TO:	**CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON APRIL 20, 2015**
FROM:	**JAY STANFORD, M.A., M.P.A. DIRECTOR, ENVIRONMENT, FLEET & SOLID WASTE**
SUBJECT	**WASTE DIVERSION – UPDATE ON EXAMINATION OF RESIDENTIAL ORGANIC WASTE (FOOD SCRAPS) AND NEXT STEPS**

RECOMMENDATION

That on the recommendation of the Director – Environment, Fleet & Solid Waste:

a) The information on residential organics management in this report **BE RECEIVED**; and

b) Civic Administration **BE DIRECTED** to examine opportunities to facilitate increased diversion of organics and recyclables from the institutional, commercial and industrial sectors including a review of:
   i. other Ontario municipalities and selected cities in Canada,
   ii. legislative and regulatory requirements and associated policies, and
   iii. potential actions that could be undertaken at the municipal government level to increase waste diversion and create local and regional jobs.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

Some relevant reports that can be found at www.london.ca under City Hall (Meetings) include:

- Garbage and Recycling Collection – Status and Potential Next Steps (December 16, 2014 meeting of the Civic Works Committee (CWC), Item #12)
- Interim Waste Diversion Plan (July 21, 2014 meeting of the CWC, Item #18)
- Waste Diversion and Garbage Collection Updates (November 25, 2013 meeting of the CWC, Item #7)
- Status Report: Update of Road Map to Maximize Waste Diversion 2.0 (July 22, 2013 meeting of the CWC, Item #14)
- Status – Green Bin and Modified Garbage Collection Pilot Project (October 1, 2012 meeting of the CWC, Item #4)
- Solid Waste Management Updates (April 23, 2012 meeting of the CWC, Item #17)
- Interim Business Plan for the Green Bin Program and Zero Waste Strategies (January 11, 2010 meeting of the Environment & Transportation Committee (ETC), Item #11)
- Waste Diversion Strategy Public Consultation Document and Recent Waste Diversion Initiatives – *A Road Map to Maximize Waste Diversion* in London (December 10, 2007 meeting of ETC, Agenda Item # 9)

BACKGROUND

PURPOSE

The purpose of this report is to:

- Provide an update on residential organic management initiatives in the Interim Waste Diversion Plan, 2014 – 2015, including the general direction these projects are taking; and

- Address the Council Resolution from December 18, 2014:

  d) the Civic Administration BE DIRECTED to prepare and submit the following reports to the Municipal Council in 2015 and 2016:
  iv) a status report on the use of Green Bins to divert food scraps and other organics in Ontario and selected Canadian municipalities and potential next steps for London;

CONTEXT

In December 2013 Council approved a community engagement document entitled: *Road Map 2.0 – The Road to Increased Resource Recovery and Zero Waste (Road Map 2.0).* This document looked for public feedback on program changes, initiatives and new measures that would increase waste diversion. Road Map 2.0 was prepared after a majority of the recommendations from a previous similar document (A Road Map to Maximize Waste Diversion in London, 2007) had been implemented. A key objective of Road Map 2.0 was to map out how we could continue to reduce our waste and receive public feedback on these options.

At that time, (2013 and into 2014) there was proposed new provincial legislation called Bill 91 (Waste Reduction Act*,* 2013) which had the potential to significantly change how waste diversion would occur and it was to be financed in Ontario. Bill 91 would strongly influence the overall direction for Road Map 2.0. However, Bill 91 was pulled from discussion when the provincial election was called in 2014. As a result of uncertainly at the provincial level, community input on Road Map 2.0 was used to develop an *Interim Waste Diversion Plan, 2014-2015* (Interim Plan). The Interim Plan selected initiatives that could be implemented in 2014 to 2015 and at minimal upfront and ongoing cost recognizing that changes at the Provincial level would impact the longer term planning covered in Road Map 2.0.

Nine Initiatives were identified, seven of which have already been either fully implemented or are underway. This report looks at the two initiatives that focus on reducing organic waste. Future reports will provide updates on other initiatives.

In December 2014, a comprehensive garbage collection and recycling report was presented to Civic Woks Committee (CWC). The absence of a Green Bin Program in London was noted in this report by City staff and in the PricewaterhouseCoopers (PwC) audit report that was undertaken. As noted, City staff were directed by Council to provide updated information on Green Bin Programs in Ontario and selected communities in Canada.

