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<b>TO:</b>	<b>CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON APRIL 23, 2012</b>
<b>FROM:</b>	<b>JAY STANFORD, M.A., M.P.A. DIRECTOR, ENVIRONMENTAL PROGRAMS &amp; SOLID WASTE</b>
<b>SUBJECT</b>	<b>SOLID WASTE MANAGEMENT UPDATES</b>

<b>RECOMMENDATION</b>
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That on the recommendation of the Director – Environmental Programs & Solid Waste, the following report **BE RECEIVED** for information.

<b>PREVIOUS REPORTS PERTINENT TO THIS MATTER</b>
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Relevant reports that can be found at [www.london.ca](http://www.london.ca) under City Hall (Meetings) include:

- Material Recovery Facility Competitive Bid Principles (October 18, 2011 meeting of the Community and Neighbourhoods Committee (CNC), Item #7)
- Municipal Partner Agreements for Blue Box Processing Services August 16, 2011 meeting of the CNC, Item #17)
- Updates on Green Bin Program and Zero Waste Strategies August 16, 2011 meeting of the CNC, Item #18)
- Update - Green Bin and Modified Garbage Collection Pilot Project Update (February 15, 2011 meeting of the CNC, Item #13)
- Update: Interim Business Plan for Green Bin Program and Zero Waste Strategies (May 10, 2010 meeting of the Environment and Transportation Committee (ETC), Agenda Item #13)
- Interim Business Plan For The Green Bin Program and Zero Waste Strategies (January 11, 2010 meeting of the ETC, Agenda Item #11)

<b>BACKGROUND</b>
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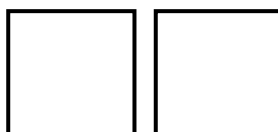
**PURPOSE AND CONTEXT**

The purpose of this information report is to provide Committee and Council with a brief update on key projects and activities within Solid Waste Services that:

- address a Council recommendation or desire of Committee for additional updates
- highlight a number of the key programs and projects currently under way or in the planning stages
- provide key available data
- indicate how the program or project contributes to Council's Strategic Plan 2011-2014
- indicate how the program or project is addressing cost impacts and/or value to customers
- provide an updated timeline for completion and additional report back to Civic Works Committee (CWC)

Updates are provided on the following project and activities:

1. Use of Manning Drive Material Recovery Facility (MRF) by Other Municipalities
2. W12A Landfill – Odour Issues
3. W12A Landfill - Remaining Capacity
4. W12A Biogas Utilization - Request for Expressions of Interest (REOI)
5. Green Bin and Modified Garbage Collection Schedule Pilot Project
6. Garbage Cart Pilot Project
7. Backyard Composting Pilot Project
8. Resource Recovery Technologies



**DISCUSSION**

<b>1. Use of Manning Drive MRF by Other Municipalities</b>	
Relationship to Council's Strategic Plan 2011-2014	A Green and Growing City (Promote a "green culture" and the fundamentals of sustainability)  Sustainable Infrastructure (i. Ensure affordability for users and ii. Achieve effectiveness, economy and efficiency in operations)
Indicate how it is addressing cost impacts and/or value to customers	<ul style="list-style-type: none"> <li>• Continues to lower London's recycling program cost</li> <li>• Has provided easy expansion of the recycling program to meet Londoners desire to recycle more materials</li> <li>• More recyclables sent to end markets including improved quality</li> <li>• Has created cost savings for neighbouring municipalities</li> </ul>
Current timeline	All activities are on schedule
Revised timeline	Not required
Next CWC report	Early 2013 unless requested sooner

Background

The operating agreement for the regional Manning Drive MRF with Miller Waste Systems allows for the processing fee for Blue Box recyclables to decrease, at specified intervals, as the quantity of delivered Blue Box material increases. This provides an opportunity for the City to reduce processing costs by having other municipalities use the facility. Consequently, last fall Council gave approval for other municipalities to use the Manning Drive MRF subject to them signing a standard Municipal Partner Blue Box Recyclables Processing Agreement or as a result of the City providing pricing in response to a tender or request for proposals (RFPs) and winning. Staff were directed to report back to Council on any agreements that were signed and the results of any tenders or RFPs.

