



Terms of Reference for Environmental Assessment

New Landfill Footprint

West Carleton Environmental Centre

Workshop on Alternatives To, Alternative Methods & Evaluation Criteria

May 3rd, 4th, and 5th, 2010

Agenda

Agenda

6:00 Register/Light refreshments

6:15 Opening remarks and overview of workshop
– Ross Wallace

The participants will be divided into three groups: A, B or C. There are three tables, each with a facilitator, focusing on one of three topics: 1) Alternatives to a new landfill footprint; 2) Alternative methods or ways of developing a new landfill footprint, and 3) criteria that will be used in the EA to compare alternatives and identify a preferred alternative.

Each person will receive a workbook to complete tonight. Each group will go through the workbooks assisted by a facilitator. You will receive some information and then be asked for your input/opinion. There will be a short break between table sessions. When we reconvene you will rotate to the next group. Everything you need is in the workbook. If you have questions, the facilitator will help and further technical resources are also available. There is space available in the workbook for you to add any comment or question that you want.

Time	Table 1: Alternatives To	Table 2: Alternative Methods	Table 3: Evaluation Criteria
6:30	Group A	Group B	Group C
7:25	BREAK		
7:30	Group C	Group A	Group B
8:25	BREAK		
8:30	Group B	Group C	Group A

9:25 Summary and Wrap Up

9:30 Adjourn

Please tell us about yourself.

Please note that information related to this Study will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments received will become part of the public record and may be included in Study documentation prepared for public review.

NAME: _____

ADDRESS: _____

POSTAL CODE: _____

PHONE: _____

EMAIL: _____

GROUP: ____ (A, B or C)

Tell us what you think!

What did you think about the workshop? How could we improve it? Did we discuss the right topics? Use the back of the page if you need more space.

GROUP A: ALTERNATIVES TO A NEW LANDFILL

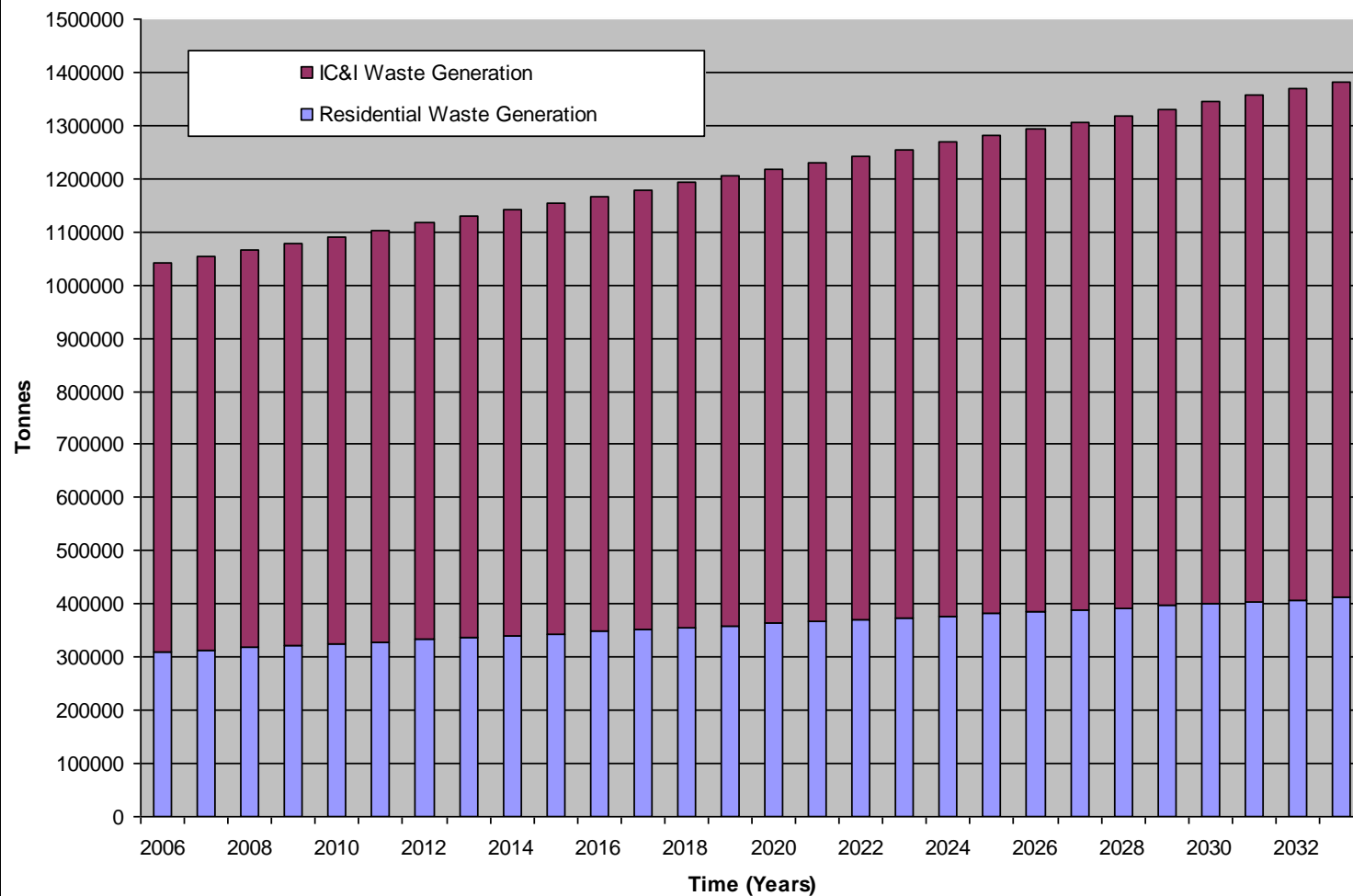
Part 1: Need and the Rationale for Waste Disposal Services in Ottawa

- The existing Ottawa Waste Management Facility (Ottawa WMF) is expected to reach its current approved capacity by September 2011. Accounting for further growth, diversion and the role of the current waste disposal facilities, WM believes there is on-going need for residual waste disposal capacity services within the City of Ottawa and the surrounding communities. WM intends to consider the future operating role of its facility in Ottawa to meet this disposal need.
- The Ottawa WMF has accepted more than 400,000 tonnes of waste annually for disposal. WM made the decision to divert waste that had previously gone to the Ottawa WMF to other locations in order to extend the life of the site. These alternatives are environmentally and economically less preferred than having disposal capacity at the site of the Ottawa WMF.