2015-2019 - Strategic Plan for the City of London

Municipal Council has recognized the importance of solid waste management in its 2015-2019 - Strategic Plan for the City of London (2015 – 2019 Strategic Plan). With respect to this CWC Report, 3 of the 4 Areas of Focus address the management of residential organics coupled with related matters:

Building a Sustainable City

- Strong and healthy environment

Growing our Economy

- Urban regeneration
- Local, regional, and global innovation
- Strategic, collaborative partnerships

Leading in Public Service

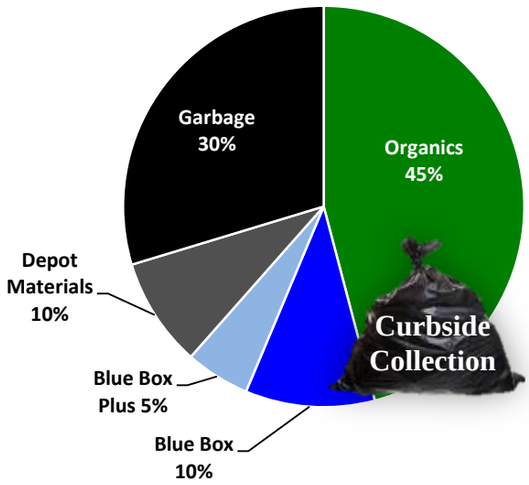
- Collaborative, engaged leadership
- Excellent service delivery

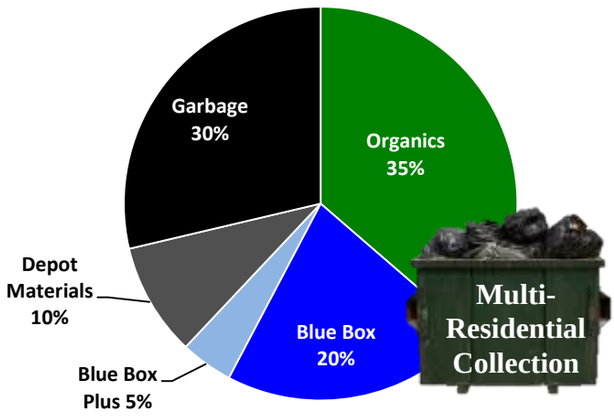
DISCUSSION

Background

The City undertook a comprehensive community engagement program for Road Map 2.0 between January and April 2014. Road Map 2.0 contained information on residential organics and the results of the Green Bin Pilot Project in London (Glen Cairn area). Road Map 2.0 recommended that a decision on the Green Bin program be delayed until a review could be completed of other waste management processes which may include: aerobic composting, anaerobic digestion, mechanical biological treatment processes, advanced thermal treatment and other new and emerging technologies.

Overall there was general public support for the Road Map 2.0 and the proposed initiatives. A large portion of what is put in the garbage is organic material that could be diverted from landfill. It represents 45% of curbside household garbage and 35% percent garbage from multi-residential buildings (see figures on next page). Public feedback indicates that Londoners wish to find ways to divert this material from landfill.