Municipalities Using MRF

Since last fall, six municipalities have signed a standard Municipal Partner Blue Box Recyclables Processing Agreement. These municipalities are listed in Table 1 along with other municipalities that have the potential to use the MRF in the future. The City has also responded to two RFPs for Blue Box processing services (Sarnia and Stratford) but was unsuccessful due to the long haul distance between these municipalities and the MRF. In both cases, City staff were advised that we had very competitive submissions and were considered runners-up in both cases.

**Table 1 - Municipalities Using Manning Drive MRF**

	<b>Municipality</b>	<b>Quantity (tonnes/yr)</b>	<b>Status</b>
<b>Approved</b>	Alymer	300	• May 1, 2012 start date
	Dutton Dunwich	200	• May 1, 2012 start date
	Thames Centre	1,000	• June 1, 2012 start date
	Central Elgin	800	• June 1, 2012 start date
	Malahide	300	• June 1, 2012 start date
	Bayham	400	• June 1, 2012 start date
	<b>Subtotal</b>	<b>3,000</b>	
<b>Potential</b>	Oxford	5,000	• Existing contract ends July 1, 2013
	Southwest Middlesex	400	• Existing contract ends July 1, 2013
	Brantford	6,400	• Existing contract ends November 1, 2013
	St. Thomas	2,000	• Existing contract ends March 1, 2014
<b>Lost</b>	Stratford	2,700	• City submitted RFP, not selected
	Sarnia	5,000	• City submitted RFP, not selected



It is estimated that having the six additional municipalities that begin using the facility in 2012 will reduce processing costs by \$5 to \$7 per tonne (\$135,000 to \$190,000 per year). A portion of these processing savings have been included in the 2012 budget with full year savings to be included in 2013 budget.

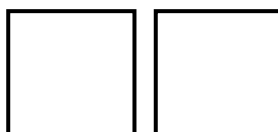
<b>2. W12A Landfill – Odour Issues</b>	
Relationship to Council's Strategic Plan 2011-2014	Sustainable Infrastructure (i. Ensure affordability for users and ii. Achieve effectiveness, economy and efficiency in operations)
Indicate how it is addressing cost impacts and/or value to customers	<ul style="list-style-type: none"> <li>Continued investment in odour control is mandatory to remain in compliance with the Ministry of the Environment's (MOE's) Certificate of Approval</li> <li>The W12A Mitigative Measures &amp; Community Enhancement Program and involvement with the W12A Neighbourhood Public Liaison Committee (PLC) requires responsiveness and action that benefit the local community</li> </ul>
Current timeline	Many activities behind schedule due to weather conditions in the fall 2011 and winter 2012
Revised timeline	All actions as discussed with MOE and PLC will be completed by the July/August time period
Next CWC report	Early 2013 unless requested sooner

**Background**

Discussions with the W12A PLC and members of the broader community suggested that odours in the latter half of 2011 and beginning of 2012 were more frequent and stronger than typically experienced from the landfill. The PLC requested that staff make Council aware of the increase of odours at the W12A Landfill. The increase in odours has occurred because of three primary factors:

- Wet Weather Coupled with Warmer Weather between October, 2011 and February, 2012*  
The wet weather in the fall and early winter resulted in a significant amount of leachate being generated. The increased leachate and associated wet garbage coupled with the warmer weather during this period resulted in increased landfill gas generation. City and contracted private tankers hauled leachate as fast as possible in order to reduce the quantity of leachate in contact with garbage but this took several weeks because of the amount of leachate.
- Final Capping of Closed Cell*  
The landfill was in a transition period between two landfill cells. The new cell was constructed in the summer of 2011 and garbage started being deposited in it in the fall. At the same time, capping of the last portion of the old cell began. Final capping with clay requires the ground to be dry or frozen. The wet warm weather over the fall and winter period delayed completion of the final capping to the spring. Capping of the cell was completed in early April.
- Development of New Cell*  
A lift of garbage is placed over an entire cell when it is opened. This provides a protective layer over the underlying clay soils (prevents cracking of the clay from freeze/thaw cycles) and provides room to handle bioset from the Greenway Pollution Control Plant (PCP). Bioset is generally delivered to the landfill once per year for a couple of weeks when the Greenway PCP is undergoing maintenance. Bioset cannot be placed directly on the leachate collection system as it can promote "bio-clogging" in the leachate collection system. Placing garbage over the entire cell results in a large area with interim/daily cover. As a result, additional odours may be produced.