Projections

- The City of Ottawa’s current population projections use a 2006 base population of 870,800 and project growth to a population of 1,136,000 by 2031. This represents annual growth in the order of 1.2%. Projected future waste quantities generated in the City of Ottawa were developed based on population and per capita waste generation. The projected annual quantities of waste generated within Ottawa are shown in *Figure 1*, for both residential and IC&I wastes, assuming no change in the per capita waste generation rate applied to population increases. Using the base year of 2006, projections are shown for a typical 20 year planning period from 2014 to 2033. WM believes it will take until at least 2014 to obtain approval and develop new disposal capacity.

Figure 1 - Residential and IC&I Waste Generation Projections (2006-2033)



- The City has set a target of diverting 60% of the residential waste stream away from disposal by 2008. In April 2009, the City of Ottawa released “Diversion 2015: An IC&I 3R Waste Diversion Strategy for Ottawa”. The strategy outlines the goal of increasing IC&I waste diversion from the current 17% to achieving 60% by 2015.

Variables

The quantity of waste remaining after diversion programs that requires disposal may vary based on a number of factors, which may be difficult to predict:

- Population growth is greater or less than projected.
- Economic growth
- City policies including Diversion 2015
- Provincial Waste Diversion Act and other provincial initiatives
- Pricing and markets for recyclable commodities
- Border restrictions for waste sent to the U.S.
- Moving from 17% to 60% diversion (i.e. 43% increase) in under six years would be a significant achievement which would require a fundamental change in the way businesses in Ottawa manage their wastes. Significant amounts of recyclables and organic materials will need to be diverted and absorbed through existing and new processing facilities and markets. Absorbing this additional tonnage would be a challenge for existing infrastructure and markets, requiring a comprehensive market development strategy and a substantial planning effort.
- Based on the uncertainties presented, for planning purposes, WM has identified a scenario where a longer time period will be required to achieve a 60% waste diversion rate for IC&I wastes. For the purpose of describing the rationale for the proposed undertaking, WM assumes that the 60% IC&I waste diversion rate may be achieved by the end of the 20 year planning period (i.e. in 2033). This reflects a diversion rate increase of 2% annually in keeping with industry norms experienced in Ontario for diversion in the IC&I sector.

Other Factors

- WM has an agreement with the City of Ottawa to reserve between 75% to 90% of their Ottawa WMF landfill disposal capacity for wastes generated within Ottawa. The percentage of the capacity reserved depends on the percentage of the City’s residential waste disposed at the WMF. Historically, WM has received up to 30% of the City’s residential wastes for disposal, requiring that 90% of the landfill capacity be reserved. In the case of a year where the WMF receives no Ottawa residential waste, then 75% of the landfill capacity is reserved for Ottawa generated wastes. The service area for the Ottawa WMF is all of Ontario.
- It is evident that there is an ongoing need to provide disposal capacity for residual wastes remaining after diversion programs within the City of Ottawa. The Ottawa WMF has played a significant role in meeting the needs for both residential and IC&I waste disposal capacity for the City of Ottawa and neighbouring municipalities. Given that the Ottawa WMF will reach capacity in approximately September 2011, the future generation of residential and IC&I wastes within the area serviced by the Ottawa WMF, and the intention of WM to continue its business operations in the City, there is a need to develop additional waste disposal capacity.
- In terms of waste disposal options, there are two city-owned landfill properties in the City of Ottawa (Trail Waste Facility and Springhill landfill) and there are two privately owned landfills (WMCC’s Ottawa WMF and WSI’s Navan landfill). Another landfill facility, the Lafleche Environmental Landfill, is located east of the City but does provide some disposal capacity to Ottawa waste generators. Waste from the Ottawa area is now also being disposed at landfill sites located within western New York State. In addition, a pilot or evaluation facility for the thermal treatment of waste has also been developed at the Trail facility through a partnership between the City and Plasco Energy. This facility would manage only residential waste from the City.
- For planning purposes, WM assumes that the five Ontario based disposal sites presently serving waste generators within Ottawa will continue in the future. These five disposal facilities are assumed to provide all of the required disposal capacity for waste generated within the City of Ottawa during the planning period. If a long term Plasco facility is developed, it is assumed to manage the residential waste stream which historically has been directed to the City’s Trail Waste Facility and the Ottawa WMF.
- WM has developed a scenario for planning purposes where implementation of a Plasco facility may take a period of time such that ongoing disposal of residual residential waste may be required at the Ottawa WMF. Under this scenario it is assumed that the Ottawa WMF would continue to receive up to 30% of the City’s residential waste (after 60% diversion). Consistent with the existing agreement, WM would reserve up to 90% of its disposal capacity for Ottawa generated wastes. The quantity of material received and utilized as cover material at the site is in addition to the waste volume disposed. The future disposal requirements for the Ottawa WMF are shown in Figure 2 and summarized in Table 1.