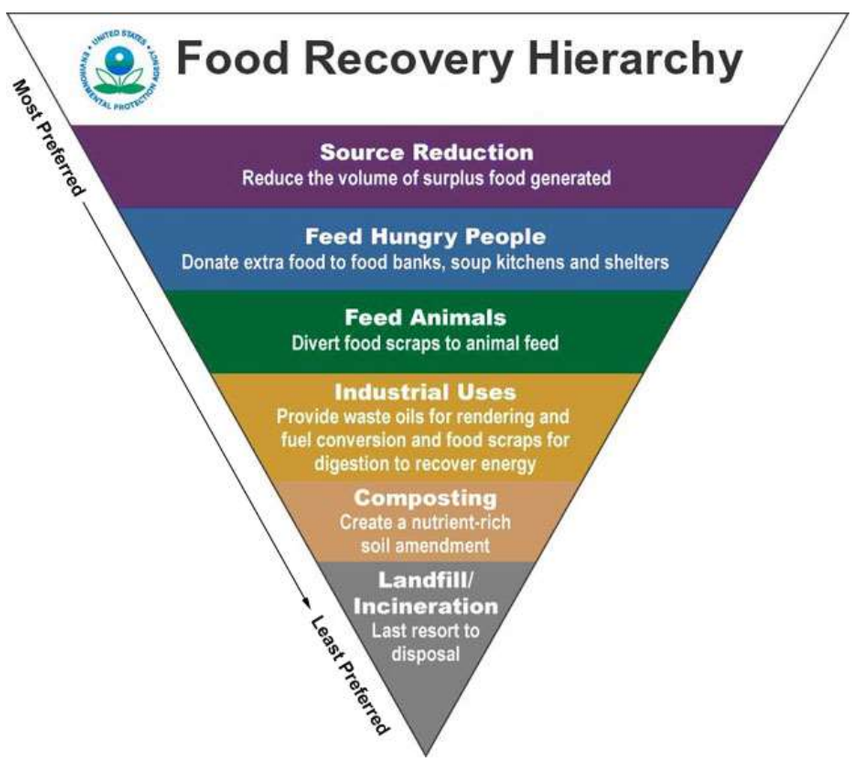


The Interim Plan recommended no change with respect to delaying the Green Bin decision. As an alternative, in the short term, the Interim Plan recommended two organics management initiatives (food waste reduction and community composting) be investigated through the implementation of pilot projects. These initiatives do not represent a complete solution for the management of organics but on a smaller scale do have potential to save money and have greater environmental benefits for London compared to solutions that require collection and processing of organics.

The Interim Plan also noted that funding higher levels of waste diversion is currently uncertain due to the lack of comprehensive and sustainable waste diversion legislation at the Provincial level. The previous attempt at extended producer responsibility (EPR) coupled with increased funding by industry stewards (i.e., manufacturers of packaging and paper products) came to a halt when the Provincial election was called in 2014. New proposed waste diversion legislation is expected in 2015. City staff have noted in the past that increased funding for recycling, subject to Council approval, could be used to offset the cost of residential organics management.

City staff continue to examine opportunities to both reduce and divert the organic content of the residential waste stream in 4 areas (see Table on next page and Appendices A to D):

1. Food waste prevention
2. Community composting
3. Green Bin collection and processing
4. Residual (Remaining) Organics Managed for Energy Content



What is becoming increasingly more common in municipalities is to look at one of the largest organic components, food waste, from a hierarchical perspective.

The United States Environmental Protection Agency (USEPA) has developed a food waste recovery hierarchy to illustrate how productive use can be made of excess food. The hierarchy emphasizes practices that provide the greatest ecological, economic, and social benefits, with disposal as the last option. Source reduction (prevention of food waste) is at the top of the hierarchy with composting near the bottom.

Residential Organics Management Approaches Being Examined/Proposed

Further Details in Appendix	Approach	Current Action	Current Next Steps for City Staff
A	Food waste prevention	Overview and Update - Begin a Food Waste Prevention Awareness Pilot Project.	• Details are being compiled from local London sources coupled with the growing body of information from other municipalities and organizations. • The goal is to have a Pilot Project launched in the summer of 2015.
B	Community composting	Overview and Update - Begin a Community Composting Pilot Project.	• Locations in London are currently being examined for a Pilot Project using private property and the tenants of the private property. • The goal is to have a Pilot Project launched in the summer of 2015.
C	Green Bin collection and processing (update for Ontario and a few Canadian cities)	City staff continues to track the progress of Green Bin Programs primarily in Ontario plus a few key Canadian municipalities.	• Details have been compiled for Ontario municipalities and are accurate to the end of 2013. There have only been minor changes since the last compilation in 2011. • The most difficult challenge is obtaining Green Bin Program costs as there is no requirement for municipalities to report these costs.
D	Residual (Remaining) Organics Managed for Energy Content	London Municipal Council signed a Memorandum of Understanding (MoU) with Green Shields Energy to examine a technology pilot project (Pilot Project) for the purpose of creating a fuel source from residential solid waste including the food waste content.	• Work is under way for the proposed Pilot Project facility to be located beside the City's Material Recovery Facility (MRF), subject to final approval by Council. • Additional work is under way with respect to the demonstration application that will be submitted to the Ministry of Environment & Climate Change for the Pilot Project.
E	Institutional, Commercial & Industrial (IC&I) Organics Management	Seeking Council approval to undertake research/work.	• Subject to approval by Council, examine opportunities to support and facilitate improved waste diversion practices for in the institutional, commercial & industrial (IC&I) sector for organics and recyclables through education, partnerships and other initiatives.