A total of 42 odour complaints were received in 2011. This is an increase in complaints compared to 2010 (35 complaints). A review of these complaints found the majority of them were in the evening between 6:00 pm and midnight. It is worth noting that City staff recognize that a formal complaint about odours is only one measurement as other residents may not notify the City or MOE as some assume others will make that notification. City staff fully concur that



there has been an increase in odours. A workplan to reduce the odours was submitted to MOE in early 2012. The majority of this workplan is identified in Appendix A.

Next Steps

Due to the odour challenges, a number of odour abatement measures are being undertaken in 2012 to reduce odour impacts. These measures are detailed in Appendix A. Key measures include:

- Installation of additional landfill gas extraction wells to capture gas from the recently completed cell (capital project approved in 2012 budget)
- Increasing the capacity of the landfill gas flare to capture more gas from existing areas
- Completion of the leachate pumping station to remove leachate quicker
- Enhanced odour monitoring

<b>4. W12A Landfill – Remaining Capacity</b>	
Relationship to Council's Strategic Plan 2011-2014	Sustainable Infrastructure (i. Ensure affordability for users and ii. Achieve effectiveness, economy and efficiency in operations)
Indicate how it is addressing cost impacts and/or value to customers	<ul style="list-style-type: none"> <li>• The W12A Landfill Site is one of the primary reasons that London has among the lowest waste management program costs in Canada for medium and large size communities</li> <li>• Continued monitoring of capacity ensures time is available to plan for future disposal requirements and necessary capital projects before existing capacity is depleted</li> </ul>
Current timeline	All activities are on schedule
Revised timeline	Not required
Next CWC report	Early 2013 unless requested sooner

Background

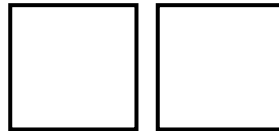
Every year staff determine the remaining capacity and site life of the landfill as part of the Annual Report submission to the MOE. Waste quantity projections for the London for the next 40 years were developed for different scenarios. These waste quantity projections represent the likely range of waste quantities that can be expected taking into account:

- Population growth,
- Provincial waste diversion target of 60% for residential; institutional, commercial & industrial (IC&I); and construction & demolition (C&D) waste, and
- Possible changes to the management of IC&I and C&D waste.

Site Life

The waste quantity projections suggest that the W12A Landfill has between 10 and 14 years of capacity remaining depending on how residential, IC&I and C&D waste is managed in the future. Under existing conditions, it is estimated that the W12A Landfill has approximately 12 years of capacity remaining.

<b>5. W12A Landfill – Biogas Utilization - Request for Expressions of Interest (REOI)</b>	
Relationship to Council's Strategic Plan 2011-2014	Sustainable Infrastructure (i. Ensure affordability for users and ii. Achieve effectiveness, economy and efficiency in operations)
Indicate how it is addressing cost impacts and/or value to customers	<ul style="list-style-type: none"> <li>• Potential for revenue to be generated from utilization of landfill gas and/or other biogas feedstock materials</li> <li>• Reduction of Greenhouse Gases</li> </ul>
Current timeline	Review of REOIs has been delayed
Revised timeline	Review of REOIs to be completed by summer 2012
Next CWC report	Summer 2012



Background

The City released a REOI in November 2011 to seek out a private sector partner, with experience in the production of Renewable Natural Gas (RNG) and other landfill gas/biogas applications, to explore a range of ideas and approaches for utilizing landfill gas and other potential biogas feedstock materials, and to work on establishing a partnership framework for pursuing these potential projects. Council requested staff report back on the outcome of the REOI process.

Status - REOI Submissions

The City received several responses to the REOI. In late February 2012 City staff notified the proponents that we learned that a decision on the Renewable Gas Program proposed by Union Gas and Enbridge to the Ontario Energy Board (OEB) is not anticipated until the spring. The result of this decision is key to the REOI for Biogas Utilization.

Staff has have completed a preliminary review of the submissions and will be meeting in mid April 2012 with the companies to confirm the details submitted and obtain further clarification.

