of the studies will be determined during the TOR development process. The proposed new landfill footprint alternative and the components of the BREC will be consistent with the Official Plan of the Town of Greater Napanee. Should zoning changes be required for the proposed undertaking, they will be sought after completion of the EA. The Town of Greater Napanee will be consulted regularly during the development of the TOR and EA studies to ensure that their requirements are understood and properly addressed.

### 3.18 Page 4, paragraph 4

#### Comment

PRT stated:

*“WM has failed to fully consider the effect of the expansion on development patterns in the area relative to the “closed landfill” scenario.”*

#### Response

Similar to previous responses, the scope of work for the land use assessment of the proposed new landfill footprint will be developed during the TOR stage in consultation with the Town of Greater Napanee, the Ministry and public. Assessments conducted during the EA studies will be in conformance with methods described in the approved TOR.





### 3.19 Page 4, paragraph 5

#### Comment

PRT stated:

*“WM’s predictions of impact are incomplete and not transparent because most of WM’s assessors did not follow the methodology set out in Section 6.2.1 of the EA Report for determining the significance of residual adverse effects of the project.”*

#### Response

Similar to previous responses, the scope of work for the EA of the proposed new landfill footprint is developed throughout the TOR stage in consultation with the Town of Greater Napanee, the Ministry and public. Assessments conducted during the EA studies will be in conformance with methods described in the approved TOR. The EA documentation will include several tools to improve clarity and traceability, including a ‘concordance table’, showing each requirement of the TOR and where it is addressed in the EA documentation.

### 3.20 Page 4, paragraph 6

#### Comment

PRT stated:

*“WM has failed to engage the community and host municipality in pursuit of innovative approaches to waste management and diversion from landfill.”*

#### Response

The proposed BREC is a very different project compared to the previous one.

Since 2006 we have listened and reconsidered the future of the Richmond Landfill. We have:

- Conducted hundreds of personal interviews with residents, local politicians, and other stakeholders and regularly attended meetings with the Town;





- Contacted the MBQ, who opposed the submission of the previous TOR and the EA, and have attempted to engage them in a separate process of discussions to hear and address their concerns and to explore opportunities for future cooperation; and,
- Continued to address the technical concerns of the Ministry, most notably in regards to the site hydrogeology and groundwater issues.

We are proposing the BREC, which would help the Town of Greater Napanee and the surrounding region meet its primary waste management goal of sending less waste to landfill by increasing waste diversion and recycling to recover valuable materials within our waste stream as well as to create clean renewable energy. BREC envisions closure of the current landfill and development of the Site as an integrated waste facility comprising several waste management components designed to deal with municipal and private sector wastes generated in the area in a comprehensive, efficient and environmentally sound manner. We envision the facility as a way of solving the waste management problems of Greater Napanee and the surrounding communities while stimulating economic growth and protecting the environment.

### 3.21 Page 4, paragraph 7

#### Comment

PRT stated:

*“WM has failed to conduct a visual impact assessment that is fully transparent and reproducible. The visual impact assessment should have included a monitoring component to verify and modify, if necessary, the mitigation measures applied.”*

#### Response

Similar to previous responses, the scope of work for the visual impact assessment of the proposed new landfill footprint will be developed during the Terms of Reference stage in consultation with the Town of Greater Napanee, the Ministry and public. Assessments conducted during the EA studies will be in conformance with methods described in the approved TOR. Follow-up monitoring will be part of the EA documentation submitted to the Ministry. One of the purposes of the follow-up monitoring program will be to verify that mitigation measures are working as intended and to modify them if necessary.







### **3.22 Page 5, paragraph 1**

#### **Comment**

PRT stated:

*“WM has proposed a nuisance claims procedure that is cumbersome and likely to get bogged down in administration and adjudication that will generate hostility and frustration on the part of residents making claims.”*

#### **Response**

Any program or procedures to address issues of concern to the public, such as nuisance claims or property value protection will be discussed and developed in consultation with the public with participation by the Ministry. Concerns regarding processes such as effectiveness, ease-of-use, and fairness of the process will be addressed through a cooperative process with the public during the EA. It is anticipated that the Community Liaison Committee will play a key role in the development and implementation of these processes.

### **3.23 Page 5, paragraph 2**

#### **Comment**

PRT stated:

*“WM has failed to clarify how its proposed impact management agreement would operate and who would be the parties to such an agreement.”*

#### **Response**

As noted in the previous response, WM will work with the community and Community Liaison Committee to develop appropriate programs, procedures and agreements to address and manage issues of concern.

### **3.24 Page 5, paragraph 3**

#### **Comment**

PRT stated:

*“WM has failed to include a clear, comprehensive impact mitigation, monitoring and management plan and to identify appropriate follow-up activities.”*





## Response

Identification and assessment of mitigation measures are part of the EA process and will be documented in the EA Study Report. A commitment to follow-up monitoring will be part of the EA documentation submitted to the Ministry. One of the purposes of the follow-up monitoring and reporting program will be to verify that mitigation measures have been implemented and are working as intended, and to modify them, when and if necessary.





## 4.0 REFERENCES

- [1] Ministry of the Environment (MOE). (2006). *Re: Richmond Landfill Expansion Environmental Assessment*. Letter from Laurel Broten to Kevin Bechard. November 3, 2006.
- [2] Waste Management of Canada Corporation. (2009). *Richmond Landfill Conceptual Site Model Report*.
- [3] Ministry of the Environment (MOE). (2010). *Richmond Landfill Conceptual Site Model Report*. Letter from K. Stephenson (MOE) to C, Dobiech (MOE). April 28, 2010.
- [4] Town of Greater Napanee. (2005). *Waste Management of Canada Corporation Richmond Landfill Expansion Environmental Assessment*. Peer Review Draft Discussion Paper No. 7. Prepared by the Town of Greater Napanee Peer Review Team. May 2005.
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**Terms of Reference**  
for  
**Environmental Assessment**  
of a  
**New Landfill Footprint**  
at  
Beechwood Road Environmental Centre  
Town of Greater Napanee

**Supporting Document #2**  
**Rationale for the Undertaking**



June 2010



## Table of Contents

<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>SD2-1</b>
<b>2.0</b>	<b>RATIONALE FOR DEMAND FOR ENVIRONMENTALLY RESPONSIBLE WASTE MANAGEMENT DISPOSAL SERVICES.....</b>	<b>SD2-3</b>
2.1	Problem Assessment .....	SD2-3
2.1.1	Methodology.....	SD2-3
2.1.2	Residual Waste Management Capacity in Ontario .....	SD2-4
2.1.3	Significance of the Richmond Facility.....	SD2-7
2.2	Opportunity Assessment.....	SD2-8
2.2.1	Disposal Needs for Eastern Ontario.....	SD2-8
2.2.2	Disposal Capacity for Eastern Ontario .....	SD2-10
2.2.3	WM Transfer Stations.....	SD2-16
2.2.4	Legislative Issues with Cross Border Waste Shipment .....	SD2-17
2.2.5	Environmental Issues with Cross Border Waste Shipment .....	SD2-19
2.2.6	Diversion of Waste and Resource Recovery.....	SD2-20
<b>3.0</b>	<b>CONCLUSION .....</b>	<b>SD2-23</b>
<b>4.0</b>	<b>REFERENCES.....</b>	<b>SD2-24</b>





**TABLES**

Table 1: Assessment Area Waste Generation and Diversion (2006)..... SD2-9  
Table 2: GHG Emissions from Long Haul of Waste..... SD2-20

**FIGURES**

Figure 1 Waste Generation and Diversion in Ontario (2002 to 2006)..... SD2-6  
Figure 2: Eastern Ontario Residual Waste Disposal Needs vs. Disposal Capacity (without new landfill footprint at WM Ottawa Landfill) ..... SD2-15  
Figure 3: Eastern Ontario Residual Disposal Needs vs. Disposal Capacity (with new landfill footprint at WM Ottawa Landfill) ..... SD2-16





## 1.0 INTRODUCTION

As discussed in the Terms of Reference (TOR), between 1999 and 2006, Waste Management of Canada Corporation (WM) sought approval under the Ontario *Environmental Assessment Act* (EAA), to expand the Richmond Landfill in the Town of Greater Napanee by an increase in licensed airspace of approximately 25 million cubic metres (m<sup>3</sup>). WM's application was met with very significant opposition and criticism from the surrounding community, residents and First Nations peoples, including challenges in court. In a letter, in 2006, the Minister of the Environment (the Minister) refused the Environmental Assessment (EA) application, providing reasons that were mainly related to groundwater protection, leachate control, air emission impacts and other environmental impact issues.

After the Minister's refusal of the EA application, WM reconsidered the need for waste management services in the Town of Greater Napanee and eastern Ontario. WM talked with many people in the community, the Town of Greater Napanee, its Solid Waste Advisory Committee, residents, businesses and other stakeholders and heard a message loud and clear – that comprehensive, sustainable waste management solutions should be sought. WM understood that any new proposed facility at the site of the existing Richmond Landfill would need to be aligned with the Town of Greater Napanee's long-term waste management goals and the province's environmental values and policy statements relating to zero waste, climate change and green energy creation. To pursue this vision, this facility would need to include a number of industrial, commercial and residential waste diversion operations that would maximize the value of the resources received and minimize the disposal of residual waste.

In accordance with the new vision, WM decided to consider development of a new, integrated multi-purpose waste management facility to serve the Town of Greater Napanee and the surrounding communities. The new facility, which would be known as the Beechwood Road Environmental Centre (BREC), would have its primary focus on waste diversion and would represent an entirely new approach to managing waste in eastern Ontario. The new facility would be focused on dividing materials into distinct streams that would allow WM to maximize re-use, recovery and recycling opportunities. This new vision would represent a significant step forward in how WM and the community could reduce dependence on disposal and help





make Napanee a leader in Ontario in responsible waste management. Based on WM's evaluation of the "Alternatives To", as described in Supporting Document #3 to this TOR, one component of the facility would be additional capacity for management of residual wastes, engineered to modern standards to protect human health and the environment. There would also be opportunities for community facilities and other benefits including a significant contribution to the local economy.

With this new vision in mind, WM undertook a business analysis to determine the need for the project and the approximate size required for a landfill component of the proposed undertaking.

This Supporting Document presents WM's business analysis that confirmed the need for solid waste disposal capacity in Ontario and led to the identification of the proposed undertaking, which will be refined through an EA that will be conducted in accordance with the TOR, once approved.

In accordance with Section 6.1(2) of the Ontario EAA, this Supporting Document provides a description and a statement of the rationale for the proposed undertaking. The rationale outlined herein has been prepared consistent with the Ministry of the Environment's (the Ministry) *Code of Practice: Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* [1].







## 2.0 RATIONALE FOR DEMAND FOR ENVIRONMENTALLY RESPONSIBLE WASTE MANAGEMENT DISPOSAL SERVICES

Waste Management of Canada Corporation has a significant business presence within the Province of Ontario where it provides an efficient, vertically integrated suite of waste management services to its clients. WM's service offering in Ontario includes waste management consulting, recycling and collection as well as disposal at five landfill sites, including the WM's Beechwood Road Site (the Site) located in the Town of Greater Napanee.

The many waste diversion components that comprise the BREC require *Environmental Protection Act* and municipal approvals. The only component that requires approval under the Ontario EAA is the landfill component for disposal of residual wastes that cannot be diverted, which is therefore the subject of this undertaking. As such, the rationale described in this document focuses on existing approved or currently proposed disposal capacity and the need for additional disposal capacity.

The other active landfill sites owned and operated by WM are:

- Ottawa (in West Carleton);
- Petrolia (Sarnia);
- Twin Creeks Warwick (Sarnia); and,
- Blenheim (Waterloo/London area).

WM determined the rationale for its proposed undertaking based on an analysis of problems and opportunities as described in the following sections.

### 2.1 Problem Assessment

#### 2.1.1 Methodology

The objective of a problem (or need) assessment is to acquire an accurate image of a system's strengths and weaknesses, in order to improve it and meet existing and future challenges. In the case of this analysis, the 'problem' or 'need' is the annual amount of residual waste that must be disposed of in Ontario. Residual waste refers to the waste that remains following diversion activities and that must be disposed of. This section of the report will assess the need to accommodate Ontario's residual waste by examining the





remaining capacity at all existing waste disposal, and the estimated waste generation and diversion rates across a twenty year time frame.

Waste generation rates are estimated using population data specific to the anticipated service area of the new facility (primarily eastern Ontario) and the assumption that the per capita waste generation rate is consistent across Ontario. Residual waste disposal needs are calculated as the difference between total waste generated and total waste diverted for both the residential and non-residential sectors. Residual waste generation rates are projected across a twenty year period (representative of a typical planning period) with an annual growth rate of 1.2 percent (%) [2]. The expected residual disposal needs will subsequently be compared against the remaining disposal capacity at all active waste disposal facilities in order to estimate the deficit in residual waste disposal needs for eastern Ontario.

As previously stated, the proposed BREC will help alleviate the residual waste disposal need outlined herein by maximizing diversion activities and minimizing the need for disposal capacity.

### **2.1.2 Residual Waste Management Capacity in Ontario**

Of the 10.4 million tonnes of residual waste that was sent for disposal from Ontario sources in 2006 (latest data available from Statistics Canada), 3.64 million tonnes (35%) was generated from residential sources and 6.76 million tonnes (65%) was generated from non-residential sources [2]. Non-residential sources include the Industrial, Commercial and Institutional (IC&I) sector, which also includes Construction and Demolition (C&D) waste. Both residential and non-residential residual waste is primarily disposed of in a combination of privately-owned and municipally-owned waste disposal sites (Note: A small fraction of the residual waste stream is managed at incinerator and anaerobic digestion sites). Over the past decade, there has been a distinct shortage of residual waste management capacity in Ontario, resulting in the need to look outside the provincial borders for the needed capacity.

According to a study carried out by the Ontario Waste Management Association [3], 6.2 million tonnes of non-residential waste was disposed from Ontario sources in 2002. At that time, due to a shortage of disposal capacity in Ontario, it was estimated that about 2 million tonnes of this waste was disposed in landfills in the United States (U.S.), and the remaining 4.2 million tonnes was disposed in Ontario at waste disposal sites.





Private sector managed waste disposal sites in Ontario reportedly disposed of about 3.4 million tonnes of the non-residential waste; therefore, the remaining 800,000 tonnes was likely disposed of in municipally managed landfills in Ontario.

The Ontario Waste Management Association study also found that, without any new landfills or landfill expansions, private sector waste disposal capacity in Ontario of slightly over 3 million tonnes per year in 2002 would drop to 2.4 million tonnes around 2009, when some sites would cease operations. This means that if no additional disposal capacity is developed, the landfill deficit for IC&I waste (the difference between landfill requirements and available capacity) would remain around 3 million tonnes per year until 2009 when a number of landfills would reach currently approved capacity. The deficit would increase to 4.5 million tonnes per year, and would increase again to 5 million tonnes in 2016. The study conservatively assumed that over time, non-residential residual waste quantities would stay at current levels, as increased reduction, reuse and innovation would offset the volume increase due to population growth.

In fact, the amount of residual waste going to disposal in Ontario has increased since 2002. According to Statistics Canada, 10,437,780 tonnes of Ontario's waste went for disposal in 2006 [2]. This is an 8.2% increase in residual waste disposal compared to 2002. The quantity of waste diverted by the residential sector increased from 21% to 29% between 2002 and 2006, due primarily to the introduction of new municipal organics programs. The waste diversion rate for the non-residential sector; however, dropped from 19% to 12%. As shown in Figure 1, this resulted in the overall percentage of waste diversion remaining relatively constant at 19% to 20% during the four year period. Because the overall quantity of waste generated increased from 2002 to 2006 and the diversion rate remained stable, the quantity of residual waste requiring disposal actually increased.