Next Steps

With respect to residential organics management, City staff will continue to:

1. work on the four approaches noted on the previous table for managing residential organics;

2. participate as a resource member to the Public Liaison Committees of the Orgaworld (aerobic) Composting Facility and the Harvest Power (anaerobic) Biogas Digester noting that both facilities are located in London;

3. participate in the development and review of Provincial legislation dealing with extended producer responsibility;

4. follow and/or participate in province-wide projects dealing with residential organics management including new Provincial research and on-going work by the Ontario Waste Management Association (OWMA); and

5. await Council's decision on undertaking an examination of opportunities to support and facilitate improved waste diversion practices for in the IC&I sector for organics and recyclables through education, partnerships and other initiatives.

ACKNOWLEDGEMENTS

This report was prepared with assistance from Mike Losee, Manager, Solid Waste Engineering & Planning.

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Appendix A Interim Waste Diversion Plan, Initiative 8: Begin Food Waste Reduction (Prevention) Awareness Pilot Project

Appendix B: Interim Waste Diversion Plan, Initiative 7: Begin a Community Composting Pilot Project

Appendix C: Green Bin Program Update in Ontario and a few Canadian Cities

Appendix D: Overview of Green Shields Energy

Appendix E: Institutional, Commercial & Industrial (IC&I) Organics & Recycling Management

APPENDIX A
Interim Waste Diversion Plan, Initiative 8:
Begin Food Waste Reduction (Prevention) Awareness Pilot Project

Why is Food Waste Reduction (Prevention) Becoming Increasingly More Important?
Organic material represents about 40% by weight of residential garbage. Approximately 80% of the organic material available to compost in the garbage is food waste thrown away by Londoners. The other 20% includes items such as soiled paper that cannot be recycled, paper tissue and towel, pet waste, and paper sanitary products (e.g., diapers).

While some of the food waste cannot be avoided (e.g., vegetable trimmings, bones, etc.), it is estimated that approximately 20% is avoidable (preventable) food waste that is the result of over buying; cooking too much and then throwing away the extras; not using things before they go bad; impulse buys and poor portion control. This avoidable percentage ends up tossed into the garbage bag or bin (source: *Developing an Industry Led Approach to Addressing Food Waste in Canada*, Provision Coalition, 2014)

In London, this 20% of avoidable food waste represents about 5,800 tonnes per year of material that is currently landfilled. The wasted food is also an avoidable cost to London households and according to some estimates could be as high as $500 to $1,500 per year for many households. For other households, this number would be much lower. These data and estimates are based on:

- local London waste audits, waste generation data and knowledge of waste generation,
- work completed by Provision Coalition in 2014 (an advocacy group for sustainability issues relating to food and beverage manufacturing in Canada),
- local research undertaken by Paul van der Werf (President of 2cg Consulting and PhD candidate at Western University),
- *"$27 Billion" Revisited – The Cost of Canada's Annual Food Waste*, Gooch, Felfel, Glasbey, 2014, and
- related data examined through preliminary research.

It is important to recognize that these data sources and estimates of total food waste and avoidable food waste and the associated costs are the subject of increased analyses and interpretation and will change. As a new and growing issue, municipalities are reviewing the numbers that have been developed at a national scale for Canada to understand how they translate to the local level.

Based on London's waste audit data, waste generation and local knowledge, City staff initial estimates suggest lower range numbers are applicable here for the residential sector. This is confirmed by preliminary research performed by Paul van der Werf. What is of interest and supported by City staff at this stage, is establishing a more realistic estimated range by assuming about 25% of the range from $500 to $1,500 (say $125 to $375 per household), therefore the value of avoidable food waste in the garbage in the London residential sector would still represent between $20 and $60 million per year.

Aside from the environmental impacts and financial costs noted above, there are very important considerations associated with avoidable food waste and the number of families and individuals that have less access to food and living in poverty in our community.

Equally important, is the growing body of knowledge of the avoidable (preventable) food waste from other sectors such as restaurants, grocery stores and other food processing businesses. Estimates suggest that millions of dollars of avoidable food waste could be occurring right here in London.