<b>6. Green Bin and Modified Garbage Collection Schedule Pilot Project</b>	
Relationship to Council's Strategic Plan 2011-2014	A Green and Growing City (Promote a “green culture” and the fundamentals of sustainability)  Sustainable Infrastructure (i. Ensure affordability for users and ii. Achieve effectiveness, economy and efficiency in operations)
Indicate how it is addressing cost impacts and/or value to customers	<ul style="list-style-type: none"> <li>Information from the pilot project will assist in determining effectiveness, costs and environmental benefit of a range of potential city-wide programs including Green Bin, modified garbage collection, home composting, recycling</li> <li>Direct measurements and interactions with a defined area provides learning opportunities that are transferred to other programs and projects</li> </ul>
Current timeline	Pilot Project ends October 2012 (All activities are on schedule)
Revised timeline	Not required
Next CWC report	Late 2012 or early 2013

Background

The Green Bin and Modified Garbage Collection Schedule Pilot Project began in October 2011 with approximately 760 homes in the Pond Mills Area participating. Residents were given the option of participating in the Green Bin program and offered a choice of three different size bins to use to hold their household organics. Residents were also provided a kitchen catcher and educational material. Material that can be placed in the Green Bin includes food scraps, non recyclable paper products (e.g., paper towels, facial tissues, etc.) and yard materials.

The Pilot Project is also being used to test a “modified” garbage collection schedule. The modified garbage collection schedule consists of weekly garbage collection during the summer (April to September) and bi-weekly collection during the winter (October to March). Testing the modified collection schedule will help determine public acceptance and what are the cost savings/increases with this type of collection schedule.

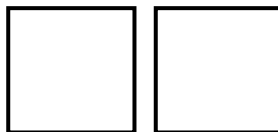
Council requested staff report back on this pilot project with updates.

Findings

Some of the findings of the pilot project from the first six months are:

Participation

- 92% of households in the Green Bin Pilot Project area agreed to participate. 100% of the households were required to participate in the bi-weekly garbage pickup portion of the project
- current Green Bin participation rate equals 50% to 60% (typical of other programs in Ontario)



**Green Bin Quantities and Diversion**

- between 1.5 tonnes and 2.5 tonnes of Green Bin materials have been collected each pickup
- the amount of Green Bin materials diverted from all households equals about 2.5 to 3 kg per week (130 to 150 kg/yr, typical of other programs in Ontario). This suggests that a participating household would be diverting about 200 to 300 kg/yr
- contamination rate of the Green Bin materials has been measured once and is about 3%. All incoming Green Bin materials have met the required analyses for feedstock (chemical) characteristics
- the Green Bin has increased waste diversion in the pilot project area between 12% and 16% (typical of other programs in Ontario)

**Initial Resident Feedback**

- resident feedback (non-solicited) includes both positive and negative comments:
  - Positive: same day collection, reduces waste & able to compost materials not acceptable for backyard composters (e.g. meats)
  - Negative: managing wet waste without plastic bags – *the YUK factor*
- there have been surprisingly few negative complaints expressed directly to staff about bi-weekly garbage collection in the winter

Next Steps

Data will continue to be collected during weekly garbage collection portion of the pilot (April to September) and Council will be provided with a complete report of the results of the pilot in the fall of 2012.

<b>7. Garbage Cart Pilot Project</b>	
Relationship to Council's Strategic Plan 2011-2014	Sustainable Infrastructure (i. Ensure affordability for users and ii. Achieve effectiveness, economy and efficiency in operations)
Indicate how it is addressing cost impacts and/or value to customers	<ul style="list-style-type: none"> <li>• Information from pilot project will assist in determining effectiveness, customer satisfaction and costs of potential implementation scenarios for a broader program</li> <li>• A garbage cart program has the potential to provide more choice to curbside customers and to reduce worker injuries</li> </ul>
Current timeline	Pilot Project ends September 2012 (All activities are on schedule)
Revised timeline	Not required
Next CWC report	Late 2012 or early 2013

Background

Some municipalities use roll-out carts for garbage collection. In some, carts are the required container and other municipalities allow resident the choice of a cart. Depending on size, these carts typically hold between 2 and 4 regular garbage cans and must be “tipped” into a garbage truck using a cart tipper.

The use of roll-out carts for garbage by residents has many advantages and disadvantages which need be considered. The City has been piloting the use of large roll-out carts in various parts of the City to assess some of their advantages and disadvantages and to test public acceptance.