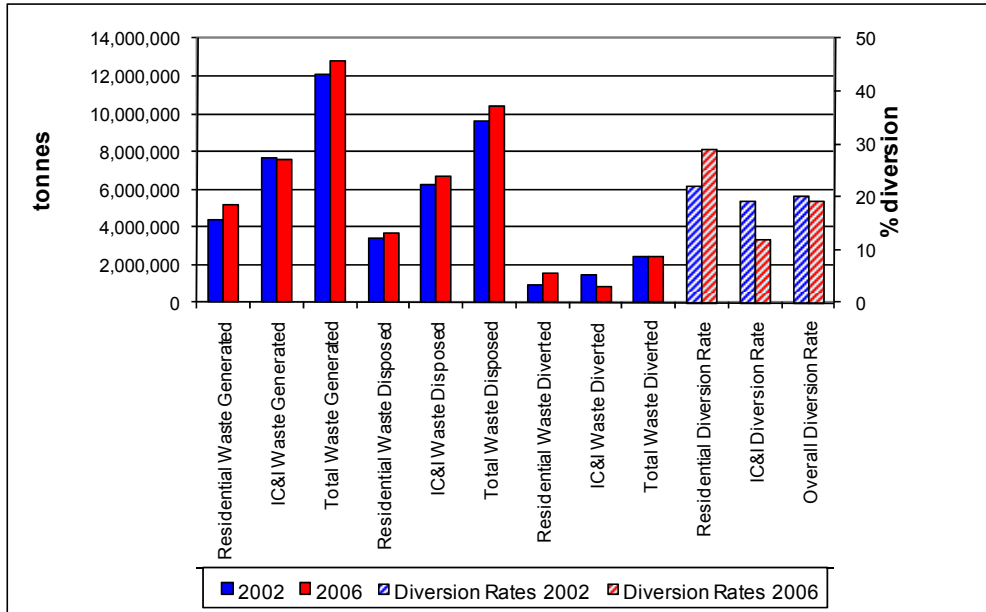


Figure 1: Waste Generation and Diversion in Ontario (2002 to 2006)

Within the eastern Ontario area, where the Site is located, the City of Ottawa has developed significant waste diversion targets that will impact on future residual waste volumes should the City be successful in achieving these targets. The City of Ottawa initiated an Integrated Waste Management Master Plan (IWMMP) in 2002. The IWMMP included a number of strategic directions including waste diversion. The IWMMP identified a minimum target of 40% residential waste diversion through existing programs with options to increase diversion beyond this level to be considered in the future. An April 2005 staff report provided an update on the IWMMP which outlined how the 40% diversion target would be achieved by the end of 2006 and recommending that the City of Ottawa endorse a target of 60% residential waste diversion by the end of 2014. The achievement of a 60% residential waste diversion rate is linked to the City of Ottawa’s implementation of a household organics program.

In 2006, Ottawa City Council directed staff to conduct a study of IC&I waste management within the City of Ottawa. The intent of this study was to develop a strategy for the minimization, diversion and disposal of IC&I and C&D waste and to extend the life of local landfills. The study culminated in July 2008 with the





issue of the report “Diversion 2015: An IC&I 3Rs Waste Diversion Strategy (Draft)” for review and consultation [4]. The strategy outlines the goal of increasing IC&I waste diversion from 17% to 60% by 2015.

In January 2008, the Region of Durham also passed a resolution setting out an aggressive residential waste diversion objective of 70%. Regional staff is currently assessing the measures necessary for achieving this objective.

In the Provincial Policy Statement, 2005, the province expressed the need to integrate land-use planning (including waste management planning) and planning for growth in order to maintain strong communities, a clean and healthy environment and a strong economy. Although it is well recognized that having adequate residual waste disposal infrastructure is critical to public health and sustainable development, Ontario has a critical shortage of capacity to manage the residual waste stream, which despite efforts is becoming more acute as time goes on.

### **2.1.3 Significance of the Richmond Landfill Facility**

As noted, the Richmond Landfill is located at the Site. Under its current Certificate of Approval (C of A), the Richmond Landfill can accept a maximum of 125,000 tonnes per year of waste for disposal. Up until 2004, the Richmond Landfill was operating at that fill rate. At that time, WM made the decision to divert waste that had previously gone to the Richmond Landfill to other locations in order to extend the life of the landfill as presently approved. These alternatives are environmentally and economically less preferred than having disposal capacity at the Richmond Landfill. The current approved landfill on the WM property will be reached soon and it is expected that the landfill will be closed at the end of June 2011 in accordance with the recently amended C of A for the Richmond Landfill.

The Richmond Landfill has historically managed the municipal waste disposal needs for a number of eastern Ontario municipalities, including Greater Napanee, Tyendinaga, Belleville, Kingston and Trenton. Until 2004, approximately 60% of the residual waste accepted at the Richmond Landfill was from residential collection systems. Since WM has reduced the amount of residual waste accepted at the Site, this waste is now sent to other areas, either in Ontario or across the border to the U.S. This has had a particular impact on the Town of Greater Napanee, which until recently had been sending their waste to landfills outside of the area, at significant cost, to the municipality.





Prior to 2004, the Richmond Landfill accepted 1% of the approximately 10 million tonnes of waste generated annually for disposal in the province of Ontario. Provincially, public and private sector landfill capacity is scarce, as evidenced by the current disposal of several million tonnes of Ontario waste each year in U.S. landfills and incinerators.

## 2.2 Opportunity Assessment

The problems described in, and arising from, the foregoing analysis create the opportunity for WM to be part of the ongoing solution to the waste management needs of generators in Ontario.

Based upon the forgoing analysis, WM has determined there is an opportunity to be part of the ongoing solution to the residual waste disposal needs for Ontario. For the purpose of this document, the rationale for the undertaking has focused on the residual waste disposal needs for eastern Ontario.

### 2.2.1 Disposal Needs for Eastern Ontario

The waste management needs of eastern Ontario can be quantified using waste generation data. However, since no specific waste generation data exists for eastern Ontario, this information will be estimated using existing population data (specific to the anticipated service area of the new facility) and the assumption that the per capita waste generation rate is consistent across Ontario.

Although the new BREC site would be available to accept waste from anywhere in the province of Ontario, for the sake of its business analysis, WM decided to limit this assessment to “eastern Ontario”, which it defined as the following 15 census divisions, as reported by Statistics Canada for 2006:

- Durham (pop. 561,258);
- Frontenac (pop.143,865);
- Haliburton (pop.16,147);
- Hastings (pop. 130,474);
- Kawartha Lakes (pop. 74,561);
- Lanark (pop. 63,785);
- Leeds and Grenville (pop.99,206);
- Lennox and Addington (pop. 40,542);





Terms of Reference for a New Landfill Footprint  
Supporting Document #2 – Rationale for the Undertaking

- Northumberland (pop. 80,963);
- Ottawa (pop. 812,129);
- Peterborough (pop. 133,080);
- Prescott and Russell (pop. 80,184);
- Prince Edward (pop. 25,496);
- Renfrew (pop. 97,545); and,
- Stormont, Dundas and Glengarry (pop. 110,399).

These census divisions have a total population of 2,469,634, or 20% of the total 2006 Statistics Canada population for Ontario [2]. Given the assumption that the amount of waste generation on a per capita basis is consistent across the province, the estimated 2006 waste generation and disposal quantities for eastern Ontario are shown in Table 1.

Total waste generation tonnages for the residential and non-residential sectors in eastern Ontario were obtained by multiplying the total waste generation in Ontario (i.e., Residential sources: 5,216,697 tonnes, Non-residential sources: 7,617,934 tonnes - Statistics Canada, 2006) by the population fraction of 20% represented by eastern Ontario. Total waste diversion tonnages were calculated in a similar fashion (i.e., Residential diversion in Ontario: 1,511,462 tonnes, Non-residential diversion in Ontario: 177,077.8 - Statistics Canada, 2006). Residual waste disposal was taken as the difference between total waste generated and waste diverted for both the residential and non-residential sectors.

**Table 1: Assessment Area Waste Generation and Diversion (2006)**

	Total Waste Generated (tonnes)	Waste Diverted (tonnes)	Residual Waste Disposed (tonnes)
<b>Residential</b>	1,043,340	302,293 (29%)	741,047
<b>Non residential</b>	1,523,587	177,078 (12%)	1,346,509
<b>Total</b>	<b>2,566,927</b>	<b>479,371 (19%)</b>	<b>2,087,556</b>





Based on this information, the 2010 need for residual waste disposal capacity in eastern Ontario is conservatively taken as 2.1 million tonnes per year, of which 1.3 million tonnes is from non-residential sources.

### **2.2.2 Disposal Capacity for Eastern Ontario**

There are four privately-owned landfill sites and a number of municipally-owned landfills in eastern Ontario that are licensed to accept waste. The privately owned sites are:

- WM Ottawa Landfill;
- Richmond Landfill;
- Waste Services Inc. (WSI) Navan Landfill; and,
- Lafèche Landfill.

The only thermal facility currently present in eastern Ontario is the Plasco demonstration facility located in Ottawa, which is operating under a limited and conditional permit.

#### ***Private Landfills***

Three of the four privately-owned landfill sites in eastern Ontario are located in the City of Ottawa, or in close proximity to the City.

Waste Management owns and operates two landfills in eastern Ontario. The Ottawa Landfill is located in the west end of the City of Ottawa in the former Township of West Carleton. The site has no licensed annual tonnage limit; however, there is less than 75,000 tonnes of remaining capacity at the Ottawa Landfill, and WM has therefore made the decision to only accept 25,000 tonnes of waste per year at this landfill. Unless the applicable C of As are amended, the site will be officially closed as of September 2011. WM announced on April 13, 2010 their intention to apply for a new landfill footprint to provide additional disposal capacity at this site. The new landfill footprint is currently proposed to allow for annual disposal of up to 400,000 tonnes of waste for a ten year period.

The Richmond Landfill has less than 20,000 tonnes of capacity remaining, and although it is licensed to accept 125,000 tonnes per year, the site is currently taking in less than 10,000 tonnes per year in order to better manage the remaining airspace for the local communities.







The WSI Navan Landfill is located in the east portion of the City of Ottawa. This site is licensed to accept a maximum of 234,750 tonnes per year of non-putrescible IC&I and C&D waste, although operational constraints have typically restricted annual disposal to about 150,000 tonnes per year. For the purpose of this report and disposal capacity calculations, a conservative estimate of 150,000 tonnes per year will be used. With a recently-approved expansion to the site, the remaining capacity is estimated at approximately 2.8 million tonnes.

Lafèche Environmental has operated a landfill site on a 200 hectares (ha) site near Moose Creek about midway between Ottawa and the Quebec border since 2001. The site is designed to take a total of 8 million tonnes of waste. Approval was obtained to increase the annual limit of waste that can be received at the site from 200,000 to 300,000 tonnes per year, and the site has until recently been accepting the residential waste from the Town of Greater Napanee. The total yearly disposal tonnage for 2009 was approximately just under the maximum allowable; however, for the purpose of this Supporting Document and disposal capacity calculations, a conservative estimate of 300,000 tonnes per year will be used. The total capacity remaining at this site is approximately 800,000 tonnes in Stage 1 (assuming airspace utilization rate of 0.9 tonnes per m<sup>3</sup>) or approximately 5,100,000 tonnes total pending the Ministry's approval of the remaining Stages (assuming airspace utilization rate of 0.9 tonnes per m<sup>3</sup>).

Based on the preceding information, there currently exists a total of approximately 10 million tonnes of remaining waste disposal capacity in private sector landfills in eastern Ontario. These sites have a permitted annual disposal capacity of about 944,750 tonnes per year but are currently only accepting about 485,000 tonnes per year of waste for disposal due to capacity limitations.

### ***Public Sector Landfills***

A survey of municipally-owned landfills in eastern Ontario and found that the majority of the municipal sites are very small (less than 10,000 tonnes per year), and are able to take waste from a restricted local service area only.





The municipally-owned sites that currently accept the most waste on an annual basis include:

- The City of Ottawa:
  - The Trail Road Landfill is permitted to dispose up to 563,000 tonnes per year; however, the City of Ottawa typically manages waste acceptance to preserve capacity for the city's residential waste stream. The City of Ottawa has a highly developed waste management suite of programs including blue, black and green bin recycling and the City-owned Trail Road Landfill. The City of Ottawa has stated that they have the ability to manage residential garbage within its own programs, without reliance on privately-owned disposal facilities. The Trail Road Landfill site typically accepts approximately 200,000 tonnes per year of waste for disposal;
  - The Springhill Landfill has historically accepted about 50,000 tonnes per year of waste for disposal, however, under a new agreement with the City of Ottawa the site is expected to increase waste disposal receipts to about 90,000 tonnes per year;
- The County of Peterborough (77,000 tonnes per year);
- The City of Cornwall (45,000 tonnes per year);
- The County of Northumberland (34,000 tonnes per year);
- The City of Kawartha Lakes (45,000 tonnes per year);
- The Ottawa Valley Waste Recovery Centre (30,000 tonnes per year);
- Municipal sites in the County of Hastings (18,000 tonnes per year); and,
- Haliburton County (11,000 tonnes per year).

The remaining sites generally take in under 10,000 tonnes of waste per year.

Based on the above information, it is estimated that the municipal sites in eastern Ontario are currently accepting approximately 550,000 tonnes of waste per year. A number of these sites have limited remaining capacity and may close over the next several years and there are no major municipal landfill developments or expansions announced. This will put continued pressure on the existing privately-owned landfill sites in eastern Ontario. For





the purposes of this assessment it has been assumed that the existing municipal sites will remain available to accept residual waste from their individual service areas; however, closure of any of these sites will further increase the demand for waste disposal at the private disposal sites.

### ***Proposed Durham/York Energy-from-Waste Facility***

The Regions of Durham and York are in the process of seeking approval for an Energy-from-Waste (EFW) facility to be located in the Region of Durham. It is understood that this facility may be operational by the end of 2012 at the earliest, but likely not until several years later, and shall have an initial per-year processing capacity of 140,000 tonnes, with the ability to accommodate expansions of up to a maximum processing capacity of 400,000 tonnes per year. For the purposes of this evaluation, it has been assumed it will be operational by the end of 2012.

Although this facility is not yet approved, WM has included a projection of the amount of waste that it would accept from the Region of Durham in their business case analysis. Waste that could potentially be accepted from the Region of York is not included in this analysis because it is outside of the boundary of the business case.

### ***Projected Waste Management Needs***

As indicated in Table 1, eastern Ontario generated approximately 2,566,927 tonnes of municipal and private waste in 2006, of which 19% was recovered through recycling and composting programs and 81% was disposed in landfills. In order to determine ongoing landfill disposal needs, the amount of waste that will be generated and the amount that will be diverted from landfill has been projected. Figure 2 illustrates the estimated disposal needs over the next twenty years for eastern Ontario based on two different scenarios.

**Scenario 1 (Status Quo)** is based on a small increase (1.2% per year) in waste generation due to ongoing population and economic growth. The waste diversion rate for Scenario 1 is assumed to remain constant at 30% for the residential sector and 12% for the IC&I sector.

**Scenario 2 (Increasing Diversion)** is based on the same annual increase in waste generation, along with an ongoing increase in waste diversion. It is assumed that there would be a 1.5% per year increase in the waste diversion rate for both the residential waste stream and the IC&I waste stream, until a





60% diversion rate is reached. Notwithstanding the aggressive diversion targets set out by the City of Ottawa and the Region of Durham, this scenario reflects that it has historically been challenging to increase waste diversion activities sufficiently to achieve anything more than a modest decrease in the overall amount of residual waste requiring disposal.

**Scenario 3 (Aggressive Diversion)** is based on the same annual increase in waste generation, along with an ongoing increase in waste diversion. It is assumed that there would be a 2% per year increase in the waste diversion rate for both the residential waste stream and the IC&I waste stream, until a 60% diversion rate is reached. To reflect the specific aggressive diversion targets that the City of Ottawa has set, this scenario assumes that the City will meet its residential and IC&I diversion targets of 60% by the beginning of 2014 and 2015, respectively. It is anticipated that achieving these diversion targets will lead to corresponding adjustments in annual disposal tonnages at both the Trail Road and Springhill Landfills. Furthermore, this scenario reflects the Region of Durham would achieve its residential diversion target of 70% by 2015. Notwithstanding the aggressive diversion targets set out by the City of Ottawa and the Region of Durham, it may be challenging to achieve a 60% waste diversion in the rest of eastern Ontario, which consists mainly of small rural municipalities that do not have the infrastructure or the financial means to implement waste diversion programs that are much more aggressive than they are currently able to provide.