There is a growing movement to reduce food waste at the source by promoting responsible food management practices for all sectors. The potential impact of this movement touches every aspect of food production, processing and consumption from the farm to the table. As a result there is much interest in this issue from various stakeholders such as retailers, farm associations, food manufacturers, health units and all levels of government. Listed at the end of Appendix A are some of the collaborations that have grown in response to this issue both in Canada and internationally

Progress to Date and Next Steps
The Interim Plan proposed a food reduction (prevention) awareness pilot project to look at providing focused education and awareness material to one or more neighbourhoods and monitoring to see what effect this has on the reduction of avoidable food waste. Staff has brought the project to the attention of some members of:

- London Poverty Research Centre at King's College (London Food Bank)
- Western University (Geography Department)
- Western University Realizing Waste's Resource Potential (ReWaRP) Project
- Middlesex London Health Unit

Outside of London's boundaries, City staff participate in two Ontario initiatives:

- the Southern Ontario Food Collaborative, which includes representatives from provincial, regional and municipal governments; food businesses; and food and farming organizations, and
- the Municipal Waste Association's Food Waste Reduction Working Group which includes representatives from municipal waste management departments.

Both groups were formed in late 2014, and are involved in preliminary discussions on how to make an impact in food waste reduction.

Further dialogue with all groups and individuals will occur over the next two months. A budget of $20,000 has been allocated to this initiative from the 2015 Solid Waste Management operating budget. The goal is to use this funding to leverage additional funds and resources. City staff will report back in late 2015 on the progress and/or findings.

Some of the other Resources outside of Ontario being reviewed
British Columbia, Canada - Food too good to waste
B.C. Ministry of Environment is working with the United State Environmental Protection Agency under this campaign to promote food waste reduction.
www.westcoastclimateforum.com/food

United States - Food Waste Reduction Alliance (FWRA)
The Food Waste Reduction Alliance (FWRA) is a partnership of the Grocery Manufacturers Association, the Food Marketing Institute, and the National Restaurant Association.
www.foodwastealliance.org

United Kingdom - Love Food Hate Waste
Love Food Hate Waste is an initiative of the Waste and Resources Action Program (WRAP). They work with different levels of government, community organizations, businesses and trade associations to raise public awareness about and to find solutions to reduce food waste.
www.lovefoodhatewaste.com

Australia - Love Food Hate Waste
The Love Food Hate Waste is a program under the Environmental Protection Authority, working with local governments, community organizations and business.
www.lovefoodhatewaste.nsw.gov.au

Denmark – Stop Wasting Food
Is Denmark non-profit, private consumers organization to raise awareness about and minimize food waste.
www.stopspildafmad.dk/inenglish.html

Europe - EU FUSIONS
EU Fusions is a four-year European Union research project (started August 2012) to look at a 50% reduction of food waste and a 20% reduction in food chain resource inputs by the year 2020.
www.eu-fusions.org/

United Nations - Save Food Initiative
Save Food works with Food and Agriculture Organization of the United Nations (FAO) and United Nations Environment Programme (UNEP) to raise awareness about and make reductions to global food loss.
www.save-food.org

United Nations - Think.Eat.Save

APPENDIX B
Interim Waste Diversion Plan, Initiative 7: Begin a Community Composting Pilot Project

What is Community Composting?
Community composting can be used to help compost residential organics generated at apartment buildings and townhome complexes. In addition, it is possible to have community composting operations at institutions, shopping malls and some commercial establishments. Typically community composting is used to compost or otherwise manage organic waste on-site. Generally it is an evolving field in Ontario that has had its challenges based on the definition of waste, where it can be managed, how it is to be transported and how the final product (compost) is to be managed.

Discussions with Ministry of the Environment & Climate Change (MOECC) Staff
MOECC staff have been contacted on two occasions to understand if any threshold exists to set up a community composting facility before one would need to apply for an Environmental Compliance Certificate (ECA). An overview of the comments received suggests the following:

- There is no official MOECC position on "community composting". In the absence of any policy, one must balance the MOECC's objective to encourage the public to divert waste (including not putting up barriers that discourage diversion) with the MOECC's mandate to protect the environment and the public.

- It is currently understood that community composting is allowed without an approval if:

    1. Residential organics are generated on-site. Residential organics cannot be delivered to the site. If this was the desirable action, then an ECA would be required.

    2. There are no operational complaints to the MOECC. If the community composting operations generate complaints, and the MOECC was called in to investigate, the MOECC would most likely require that an ECA be obtained so that operational safeguards would be put in place to mitigate the problem.

    3. The compost is used on the same site. This will limit the size of a community composting project. If one cannot use all of the compost output on site, the facility is too big and will require an ECA.

Some community composting examples include:

- A community garden where the gardeners composted all the organic waste from the gardens and then applied the compost to the garden plots.

- If residents in an apartment building wanted to compost collectively on the premises and then use the compost for on-site property landscaping or for balcony planters.