The pilot project consists of distributing approximately 100 carts to residents within one garbage collection route on a “first come first serve” basis (this represents approximately 10% of the route). Residents have a choice of two cart sizes to select from 360 litres (holds 3 regular garbage cans) or 240 litres (holds 2 regular garbage cans). The location of pilot project was moved at regular intervals to gain experience in different parts of the city.

Table 2 summarizes the locations of the pilot project, duration at each location and a general description of the housing type at the location.

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**Table 2 – Garbage Cart Pilot Project**

Location	Pilot Date	Description
Uplands	June 20, 2011 to September 6, 2011	<ul style="list-style-type: none"> <li>• New development</li> <li>• Single family homes with garage and condos with garage</li> </ul>
Oakridge	September 7, 2011 to December 7, 2011	<ul style="list-style-type: none"> <li>• Established neighbourhood (20 years)</li> <li>• Single family homes with garage, condo with garage and townhomes without garage</li> </ul>
Huron Heights	December 8, 2011 to March 9, 2012	<ul style="list-style-type: none"> <li>• Established neighbourhood (25-45 years)</li> <li>• Single family homes with and without garage</li> </ul>
Glen Cairn	March 14, 2012 to June 21, 2012	<ul style="list-style-type: none"> <li>• Green Bin Pilot Area</li> <li>• Single family homes with garage, condo with garage and townhomes without garage</li> </ul>
To be determined (potentially Old South or South London)	July 2, 2012 to September 30, 2012	<ul style="list-style-type: none"> <li>• Older neighbourhood and/or homes with smaller lots and/or small frontage</li> </ul>

Council requested staff report back to Council on this pilot project with updates.

Findings

Resident feedback (non-solicited) is almost exclusively positive.

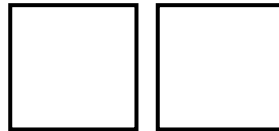
Next Steps

Data collection, including resident surveys, will continue for the remaining six months of the pilot project and Council will be provided with a complete report of the results of the pilot in the fall of 2012.

<b>8. Backyard Composting Pilot Project</b>	
Relationship to Council's Strategic Plan 2011-2014	A Green and Growing City (Promote a “green culture” and the fundamentals of sustainability)
Indicate how it is addressing cost impacts and/or value to customers	<ul style="list-style-type: none"> <li>• Information from the pilot project will assist in determining effectiveness and costs of City wide program</li> <li>• City wide program has potential to provide several environmental benefits (increase waste diversion, reduce greenhouse gases, extend life of landfill, etc.)</li> </ul>
Current timeline	Behind schedule due to workload issues. Pilot project complete, further research & final analysis to be completed
Revised timeline	Revised scheduled will have final report completed in conjunction with Green Bin and garbage cart reports
Next CWC report	Late 2012 or early 2013

Background

Home (or “backyard”) composting has played an important role in waste reduction in London since the mid-1990s. Between 1995 and 1999 the City of London participated in a provincial grant program to provide subsidized home composters to residents. Through this program, the City sold approximately 53,000 subsidized composters. Since 2007 the City has sold composters at cost from the two EnviroDepots. The units are sold for \$30 and approximately 250 units per year are sold. Home composting is promoted on the City’s website and through information flyers.



It is estimated that home composting currently diverts 3% of all household waste away from disposal. Even with a home composting program in place, waste audits in London suggest that 35% to 40% of residential garbage sent to the W12A Landfill is material that could be composted.

Home Composting Pilot Projects

To learn more about the potential to increase waste diversion by increasing home composting two pilot projects were implemented. The pilot projects tested strategies to increase the uptake of home composting units by residents. The projects and findings are summarized in Table 3.