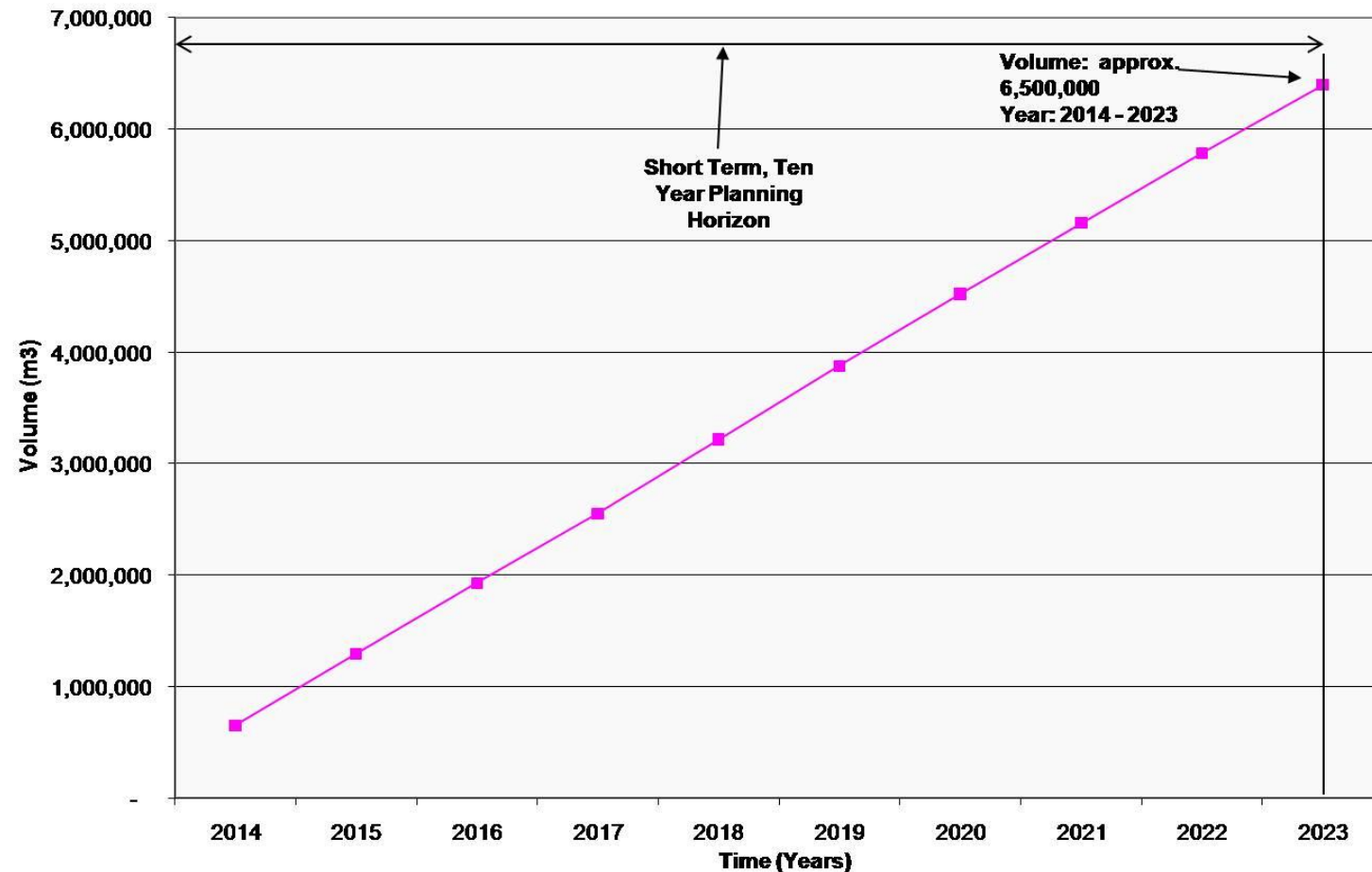
Rationale

- The assumptions related to the achievement of waste diversion rates have a significant influence on the volume of disposal capacity to be provided by WM in Ottawa. As described earlier, WM believes that additional time is required to develop the markets and infrastructure to achieve the 60% IC&I diversion target. In addition, the schedule with respect to the City’s implementation of alternative disposal technologies is not yet known. Based on these factors, WM believes that in the short term, a 10 year planning horizon is appropriate and reasonable.
- A long term planning horizon is typically set as a potential benchmark, which is often re-evaluated in future years to determine whether or not the assumptions still hold true. If not, revised projections/assumptions are usually made to adjust the baseline to reflect actual current conditions.
- Based on the above, we determined that a new landfill footprint would need to be approximately 6.5 million cubic metres in size.

Table 1 – Disposal Requirements for West Carleton Environmental Centre

Scenario	Time Period 10 Years (2014-2023)
Cumulative Annual Volume (m ³)	6,500,000
Cumulative Annual Tonnes	4,030,000
Average Annual Tonnes	403,000

Figure 2 Volume Range of Disposal Requirements for Ottawa WMF (m³)



Part 2: Alternatives To the Undertaking

- After reaching the conclusion that there is the need for waste disposal services in Ottawa and that we have an opportunity to provide those services, we looked at different ways of meeting the need. In EA terms this is known as assessing “Alternatives To”.
- First we identified a number of potential alternatives on how to provide waste disposal services. The alternatives identified and considered were:

1. Do nothing;
2. Develop a thermal destruction (waste to energy) facility at the WCEC;
3. Close the current landfill and establish new landfill disposal capacity at the WCEC;
4. Establish a new landfill elsewhere; and,
5. Export waste to other facilities.