Figure 2 shows the expected residual waste disposal needs in comparison with the remaining disposal capacity for eastern Ontario. This figure includes the potential available capacity for the proposed Durham EFW facility. This analysis does not include the potential new landfill footprint at the WM's Ottawa Landfill. It is noted that the existing Agreement between the City of Ottawa and WM allows the Ottawa Landfill to reserve 75% to 90% of its total disposal capacity (percentage is a sliding scale depending on how much residential waste is directed to the site) for waste generated within the City of Ottawa; it is assumed that the requirements of the existing Agreement will also be applicable to the proposed new landfill footprint. As indicated, the total annual disposal capacity is approximately 1 million tonnes until 2014 and subsequently ranges from 880,000 to 940,000 tonnes per year. Based on current waste diversion rates and a 1.2% population growth (Scenario 1), the quantity of residual waste requiring disposal is expected to increase from 2.1





to just less than 2.7 million tonnes through the year 2028. This results in a disposal capacity deficit of between 1.0 and 1.75 million tonnes per year. In consideration of the implementation of more diversion programs for both residential and IC&I waste streams (Scenario 2), it is projected that the amount of waste requiring disposal would decrease at an annual rate of about 0.7% to 1.0% per year until 2016, and from 1.0 to 1.7% from 2017 to 2028. This increase in diversion would result in the quantity of residual waste needing disposal to remain relatively constant at about 1 million tonnes per year until 2021 and gradually decrease to reach 720,000 tonnes in 2028.

Even with an aggressive increase in waste diversion (Scenario 3), there is an expected disposal capacity deficit ranging from approximately 520,000 to 708,000 tonnes per year until 2015. Thereafter, the highly aggressive waste diversion assumptions, particularly those for IC&I waste in the City of Ottawa, lead to a disposal deficit which ranges from 310,000 to 510,000 tonnes per year through the year 2028.

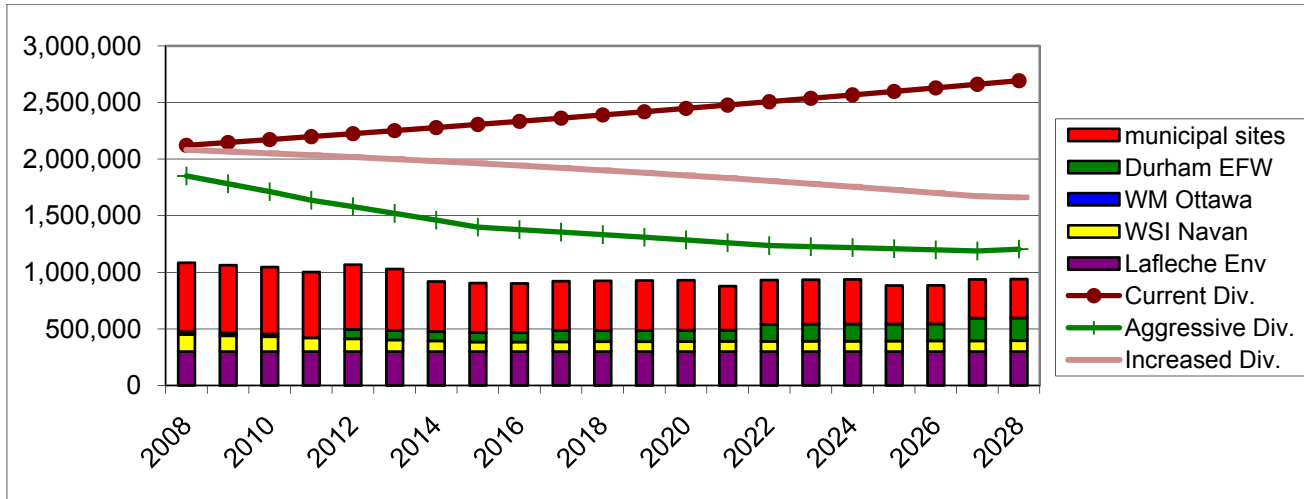


Figure 2: Eastern Ontario Residual Waste Disposal Needs vs. Disposal Capacity (without a new landfill footprint at WM Ottawa Landfill)

It is apparent that there is a definite shortage of disposal capacity in eastern Ontario, particularly if major waste diversion initiatives are not implemented in the next few years.





As shown in Figure 3, if the development of a new landfill footprint at WM's Ottawa Landfill is successful as currently proposed, the disposal deficit in eastern Ontario is somewhat relieved; however, even with an aggressive increase in the amount of diversion taking place, it is anticipated that there will be more waste generated in eastern Ontario than disposal capacity available.

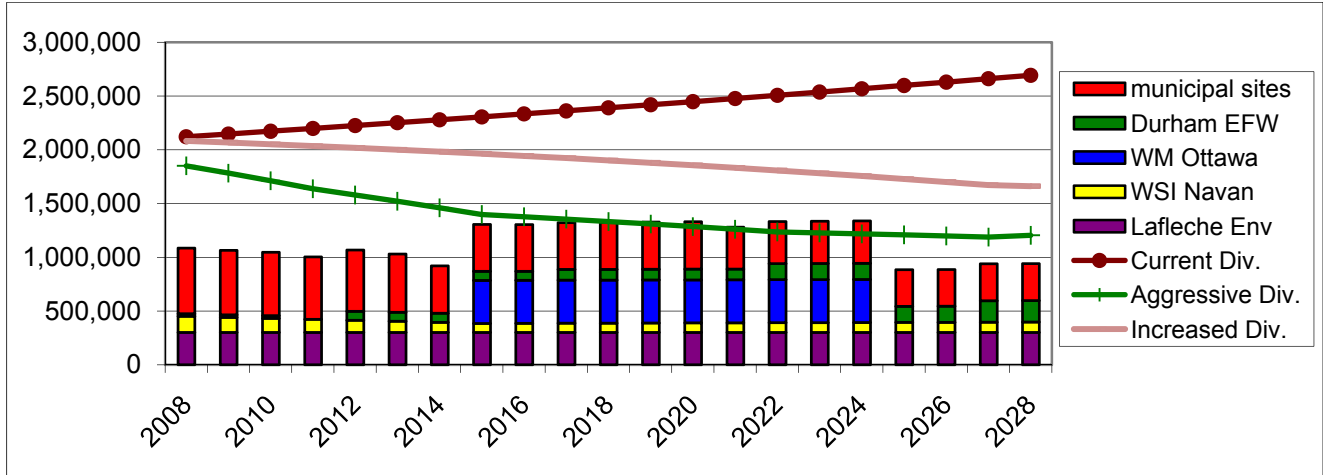


Figure 3: Eastern Ontario Residual Disposal Needs vs. Disposal Capacity (with new landfill footprint at WM Ottawa Landfill)

There is a clear opportunity defined by the analysis above for extending the historic waste management role of the WM's Site in the Town of Greater Napanee as a significant component in the residual waste disposal infrastructure servicing generators in eastern Ontario. In addition to the overall general shortage of disposal capacity, the Site is favourably located in eastern Ontario. The Site is centrally located for residential and non-residential waste generators in eastern Ontario, in terms of both haul distances and routes, since the other private disposal sites are located a considerable distance away in the more eastern parts of the province.

### 2.2.3 WM Transfer Stations

In order to compensate for the disposal capacity deficit in eastern Ontario, WM operates a network of transfer stations that accept waste from front-end collection trucks, municipal collection trucks or roll-off trucks and transfers to larger transport trailers, which are then hauled to landfills in Ontario or the U.S.





WM's network comprises four waste transfer stations in eastern Ontario, located in Brockville, Kingston, Trenton, and Clarington. These transfer stations have been forced to handle an increased amount of waste over the past several years due to the shortage of disposal capacity in eastern Ontario. These sites accepted just under 200,000 tonnes of waste in 2007, which was made up of the following:

- 65% IC&I waste;
- 10% C&D waste; and,
- 25% residential waste.

Over half of the waste accepted at these transfer stations (108,355 tonnes) was shipped to landfill sites in the State of Michigan. The remaining 85,452 tonnes was hauled to the Lafèche, BFI Ridge or Petrolia Landfill Sites.

In addition, there are several other private companies that have developed transfer stations in eastern Ontario to allow for waste hauling to locations outside of eastern Ontario, in response to the lack of disposal capacity in eastern Ontario.

The Province of Ontario understands the need to develop local waste disposal options instead of hauling waste long distances to other communities. The *Policy Statement on Waste Management Planning: Best Practices for Waste Managers* [5], states:

*“Exporting waste is not a sustainable long-term solution because it creates broader problems. It generates greenhouse gases from long-haul truck transport, causes social discord (as many communities oppose siting of landfills for other communities in their municipality) and could potentially create economic challenges for Ontario businesses and municipalities required to search for alternative solutions.”*

#### **2.2.4 Legislative Issues with Cross Border Waste Shipment**

The practice of hauling waste into the U.S., and particularly the State of Michigan, has become increasingly challenging over the past several years. As a reaction to strong public opposition to the cross-border shipment of waste, both the State of Michigan and the U.S. federal government have





passed several bills making it more difficult to export waste from Ontario into Michigan. Waste can be refused if it contains beverage containers, yard waste, tires, or other prohibited materials. The State of Michigan has emergency powers to close its border to waste in the event of imminent health, safety or environmental threats. Waste from Ontario is subjected to ongoing inspections and the fines for violations have been increased.

In March 2006, the State of Michigan passed House Bill 5176 that would ban the disposal of Canadian waste in Michigan landfills, providing that federal enabling legislation was passed. The House Bill (2491) that would enable Michigan to ban Canadian waste and another Bill (5441) that would levy a fee on waste trucks crossing the border were before the U.S. House of Representatives when the Ontario Minister of the Environment entered into an agreement with two Michigan Senators that defused the issue.

In August 2006, the Minister Laurel Broten made a commitment to the Michigan senators promoting House Bills 2491 and 5441, that Ontario municipalities would reduce the amount of waste that they ship to Michigan by 20% by the end of 2007, with a further 20% reduction by the end of 2008, and that municipalities would eliminate altogether the cross-border shipments of municipally managed wastes by the end of 2010. In return, the senators agreed not to pursue passage of the legislation that would allow Michigan to ban all Canadian waste. The Minister's commitment to eliminate the cross-border shipping of all municipally managed waste means that the already overburdened waste disposal (landfill) infrastructure in Ontario will need to be able to accommodate another 2.78 million tonnes of waste by 2010 [6].

Although the Ontario/Michigan agreement seems to have appeased the Michigan residents and politicians at the moment, it is apparent that the shipment of any waste outside the borders of Ontario is fraught with uncertainty and risk. Apart from the ongoing threat of a permanent border closing, there are many examples of when it has been difficult, if not impossible, to transport waste to the U.S. as a result of labour disputes, homeland security issues (such as those that occurred following the September 11<sup>th</sup> terrorist attack), or due to health-related concerns (such as the bovine spongiform encephalopathy outbreak).







## 2.2.5 Environmental Issues with Cross Border Waste Shipment

In addition to the legislative challenges, long distance hauling of waste is environmentally unsustainable. It depletes non-renewable resources and generates large quantities of Greenhouse Gases (GHG) that contribute to climate change.

Assuming that the BREC facility would accept about 400,000 tonnes of waste per year for disposal, this would result in a reduction of approximately 400,000 tonnes per year of waste being hauled from eastern Ontario to Michigan or New York State. The distance from the BREC site (located in the centre of eastern Ontario) to these landfills are approximately 450 kilometres, resulting in an average travel distance per trip of about 900 kilometres (km).

The Greenhouse Gas (GHG) engine emissions were considered for:

- Carbon dioxide (CO<sub>2</sub>);
- Methane (CH<sub>4</sub>); and,
- Nitrous oxide (N<sub>2</sub>O).

Although CO<sub>2</sub> is the primary GHG emitted from truck engines, the contribution of CH<sub>4</sub> and N<sub>2</sub>O can be significant due to their high global warming potential.

Typically, long haul trucks with a 27 tonne carrying capacity are used for cross-border waste hauling. These trucks are defined by the U.S. Environmental Protection Agency and Environment Canada as Heavy Duty Diesel Vehicles, Class 8 (HDDV8B).

The number of trips per year to haul 400,000 tonnes of waste is 14,815, with a total travel distance of 13.4 million km. Based on a fuel economy of 2.6 km per litre, a total of 5.1 million litres of fuel would be consumed in hauling this waste.

For this analysis, emission factors for trucks were adopted from the *National Inventory Report 1990 to 2004 – Greenhouse Gas Sources and Sinks in Canada (2006)* [7]. In order to determine the equivalent CO<sub>2</sub> emissions, it is important to take into account the Global Warming Potential (GWP) for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. Table 2 presents the total equivalent CO<sub>2</sub> emissions based on using 6.85 million litres of fuel to haul 400,000 tonnes of waste per year from eastern Ontario to Michigan.





**Table 2: GHG Emissions from Long Haul of Waste**

	Emissions (g/litre)	Total Emissions (tonnes)	Global Warming Potential (GWP)	GHG (tonnes/yr)
CO <sub>2</sub>	2730	14,000	1	14,000
CH <sub>4</sub>	0.13	0.7	21	14
N <sub>2</sub> O	0.08	0.41	310	126
Equivalent CO <sub>2</sub>				14,140

The other sources of GHG, those emissions associated with waste disposal, will be generally equivalent if the waste is disposed in a Michigan landfill or at the Richmond Landfill, assuming that both sites have methane recovery systems in place. Therefore, the disposal of 400,000 tonnes of residual waste per year at a location near the source of the waste generation instead of hauling it approximately 900 km for disposal would result in an annual decrease in the generation of approximately 14,140 tonnes of GHGs (CO<sub>2</sub> equivalent).

### 2.2.6 Diversion of Waste and Resource Recovery

Diversion of waste through the reuse and recycling of resources would be a key activity in the ongoing and future management and operation of the BREC facility.

There is currently an on-site composting facility that processes leaf and yard waste from the Town of Greater Napanee and other municipalities in the area, as well as providing for local residents to drop off their yard waste. Other feed stocks that are accepted at the composting facility are agricultural wastes from local farmers and scrap from Bag-to-Earth, a local industry that produces compostable kraft bags. The compost product is used on-site, sold for commercial use or made available free to local residents.

The new BREC development would provide the opportunity for the diversion of materials such as drywall, waste electronics, household hazardous and special wastes, scrap metal, and tires.

In October 2008, the Ministry released for consultation a discussion paper titled “Toward a Zero Waste Future: Review of Ontario’s Waste Diversion Act, 2002” [8]. The discussion paper outlines how the concepts of zero waste and extended producer responsibility (EPR) can jointly be utilized to





eliminate waste. The zero waste approach is based on all materials having a value that can be recovered and used in another form as opposed to being disposed. The EPR model requires producers to assume the responsibility of managing the end of life of the materials they produced. There are a number of approaches that can be taken for extended producer responsibility and achieving zero waste, which is the focus of the Ministry's consultation. It is worth noting that a number of jurisdictions have implemented EPR approaches in order to maximize waste diversion and move towards achieving zero waste. Given the current level of waste diversion in Ontario, experience suggests this type of approach will be essential to achieving the Ontario's 60% waste diversion.

WM's vision to develop the BREC facility at the Site is consistent with WM's overall vision to be an industry leader in management of the natural environment, waste diversion and resource management, renewable energy, and environmentally sound residual waste management. The proposed BREC facility concept is outlined in greater detail in Supporting Document #3. This vision links the development of much needed residual waste management capacity at the Site with a significant investment in ecological preservation, restoration, and education, materials recycling, organics composting, renewable energy from landfill gas, diversion of waste electronics (WEEE) and Municipal Hazardous and Special Waste (MHSW), and recycling of construction and demolition (C&D) wastes.

It should be noted that, in general, the existing Richmond Landfill currently receives only residual waste streams, (i.e., post diversion at the source). Many waste generators have, with WM's assistance, implemented diversion programs at their places of business where the volume of potentially recyclable materials justifies the separate collection and recycling of commodities such as cardboard, metals, plastics, aggregate, wood, etc. As the province implements new regulations and programs in the coming years to increase the diversion rates to meet its stated target of 60%, WM will continue to provide the services necessary to enable its customers to meet these new challenges. WM envisions that the BREC facility will play an important role in the overall waste diversion initiative for Ontario and specifically eastern Ontario.

WM is constantly searching for on-site and off-site diversion opportunities to ensure that approved disposal capacity is preserved and used for the disposal of residual waste material of least commercial value. Given the provincial policy and





Terms of Reference for a New Landfill Footprint  
Supporting Document #2 – Rationale for the Undertaking

regulations concerning waste diversion from landfill, the Site will continue to provide critical support to the Town and Province in their efforts to meet diversion targets while at the same time ensuring essential disposal capacity is available locally.