**Table 3 – Home Composting Pilot Project**

<b>Location</b>	<b>Northridge (south of Fanshawe, east of Adelaide)</b>	<b>Old South (east of Wellington)</b>
Households	1,200	700
Timing	Summer 2010	Fall 2011 (one-time-only event)
Strategy	Convenience, a very low cost and 'meet and greet' discussions with residents: <ul style="list-style-type: none"> <li>Assembled &amp; delivered to the home</li> <li>Direct encouragement and interaction</li> </ul>	Local community sale of 3 different units at low cost <ul style="list-style-type: none"> <li>Pre-order and pick up at local community school (convenient location, but one-time-only sale)</li> <li>Not assembled</li> </ul>
Compost Units & price	<ul style="list-style-type: none"> <li>'Earth Machine' same unit as supplied at City Depots</li> <li>\$10</li> </ul>	<ul style="list-style-type: none"> <li>'Earth Machine', Rotating unit, 'Green Cone' (digester)</li> <li>\$20</li> </ul>
Promotion	<ul style="list-style-type: none"> <li>Flyer delivered door-to-door</li> <li>Promoted again during the door-to-door visit (mid-summer)</li> </ul>	<ul style="list-style-type: none"> <li>Flyer delivered door-to-door</li> </ul>
Participation	<ul style="list-style-type: none"> <li>13% (160 households) purchased composters</li> </ul>	<ul style="list-style-type: none"> <li>3% (25 households) purchased composters</li> <li>Approximately 50% of the units sold were the rotating barrel units</li> </ul>

The Northridge Pilot also included door-to-door visits of residents in August 2010. Respondents were asked about their home composting routines. Information was compiled from 40% of the households (about 500 homes). Summary findings from the 500 homes that provided details included:

- 60% indicated they had home composters (on average 1.5 composter per household)
- 45% indicated they were actively composting (i.e., using their composter at least weekly)
- 5% of the homes that participated were new to home composting the remaining 8% were already home composting

Waste audit results indicated that as much as 35 to 40% of our waste stream in London and other communities consist of kitchen and other organics. Initial estimates suggest that an additional 500 to 2,000 tonnes of food scraps could be diverted (up to 1.5% increase in overall diversion) with an aggressive home composting program modeled on the Northridge pilot project. Similarly, initial estimates suggest that less than 1,000 additional tonnes would be diverted (less than 1.0% increase in overall diversion) with a home composting program modeled on the Old South pilot project.

Next Steps

To continue to develop better estimates of the diversion potential for home composting in London, three additional initiatives are going to be undertaken:



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- Waste audits (60% funded by Waste Diversion Ontario – Continuous Improvement Fund) are scheduled for 2012. These will provide valuable information about the amount of organic materials in the waste stream that could be diverted.
- Further review of proactive home composting programs in other Canadian jurisdictions.
- Green Cones and rotating composters will be sold from the EnviroDepots to provide more choices to residents wanting to purchase composters.

<b>9. Resource Recovery Technologies</b>	
Relationship to Council's Strategic Plan 2011-2014	A Green and Growing City (Promote a “green culture” and the fundamentals of sustainability)  Sustainable Infrastructure (i. Ensure affordability for users and ii. Achieve effectiveness, economy and efficiency in operations)
Indicate how it is addressing cost impacts and/or value to customers	<ul style="list-style-type: none"> <li>• Review of resource recovery technologies may identify opportunities to reduce costs, provide jobs and/or improve environmental performance</li> </ul>
Current timeline	Behind schedule due to changing technologies and workload issues.
Revised timeline	Research and analysis to be completed over spring/summer 2012
Next CWC report	Fall 2012

Background

Staff have been undertaking a review of resource recovery facilities and strategies as requested by Council. This review involves looking at aerobic composting, anaerobic digestion, mechanical biological treatment (MBT) processes, advanced thermal treatment (ATT) and other technologies (including new, next generation and emerging technologies) to assist in optimizing materials recovery and moving from current diversion rate of approximately 40% towards the Provincial goal of 60%. Council requested staff report back to Council on this review.

Review

The review of resource recovery facilities and strategies has been slowed because of the rapidly changing landscape in solid waste management (e.g., new thermal technologies being piloted, proposed provincial review and delay of the *Waste Diversion Act* and extended producer responsibility policies, etc.) and staff workload issues. The good news is that there is a substantial increase in the amount of current information being produced on resource recovery technologies. Current information is being compiled from the following locations:

**Ontario:**

- City of Toronto
- City of Hamilton
- City of Ottawa
- Region of Durham
- Region of York
- Region of Peel

**Other Canadian Jurisdictions:**

- Metro Vancouver, British Columbia
- Calgary, Alberta
- Edmonton, Alberta
- Halifax, Nova Scotia
- Winnipeg, Manitoba

**United States:**

- New York City, New York
- State of Massachusetts
- State of Oregon
- Several cities/counties in California

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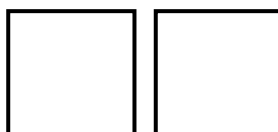
**ACKNOWLEDGEMENTS**

This report was prepared with assistance from Anne Boyd, Waste Diversion Coordinator and Mike Losee, Manager – Solid Waste Engineering.