- The Ministry of Environment (MOE) Code of Practice Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario (October, 2009) outlines the consideration of alternatives to by private proponents like WM. The Code of Practice 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 curbside 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. WM is committed to pursuing the development of waste diversion programs and facilities to support the achievement of the City’s waste diversion targets. The City of Ottawa has also identified the goal of achieving a 60% diversion from disposal rate for industrial, commercial and institutional (IC&I) wastes by 2015. To achieve this goal, the City has identified the requirement for support and cooperation from IC&I waste generators and private waste service providers. WM intends to work with the City to support their diversion targets as identified through their policies and minimize the disposal of post diversion residuals. This will also minimize the amount of waste disposal capacity required.

Screening Questions for Alternatives

- An assessment of the five alternatives was undertaken to confirm their feasibility with respect to addressing the need/rationale established. A series of questions were applied to each of the alternatives to determine if they were feasible, achievable and reasonable for WM to implement. The questions applied to each of the alternatives include:
 - Will the alternative address the need/rationale for additional waste disposal capacity within the City of Ottawa?
 - Is the alternative economically viable and acceptable?
 - Is the alternative technically feasible?
 - Is the alternative consistent with the principles of responsible waste management?

Alternative #1

- The “do nothing” alternative means that WM would continue to use the existing Ottawa WMF landfill for residual waste disposal until it reaches the currently approved capacity, in the next 2-3years. Once this landfill has reached capacity, customers that have historically used the site would be required to find other means of managing their wastes for disposal in the future. Further, the ‘do nothing’ alternative would not address the current local waste disposal needs of the City of Ottawa, which would force waste generators within the City to look outside of the municipal boundaries to dispose of locally created waste. WM does not consider the “do nothing” alternative a reasonable option for its ongoing business, its customers, the City of Ottawa or the Province of Ontario.

Alternative #2

- With respect to alternative technologies, in 2004, the City of Ottawa completed a review of technologies available for processing and disposal of residual waste as part of their Integrated Waste Management Master Plan (IWMMP) Phase II work. Subsequently, the City issued a Request for Expressions of Interest (REOI) in 2006 to confirm the scope of technologies available for processing and disposal, excluding landfill. In general, the thermal waste technologies submitted under the REOI can reduce the volume of waste by upwards of 90%. The City report noted that the capital costs of these approaches is in the range of \$150-\$230 million for conventional incineration, and \$195-\$230 million for gasification technologies. This work was to be the foundation of a Residual Waste Management Plan to be prepared by the City.
- WM is not aware of the City’s Residual Waste Management Plan being advanced any further. However, the City has entered into a contract with Orgaworld for the composting of residual source separated organic materials (i.e. green bin waste). In addition, WM understands that the City has entered into an agreement with Plasco Energy for the potential development of a full scale plasma gasification facility to manage residential residual waste.
- Currently, WM’s only commercially proven means of disposal as an alternative to landfill is mass-burn waste to energy technology. This disposal technology is available through WM’s subsidiary, Wheelabrator Technologies. In May 2009, WM formed a joint venture company called S4 Energy Solutions in conjunction with a plasma gasification technology developer. Waste Management is also pursuing alternative thermal technologies through its recent strategic investment in Enerkem Inc. Enerkem has developed a proprietary thermo-chemical gasification process to convert waste materials into a synthetic gas which is then converted to liquid fuels like ethanol.
- In summary, WM believes that plasma gasification technology is very promising, but WM is not yet ready to deploy it on a commercial scale due to the technical complexities of the feedstocks, the capital costs to develop the facilities, and it has not yet been successfully demonstrated at the appropriate scale for municipal solid waste. We expect the development and deployment timeframe to be approximately 4 to 7 years and the company’s expectations are that the largest processing size would be approximately 500 tonnes/day. Further, Ottawa City Council has yet to make a determination on their REOI for alternative technologies and those that they will pursue, if any. WM had submitted for the technology (thermal) that Wheelabrator provides, and as such, uncertainty exists as to whether or not the City will select this type of technology. WM would need to be guaranteed that a certain quantity of waste would be devoted to this alternative technology, to ensure the economic viability.

Alternative #3

- Under this alternative, the existing landfill would be closed once it reaches its approved capacity and a new landfill footprint would be established on contiguous WM property north or west of the current landfill. Given the role of the Ottawa WMF within WM’s business operations and to waste generators within the City of Ottawa, developing new landfill disposal capacity will allow the ongoing operation of the WMF. The disposal capacity will be provided for those residual wastes remaining after both residential (MSW) and IC&I diversion.
- In short, this alternative would meet WM’s stated goal by continuing to provide waste disposal services to its customers and would be constructed and operated as an environmentally sound landfill. WM owns or has options to purchase the necessary contiguous property to construct new landfill disposal capacity and the required infrastructure for the new landfill is already in place or can be put in place in a cost-effective manner.
- Further, this alternative is consistent with responsible waste management strategies as it provides a local solution to waste management (no exporting) and will incorporate enhanced waste diversion activities to reduce the overall volume of waste disposal capacity required. Development of this alternative would also provide a reasonable timeframe (i.e. approximately 10 years) for WM to pursue the development and implementation of an alternative thermal technology with the City of Ottawa.