Progress to Date and Next Steps
The Interim Plan proposed a pilot project for 2015 to assess the viability, effectiveness and cost of community composting. The City has heard from property managers of multi-residential buildings and some community groups that have expressed an interest in community composting. Three potential community composting options are currently being considered:

Option 1: A large multi-residential building complex for use by building residents
Option 2: One to two smaller multi-residential buildings for use by building residents
Option 3: In a community park or community garden for use by neighbourhood residents

Proceeding with Options 1 and 2 is straight forward with regards to provincial legislation. A number of buildings have been identified as potential pilot sites, and implementation is planned for spring 2015 once the sites and method of composting the materials is finalized. Moving forward with Option 3 will require approval from the MOECC.

A budget of $30,000 has been allocated to this initiative from the 2015 Solid Waste Management operating budget. Staff will report back in late 2015 on the progress and findings.

APPENDIX C
Green Bin Program Update in Ontario and a few Canadian Cities

City Green Program
Diversion rate and costs were developed for a City of London Green Bin program in the report *Road Map 2.0 The Road to Increased Resource Recovery and Zero Waste* and are presented below. These estimates were based on providing weekly Green Bin, Garbage and Blue Box collection to approximately 100,000 households in London. Green Bin programs are generally designed for single family homes, low-rise multifamily homes (curbside) and townhome/condo environments. Lower costs and higher diversion rates can be achieved by a Green Bin program if additional initiatives such as bi-weekly garbage collection are incorporated.

Diversion Impact:
- a curbside Green Bin program would divert approximately 12,000 to 14,500 tonnes (45% to 55% of the compostable waste)
- increase overall waste diversion from about 45% to between 53% and 55%
- increase curbside diversion from about 50% to between 60% and 65%
- extend the current landfill site by 9 to 12 months (if implemented in the next 2 to 3 years)

Costs (as estimated in 2013):
- $3 million annually for collection and processing of Green Bin materials (about $25 per household per year)
- $1.2 million annually to provide weekly, same day garbage and recycling (about $10 per household per year)
- Between $7 and $9 million in capital costs for carts and some new trucks

There are many benefits to a Green Bin program in addition to the increase in waste diversion as well as some potential problems. Benefits of the program include reduction of greenhouse gases, increased employment; creation of a valuable product and increasing the likelihood of expanding the City's landfill.

Potential problems and concerns that have occurred in some existing programs include:

- Lower quantities being diverted than estimated
- Programs with higher quantities often allow some unusual materials such as diapers, pet waste, the use of plastic bags, grass clippings, etc.
- Lower participation than planned (30 to 40% for some); however some are above 80%
- Municipalities signing a put-or-pay contract. They must guarantee a minimum quantity and pay this amount even when the contractor processes less than the minimum
- Program costs going up not down
- Odours at some composting facilities

Update on Green Bin Programs in Ontario
2013 details of all Green Bin programs in Ontario are provided in 3 tables:

- Table C-1 provides a summary of the operations details of the collection programs in Ontario
- Table C-2 provides a summary of collection and processing details for Ontario programs
- Table C-3 provides a comparison of participation rates and capture rate for Ontario programs and shows programs that have bi-weekly garbage collection typically have the highest participation and capture rates

Summary statistics for 2013 indicate:

- Over 20 small and very large municipalities have Green Programs; about the same as 2011
- About 2.8 million households have Green Bin service; up from 2.5 million in 2011
- About 55% of Ontario households have access to Green Bin services; up from 50% in 2011
- 450,000 tonnes of Green Bin materials were diverted; up from 440,000 in 2011

Green Bin Programs in Canada
Details of Green Bin programs in selected Canadian cities are provide in Table C-4.