As part of the BREC facility, a new landfill footprint could be developed at the Site that would be designed to capture the landfill gas generated as part of the waste stabilization process in the landfill. The captured landfill gas would not only reduce emissions of methane, a key greenhouse gas, to the atmosphere, but could use the captured gas to generate electricity or other forms of heat energy. The renewable energy generated will offset greenhouse gas emissions from fossil fuel fired power plants currently in operation. At their Ottawa Landfill, WM is about to commence operation of a 6.4 Megawatt landfill gas to energy facility, equivalent to satisfy the annual electricity requirements for 6,000 homes.





### 3.0 CONCLUSION

Based on the foregoing analysis of problems and opportunities, WM concluded that there is an ongoing need for residual waste disposal services in eastern Ontario for at least the next 20 years. The disposal capacity deficit assuming an increase in current diversion rates ranges from about 720,000 to 1 million tonnes per year. Provision of an annual residual waste disposal capacity in the range of 350,000 to 450,000 tonnes per year would deliver a key service to the communities in eastern Ontario while encouraging the development of higher diversion rates and alternative technologies through the BREC vision for managing the residual waste stream.

The location, available land, and historic role of the Site as a waste management facility provides WM the opportunity to deliver environmentally sound waste management services to eastern Ontario, including the disposal of solid, non-hazardous residual wastes in a new landfill footprint developed to modern design standards within an integrated waste management facility.





## 4.0 REFERENCES

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**Terms of Reference**  
for  
**Environmental Assessment**  
of a  
**New Landfill Footprint**  
at  
Beechwood Road Environmental Centre  
Town of Greater Napanee

**Supporting Document #3**  
**Alternatives to the Undertaking**



June 2010



## Table of Contents

<b>1.0 INTRODUCTION .....</b>	<b>SD3-1</b>
<b>2.0 METHODOLOGY .....</b>	<b>SD3-3</b>
<b>3.0 RESULTS OF THE ASSESSMENT .....</b>	<b>SD3-4</b>
3.1 Identification of Alternatives.....	SD3-4
3.2 Assessment of Alternatives .....	SD3-5
3.2.1 Alternative 1 - Do Nothing.....	SD3-5
3.2.2 Alternative 2 - Use Current Landfill Site as a Transfer and Processing Facility and Haul Wastes to a Disposal Facility Elsewhere.....	SD3-8
3.2.3 Alternative 3 - Construct a Thermal Destruction Facility at the Site.....	SD3-11
3.2.4 Alternative 4 - Establish a New Landfill Elsewhere .....	SD3-14
3.2.5 Alternative 5 - Close the Current Landfill and Establish a New Landfill Footprint on Site .....	SD3-17
3.2.6 Alternative 6 - Close the Current Landfill and Establish a New Landfill on Site with Enhanced Waste Diversion Activities.....	SD3-20
3.3 Summary of Assessment.....	SD3-23
<b>4.0 CONCLUSION.....</b>	<b>SD3-26</b>
<b>5.0 REFERENCES .....</b>	<b>SD3-27</b>
<b>TABLES</b>	
Table 1: Screening Assessment for Alternative 1 .....	SD3-7
Table 2: Screening Assessment for Alternative 2 .....	SD3-9
Table 3: Screening Assessment for Alternative 3 .....	SD3-13
Table 4: Screening Assessment for Alternative 4 .....	SD3-16
Table 5: Screening Assessment for Alternative 5 .....	SD3-19
Table 6: Screening Assessment for Alternative 6 .....	SD3-22
Table 7: Summary of Screening to Identify Reasonable and Practicable Alternatives .....	SD3-24







## 1.0 INTRODUCTION

Waste Management of Canada Corporation (WM) conducted a business assessment to determine the need for additional service capacity in eastern Ontario (See Supporting Document #2). We concluded that there is an ongoing need to manage wastes in eastern Ontario for the foreseeable future (i.e., at least the next 20 years) even with aggressive increases in the rate of waste diversion and recycling, and potential development of additional waste disposal at other locations in eastern Ontario. Accordingly we established the following business goal:

*“The purpose of the proposed new landfill footprint at WM’s Beechwood Road site (the Site) in the Town of Greater Napanee is to enable WM to continue to provide environmentally safe waste management services for disposal of solid, non-hazardous residual wastes.”*

As noted, the assessment of the need for the undertaking is documented in Supporting Document #2. Next we considered alternatives to meet this business opportunity. Our assessment is presented in this document.

In Environmental Assessment (EA) terms, the assessment presented herein is referred to as an assessment of “Alternatives To” the project and comprises the functionally different ways of approaching or dealing with the identified “need” or “opportunity” for WM to provide waste management services in eastern Ontario. This assessment has been carried out in conformance with the Ministry of the Environment (the Ministry) *Code of Practice: Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario* [1], which states:

*“...what is reasonable for one proponent to implement may not be reasonable for another when trying to solve a similar problem because the circumstances between proponents may vary widely. A private sector proponent’s inability to expropriate land or implement public programs will influence the range of alternatives it may examine.”*





As it relates to WM and its business, the Code of Practice also makes reference to private sector proponents in the waste industry as follows:

*“The private sector proponent may only consider landfill or on-site diversion because:*

- *It cannot implement a municipal waste diversion program such as curb side recycling;*
- *Export would affect their business; and,*
- *Thermal technology is not economically viable because waste volumes are too small.”*

Based on the above statements within the Code of Practice, WM has identified and assessed only those alternatives that are appropriate and reasonable for WM to implement.

This Supporting Document (SD) presents a description and statement of the rationale for “Alternatives To” the project. This assessment has been conducted by WM prior to the commencement of the EA for a new landfill footprint alternative for business purposes (i.e., to address how we might convert to provide waste management services).

During the consultation process for the development of the Terms of Reference (TOR), a summary and the conclusions of WM’s business analysis for “Alternatives To” were made available to the public for information. In general, people indicated that they understood WM’s analysis and agreed with the conclusions.





## 2.0 METHODOLOGY

The methodology used to identify and assess alternatives to meet the identified need and opportunity for WM to provide waste management services in eastern Ontario conforms to the Ministry Code of Practice and consisted of the following steps:

- 1) Identify a range of alternatives, which are reasonable, to meet the need for waste disposal for eastern Ontario incorporating input to reflect the community's interests and comments;
- 2) Prepare a description of each alternative and conduct a screening analysis to determine if the alternatives are feasible, reasonable, and practicable. Conduct the screening by assessing each alternative based on the following questions:
  - Is the alternative consistent with the identified opportunity?
  - Is it technically feasible?
  - Is it reasonably capable of being approved (e.g., must meet environmental requirements)?
  - Is it within WM's core business competence and established lines of business?
  - Is it consistent with principles of responsible waste management?
  - Will the alternative enable WM to continue to provide cost effective services to its customers?
  - Are the economic benefits and risks acceptable to WM; and
  - Is it economically viable for WM?





## **3.0 RESULTS OF THE ASSESSMENT**

### **3.1 Identification of Alternatives**

The first step in the “Alternatives To” assessment was to identify a number of potential alternatives to meet the opportunity noted above. Based on a consideration of EA requirements as described in the Ministry Code of Practice and numerous discussions with the Town of Greater Napanee, local businessmen, community groups, residents and Ministry staff prior to the commencement of the EA, WM identified a broad range of “Alternatives To” the project. The alternatives identified were:

- 1) Do nothing;
- 2) Close current landfill and continue to use the site as a transfer and processing facility and haul waste to a disposal facility elsewhere;
- 3) Construct a thermal destruction facility at the Site;
- 4) Establish a new landfill elsewhere;
- 5) Close the current landfill and establish a new landfill On-Site (similar to the previous proposal); and
- 6) Close the current landfill and establish a new landfill footprint for disposal of residual wastes on-site as part of a comprehensive waste management system (the BREC) that encompasses a facility for increased waste diversion, energy conservation, and opportunities for economic development and community benefits.

The results of the “Alternatives To” assessment conducted by WM were presented during a workshop that was held on March 25, 2010 in the Town of Greater Napanee as a part of the development of the TOR. Twenty-one people attended the workshop and the participants were asked if other alternatives should be considered in the assessment. No additional alternatives were identified.





The second step in the assessment of “Alternatives To” was to predict what would likely occur if the alternative was implemented and to conduct a feasibility screening to determine if alternatives were feasible, practicable and reasonable in terms of technical and economic considerations. The screening questions listed in Section 2.0 were used. The respondents at the workshop generally agreed that no additional screening questions should be considered. The results of the assessment for each alternative are discussed below.

## **3.2 Assessment of Alternatives**

### **3.2.1 Alternative 1 - Do Nothing**

#### **Description**

The “do nothing” alternative would mean that the current landfill would close in June 2011 and there would be no construction or operation of a new landfill footprint. WM would be required to exit the waste disposal business in the Town of Greater Napanee when the Richmond Landfill reaches its currently approved capacity and the construction of the BREC does not proceed.

Waste generators that currently use the Site for waste disposal or transfer would be required to find other means of managing their wastes such as exporting wastes to other facilities, including those located in the United States (U.S.). This would likely result in a loss of jobs at the current WM site and potentially at other business which rely on WM for cost effective and reliable disposal services.

Truck traffic in the Site-vicinity would be reduced because wastes will not be received at the Site; however, there would be an increase in truck traffic in the regional study area due to the need to export wastes to other facilities. Greenhouse gas production would be reduced in the Site-vicinity (due to reduced truck traffic) but increased in the regional study area due to export of waste to other facilities.

Construction of the BREC would not proceed and 75 new jobs would not be created. More than \$1,000,000 in economic benefits to the Town of Greater Napanee and surrounding communities would not occur. Community host agreements would not be realized. New diversion facilities including the Materials Recycling Facility, Construction and Demolition Facility, Residential





Diversion Facility, Organics Processing Facility and Electronic Waste Handling Facility would not be constructed. Consequently, spin-off economic benefits to local businesses and downstream processors would not be realized. The benefits of increased diversion rates would not be realized and there would be no contribution towards realization of the Provincial goal of 60% diversion.

Funds to support local projects and community groups would not be available. Funds to support the On-Site wildlife habitat centre would likely continue. Funds to support new recreation facilities or community facilities would not likely be available.

Although closed, maintenance and monitoring activities would be required at the current landfill and it would continue to produce leachate and gas that will require collection, management and treatment. There would be no change in the degree of protection afforded to human health, safety and the environment. The Site would continue to be maintained safely even after it is closed.

### **Assessment**

The results of the screening assessment are presented in Table 1, below.





**Table 1: Screening Assessment for Alternative 1**

Screening Question	Feasible?
Is the alternative consistent with the identified opportunity?	“No” - the “do nothing” alternative is not consistent with WM’s stated opportunity, which is: <i>“to enable WM to continue to provide environmentally sound waste management services for disposal of solid, non-hazardous wastes.”</i>
Is it technically feasible?	“Yes” - the alternative is technically feasible as it requires no action.
Is it reasonably capable of being approved (e.g., must meet environmental requirements)?	“Yes” - the alternative requires no new approvals (i.e., approvals are “not applicable”).
Is it within WM’s core business competence and established lines of business?	“Yes” - the alternative is within WM’s technical expertise and capabilities.
Is it consistent with principles of responsible waste management?	“No” - the alternative is not consistent with principles of responsible waste management. The “do nothing” alternative would require disposal of the waste at other eastern Ontario landfills and landfills in New York State, thus reducing their site life and result in increased effects from transportation.
Will the alternative enable WM to continue to provide cost effective services to its customers?	“No” - the alternative does not provide a solution to the Town of Greater Napanee and eastern Ontario waste generators’ need for continued cost effective waste disposal services; and, it does not allow WM to continue to provide waste management services to all of its eastern Ontario customers. This in turn may adversely affect WM customers who rely on WM for reliable, cost-effective services.
Are the economic benefits and risks acceptable to WM and is it economically viable for WM?	“No” - the economic risks to WM are unacceptable. Waste disposal of residual wastes is a key service element of an integrated waste management business such as WM’s operations in the Town of Greater Napanee. To exit the waste disposal business in the Town of Greater Napanee would place WM at a significant competitive disadvantage in the marketplace and lead to an erosion of WM’s ability to maintain its current level of business and compete effectively in the eastern Ontario market, and would significantly lower the value and quality of the company’s overall business.





## Conclusion

*WM determined that the “do nothing” alternative was not a viable alternative. It was judged to be not reasonable and not practicable because it would result in adverse economic effects on WM, the Town of Greater Napanee, the surrounding community and businesses that use WM’s services. This alternative was not considered further.*

### 3.2.2 Alternative 2 - Use Current Landfill Site as a Transfer and Processing Facility and Haul Wastes to a Disposal Facility Elsewhere

#### Description

The current Richmond Landfill will reach its approved capacity and close in June 2011 and will no longer be able to receive wastes for disposal on the Site. Under this alternative, the Site would continue to be used as a waste collection and transfer facility. This alternative is not very different from the current situation where the Richmond Landfill is receiving wastes at a limited rate (i.e., about 10,000 tonnes per year).

Waste generators that currently use the Site for waste disposal or transfer could continue to use the facility but would likely pay more for disposal because their wastes would need to be exported to other facilities including those located in the U.S. There would be a loss of jobs at the current Richmond Landfill and potentially at other businesses that rely on WM for cost effective and reliable disposal services.

Construction of BREC would not proceed and 75 new jobs would not be created. More than \$1,000,000 in benefits to the Town of Greater Napanee and surrounding communities would not occur. Community host agreements would not be realized. The current recycling facilities would likely remain including residential drop-off, household hazardous waste drop-off, bulky items drop-off and composting; however, new diversion facilities including the Materials Recycling Facility, Construction and Demolition Facility, Residential Diversion Facility, Organics Processing Facility and Electronic Waste Handling Facility would not be constructed. Consequently, spin-off economic benefits to local businesses and downstream processors would not be realized. The benefits of increased diversion rates would not be realized and there would be no contribution towards realization of the Provincial goal of 60% diversion.







Funds to support local projects and community groups would not be available. Funds to support the On-Site wildlife habitat centre would likely continue. Funds to support new recreation facilities or community facilities would not likely be available.

Although closed, maintenance and monitoring activities would still be required at the current landfill and it would continue to produce leachate and gas that will require collection, management and treatment. There would be no change in the degree of protection afforded to human health, safety and the environment. Currently, the Site is safe and it would continue to be maintained safely even after it is closed.

**Assessment**

The results of the assessment are shown in Table 2, below.

**Table 2: Screening Assessment for Alternative 2**

Screening Question	Feasible?
Is the alternative consistent with the identified opportunity?	“Yes” - this alternative could in theory meet WM’s stated opportunity in that WM’s customers would continue to be provided with waste management services for disposal of wastes, albeit, their wastes would be exported to other jurisdictions.
Is it technically feasible?	“Yes” - the alternative is technically feasible. There are many examples of waste transfer facilities operating in an environmentally sound manner. Over the past few years, the Richmond Landfill has been receiving limited wastes and the landfill has functioned as a transfer facility with wastes being transported to other jurisdictions.
Is it reasonably capable of being approved (e.g., must meet environmental requirements)?	“Yes” - the alternative is capable of being approved by regulatory agencies assuming the necessary agreements with the landfill owners that would receive the wastes could be obtained.
Is it within WM’s core business competence and established lines of business?	“Yes” - as an owner and operator of waste processing and transfer facilities in other Ontario markets, this alternative would clearly fall within WM’s sphere of core competencies.