Alternative #4

- Under this alternative, the current landfill would close and new landfill disposal capacity would be developed on a site completely separate from the Ottawa WMF. The new landfill capacity would be built elsewhere within the City of Ottawa in order to continue to serve the existing clients and market area for the Ottawa WMF. This would require WM to determine an appropriate location and obtain the site for landfill development. In order to achieve this alternative, a site selection process would be undertaken in order to identify a suitable site within the City of Ottawa, as well as obtaining all necessary regulatory approvals and agreements.
- WM does not own, nor is it aware of, other lands within the City of Ottawa that have been identified as suitable for new waste disposal capacity. As a private corporation, WM does not have the powers of expropriation if such a location existed. The development of a new landfill at a site elsewhere in the City of Ottawa is also not an economically attractive option. If a new site was identified and approved, it would require a significant investment with respect to land purchase, building, services and utility construction and creation of infrastructure and management. The ability to utilize the required infrastructure for the new landfill that is already in place at the current WMF operation would be lost. In recent years, WM has also invested a significant amount of money into their Ottawa facility in order to improve some of the legacy issues and operations. These operational investments would be transferred over to the new landfill.
- For the above reasons, WM does not believe that establishing a new landfill at another location in Ontario is a practical or reasonable option.

Alternative #5

- This alternative would see wastes delivered to the site or another location, processed (if necessary) and then transferred to other waste disposal facilities. It is anticipated that the waste would be transferred to other facilities in Ottawa (i.e. Trail Road, Springhill, WSI Navan), eastern Ontario (Lafleche) or New York State. The availability of potential locations in Ottawa and eastern Ontario is very limited.
- Relying on a third party for disposal is not economically acceptable as WM's customers would not only be charged for transfer fees as well as disposal fees but also subjected to the risks associated with the transboundary movement of wastes. Reliance on a third party disposal facility would put WM at a significant disadvantage competitively. This alternative is also not consistent with responsible waste management strategies or principles as it is not a local solution and relies on shipping waste to other jurisdictions within the province, which are already experiencing an identified shortage of approved disposal capacity. Further, it is no longer acceptable to assume that waste may be exported to the United States because of the gradual restrictions on the seamless transfer of waste across the border. These restrictions include strong political opposition and the Province of Ontario reaching an agreement to phase out shipments of municipal waste to Michigan by the end of 2010. In addition, at anytime the Canada/U.S. border may be closed to waste shipments due to national security issues and as such, the waste would need to be dealt with at a local level. Given the political nature of waste disposal, WM believes that it is in Ottawa's and Ontario's long term economic interests to ensure that the City and surrounding communities are self sufficient in waste disposal capacity.

Preferred Alternative – Alternative #3

- Based on the foregoing analysis, WM has concluded that New Landfill Disposal Capacity at the WCEC is the only reasonable alternative that may be implemented within a 10 year planning horizon. At that point WM may be in a position to consider the development of a thermal or other technology alternative. Implementation of the new landfill footprint alternative will ensure additional waste disposal capacity for waste generators in the City of Ottawa and neighbouring municipalities is available for approximately 10 years.
- This preferred alternative is WM's proposed undertaking which will be considered further in the EA.

Discussion and Comments on Need/Rationale and Alternatives To

1. Do you understand the analysis that WMCC undertook to determine if there is a need for waste disposal services in Ottawa?

2. Do you agree that there is a need for waste disposal services in Ottawa even with aggressive increases in waste diversion efforts?

3. Are there other factors that should be included in the analysis? If so, what are they?

4. Do you understand the analysis that WM undertook to determine alternatives to meeting the need for waste disposal services in eastern Ontario?