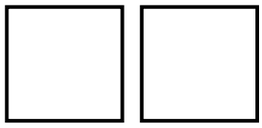

Table C1- Ontario Green Bin Programs - Operational Details

Municipality/ # Households Eligible for Service	Container Size (litres)	Allowable liners (plastic, compostable plastic, paper)	Collection Details			Collection Issues Reported by the Municipality
			SSO[a]	Garbage	Leaf/ Yard Top Up	
Municipalities allowing plastic bags, sanitary products and pet waste						
Toronto 459,000 SF 300,000 MF	46 litre	Plastic	Weekly	Bi-Weekly	No	• Moving from manual to automated collection • SSO freezes in bin • Wildlife overturning bins and creating mess
York Region 298,700	46 litre	Paper or certified compostable mandatory but currently no leave behind policy or enforcement	Weekly	Bi-Weekly	No	• Leachate leaks from collection vehicle • SSO freezes in bin • Loose organics in bin not emptying • Broken bins in winter
Municipalities not allowing plastic bags or sanitary products						
Barrie 46,600	46 litre	Paper or certified compostable	Weekly	Weekly	No	• Use of plastic instead of compostable liners • Residents opposed to the “Yuck” factor
Durham 192,800	46 litre	Paper or certified compostable	Weekly	Bi-Weekly	No	• Use of plastic bags • Late set out/missed collection resulting in resident complaints • Plastics contamination • Animals getting into containers in rural areas
Guelph 29,400	80 litre	Paper or certified compostable	Weekly	Bi-weekly	Yes	None
Hamilton 168,900	46 litre downtown 120 litre	Paper or certified compostable	Weekly	Weekly	Yes	• Buried contamination in bottom of bins • SSO freezes in bin • Strong odours from SSO • Broken bins in winter • Parked cars • Yard materials and grass top up makes tipping hard • Grass creates large amount of leachate
Halton Region 154,000	46 litre & 360 litre for some town houses	Paper or certified compostable	Weekly	Bi-Weekly	No	• Placement of unacceptable materials in bin (plastic, glass)

[a] – SSO is an abbreviation for source separated organics

Table C1- Ontario Green Bin Programs - Operational Details

Municipality/ # Households Eligible for Service	Container Size (litres)	Allowable liners (plastic, compostable plastic, paper)	Collection Details			Collection Issues Reported by the Municipality
			SSO[a]	Garbage	Leaf/ Yard Top Up	
Kingston 45,400	46 litre downtown residential 80 litre	Paper or certified compostable	Weekly	Weekly	Yes	• SSO freezes in bin • Top-up yard waste too compacted in summer to empty • Bins broken in summer and winter • Residents upset if bins not empty or broken
Niagara Region 170,200	46 litre (single and multifamily) 80 litre- (small businesses)	Paper or certified compostable	Weekly	Weekly	Yes	• Leachate leaks from collection vehicle • SSO freezes in bin • Broken bins in winter • Odour from bins and trucks • Animals getting into bins
Ottawa 277,200	80 litre some 47 litre	Paper	Weekly	Bi-weekly	Yes	• SSO freezes in bin • Broken bins in winter
Ottawa Valley 18,000	120 litre	Paper	Weekly	Bi-weekly	Yes	None
Peel Region 329,600	46 litre	Paper or certified compostable	Weekly	Weekly	Yes	• Entire waste program changing to cart based collection 2016, garbage & recycling alternating weeks, SSO weekly • Heavy bins during manual collection (to be resolved with switch to automated collection)
Simcoe County 124,300	46 litre	Paper or certified compostable	Weekly	Weekly	No	None
City of St. Thomas 13,100	240 litre	Paper or certified compostable	Bi-Weekly	Weekly	Yes	• Overweight bins • Hiding of unacceptable materials
Waterloo 146,600	46 litre	Paper or certified compostable	Weekly	Weekly	No	• SSO freezes in bin • Bin handling by contractor (breaking, mess on outside of bin)

Table C2 - Ontario Green Bin Programs - Collection and Processing Details

Municipality/ # Households Eligible for Service	SSO Collection (2013)#	SSO Collection Per Household (2013)	Participation Rate (at least twice per month)	Processing Facility (Location) & Other Comments
	Tonnes	Kg/household	%	
Municipalities allowing plastic bags, sanitary products and pet waste				
Toronto 459,000 SF 300,000 MF	131,587	286	86%-2013	Majority at Disco Road Waste Management Facility Small portion processed by contractors
York Region 298,700	74,079	248	Region wide-80%	Orgaworld (London) LaFleche Environmental
Municipalities not allowing plastic bags or sanitary products				
Barrie 46,600	2,680	58	30% - 2014	All Treat Farms (Arthur)
Durham 192,800	27,486	143	67%	Durham Region (Miller Compost) All Treat Farms (Arthur, overflow)
Guelph 29,400	9,169	311	100% (City of Guelph has a bylaw making it mandatory to separate waste into 3 streams)	City of Guelph
Hamilton 168,900	31,367	186	59%	City of Hamilton
Halton Region 154,000	28,116	183	75%	City of Hamilton
Kingston 45,400	4,408	97	64% fall 2012 61% summer 2014 43% winter 2015	Norterra (Kingston)
Niagara Region 170,200	12,551	74	42% - 2010-2011	Walker Environmental Group (Thorold)
Ottawa 277,200	69,403	250	Set out rate 45% - 2014	Orgaworld (Ottawa)
Ottawa Valley 18,100	4,201	237	Participation less than twice per month due to large bin size	Ottawa Valley Waste Recovery Centre (Pembrooke)
Peel Region 329,600	30,963	94	35% - 2014	Peel Region (Brampton, Caledon)
Simcoe County 124,300	10,750	86	48% -2014	City of Hamilton
City of St. Thomas 13,100	3,393	259	90% April-Nov 30-40% Dec-Mar	Orgaworld (London)
Waterloo 146,600	8,993	61	20-35% depending on neighbourhood	City of Guelph