<b>PREPARED BY:</b>	
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<b>PREPARED AND RECOMMENDED BY:</b>	<b>REVIEWED &amp; CONCURRED BY:</b>
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Attachment A - Proposed 2012 Odour Abatement Measures



**Attachment A - Proposed 2012 Odour Abatement Measures**

**Table A-1 Proposed 2012 Odour Abatement Measures**

<b>Action</b>	<b>Description</b>	<b>Expected Impact on Odour Reduction</b>
Enhanced Monitoring	<ul style="list-style-type: none"> <li>The City will implement twice daily odour monitoring around the landfill by an outside firm.</li> <li>Monitoring will be done late in the evening and early morning.</li> </ul>	-
Placement of Final Cover	<ul style="list-style-type: none"> <li>Placement of final cover over the remainder of southern portion of Cell 6N began in the fall and is continuing. This will reduce the area of the landfill with interim/daily cover.</li> <li>Capping was completed in early April 2012.</li> </ul>	May result in a noticeable reduction in the odours
Review of Final Cover Placement Strategy	<ul style="list-style-type: none"> <li>The final capping of Cell 6N has been problematic in 2012. Previous final capping exercises (in the last ten years) have not been this problematic. The City will review the 2011 situation to determine what could have been done differently in light of the wet weather conditions. Our next major final capping exercise will likely occur in early 2013.</li> </ul>	-
Review of Cell Development	<ul style="list-style-type: none"> <li>The City will review our cell development sequence to determine it can be modified to reduce the amount of area that has interim/daily cover when a new cell is opened.</li> </ul>	-
Leachate Forcemain and Pumping Station	<ul style="list-style-type: none"> <li>The new pumping station and forcemain will eliminate loading of tankers and will keep leachate levels lower after heavy rains.</li> <li>The pumping station and forcemain became operational in March 2012.</li> </ul>	May result in a noticeable reduction in odours
New Landfill Gas Wells	<ul style="list-style-type: none"> <li>It was originally anticipated that the City will be able to install a further 8 to 12 landfill gas wells in the spring in the area currently being capped. This is expected to increase our capture of landfill gas by a further 200 cubic feet per minute (cfm) to 250 cfm (currently at about 500 cfm).</li> <li>A review of enhancements such as increased density of wells and/or the installation of "boots" around new wells in was completed to see if this would increase draw. As a result, the number of wells to be installed have been increased to 15 to 17.</li> </ul>	Should result in a noticeable reduction in odours
Landfill Flare Capacity	<ul style="list-style-type: none"> <li>The landfill gas flare is currently drawing all the landfill gas it can with the existing electrical system. The electrical system will be upgraded to provide more power so that we can have two blowers drawing landfill gas instead of just one blower.</li> <li>Design of the upgraded electrical system is underway.</li> </ul>	Should result in a noticeable reduction in odours

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<b>Action</b>	<b>Description</b>	<b>Expected Impact on Odour Reduction</b>
Surface Emission Monitoring	<ul style="list-style-type: none"> <li>• Surface emission monitoring will be undertaken in 2012 to identify areas where significant gas quantities are passing through the final cover and additional gas wells are warranted. Previous surveys have identified areas where remediation was required.</li> <li>• The next round of surface emission monitoring will be undertaken within the next 4 to 8 weeks.</li> </ul>	May identify additional action to reduce potential odours
Bioset Handling Strategy – Planned Shutdown	<ul style="list-style-type: none"> <li>• The City will review our Bioset Handling Strategy (planned shutdown) to see if any changes can be made to reduce odours. This includes both at the lime stabilization stage at Greenway and receipt at the W12A landfill handling.</li> </ul>	
Bioset handling Strategy – Emergency Shutdown	<ul style="list-style-type: none"> <li>• The City will review our Bioset Handling Strategy (emergency shutdown) to see if any changes can be made to reduce odours. This includes both at the lime stabilization stage at Greenway and receipt at the W12A landfill handling.</li> </ul>	