5. Are there other “alternatives to” that should be considered? What are they?

6. Do you agree with the assessment of alternatives to determine if they are reasonable and practical?

7. Do you agree with the Screening questions applied to each of the alternatives?

8. Do you agree with the conclusion that alternative #3 is the preferred alternative?

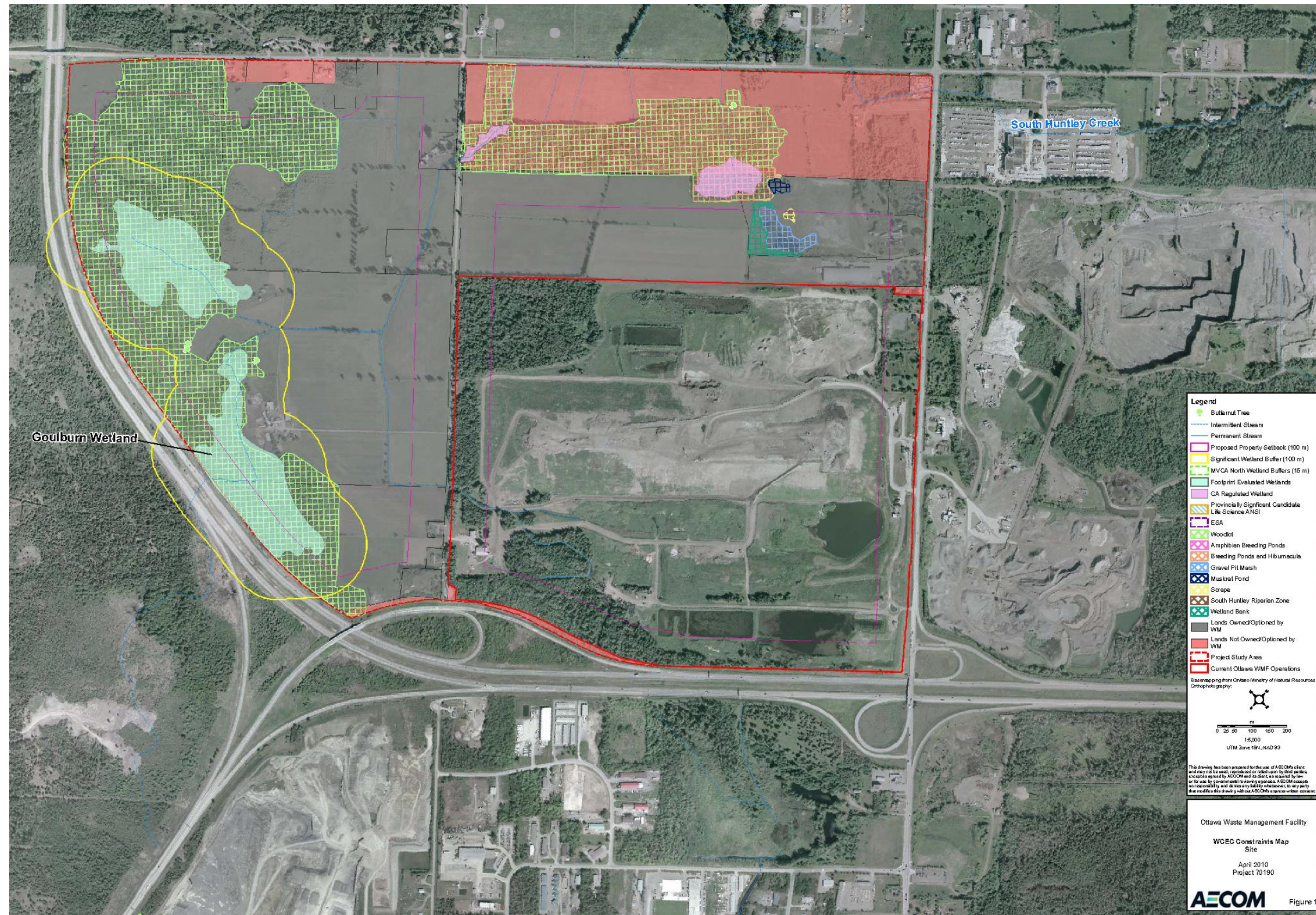


GROUP B: ALTERNATIVE METHODS (WAYS) FOR DEVELOPING A NEW LANDFILL FOOTPRINT

- WM conducted an analysis to determine if there was a need for providing waste disposal services in Ottawa and alternatives to provide this service. We concluded that there was a need and that the preferred way of meeting this need was to close the current landfill and establish a new landfill footprint on the site and provide enhanced waste diversion activities to minimize residual waste that would need to be landfilled. In EA terms, this is known as the preferred alternative or proposed 'undertaking'.
- Identification and evaluation of 'Alternative Methods' or different ways that the project can be developed is a key element of the Environmental Assessment process. WM is proposing to compare alternative footprints for the new landfill at the EA stage. At the TOR stage, an envelope (or areas) for potential development of landfill footprints will be determined. During the EA, a number of reasonable alternatives will be identified within the development envelope.
- To identify a potential envelope we determined the approximate area needed to develop a new landfill footprint with an approximate volume of 6.5 million cubic metres, would need approximately 40 to 45 ha of land.
- Next we looked at the lands that we currently own or leased and the constraints on these lands (see Figure).
- The alternative methods that can be developed on the WM owned properties are a function of a number of site-specific factors that include existing natural features, land use constraints, transportation access, the provision of perimeter buffer zones, and landfill design and operations considerations. WM owns or has options to purchase the lands bordered by Hwy 417, Carp Road, Richardson Sideroad and William Mooney Road, with the exception of the properties outlined in the attached figure.
- The attached figure shows the lands excluded for potential development and the reasons for their exclusion (i.e. natural features, buffer areas, land use constraints, etc).
- The remaining area was identified as an area where landfill footprint alternatives could be located. It is anticipated that the existing infrastructure to support landfilling will be used, but also new infrastructure for the new footprint and waste diversion operations could be located in this envelope as well as community facilities.
- The 40 to 45 ha required for landfill footprint would occupy most of the land within the envelope.
- It is anticipated that two or more alternatives would be identified during the EA within the stated envelope.
- The alternatives will comprise different landfill footprint dimensions (variation in height, width, length, etc.), location of entrance, infrastructure, waste diversion facilities and community facilities.
- During the EA, alternatives will be identified, evaluated and preferred alternative identified.



FIGURE 1: CONSTRAINTS AND DEVELOPMENT OPPORTUNITIES FOR NEW LANDFILL FOOTPRINT



Discussion and Comments on Alternatives Methods for a New Landfill Footprint

1. Do you understand the analysis that WM undertook to determine general areas (envelopes) for developing new landfill footprint alternatives and other components of the WCEC?

2. Are you in agreement with the constraint areas? If no, how would you change them?

3. Are there you in agreement with the potential development areas (envelopes)? If no, how would you change them?

4. How many alternative methods should be considered in the EA? Why?



GROUP C: CRITERIA FOR EVALUATING ALTERNATIVES METHODS FOR DEVELOPING A NEW LANDFILL FOOTPRINT

- WM conducted an analysis to determine if there was a need for providing waste disposal services in Ottawa and alternatives to provide this service. We concluded that there was a need and that the preferred way of meeting this need was to close the current landfill and establish a new landfill footprint on the site and provide enhanced waste diversion activities to minimize residual waste that would need to be landfilled. (i.e., as discussed at Group 1)
- WM identified constraint areas and areas for potential development of landfill footprint alternatives (discussed at Group 2). During the EA, a number of reasonable alternatives will be identified, assessed and preferred alternative identified.
- To assist in the assessment and comparative evaluation of alternatives in the EA, the environment will be studied to determine and document existing conditions. Predicted future conditions for each alternative method will be assessed and comparative evaluation undertaken to determine a preferred alternative. The advantages and disadvantages of each alternative will be assessed and documented.
- For the purposes of discussion, the environment may be divided into several components for the study. WM has identified the following environmental components which will be studied during the EA:

Atmospheric Environment	Archaeology and Cultural Heritage
Geology and Hydrogeology	Transportation
Surface Water Resources	Land Use
Terrestrial Environment	Economic
Aquatic Environment	Social
Aboriginal	