Screening Question	Feasible?
<p>Is it consistent with principles of responsible waste management?</p>	<p>“No” – this alternative is not consistent with sustainable waste management principles. As discussed in SD #2, there is already a significant shortage of approved disposal capacity in the province, with an estimated 3,600,000 tonnes having been exported to the U.S. for disposal in 2005. Disposal in the U.S. is not economically attractive for eastern Ontario waste because of the haul distance and is increasingly not a viable disposal alternative because of strong political opposition to Canadian waste being disposed in Michigan and likely to extend to other border states, including New York. This alternative is not a local disposal solution to the waste that is generated in the Town of Greater Napanee and eastern Ontario; sending the current waste volume to other jurisdictions will affect the remaining capacities of other landfills and is contrary to responsible waste management strategies.</p>
<p>Will the alternative enable WM to continue to provide cost effective services to its customers?</p>	<p>“No” - because WM does not own another landfill in eastern Ontario with adequate capacity to receive the wastes formerly going to the Town of Greater Napanee<sup>1</sup>; these wastes will have to be transferred to a third party for disposal. WM (and ultimately its customers) would need to pay to transfer to and dispose of wastes at other facilities.</p>
<p>Are the economic benefits and risks acceptable to WM and is it economically viable for WM?</p>	<p>“No” - reliance on third party waste disposal facilities is not as secure an alternative for WM or its customers in the Town of Greater Napanee and eastern Ontario compared to the development of a new landfill at WM’s Site in the Town of Greater Napanee. It is also not as economically attractive because transfer and hauling would add significant cost for WM and; therefore, its customers. Furthermore, reliance on a third party disposal facility would leave WM at a significant competitive disadvantage and would lead to a reduced level of competition in the eastern Ontario marketplace. This alternative is not likely to be economically viable for WM or its customers over the long-term, in view of the current shortage of long-term disposal capacity and the cost of landfill disposal in eastern Ontario.</p>

<sup>1</sup> Even assuming potential development of additional waste disposal capacity at other locations in eastern Ontario.





## Conclusion

***WM determined that the “transfer facility” alternative was not a viable alternative. It was judged to be not reasonable and not practicable because it was not consistent with WM’s principles of responsible waste management (export of wastes out of the region), would not allow WM to continue to provide cost-effective services, and posed significant financial risks to WM. This alternative was judged to be not viable for WM from a business point of view and was not assessed further.***

### 3.2.3 Alternative 3 - Construct a Thermal Destruction Facility at the Site

#### Description

The thermal destruction alternative would consider mass-burn incineration of wastes to achieve a reduction in the volume of wastes prior to disposal in a residual wastes landfill. There are a variety of thermal destruction technologies being promoted in the marketplace at present. These include incineration, pyrolysis, gasification, refuse-derived fuel, plasma gasification and depolymerisation. Some technologies, such as incineration, are proven at full scale while others such as plasma gasification or pyrolysis are in the demonstration phase.

It is important to note that this thermal destruction facility alternative is considered as a “stand alone” facility – no other waste management facilities are included.

WM has commercial operating experience with mass-burn, waste to energy technology for a municipal waste stream, as an alternative to landfill disposal, through our subsidiary, Wheelabrator Technologies Inc. Wheelabrator has been one of the most successful developers, owners and operators of commercial waste-to-energy projects in North America and currently operates 17 waste-to-energy facilities.

WM has spent significant time researching industry trends and looking for solutions that address emerging needs. We have found plasma gasification technology very promising, but we are not yet ready to deploy it on a large scale due to the technical complexities of the feed stocks and the capital costs to develop the facilities. Our goal is to build and demonstrate the





technology on a small-scale first focusing on high cost of disposal and segregated waste streams such as medical wastes to prove out the commercial efficacy of the technology on non-homogeneous waste streams. We would then extend our focus to larger sized facilities focused on municipal solid waste. We expect the development and deployment timeframe to be approximately four to seven years from now and the company's expectations are that the largest processing size would be approximately 500 tonnes/day. WM anticipates that this technology will be a niche service offered to customers who may have complex disposal needs and or specific energy off-take needs but it is not anticipated to take the place of any large scale disposal options that are currently being addressed with existing mass-burn incineration or landfill options. We believe that we won't be in a position to offer this technology on a commercial scale basis for about 10 years.

Consequently, we concluded that this alternative to a landfill was not economically feasible for the current need and opportunity.

### **Assessment**

The results of the screening assessment are shown in Table 3, below.





**Table 3: Screening Assessment for Alternative 3**

Screening Question	Feasible?
Is the alternative consistent with the identified opportunity?	“Yes” – this alternative would meet the opportunity identified by WM by continuing to provide waste disposal services to its customers.
Is it technically feasible?	“Yes” – the thermal destruction technology was judged to be technically feasible for waste volume reduction but not as a complete alternative to a landfill. Although significant reductions in the volume of wastes are achievable, there will still be residual wastes that must be disposed of in a landfill.
Is it reasonably capable of being approved (e.g., must meet environmental requirements)?	“Yes” – some technologies such as incineration have been proven to be effective at full scale, while others, such as plasma gasification or pyrolysis, are in the demonstration phase. A thermal destruction alternative technology would likely be approvable as Ontario legislation does not prohibit waste combustion and thermal plants. It should be noted that, historically, very few incinerators have been approved and operated in Ontario or Canada. However, the McGuinty government recently gave approval for Plasco Trail Road Inc. of Ottawa to construct and operate a pilot plasma gasification facility. The plasma gasification process will break down non-recyclable municipal waste that is destined for landfill to create a synthetic gas to power electricity generators
Is it within WM’s core business competence and established lines of business?	“Yes” - incineration is one of WM’s primary services, offered through its affiliate, Wheelabrator Technologies Inc.
Is it consistent with principles of responsible waste management?	“Yes” – this alternative is consistent with a strategy for responsible waste management
Will the alternative enable WM to continue to provide cost effective services to its customers?	“No” - thermal destruction plants are very expensive from both a capital and operating cost perspective and are likely not economically viable to WM’s customers. Some materials received in the waste stream (e.g., concrete, rubble, soils, metals, etc.) will not easily burn or reduce through the above-mentioned processes, thus adding greatly to costs. Thermal destruction plants are extremely complex and require very specialized skills to operate them safely and efficiently. These factors make it unlikely that WM can continue to provide cost effective services in the short term. We believe that we won’t be in a position to offer this technology on a commercial scale basis for about the next 10 years.
Are the economic benefits and risks acceptable to WM and is it economically viable for WM?	“No” - the risks in regards to uncertainties in approvability and economic viability make this alternative unacceptable to WM from a business perspective.





## Conclusion

***WM determined that thermal destruction as a stand-alone alternative was not a viable alternative from an economic and risk points of view. WM determined this alternative to be not reasonable and not practicable and was not assessed further; however, this alternative might still be considered as a component of a comprehensive waste management solution in the future. Even if this alternative was implemented, there would still be a need for disposal of residual wastes.***

### 3.2.4 Alternative 4 - Establish a New Landfill Elsewhere Description

This alternative contemplates that WM would close the current landfill in 2011, identify a new landfill footprint for a facility, seek approvals and ultimately construct and operate a new landfill facility elsewhere.

With the closure of the current Richmond Landfill, waste generators that currently use the Site for waste disposal or transfer would be required to find other means of managing their wastes such as exporting wastes to other facilities including those located in the U.S., or to a new site where WM is able to establish a new landfill footprint. This would likely result in a loss of jobs at the current WM Site and potentially at other businesses that rely on WM for cost effective and reliable disposal services.

Truck traffic in the Site-vicinity would be eliminated because waste (about 10,000 tonnes per year) will not be received at the Site; however, there would be an increase in truck traffic in the regional study area due to the need to export waste to other facilities. Greenhouse gas production would be reduced in the Site-vicinity (due to reduced truck traffic) but increased in the regional study area due to export of waste to other facilities.

Construction of BREC would not proceed and 75 new jobs would not be created. More than \$1,000,000 in economic benefits to the Town of Greater Napanee and surrounding communities would not occur. Community host agreements would not be realized. New diversion facilities including the Materials Recycling Facility, Construction and Demolition Facility, Residential Diversion Facility, Organics Processing Facility and Electronic Waste Handling Facility would not be constructed. Consequently, spin-off economic benefits to local businesses and downstream processors would not be realized. The





benefits of increased diversion rates would not be realized and there would be no contribution towards realization of the Provincial goal of 60% diversion.

Funds to support local projects and community groups would not be available. Funds to support the On-Site wildlife habitat centre would likely continue. Funds to support new recreation facilities or community facilities would not likely be available.

Although closed, the current landfill would still require maintenance and monitoring activities and it would continue to produce leachate and gas that will require collection, management and treatment. There would be no change in the degree of protection afforded to human health, safety and the environment. The Site is currently safe and would continue be safe after it is closed.

WM would conduct a site search and obtain a sufficiently large and suitable Site for landfill development. It would be necessary to obtain the required regulatory approvals and agreements to operate the site as a waste management facility. WM would face significant challenges and risks because it may not be able find a suitable site or the approval for a new site.

Assuming that a site could be found and approved, then WM would construct and operate a new landfill.

### **Assessment**

The results of the screening assessment are shown in Table 4, below.





**Table 4: Screening Assessment for Alternative 4**

Screening Question	Feasible?
Is the alternative consistent with the identified opportunity?	"Yes" - this alternative would meet the opportunity identified by WM to continue to provide waste disposal services to its customers.
Is it technically feasible?	"Yes" - the alternative is technically feasible. WM could identify, select, construct and operate an environmentally safe landfill for disposal of wastes.
Is it reasonably capable of being approved (e.g., must meet environmental requirements)?	"Yes" - provided that a new suitable landfill site is selected and that it could be operated in an environmentally safe manner, it should be "approvable". It is likely that the necessary regulatory approvals for development of the landfill would be obtained pursuant to the requirements of the <i>Environmental Assessment Act</i> , <i>Environmental Protection Act</i> and <i>Planning Act</i> as well as other pertinent legislation.
Is it within WM's core business competence and established lines of business?	"Yes" - construction and operation of a new landfill is certainly within the core competencies and technical expertise of WM. This is clearly demonstrated by decades of successful operation of landfills in Ontario.
Is it consistent with principles of responsible waste management?	"Yes" - the alternative is consistent with principles of responsible waste management assuming that the new landfill is located in eastern Ontario.
Will the alternative enable WM to continue to provide cost effective services to its customers?	"Yes" - construction and operation of a new landfill would probably be a cost effective solution for WM's customers in that they would have an assured and affordable waste disposal service for many years in the future. However, the cost of site selection, land acquisition, and development of a completely new site would be significantly higher than development of new disposal capacity on the existing Site.
Are the economic benefits and risks acceptable to WM and is it economically viable for WM?	"No" - the economic benefits of establishing a new landfill would be outweighed by its risks. The primary risk of pursuing this alternative is that WM may not find a suitable site or get approvals for a new site, assuming it could be found. Compared to further developing an existing site, it is much more difficult, costly and time-consuming to find and obtain the necessary approvals, permits and agreements for a new landfill site in Ontario. The history of landfill permitting in the province over the past 25 years supports this conclusion. WM does not own or know of any other property in the Greater Napanee area that would be suitable for a new landfill. As a private company, WM does not have the power of expropriation to secure ownership of land that it might identify for this purpose. WM concluded that the risks associated with this alternative outweighed the potential economic benefits.







## Conclusion

***WM determined that “a new landfill at a new Site” alternative clearly has significant risks, was not reasonable and not practicable, therefore this alternative was not assessed further.***

### **3.2.5 Alternative 5 - Close the Current Landfill and Establish a New Landfill Footprint on Site**

#### **Description**

This alternative contemplates closing of the current landfill when it reaches capacity and establishing a new landfill on WM property north or northeast of the current landfill. WM has provided waste disposal services in the past through the operation of the Richmond Landfill in the Town of Greater Napanee. A new landfill footprint on the existing Site would allow for acceptance of additional waste capacity to continue ongoing operations in the Town of Greater Napanee. It should be noted that this alternative does not contemplate any additional measures by WM to reduce the amount of wastes going to its landfill and so it is similar to the previous EA proposal which was refused by the Minister in 2006.

Waste generators that currently use the Site for waste disposal or transfer would continue to use the Site. There would not be a loss of jobs at the current WM Site or at other business that rely on WM for cost effective and reliable disposal services.

Truck traffic in the Site-vicinity would be increased because more waste would be received at the Site; however, there would not likely be an increase in truck traffic in the regional study area due to the need to export waste to other facilities.

Construction of BREC would not proceed and 75 new jobs would not be created. More than \$1,000,000 in benefits to the Town of Greater Napanee and surrounding communities would not occur. Community host agreements would not be realized. New diversion facilities including the Materials Recycling Facility, Construction and Demolition Facility, Residential Diversion Facility, Organics Processing Facility and Electronic Waste Handling Facility would not be constructed consequently spin-off economic benefits to local businesses and downstream processors would not be realized. The benefits of increased diversion rates would not be realized and there would be no contribution towards realization of the Provincial goal of 60% diversion.



Funds to support local projects and community groups would likely continue to be available. Funds to support the On-Site wildlife habitat centre would likely continue. Funds to support new recreation facilities or community facilities would not likely be available.

Although closed, the current landfill would still require maintenance and monitoring and it would continue to produce leachate and gas that will require collection, management and treatment. There would be no change in the degree of protection afforded to human health, safety and the environment. The Site is safe and would continue to operate safely after it is closed.

### **Assessment**

The results of the screening assessment are shown in Table 5, below.





**Table 5: Screening Assessment for Alternative 5**

Screening Question	Feasible?
Is the alternative consistent with the identified opportunity?	“Yes” - this alternative would meet the opportunity identified by WM to continue to provide waste disposal services to its customers.
Is it technically feasible?	“Yes” - the alternative is technically feasible. WM could construct and operate an environmentally safe landfill for disposal of wastes on the existing Site; WM owns the property and operates a landfill there already. Furthermore, WM owns sufficient land to construct and operate the new landfill, the property is located in a suitable environmental setting, monitoring of Site performance after many years of operations demonstrates acceptable environmental performance of the current landfill at the Site, and the required infrastructure for the new landfill is already in place or can be put in place cost effectively.
Is it reasonably capable of being approved (e.g., must meet environmental requirements)?	“Yes” - the new landfill would be approvable. WM believes that technical issues concerning the past performance of the current landfill have been addressed. WM also believes that technical issues associated with a new landfill can also be successfully addressed. WM can mitigate any reasonable concerns of its neighbours as they relate to future operations at the Site within the context of a new landfill footprint. However, as this alternative does not contemplate additional measures by WM to minimize the amount of residual waste going to the landfill, it is likely to be met with significant criticism and opposition by the Ministry (which has a 60% diversion target), the public and other stakeholders (who have clearly identified their preference for sustainable waste management solutions).
Is it within WM’s core business competence and established lines of business?	“Yes” - this alternative is clearly within WM’s core business competence and established lines of business. Furthermore, there is an excellent management and operations team already in place at the Richmond Landfill.
Is it consistent with principles of responsible waste management?	“Yes” - this alternative does provide a local solution to waste management (no exporting of waste); however, it does not incorporate measures to reduce the amount of waste going to the new landfill.
Will the alternative enable WM to continue to provide cost effective services to its customers?	“Yes” – this alternative will enable WM to continue to provide cost effective services to its customers.
Are the economic benefits and risks acceptable to WM and is it economically viable for WM?	“No” – although there would be significant economic benefits to WM and its customers from a new landfill, there would also be a significant risk of failure to obtain the required approvals, or at a minimum, approvals would be costly, time-consuming and challenging to obtain.





## Conclusion

*WM determined that the “new landfill On-Site” alternative was not a viable alternative because it posed too great of a risk and was unlikely to be successful. This alternative is essentially the proposal for which the EA was refused by the Minister in 2006. Although technical considerations could be addressed successfully, and a successful project would be economically beneficial to WM and the community, it is very unlikely that the Town of Greater Napanee and the community would support a ‘landfill only’ alternative. Through extensive consultation, WM had heard that a comprehensive, integrated waste management facility should be sought. WM concluded that this alternative was not reasonable and not practicable, therefore was not assessed further.*

### **3.2.6 Alternative 6 - Close the Current Landfill and Establish a New Landfill on Site with Enhanced Waste Diversion Activities**

#### **Description**

This alternative is similar to the previous alternative (Section 3.2.5) except that it embodies a smaller new landfill footprint with significantly enhanced waste diversion activities within a comprehensive waste management facility. The new landfill footprint is intended to receive only residual wastes following diversion efforts. The Minister has established a 60% goal for waste diversion in Ontario. In this alternative, WM will incorporate reduction, reuse and recycling of resources in the facility as key activities in the ongoing management and preservation of waste disposal in eastern Ontario. Also, there are significant added economic benefits associated with this alternative.

Under this alternative, the current landfill would close in June 2011 and WM would seek approvals for a new landfill footprint and for additional diversion and energy facilities at the Site (i.e., the BREC proposal).