- The rationale for each component of the environment is presented in the attached Table.
- Each component can then be divided into sub-components. For example, air quality, odour and noise would be considered three sub-components of the atmospheric environment component. A rationale for each sub-component is provided in the attached Table.
- Indicators are the specific parameters that will be studied for each environmental sub-component. For example, indicators for the Terrestrial Ecosystems sub-component are:
 - Potential effects on vegetation communities;
 - Potential effects on wildlife habitat; and,
 - Potential effects on vegetation and wildlife including rare, threatened or endangered species.
- During the EA, baseline environmental data will be collected for each alternative, each environmental component and each environmental sub-component. Future environmental conditions will be predicted and assessed and information developed to enable a detailed comparative evaluation of alternatives.
- During the EA each technical discipline leader (e.g., atmospheric environment leader) will compare and rank alternatives for each of their environmental sub-components. The following table, taken from another EA, shows how the various technical discipline leaders ranked their respective environmental sub-components from “least preferred” to “most preferred.”



Environmental Criteria	Alternatives			
	A	B	C	D
Air quality	Less Preferred	Less Preferred	Most Preferred	Least Preferred
Odour	Least Preferred	Less Preferred	Most Preferred	Less Preferred
Visual impact	Less Preferred	Most Preferred	Least Preferred	Most Preferred
Traffic	Less Preferred	Least Preferred	Most Preferred	Most Preferred
Noise	Most Preferred	Less Preferred	Less Preferred	Least Preferred
Site D&O	Equally Preferred			
Aquatic ecosystems	Less Preferred	Least Preferred	Most Preferred	Most Preferred
Groundwater quality	Equally Preferred			
Surface water quality	Less Preferred	Least Preferred	Most Preferred	Less Preferred
Terrestrial ecosystems	Less Preferred	Most Preferred	Least Preferred	Less Preferred
Cultural & heritage resources	Least Preferred	Less Preferred	Less Preferred	Most Preferred
Recreational facilities	Most Preferred	Most Preferred	Least Preferred	Least Preferred
Archaeological resources	Equally Preferred			
Effects of costs on customers	Most Preferred	Less Preferred	Least Preferred	Less Preferred
Continued service to customers	Most Preferred	Less Preferred	Least Preferred	Least Preferred
Economic benefit to community	Less Preferred	Most Preferred	Less Preferred	Least Preferred

- In the final stages of the detailed comparative evaluation of alternatives it is necessary to combine (aggregate) the individual preferences for each environmental sub-component into a single preference rating for each alternative in order to rank the alternatives and identify a preferred alternative.
- The aggregation of preferences uses a qualitative analysis completed by the community. In the above example, the community placed the highest importance on air quality, odour, visual impact, noise, site D&A and aquatic ecosystems and the lowest importance on archaeology and economic benefits. This information was used to determine the final overall preferences for the alternatives.



Discussion and Comments on Evaluation Criteria for Detailed Comparative Evaluation of Footprint Alternatives

1. What in the Natural, Social, Cultural and Economic Environments do you value most?

2. Do you agree with the environmental components and sub-components that have been identified? If no, what changes would you suggest?

3. What about the components or sub-components are important to you?

4. Do you agree with the indicators provided? If no, what changes or additions would you make? (make changes on the table).



Proposed Assessment Criteria, Rationale, Indicators & Criteria Rating

Component	Sub-component	Rationale	Indicators	Possible Additional Indicators	Criteria Rating	Rationale
Environmental Criteria – Natural Environment						
Atmospheric Environment	Air quality	Waste disposal facilities and associated operations can produce gases containing contaminants that degrade air quality if they are emitted to the atmosphere. Construction and operation activities at a waste disposal facility can lead to increased levels of particulates (dust) in the air. Changes in air quality may affect human health.	<ul style="list-style-type: none"> Modelled air concentrations of indicator compounds (organics, particulates) Number of off-site receptors potentially affected (residential properties, public facilities, businesses, and institutions) 		Very Important	
					Important	
					Less Important	
					Not Important	
	Noise	Construction and operation activities at the facility may result in increased noise levels resulting from the site.	<ul style="list-style-type: none"> Predicted site-related noise Number of off-site receptors potentially affected (residential properties, public facilities, businesses, and institutions) 		Very Important	
					Important	
					Less Important	
					Not Important	
	Odour	Continued operation of the waste disposal facility may result in changes in the degree and frequency of odours from the site	<ul style="list-style-type: none"> Predicted odour emissions Number of off-site receptors potentially affected (residential properties, public facilities, businesses, and institutions) 		Very Important	
					Important	
					Less Important	
					Not Important	
Geology and Hydrogeology	Groundwater quality	Contaminants associated with waste disposal sites have the potential to enter the groundwater and impact off-site groundwater or surface water.	<ul style="list-style-type: none"> Predicted effects to groundwater quality at property boundaries and off-site 		Very Important	
					Important	
					Less Important	
					Not Important	
Surface Water Resources	Surface water quality	Contaminants associated with waste disposal sites have the potential to seep or runoff into surface water.	<ul style="list-style-type: none"> Predicted effects on surface water quality on-site and off-site 		Very Important	
					Important	
					Less Important	
					Not Important	
	Surface water quantity	The construction of physical works may disrupt natural surface drainage patterns and may alter runoff and peak flows. The presence of the facility may also affect base flow to surface water.	<ul style="list-style-type: none"> Change in drainage areas Predicted occurrence and degree of off-site effects 		Very Important	
					Important	
					Less Important	
					Not Important	
Terrestrial Environment	Terrestrial ecosystems	Waste disposal facility construction and operations may remove or disturb the functioning of natural terrestrial habitats and vegetation, including rare, threatened or endangered species.	<ul style="list-style-type: none"> Predicted impact on vegetation communities due to project Predicted impact on wildlife habitat due to project Predicted impact of project on vegetation and wildlife including rare, threatened or endangered species 		Very Important	
					Important	
					Less Important	
					Not Important	
Aquatic Environment	Aquatic ecosystems	Waste disposal facility construction and operations may remove or disturb the functioning of natural aquatic habitats and species, including rare, threatened or endangered species.	<ul style="list-style-type: none"> Predicted changes in water quality Predicted impact on aquatic habitat due to project Predicted impact on aquatic biota due to project 		Very Important	
					Important	
					Less Important	
					Not Important	