Construction of BREC would result in the creation of 75 new “green” jobs. There would be more than \$1,000,000 in economic benefits to the Town of Greater Napanee and surrounding communities. Community host agreements would be negotiated and executed. New diversion facilities including the Materials Recycling Facility, Construction and Demolition Facility, Residential Diversion Facility, Organics Processing Facility and Electronic Waste Handling Facility would be constructed resulting in spin-off economic benefits to local businesses and downstream processors. These facilities would contribute to increased diversion rates helping WM realize the Provincial goal of 60% diversion and help make the Site a leader in responsible waste management.

Increased funds would be available to support local projects and community groups as a result of the construction of BREC. Funds to support the On-Site wildlife habitat centre would continue to be available and other aspects could be developed. Funds to support new recreation facilities and community facilities on the Site would not be available. Cultural heritage features could be protected and enhanced through the BREC facility.

Although closed, the current landfill would still require maintenance and monitoring and it would continue to produce leachate and gas that will require collection, management and treatment. There would be no change in the degree of protection afforded to human health, safety and the environment. The Site is safe and would continue to be safe after it is closed.

### **Assessment**

The results of the screening assessment are shown in Table 6, below.





**Table 6: Screening Assessment for Alternative 6**

Screening Question	Feasible?
Is the alternative consistent with the identified opportunity?	“Yes” - this alternative would meet the opportunity identified for WM to continue to provide waste disposal services to its customers.
Is it technically feasible?	“Yes” - the alternative is technically feasible. WM could construct and operate an environmentally safe landfill for disposal of wastes on the existing Site. WM owns or has optioned property and operates a landfill at this site. Furthermore, WM owns sufficient land to construct and operate the new landfill, the property is located in a suitable environmental setting, monitoring of Site performance after many years of operations demonstrates acceptable environmental performance by the current landfill at the Site, and the required infrastructure for the new landfill is already in place or can be put in place cost effectively.
Is it reasonably capable of being approved (e.g., must meet environmental requirements)?	“Yes” - the new landfill would be approvable. WM believes that it has addressed technical issues concerning the past performance of the current landfill and can successfully address technical issues associated with a new landfill. WM also believes it can mitigate any reasonable concerns of its neighbours as they relate to future operations at the Site within the context of a new landfill footprint. Since this alternative contemplates additional measures by WM to minimize the amount of residual waste going to a landfill, it is likely to be met with greater acceptance by the Ministry, the public and other stakeholders.
Is it within WM’s core business competence and established lines of business?	“Yes” - this alternative is clearly within WM’s core business competence and established lines of business. Furthermore, there is an excellent management and operations team already in place at the Richmond Landfill.
Is it consistent with principles of responsible waste management?	“Yes” - this alternative provides a local solution to waste management (no exporting of waste) and incorporates several measures to reduce the amount of waste going to the new landfill and is; therefore, consistent with principles of responsible waste management.
Will the alternative enable WM to continue to provide cost effective services to its customers?	“Yes” – this alternative will enable WM to continue to provide cost effective services to its customers.
Are the economic benefits and risks acceptable to WM and is it economically viable for WM?	“Yes” – there would be significant economic benefits to WM and its customers for a new landfill. The risk of failure to obtain the required approvals is mitigated by the incorporation of several waste reduction measures to provide a comprehensive, sustainable waste management solution.





## Conclusion

*WM determined that the “new landfill footprint with enhanced waste diversion activities” alternative (i.e., the BREC proposal) is a viable alternative. This approach would provide significant economic benefits to the Town of Greater Napanee, surrounding communities and WM. It addresses the mistakes of the past approach and incorporates the input of the public and provincial policies towards waste management. WM concluded that this alternative was reasonable and practicable and the preferred approach from WM’s business perspective.*

### 3.3 Summary of Assessment

Table 7 presents a summary of the assessment of the six alternatives considered to achieve WM’s purpose statement. If any approach received a ‘no’ in response to one or more of the assessment factors, it was eliminated from further consideration.





**Table 7: Summary of Screening to Identify Reasonable and Practicable Alternatives**

Screening Criteria	Alt. #1: Do Nothing	Alt. #2: Transfer Facility	Alt. #3: Thermal	Alt. #4: New Landfill Elsewhere	Alt. #5: New Landfill On-site	Alt. #6: New Landfill On-site – Diversion
<b>A) Consistent with WM opportunity?</b>	No	Yes	Yes	Yes	Yes	Yes
<b>B) Technically Feasible?</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>C) Able to be approved?</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>D) Consistent with core business competencies?</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>E) Consistent with strategy for responsible waste management?</b>	No	No	Yes	Yes	Yes	Yes
<b>F) Enables WM to continue to provide cost effective services?</b>	No	No	No	Yes	Yes	Yes
<b>G) Acceptable economic risks and benefits?</b>	No	No	No	No	No	Yes







Terms of Reference for a New Landfill Footprint  
Supporting Document #3 – Alternatives to the Undertaking

WM's analysis concluded that alternatives 1, 2, 3, 4 and 5 were not reasonable or practicable alternatives for the reasons discussed above. The sixth alternative, closing the current landfill, establishing a new landfill on the current Site and incorporating several measures to provide enhanced waste diversion, was judged to be acceptable against all of the assessment factors and was; therefore, identified as the preferred alternative to carry forward to the EA. WM believes that implementation of this alternative will provide additional waste disposal capacity for the Town of Greater Napanee and eastern Ontario for an estimated 20 years. In addition, the project location in the eastern part of Ontario is strategic and economically favourable to WM in terms of haul distances and routes, since other landfill sites within eastern Ontario are located in the Ottawa area.





## 4.0 CONCLUSION

On the basis of the analysis presented herein, WM concluded that Alternative 6, the closure of the current landfill in 2011, the construction and operation of a new landfill footprint located north and/or northeast of the current landfill and the establishment of several activities to enhance diversion of waste from the landfill was its preferred alternative for implementing its business plan.

All of the components of this alternative comprise the BREC proposal which WM announced on March 3, 2010.

WM has decided to pursue a new landfill footprint having a total volume of about 13 million m<sup>3</sup> with an expected operating life of 20 years and receipt of up to 400,000 tonnes per year. The total volume was estimated by determining the total amount of waste received over 20 years (400,000 tonnes/yr x 20 years = 8 million tonnes). The volume of landfill air space was determined using an airspace utilization factor of 0.75 tonnes of waste per m<sup>3</sup> (8 million tonnes/0.75 tonnes/m<sup>3</sup> = 10.64 million m<sup>3</sup>). Finally, an allowance was made for daily cover material ratio that resulted in a total air space requirement of 10 million m<sup>3</sup>.





## 5.0 REFERENCES

- [1] Ministry of the Environment (MOE). (2009). *Code of Practice. Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario. October 2009.*



**Terms of Reference**  
for  
**Environmental Assessment**  
of a  
**New Landfill Footprint**  
at  
Beechwood Road Environmental Centre  
Town of Greater Napanee

**Supporting Document #4**  
**Overview of Existing**  
**Environmental Conditions**



June 2010



## Table of Contents

**1.0 INTRODUCTION ..... SD4-1**

1.1 Atmosphere ..... SD4-1

1.2 Geology and Hydrogeology ..... SD4-5

1.3 Surface Water ..... SD4-7

1.4 Biology ..... SD4-10

1.5 Cultural Heritage Resources ..... SD4-12

1.6 Transportation ..... SD4-13

1.7 Land Use ..... SD4-16

1.8 Agriculture ..... SD4-18

1.9 Socio-Economic ..... SD4-18

1.9.1 Economic ..... SD4-18

1.9.2 Social ..... SD4-19

1.9.3 Visual ..... SD4-20

1.10 Aboriginal ..... SD4-21

1.11 Site Design and Operations ..... SD4-24

**2.0 REFERENCES ..... SD4-26**





## 1.0 INTRODUCTION

The environment is divided into individual components for this Terms of Reference (TOR) and for the subsequent Environmental Assessment (EA). These components correspond to the proposed assessment criteria as described in Appendix B of the TOR, as follows:

- Atmosphere;
- Geology and Hydrogeology;
- Surface Water;
- Biology;
- Cultural Heritage Resources;
- Transportation;
- Land Use;
- Agriculture;
- Socio-economic;
- Aboriginal; and,
- Site Design and Operations.

An overview of the existing environmental conditions for each of these components is provided in the following subsections, noting that under the Site Design and Operations component the overview is a description of environmental controls associated with the existing landfill facility. The sources of information for the overview are the previous EA Study Report and recent technical studies completed since the refusal of the EA in 2006, including hydrogeological and odour studies.

### 1.1 Atmosphere

The following summary of existing conditions is based on a review of the existing information provided in the previous Richmond Landfill EA, as well as subsequent information.





## Air Quality and Odour

The results presented in the previous EA are based on air quality and odour monitoring/sampling conducted in late 1999/early 2000, and modelling performed on landfilling activities occurring in 2000 to 2005. The previous EA presented data on baseline conditions within the area of the landfill, which is considered representative of the baseline conditions for the current site.

In terms of air quality, the previous EA addressed particulate matter (total suspended particulate, inhalable particulate (PM<sub>10</sub>), respirable particulate (PM<sub>2.5</sub>) and dustfall), non-methane organic compounds (including 19 volatile organic compounds and 5 mercaptans and sulphides), criteria air contaminants, dioxins and furans, polyaromatic hydrocarbons, and particulate bound metals.

The baseline air quality in the vicinity of the existing landfill is defined as the combination of background activities (e.g., roadways, biogenic emissions) and landfilling operations. The results of the assessments included in the previous EA were that baseline concentrations of all compounds assessed were below applicable air quality criteria.

Baseline odour concentrations from the historical landfill activities were predicted to be below the Ministry of the Environment's (the Ministry) odour guideline of 1 odour unit per cubic metre (OU/m<sup>3</sup>), when composting operations at the site were excluded from the modelling. The inclusion of composting operations caused exceedances of the Ministry guideline, but at low frequencies.

These baseline model results have been confirmed by the fact that the site has historically received odour complaints. In 2003, WM was receiving numerous odour complaints mainly due to leaking, above-ground collection flex piping. This situation was rectified by WM by replacing the flex piping with HDPE and burying piping system. Since the remediation took place, every year odour complaints have decreased. By 2007 they were down to a few dozen. In the past two years WM has installed dewatering pumps, which has lowered complaints even further.





Odour surveys have been undertaken by a consultant specializing in odour surveys from December 8 to 31, 2008 and from June 22 to July 2, 2009. Odours were observed by a Certified technician travelling the route around the landfill and the perimeter of the landfill or directly downwind of the landfill footprint. A Ministry Air Quality Technician participated in 5 out of the 15 field survey trips through the timeframe of the survey to ensure that the survey protocol was followed and that the results would be considered supportable by the Ministry. Intensity of odour was determined based on the following odour intensity scale developed by the Ottawa District Office of the Ministry:

- 0 - No odour.
- 1 - Odour just detectable.
- 2 - Distinct and definite odour.
- 3 - Strong and objectionable enough to cause a person to attempt to avoid it after a period of exposure.
- 4 - So powerful to be offensive and repulsive and bordering on being intolerable.
- 5 - Overpowering, nauseating, intolerable odour.

During December 2008, eight of 35 odour observations were attributed to landfill gas. In all cases, strength of landfill gas odour was characterized as "just detectable." In June/July 2009, 23 of 257 odour observations were attributed to landfill gas. For 19 of the 23 landfill gas observations, the strength of the odour at WM's owned and optioned lands at the Beechwood Road site in the Town of Greater Napanee (the Site) property boundary was characterized as "just detectable" and for the remaining four observations at the landfill entrance, the odour strength was characterized as "distinct and definite". In addition, the Ministry also conducted their own Trace Atmospheric Gas Analyser (TAGA) survey and reported that there were no issues.

The baseline assessments contained within the previous EA represent findings applicable to the 2000 to 2005 operations. Activities at the landfill have lowered in intensity since then due to reductions in the waste acceptance rate, and improvements have been made to the landfill gas collection system at the Site and its operations has been optimized. Therefore, conditions at present related to air quality and odour emissions are expected to have improved since the compilation of the historical EA studies.







Further, additional air quality and odour studies have been conducted at the Site since the compilation of the historical EA. These studies will be considered in the future EA of the new landfill footprint.

## Noise and Vibration

The results presented in the previous EA are based on noise monitoring data collected at three (3) locations, modelling of haul route noise levels and modelling of activities on the Site (On-Site). The EA presented data on baseline conditions within the area of the landfill, which is considered representative of the baseline conditions for the current site.

The existing noise levels in the vicinity of the landfill are composed of noise associated with landfilling activities, road traffic (including adjacent roads and Highway 401) and other local industry. As a result, sensitive Points of Reception (PORs) have been identified as either Class 3 (rural) or Class 2 (urban) in accordance with the Ministry guideline publications NPC-232 and NPC-205, respectively.

Based on the existing activities at the Site, the noise levels at the identified POR's due to landfilling operations are likely lower than the levels predicted for the expansion scenario that was assessed in the previous EA. Also, the current operations are reduced when compared to the level of activity during the October 1998 monitoring period. At that time, the monitoring data (i.e., baseline) collected indicated that the minimum 1 hour daytime  $L_{eq}$ s were below 55 dBA. Therefore, the landfill operations at the time of the assessment met the 55 dBA sound level limit as outlined in the Landfill Standards Guideline based on the time period under review (i.e., 0800-1700) for each of the identified POR's in the assessment.

Based on the projected traffic volumes, the existing noise environment (i.e., 2010) may have increased about 3 dB from the time that the noise study was carried out for the EA. This increase in background noise levels is solely attributed to the increase in road traffic and not the landfill activity including haul trucks.





## 1.2 Geology and Hydrogeology

The Site is located within the Napanee Plain, which is a flat to slightly undulating plain of limestone dipping slightly to the south and typically covered with a relatively thin veneer of overburden. The relatively flat nature of the regional topography is interrupted in places by the presence of drumlins and major surface drainage features such as the Salmon River north of the Site and the Napanee River south of the Site. The dominant drainage feature on the Site is Marysville Creek located in the central part of the Site north of the existing landfill. Beechwood Ditch provides drainage south of the landfill.

The overburden geology across much of the regional area consists of a thin mantle of glacial till, generally clayey/silty to sandy in texture, overlying the Paleozoic bedrock strata. The overburden thickness is typically one to two metres (m) or less. Isolated drumlins, such as Empey Hill, locally increase the thickness of the overburden to approximately 15 to 20 m. In some locations there are thicker sequences of shallow (sand and gravel shoreline ridges) and deeper (silt and clay) glaciolacustrine deposits from Glacial Lake Iroquois. The finer-grained silt and clay deposits are generally less than two m thick, highly weathered, and are laterally discontinuous. Post-glacial organic deposits (e.g., from bogs and swamps) are also common throughout the regional area.

Bedrock in the area consists of Middle Ordovician limestone of the Simcoe Group which was originally deposited as sediments in a marine environment beginning approximately 500 million years ago. The bedrock strata generally dip slightly to the south at approximately one to three m per kilometre (km). Exceptions to this occur where localized highs in the Precambrian basement have produced doming of the Paleozoic strata and anomalously high localized angles of dip. A Precambrian inlier is present near the Salmon River approximately 2.5 km north of the existing landfill site.

At the existing Richmond Landfill, the upper strata of bedrock consists of the Verulam Formation, which is a horizontally bedded, medium to coarse crystalline limestone with interbedded shale layers. The Verulam is generally up to a few metres thick at the existing landfill site and is underlain by the Bobcaygeon Formation, which generally consists of horizontally bedded, crystalline limestone with interbedded shale in the upper part and interbedded calcarenite in the lower part. The thickness of the Bobcaygeon Formation beneath the existing landfill varies from approximately 11 m to 15 m. The





Bobcaygeon Formation is underlain by the Gull River Formation, which consists of horizontally bedded limestone and exhibits a thickness of approximately 75 m beneath the landfill site.

The Site is located between two normal faults: the Salmon River and Napanee River faults. Observations of bedrock outcrop near the Salmon River indicate the development of a jointing system that appears to consist predominantly of two sets of joints oriented at approximately 75 degrees to one another – a primary joint system oriented at 210 degrees (parallel to the Salmon and Napanee River faults) and a secondary one at about 285 degrees. The results of bedrock coring at the Site indicate that bedrock fracturing consists predominantly of bedding plane partings. Many of the fractures observed in the rock core were infilled with calcite indicating some degree of water transport in the past.