Component	Sub-component	Rationale	Indicators	Possible Additional Indicators	Criteria Rating	Rationale
<i>Environmental Criteria – Human Environment</i>						
Archaeology and Cultural Heritage	Cultural and heritage resources	Cultural/heritage resources could be displaced by the construction of waste disposal facility components. The use and enjoyment of cultural resources may also be disturbed by the ongoing facility operation.	<ul style="list-style-type: none"> Cultural and heritage resources on-site and in vicinity Predicted impacts to cultural and heritage resources on-site and in vicinity 		Very Important	
					Important	
					Less Important	
					Not Important	
	Archaeological resources	Archaeological resources are non-renewable cultural resources that can be destroyed by the construction and operation of a waste disposal facility.	<ul style="list-style-type: none"> Presence of archaeological resources on-site Significance of on-site archaeology resources potentially displaced/disturbed 		Very Important	
					Important	
					Less Important	
					Not Important	
Transportation	Effects on airport operations	There is the potential for bird strikes for aircraft using Carp airport	<ul style="list-style-type: none"> Bird strike hazard to aircraft in Local Study Area 		Very Important	
					Important	
					Less Important	
					Not Important	
	Effects from truck transportation along access roads	Truck traffic associated with the landfill may adversely affect residents, business, institutions and movement of farm vehicles in the site vicinity.	<ul style="list-style-type: none"> Potential for traffic collisions Disturbance to traffic operations Proposed road improvement requirements 		Very Important	
					Important	
					Less Important	
					Not Important	
Land Use	Effects on current and planned future land uses	The facilities may not be fully compatible with certain current and/or planned future land uses. Current land uses (e.g., agriculture) may be displaced by facility development. Waste disposal facilities can potentially affect the use and enjoyment of recreational resources in the vicinity of the site.	<ul style="list-style-type: none"> Current land use Planned future land use Type(s) and proximity of off-site recreational resources within 500 m of landfill footprint potentially affected Type(s) and proximity of off-site sensitive land uses (i.e. dwellings, churches, cemeteries, parks) within 500 m of landfill footprint potentially affected 		Very Important	
					Important	
					Less Important	
					Not Important	
	Displacement of agricultural land	Agricultural land will be displaced by the development of the facility if the facility is located away from the lands currently designated to accommodate waste management facilities.	<ul style="list-style-type: none"> Current land use Predicted impacts on surrounding agricultural operations Type(s) and proximity agricultural operations (i.e. organic, cash crop, livestock) 		Very Important	
					Important	
					Less Important	
					Not Important	



Component	Sub-component	Rationale	Indicators	Possible Additional Indicators	Criteria Rating	Rationale
Environmental Criteria – Human Environment						
Economic	Effects on the cost of services to customers	The costs of continued operation of a waste disposal facility will affect the price of tipping fees, subsequently affecting the cost of service to customers. The greater the air space achieved for a lower capital cost will enable a lower cost of services to be provided.	<ul style="list-style-type: none"> Ratio of air space achieved to volume of soil to be excavated and area of cell base and leachate collection system to be constructed 		Very Important	
					Important	
					Less Important	
					Not Important	
	Continued service to customers	The Ottawa WMF provides an important and affordable service to its users, particularly in the east end of Ottawa.	<ul style="list-style-type: none"> Total optimized site capacity and site life 		Very Important	
					Important	
					Less Important	
					Not Important	
	Economic benefit to local municipality	The continued use of the facility will provide economic benefits to the local community in the form of new employment opportunities in both the construction and day-to-day operation. This also has the potential for increased employment opportunities in local firms.	<ul style="list-style-type: none"> Employment at site (number and duration) Opportunities to provide products or services 		Very Important	
Important						
Less Important						
Not Important						
Social	Visual impact of the facility	The contours of a waste disposal facility can affect the visual appeal of a landscape.	<ul style="list-style-type: none"> Predicted changes in landscapes and views 		Very Important	
					Important	
					Less Important	
					Not Important	
	Local Residents	Waste disposal facilities can potentially affect local residents in the vicinity of the site	<ul style="list-style-type: none"> Number of residents 		Very Important	
					Important	
					Less Important	
					Not Important	
	Recreational Facilities	Waste disposal facilities can potentially affect the use and enjoyment of recreational resources in the vicinity of the site	<ul style="list-style-type: none"> Type(s) and proximity of off-site recreational resources within 500 m of landfill footprint potentially affected 		Very Important	
Important						
Less Important						
Not Important						
Aboriginal	Potential effects on aboriginal communities	The facility construction and operations may adversely affect local aboriginal communities.	<ul style="list-style-type: none"> Potential effects on use of lands for traditional purposes 		Very Important	
					Important	
					Less Important	
					Not Important	
Technical Criteria						
Site Design and Operations	Site design and operations characteristics	The characteristics of the existing and proposed site design and engineered system requirements will affect site activities and operational and maintenance requirements.	<ul style="list-style-type: none"> Complexity of site infrastructure Operational flexibility Interaction with existing site infrastructure Soil management requirements 		Very Important	
					Important	
					Less Important	
					Not Important	