Groundwater is present throughout the region in both the overburden and bedrock; however, the occurrence and quality are variable. Overburden aquifers are limited to areas of greater overburden thickness and are not continuous across the region. They are restricted to areas of glaciofluvial sands and gravels, beach ridge deposits, drumlins and thicker moraines. The Paleozoic limestone bedrock is the primary groundwater supply aquifer in the region, with the groundwater occurring in the fractures in the rock. The depths of domestic wells in the area suggest that the quantity of groundwater within the bedrock is variable; however, sufficient quantities of groundwater for domestic supplies can generally be found in fracture zones that occur at depths between 6m and 40m below ground surface. Water quality is usually hard, with calcium and bicarbonate being the dominant ions, and salty or sulfurous water quality can be common.

The regional groundwater flow direction is southward, following the dip of the limestone bedrock as well as the general slope of the topographic surface. Local, shallow groundwater flow patterns are influenced by topography, with recharge occurring in areas of high ground and discharge zones occurring in areas of topographic lows. On a regional scale, groundwater recharge occurs to the bedrock aquifer in areas where the bedrock is exposed at the surface or where it is covered by a thin layer of permeable overburden. Regional groundwater discharge occurs into the Bay of Quinte/Lake Ontario basin.





The active groundwater flow zone at the existing landfill site extends to a depth of approximately 30 m below the top of bedrock, and is composed of two zones: 1) the shallow groundwater zone which includes the overburden and top one to two metres of bedrock, and 2) the intermediate bedrock, extending to 30 m below the top of bedrock. The dominant fracture orientation in the upper 30 m of bedrock is parallel to bedding (horizontal to sub-horizontal), which is typical of flat lying limestone formations. In addition to the horizontal to sub-horizontal fractures, a moderate amount of vertical to sub-vertical fractures exist providing hydraulic connections between the various horizontal to sub-horizontal fractures.

The directions of local groundwater flow in the shallow flow zone are strongly influenced by ground surface topography and the orientations of drainage routes. Empey Hill creates a flow divide west of the landfill with shallow groundwater being directed both to the north and the south. In the intermediate bedrock zone, groundwater generally flows to the west from the western edge of the existing landfill, to the south-southeast from the southern edge of the existing landfill, and to the southwest from the southwest corner of the existing landfill.

### 1.3 Surface Water

Surface water flow patterns in the general area of the Site are typically from northeast to southwest towards Hungry Bay on the Bay of Quinte. Lands throughout the area are drained by a number of watersheds as follows: Marysville Creek, Selby Creek and the Salmon River, which all discharge to the Bay of Quinte.

The entire Site is located within the Marysville Creek watershed, which originates in the eastern portion of the Site. The Salmon River watershed is to its northwest, and the Sucker Creek watershed to its northeast and south. The watershed divides between the Marysville and Sucker Creek watersheds within the eastern side of the Site near Johnsons Side Road.

Two branches of Marysville Creek are found on the Site. The south branch is located in the middle portion of the Site, while the north branch passes through the northwest corner portion of the Site and joins the south branch just west of the Site. Drainage for the southern portion of the Site is provided by Beechwood Ditch, a tributary of Marysville Creek which traverses the south part of the site and discharges into the roadside ditch on the north side of





Beechwood Road, approximately 150 m west of the main access road into the Site. The ditch flows south across Beechwood Road and west across County Road 10 to join Marysville Creek about 3 km west of County Road 10.

Upstream of the area immediately adjacent to County Road 10, Marysville Creek is an ephemeral (seasonal) watercourse, flowing only during the spring freshet or after prolonged rains. The channel is poorly defined at various points and, in other sections has been channelized to improve drainage. No groundwater discharge locations have been identified in the vicinity of the existing landfill or upstream, other than a discharge area immediately upstream of County Road 10. Permanent flow appears to originate downstream of County Road 10. The Beechwood Ditch flows intermittently, in response to the spring freshet and substantial rainfalls. The total catchment area of Marysville Creek at the Bay of Quinte is 5,480 hectares (ha); flow in Marysville Creek at County Road 10, i.e., from the Site, represents contributions from only 7 percent (%) of the entire watershed.

The Beechwood Ditch receives stormwater and surface water runoff from the area to the south of the Richmond Landfill and from the southern slopes of the existing fill area. Two storm water management (SWM) ponds on the north side of the existing landfill drain into Marysville Creek. A SWM pond system drains into Beechwood Ditch to the south. These ponds are part of the landfill's On-Site management system for storm water. They are designed to treat runoff from the site before it reaches Marysville Creek or Beechwood Ditch. There is also a pond On-Site to collect run-off from the compost area. This pond is self-contained and does not discharge directly to either watercourse.

As described in the 2006 EA, derived hydrographs for the entire Marysville Creek watershed indicate that the average daily flow for Marysville Creek at the Bay of Quinte ranged from 441 litres per second (L/sec) in a dry year to 960 L/sec in a wet year, with an average daily flow of 558 L/sec for the average discharge year. Minimum daily flows ranged from 15 L/sec to 44 L/sec for dry and wet years, respectively, with an average minimum daily flow of 16 L/sec over the period of record.





Baseline water quality for Marysville Creek and Beechwood Ditch in the area of the Richmond Landfill has been determined based on ongoing surface water quality monitoring programs carried out as part of landfill site operations, as well as sampling programs conducted by the Ministry. Interpretations of water quality are based on comparison between sites upstream of, and those within, any potential landfill influence, in the context of the Ministry's Provincial Water Quality Objectives (PWQOs). The PWQOs are a set of numeric and narrative criteria that are set at a level to ensure the indefinite survival of the most sensitive aquatic species inhabiting Ontario waters.

Overall, there is no evidence of any existing impact of the landfill on water quality in Marysville Creek or the Beechwood Ditch. Water quality in the area of the Richmond Landfill is enriched with nutrients, and trace metals such as aluminum, zinc and iron. Water quality does not differ between locations upstream and downstream of the landfill and the patterns suggest agricultural influence, the presence of soil particles in the water and stagnant conditions. Several water quality parameters, including total phosphorous, exceeded their PWQOs, but these showed no pattern consistent with a landfill influence.





## 1.4 Biology

### Vegetation

Using the coarse-scale Ecological Land Classification (ELC) mapping as a foundation, ELC field surveys were conducted in the summer of 2009 to add to the natural environment surveys conducted during the previous EA and to include the enlarged Site area. In total, 20 distinct meso-ecosites were delineated during these surveys. The largest ecosite vegetation is the 37 ha Swamp Maple Mineral Deciduous Swamp with Cattail-Sedge Inclusion in the northwestern corner of the Site. Sugar Maple Deciduous Forest and Green-Ash – Mixed Hardwood Woodland are also large ecosites on the Site. The remainder of the Site vegetation is a mosaic of cultivated fields, hedgerows, abandoned fields, and woodlots of various succession stages. Soils are imperfectly drained, leading to the establishment of small patches of cattail marsh in places. A total of 250 plant species have been historically recorded on the Site, including four species considered rare in the Lake Ontario lowlands portion of eastern Ontario: troublesome sedge (*Carex molesta*), necklace sedge (*Carex projecta*), slummy hedge-hyssop (*Gratiola neglecta*), and swamp red-currant (*Ribes triste*).

Site-vicinity (within 500m of the Site) vegetation is similar to that present On-Site, consisting of woodlots, old field and swamp within an agricultural landscape.

### Wetlands

An evaluated wetland is found within the Site-vicinity: Hempfly Swamp (provincially significant) is located north of Selby Road (County Road 11), within approximately 400 m of the Site. A second, unevaluated wetland extends onto the northwest corner of the site, incorporating the maple swamp found in this area. Although this wetland is within 200 m of the Hempfly Swamp at the closest point, the two wetlands are not hydrologically connected as they are within different watersheds.

### Wildlife

During surveys in 2005, 2008, and 2009, a total of 85 potential breeding bird species were recorded on the Site, including several forest interior species, such as white-breasted nuthatch (*Sitta carolinensis*), veery (*Catharus fuscescens*), wood thrush (*Hylocichla mustelina*), and northern waterthrush (*Seiuris noveboracensis*). Marsh and wetland bird species identified on the





Site included sora (*Porzana carolina*), common moorhen (*Gallinula chloropus*), and Wood Duck (*Aix sponsa*).

Four significant bird species were identified within the Site-vicinity: the provincially endangered loggerhead shrike (*Lanius ludovicianus*) and the locally significant northern mockingbird (*Mimus polyglottos*), clay-coloured sparrow (*Spizella pallida*), and eastern bluebird (*Sialia sialis*). Only the eastern bluebird was also recorded on the Site. There is an additional historical record of Henslow's Sparrow (*Ammodramus henslowii*) in the Site-vicinity, although there is no recent evidence that this species still occurs in the area.

Other wildlife recorded from the Site included 11 mammal species, three species of reptiles, and seven species of amphibians.

Thirty species of butterflies were identified from the Site, including the provincially significant Juniper Hairstreak (*Collophrys gryneus*), which feeds on red cedar.

### **Fish and Fish Habitat**

Previous fish habitat assessments within Marysville Creek indicate that habitat quality is generally poor to moderate, although there is good potential northern pike (*Esox lucius*) spawning habitat present in the marsh at the lower end of Marysville Creek.

On-Site, Marysville Creek from County Road 10 upstream to the eastern Site property limit is generally an intermittent, poorly defined headwater channel. The only area within the Site limits that is capable of supporting fish year-round is a small meandering area found just upstream of County Road 10. There was one potential, permanent barrier to juvenile fish migration observed in the Site-vicinity study area, which consisted of a small drop-off, approximately 40 cm high with no plunge pool. However, it is unlikely during a rain or high water event that this barrier would create a problem for larger fish. A potential obstruction to fish migration was also located at the mouth of the creek, which consisted of a water control structure built by Ducks Unlimited.







Fish community sampling was conducted in Marysville Creek at two On-Site locations and one location in the Site-vicinity study area. A total of seven fish species were captured at the On-Site location and five species at the Site-vicinity location. All species collected were warmwater species and none were species at risk.

Benthic invertebrate assessments were conducted at one station in the Site-vicinity study area. A total of 17 species of benthic invertebrates were recorded at this station. The majority of the species recorded are tolerant to warm water temperatures, siltation, and low levels of dissolved oxygen.

## 1.5 Cultural Heritage Resources

The Site and Site-vicinity study areas are situated at the watershed divide between the Salmon and Napanee River Drainage Basins. There is evidence for occupation of the region dating at least 9,000 years ago. Richmond Township was initially surveyed in 1787 with the first crown patents for lots in the area issued in 1801 to 1802 followed by the settlement of the area between 1820 and 1850. The agricultural land use has continued largely unchanged through the twentieth century.

Both Stage 1 and 2 archaeological and cultural heritage assessments that included consideration of both built heritage and cultural landscape features were undertaken as part of the 2005 EA review for the previously proposed expansion of the Richmond landfill site by Archaeological Services Inc. (A.S.I.).

The Stage 1 Archaeological Resource Assessment, produced for the Site and vicinity (250 metres) of the proposed previous expansion, did not identify any known archaeological sites within this area but noted that five archaeological sites are located within the vicinity of the previous site (within 4 km radius). The assessment noted most of the area based on “the favourable topographic features and soils and the close proximity of a tertiary stream and associated wetland” [1] as having potential for pre-contact archaeological resources. The potential for historic resources was restricted to the area of the former hamlet of Empey Hill and along County Road 11 where early homesteading occurred. The study recommended that a Stage 2 assessment be undertaken.





The previous On-Site study area composed of approximately 220 acres was assessed by surface survey of ploughed fields (51.8%) and test pit survey (8.9%). Almost 40% of the property could not be assessed due to extremely wet or swampy conditions. No sites were identified in the assessment, and as a consequence, no adverse impacts were anticipated for archaeological resources.

The Cultural Heritage assessment included investigations of built heritage and cultural landscapes. The study included 18 built heritage sites and 15 cultural landscape units, one located on the previous study area, three along the haul route and eleven in the vicinity of the previous study area. Seven built heritage features and two cultural landscape features were listed with a high heritage value.

The built features of heritage value included the Empey Hill United Church of Canada (circa 1912), the Tucker Barn (1900 to 1939), the Abbot barn (pre-1900); the two Cline farm barns (one 1900 to 1939 and the other pre-1900); the Martin/Winters Barn (pre-1900), and the Winters drive shed (1900 to 1939). The two cultural landscapes of heritage value consist of a “roadscape” that extends southward from Beechwood, and the Martin Cemetery that is a provincially designated historic site.

## 1.6 Transportation

### Air Traffic

The existing landfill site is located just over 8 km from the Tyendinaga Mohawk Airport, which is operated as a training facility by the First Nations Technical Institute. Between 2000 and 2010, there have been eight reported incidents of bird strikes, five of which involved gulls.

### Road Traffic

Heavy vehicles represent two-thirds of the total traffic generated by the landfill site on weekdays. The majority of heavy vehicles (95% or more) access the landfill site via Highway 401. This reflects the regional market nature served by the landfill site, which includes Kingston to the east and Belleville/Trenton to the west. The proximity of the Highway 401/County Road 10 interchange to the site limits the impact on the local road network to 1.3 km on County Road 10 (a rural collector road under the jurisdiction of County of Lennox and Addington) and 0.7 km on Beechwood Road (a rural local road under the jurisdiction of the Town of Greater Napanee).





A transportation study aimed at assessing baseline conditions confirmed the adequacy of the existing interchange configuration and traffic controls along the haulage route to the site. The study also confirmed that On-Site queuing of waste vehicles to access the weigh scale does not cause any spill over to the road network, and that all intersections en route are operating at excellent levels of service with minimal delays to the minor street traffic. The assessment was based on a series of traffic counts that were undertaken in May 1998, September 1999 and June 2001. These count dates correspond to the peak agricultural activity and landfill site activity.

It should be noted that the volume of waste being presently hauled, and by implication the number of loads and vehicular trips, to the Richmond landfill facility is significantly below the levels prevailing earlier this decade due to the limited residual capacity of the facility. The current level of activity is estimated at 10,000 tonnes per year (10 loads per day), which is roughly 8 percent of the annual waste volume previously accommodated by the facility.

### **Road Safety**

The existing road configuration and profile through the study area are considered to be consistent with the posted speed, with the exception of the area within the vicinity of the County Road 10/Beechwood Road intersection near Empey Hill. Stopping sight distances at the Highway 401 On/Off-ramps were found to be adequate.

The Ontario Ministry of Transportation reported the occurrence of 15 accidents on Highway 401 near the County Road 10 interchange and on the respective ramps for the period from 1993 to 1997 inclusive. The primary causes included lost control, skidding and/or sliding and collisions with wildlife. No specific references to accidents involving waste vehicles or agricultural vehicles were reported.

The County of Lennox and Addington reported two accidents on County Road 10 between Highway 401 and County Road 11 for the period 1994 to 1998, both of which were single vehicle collisions with wildlife. None of the above accidents involved waste trucks or agricultural vehicles of any sort.

The Town of Greater Napanee advised that no accidents have been reported on Beechwood Road from 1993 to 1999.





## **Pavement Condition**

The existing pavement along most road sections comprising the haul route to the site is in a general state of disrepair with significant cracking and ravelling evident. It is noted that a five metric tonnes/axle (half load) restriction is in place yearly on County Road 10 from 15 February to 30 April, in an attempt to minimize damage during the spring thaw.

## **Landfill Site Operations**

The landfill is located within reasonable proximity to the Napanee Water Pollution Control Plant (WPCP), which is used to treat the leachate collected On-Site. The leachate is conveyed from the site to the WPCP by tanker truck.

Dust from the gravel access roads is controlled by application of water or calcium chloride as required. The site access road is paved from the weigh scale area to Beechwood Road thus minimizing the amount of mud tracking onto municipal roads. As required, a sweeper is used to clean any debris from the site roads and a portion of Beechwood Road.

## **School Bus Traffic**

Three school boards currently operate school bus routes through the study area: Limestone District School Board, the Algonquin and Lakeshore Catholic District School Board-East, and the Hastings Prince Edward School Board. Bus stops along these routes are located near each student's home, based on arrangements between the student's parents and the bus drivers. Not all of the routes serve local residences; however, some are simply travelling en-route to their ultimate destinations.

Of the school bus routes, only two school boards (three buses) travel on Beechwood Road and thereby pass the existing site entrance.

No accidents involving school buses from any of the respective school boards have been recorded within the study area in the past five years (in fact all three boards reported no accidents regardless of date). Future bus operations and routes are dependent upon the need to serve students' place of residence.





## 1.7 Land Use

In the context of the Regional setting, the Site is situated approximately 1.2 kilometres to the north of Highway 401 and is directly accessible by means of County Road 10. The Town of Greater Napanee, in the County of Lennox and Addington, with a population of approximately 15,400 persons, is located approximately 12 km to the southeast of the site. Deseronto, a community of approximately 1,800 persons, is situated to the south approximately 7 km.

The general area surrounding the Site is traversed by a series of transportation and utility corridors which include Highway 401, roads under the jurisdiction of the County of Lennox and Addington and the County of Hastings, municipal roads, electric power corridors, and pipelines.

Trans Canada Pipelines and Interprovincial Pipelines operate pipelines, which are buried in easements just to the south of the WM property area along a northwest to southeast axis. While building restrictions exist relative to the easements, the lands within the easements are frequently used for agricultural purposes or have been retained in a natural state.

The Lennox-Oshawa Hydro Corridor traverses the southern portion of the lands owned by WM in part of Lots 1, 2 and 3 of Concession 4. This corridor accommodates two rows of towers with high-tension 500 kV transmission lines. The Lennox-Oshawa corridor is in the form of an easement having a width that varies from approximately 120 m to 250 m.

The County of Hastings and the Town of Greater Napanee both have Official Plans. The existing WM site, comprising the western portion of the Site, is designated as Waste Management in the Town of Greater Napanee Official Plan and recognizes the existing waste management operations and related facilities; the eastern portion of the Site is currently designated as agricultural and is used for field crops and pasture and forage areas. Within the 500 m Site-vicinity study area (and beyond), the majority of the lands are designated as either agricultural or rural under the respective Official Plans. Isolated Environmental Protection/Sensitive Areas exist to the north (Hempfly Swamp, a provincially significant wetland) and northwest (two unevaluated wetlands) of the sites, and as a buffer zone along watercourses both On-Site and within the Site-vicinity.





The predominant land uses permitted in the agricultural designation include agriculture (i.e., farm residence, farm buildings, structures and uses such as crop production, tree farms, animal husbandry, poultry operations, fruit production, greenhouses, apiaries, related retail stands) and agricultural related uses such as small scale and directly farm related commercial and industrial uses. Other more secondary uses include home occupations, home industries, and value added agricultural products such as farm vacations, pick-your-own operations, and packing operations. Other compatible uses include forestry, passive outdoor recreation, conservation uses, and woodlots, accessory farm-related residential uses, and wayside pits and quarries.

The predominant land uses permitted in the rural designation include agriculture, conservation, forestry, public and private recreation uses. Other land uses include non-farm residential, estate residential, seasonal residential, home occupation, institutional, forestry, open space, small scale commercial and industrial uses servicing and directly related to the rural economy together with accessory residential uses.

The study area is a rural, agricultural-resource based community with a non-farm related component of development, which is neither well defined nor structured. Development is typically of a linear or strip nature and has focused upon roads under the jurisdiction of the local municipalities, the County of Lennox and Addington and the County of Hastings. Within 3 km of the Site there are no areas of in-depth residential development, or areas which have developed by registered plan of subdivision.

Nearby institutional land uses consist of the Empey Hill United Church located immediately adjacent to the west side of the existing waste management site, and the Pioneer Cemetery located just north of Beechwood Road to the east of the Site. Commercial uses and activities are a closed abattoir located immediately south of Beechwood Road and the existing waste management site, and an automotive sales and repair establishment located along Beechwood Road to the east of Johnsons Side Road. In terms of industrial uses, immediately to the north of the hydro corridor adjacent to the east of the Site along Johnsons Side Road, a parcel of land has been developed for the purposes of four sewage sludge lagoons operated by Sutcliffe Septic Tank Services Ltd. The Town of Greater Napanee relies upon two of the lagoons for the disposal of sludge from the water pollution control plant located in Napanee.





## 1.8 Agriculture

Soil capability for agricultural capability on the Site and in the Site-vicinity is derived from the Canada Land Inventory mapping. Class 3 soil, defined as having moderately severe limitations, is predominant on the Site, with some areas of Class 1 soils which have no significant limitations. In the Site-vicinity, Classes 1 and 3 exist to the north and west, while to the south and east the capability is mostly Classes 4 and 6 (severe limitations and capable of producing only perennial forage crops, respectively); areas of organic soils are mapped in the wetlands to the north and northwest. Limitations on agriculture in the various classes are mainly due to stoniness or excess water, and occasionally due to bedrock near surface.

There are a number of active or retired agricultural uses on the Site or in the Site-vicinity. The largest number is retired/non-operational, followed by beef cattle operations. The largest concentration of active farming is to the northeast, where there is a mixture of cash crop, dairy and beef production. To the southeast, beyond the Site-vicinity, the majority are retired. Beef cattle operations are most common to the west, while to the southwest cash crop and beef cattle are present.

## 1.9 Socio-Economic

The Socio-economic environment is described under the general headings of economic and social in both the area local to the Site and at a broader perspective, as well as a description of the views of the Site from the surrounding area.

### 1.9.1 Economic

Economic conditions relate primarily to the activities within the vicinity of the Site that produce income, generate employment or represent a significant investment for the local community. Overall within three km of the Site there are some 20 businesses and institutional uses. These businesses include community institutional uses; agricultural based commercial uses, home based businesses, industrial uses, and commercial activities. Other business in the remainder of the area is agricultural-based.





More broadly within the County there are over 1,200 businesses, of which about 25% are in the retail sector, serving predominantly local residents. Overall, the services category (i.e., all economic activities that are not classified as either primary services such as agriculture, mining or fishing, or secondary services such as manufacturing, warehousing, and transportation) is well represented by local businesses. The County also has a relatively diverse manufacturing base.

There are five business parks and other industrial land sites in the County, with a large total area of vacant industrial land, much of it serviced.

Tourism is centred on outdoor activities and attractions (hiking, fishing, boating, camping, snowmobiling, etc.) and loyalist heritage.

WM's current economic contribution to the municipality includes direct employment opportunities, property tax revenue from the landfill site and adjacent properties, generation of increased sales for local businesses and local waste disposal arrangements.

### **1.9.2 Social**

From a social perspective, the community character can be defined as rural agricultural, with some commercial activity. It was previously described as conservative, with a quiet character and a "live and let live" philosophy. Important social features noted by residents included the church, neighbourly atmosphere, tranquillity, peacefulness, location, heritage, pride in homes and property, the pioneer cemetery, and the Mohawk Territory. For most people, the community was described as special because it is "home" and has a history of their families living here. The location of the community with access to Highway 401 is also seen as an important feature of the community.

During public consultation during the previous WM environmental assessment process, residents indicated that many people in the community have lived here for three or more generations, with everyone knowing each other and getting along well. It was noted that some families have lived here for centuries and are 'bonded' to the area. The community was described as close-knit, neighbourly and supportive.







Based on 1990's data for Richmond Ward (the former Township of Richmond), Tyendinaga Township, both counties and Ontario, the service industries sector was the largest employer, followed by manufacturing and construction industries. The proportion of people in the agricultural sector for the former Township of Richmond and Township of Tyendinaga was considerably larger than in the County of Lennox and Addington, the County of Hastings and the Province.

There are a number of residences located along the road system in the area of the Site. There are two community facilities within the 1 km of the Site: the Empey Hill United Church and the Martin/Empey Hill (Pioneer's) Cemetery. There are other community and recreational facilities located within 3 km of the Site, including the Napanee Rod and Gun Club; the Kingsford Conservation Area/Tyendinaga Centennial Park; the Kingsford Ball Park; and, the Mount Pleasant Cemetery.

The Tyendinaga Mohawk Territory occupies a large tract of land south of Highway 401, extending from Deseronto to Shannonville and southward to the bay of Quinte. There are a large number of community and recreational facilities within the Territory.

### **1.9.3 Visual**

Within about 3 km of the Site, the physical relief is relatively flat and rising to the north and northeast, with the exception being in the valley area in vicinity of the Salmon River located to the northwest. For the most part, the slope of the lands throughout the area is typically less than 5%.

The highest elevations in the vicinity of the Site are associated with the existing landfill, which is approximately 25 m to 30 m above the elevation of the adjacent lands. Much of the landfill has received final cover and the surface is vegetated. Berms and limited planting obscure some views from Beechwood Road. Direct unobstructed views are available at the main entrance from Beechwood Road.

A drumlin is situated immediately west of the existing landfill. The drumlin is turf covered and is approximately 15 m higher than the adjacent land elevations.





Lands north of the landfill are composed of open field, interspersed with wetlands, hedgerows, pockets of scrub vegetation and wooded area. The largest wooded area is located at the north end of the WM controlled lands and provides considerable screening for views from the north.

The Hydro One corridor exists immediately north of the existing landfill area. A row of towers occupies the hydro easement, which crosses the WM lands and off-site areas to both the west and east.

The road network within the Site provides access to various areas of the property, including the active face, borrow area and compost pad. Various buildings, sheds and other structures related to the landfill operation are located within the buffer zone around the landfill.

Along County Road 10 to the west, views of the existing landfill are interrupted by a wooded area adjacent to the east side of the road.

The existing visual conditions within the broader area consist of agricultural imagery interspersed with wooded areas, scrub hedgerows and farm related structures. Non-farm built form includes housing and some institutional and commercial facilities as well as local nearby heritage cultural features.

## 1.10 Aboriginal

The area of Richmond and Tyendinaga Townships were first inhabited approximately 9,000 years ago as evidenced by sites noted in the Napanee River Drainage Basin. For the following 8,000 years, the area was utilized by First Nation peoples who hunted, gathered and fished along the region's water courses. Approximately 600 years prior to the arrival of European populations, some area First Nations groups adopted agriculture, cultivating corn, beans and squash. Accompanying the shift in subsistence patterns was the development of permanent and semi permanent settlements with large populations.

Upon arrival of the French traders and missionaries to the area in the early seventeenth century, the north shore of Lake Ontario was occupied by Iroquoian speaking populations. Sometime in the sixteenth century, the Huron had moved from this area, which included Prince Edward County, to the Lake Simcoe-Georgian Bay region. The interior areas were occupied by Algonquin speaking populations. By the mid seventeenth century, these areas as well as the north shore of Lake Ontario were seasonally occupied





by Iroquoian populations from the Five Nations situated south of Lake Ontario. By the end of the century, however, central Algonquian groups had established occupation along the north shore of Lake Ontario.

Following the American Revolution, the British, who had taken possession of Canada from the French by 1765, set aside lands for displaced Five Nation populations who had sided with England in the conflict. Tyendinaga was among the tracts granted to the Mohawk in the late eighteenth century. Continuing to reside in the area were the Mississauga populations that included a settlement on Grape Island in the Bay of Quinte. Pressure from Euro-Canadian settlement of the area led to the resettlement of these populations at Alderville in the Rice Lake area, as well as the reduction of the original land grant to the Mohawk to the present day Mohawks of the Bay of Quinte Territory.

The Tyendinaga Mohawk Territory encompasses approximately 7,200 ha. The number of residents on the Territory is estimated to number about 2,500, although there is a lack of available current population data. In addition to housing and community infrastructure facilities and services, there are community and recreation facilities including the following:

- Administration Office;
- Tsitkerhododon Park;
- All Saints Church;
- Christ Church;
- Tyendinaga Health Centre;
- Tyendinaga Police Service;
- Double Diamond Ball Park;
- Kahniole Public Library;
- First Nations Air Service;
- Mohawk Community Centre and Lacrosse Box;





Terms of Reference for a New Landfill Footprint  
Supporting Document #4 – Overview of Existing Environmental Conditions

- First Nation Technical Institute;
- Mohawk Recreation Complex;
- Quinte Mohawk School;
- Red Cedars Shelter; and,
- Child Care Centre.

The Mohawks of the Bay of Quinte are located on Tyendinaga Mohawk Territory, with its closest boundary located approximately 3.5 km south of WM's Site. Other Aboriginal communities identified in the eastern Ontario region include Chippewas of Mnjikaning (Rama), Alderville First Nation, Algonquins of Pikwakanagan First Nation, Curve Lake First Nation, Hiawatha First Nation, Mississaugas of Scugog Island, Wendat-Huron First Nation and Métis peoples.





## 1.11 Site Design and Operations

The WM existing Richmond Landfill operates under Certificate of Approval (C of A) No. A 371203, dated March 1988, as amended. The existing landfill has an approved height of 165 m above sea level (ASL) (approximately 40 m above surrounding grade). The approved landfill footprint is 16.2 ha in area and lies within a 143.8 hectare area zoned for waste management.

The site presently is licensed to receive 125,000 tonnes per year of residential, industrial, commercial, institutional, construction and demolition waste from an Ontario-wide service area. Contaminated non-hazardous soil received at the site for daily and intermediate cover is not included in the licensed tonnage. It serves a number of municipalities within the Counties of Lennox and Addington, Prince Edward, Hastings, Frontenac, and Leeds and Grenville and Durham Region. Prior to 2004, the incoming waste volume was approximately 50% residential and 50% industrial, commercial and institutional (IC&I). A large part of the waste received at the site arrived via truck transfer trailers from Kingston and the Trenton/Belleville areas. Since 2004, the quantity of waste received at the site has been significantly reduced, and in 2009 was only about 10,000 tonnes.

The existing landfill was constructed in five phases. Phase 1 is not lined, Phases 2 and 3 have a clay liner and Phases 4 and 5 have a composite clay/geomembrane (plastic) liner. Peripheral drains collect leachate from the lined portion and from Phase 1. Leachate is pumped into trucks for off-site treatment at the Napanee WPCP. Much of the site has been built to final grades and slopes, the final cover constructed and vegetation applied.

An original piped landfill gas (LFG) collection system was installed in 2001, consisting of 24 wells and the toe-drain collector, on the completed parts of the existing landfill that discharge gas to a controlled high temperature enclosed flare. Since then, 31 additional verticals gas extraction wells have been installed and the system is completed. The total LFG collection system consists of 55 vertical wells and the toe-drain collector (12 manholes and 9 cleanouts). The flare capacity is 1,200 standard cubic feet per minute (scfm) at 50% methane and there is one fan blower, with provision for a second blower if required.





All stormwater runoff from the landfill site is collected by a series of ditches and passes through one of three stormwater management ponds before being discharged to Marysville Creek or the Beechwood Ditch. The leachate, gas and stormwater management systems will continue to operate following closure of the active landfill.

WM prepares Annual Monitoring Reports for submission to the Ministry, in accordance with the Certificate of Approval for the site. These reports include the results of the comprehensive surface water and groundwater compliance monitoring programs. To date, these reports have not indicated any evidence of non-compliance related to off-site impacts attributed to the landfill.

Since 1996, leachate has been withdrawn from the site and trucked to the Napanee Sewage Treatment Plant. A recirculation system for leachate was implemented on Phase 4 in late 1996 and was used in Phases 4 and 5 until 2003.

The existing site operates from 8:00 a.m. to 5:00 p.m., Monday to Friday. WM provides small bins and containers for recycling drop-off for local area residences, and for small vehicle disposal. A cardboard/storage area and buildings are located south of the landfill.

A modern scale and scale house exist at the site to weigh all incoming waste, and to provide office facilities for the site staff.

WM operates an organic waste compost facility to the west of the landfill. It processes leaf and yard waste, wood, and manure, although other wastes can be accepted under the organic waste composting C of A. In the early 2000's, in excess of 3,000 tonnes per year of material was directed to the composting operation; composting operations are ongoing.

There is a soil-recycling pad to the east of the existing maintenance building. The pad is used for temporary storage of hydrocarbon-impacted soil. Surface runoff from this pad is directed to an oil trap, which is pumped out regularly and trucked off-site by a licensed hauler. The hydrocarbon-impacted soil is used for daily cover.





## 2.0 REFERENCES

- [1] Archaeological Services Inc. (A.S.I.). (2005). *Stage 1 Archaeological Resource Assessment for the Richmond Landfill Expansion Environmental Assessment.*