Table C3 - Ontario Green Bin Programs - Participation and Capture Rates

Municipality	Single Family House-holds	Household Organics	Participation Rate	Per Household total	Per Household Participating	Weekly or Bi-Weekly Garbage Collection
		tonnes	%	kg/hhld/yr	kg/shld/yr	
Municipalities allowing plastic bags, sanitary products and pet waste						
Toronto	459,000	131,587	86	287	333	b
York	298,700	74,079	80	248	310	b
Municipalities not allowing plastic bags or sanitary products						
Barrie	46,600	2,680	30	58	192	w
Durham	192,800	27,486	67	143	213	b
Guelph	29,400	9,169	100	311	311	w
Hamilton	168,900	31,367	59	186	315	b
Halton	154,000	28,116	75	183	243	w
Kingston	45,400	4,408	60	97	162	w
Niagara	170,200	12,551	42	74	176	w
Ottawa	277,200	69,403	45	250	556	b
Ottawa Valley Waste Recovery Centre	18,100	4,201	n.a.	237	n.a.	b
Peel	329,600	30,963	35	94	268	w
Simcoe County	124,300	10,690	48	86	179	w
St. Thomas	13,100	3,393	90	259	288	w
Region of Waterloo	146,600	8,993	25	61	245	w

Notes

1. Single Family households, household organics (tonnes), participation rate (%) and per household total (kg/household/year) are from Table C-2. Per household participating (kg/household/year) is calculated.

Table C4 – Selected Canadian Cities - Green Bin Programs (Operational Details)

Municipality/ # Households Eligible for Service	Container Size (litres)	Allowable liners (plastic, compostable plastic, paper)	Collection Details			Notes
			SSO	Garbage	Yard Material Top Up	
Municipalities allowing plastic bags, sanitary products and pet waste						
Calgary, Alberta (Pilot) 7,500	120 litre	Paper or certified compostable	Weekly	Bi-Weekly	Yes	• Pet waste accepted, no diapers • Two different collection schedules: blue & black carts or blue & green • 80% of available organic material collected • 50% yard waste, 45% food waste • Garbage decreased by 40% • 76% measured participation, 96% self-reported participation • City-wide launch expected in 2017 once large-scale composting facility is constructed and operating
Municipalities not allowing plastic bags or sanitary products						
Halifax, Nova Scotia 95,000	240 litre	Paper or boxboard	Bi-weekly, and weekly in July-August	Bi-Weekly	Yes	• Aerobic digestion • 50% to Miller Compost Dartmouth • 50% to New Era Technologies • Starting Aug 1, 2015, clear bags for garbage
Vancouver, British Columbia 320,000	120-360 litre	Paper	Weekly	Bi-Weekly	Yes	• As of Jan 1, 2015, food scraps banned from disposal with garbage
Surrey, British Columbia 68,000	80-360 litre	Paper	Weekly	Bi-weekly	Yes	• Will accept pet waste once biofuel facility is operating
Richmond, British Columbia 27,000	80 litre	Paper	Weekly	Weekly	Yes	• As of Jan 1, 2015, food scraps banned from disposal with garbage
Coquitlam, British Columbia 22,000	240-360 litre	Paper	Weekly	Bi-Weekly	Yes	

APPENDIX D
Overview of Green Shields Energy

London Municipal Council signed a Memorandum of Understanding with Green Shields Energy (GES) to examine a Gas Phase Reduction (GPR) technology (Pilot Project) for the purpose of creating a fuel source from residential solid waste including the food waste content.

GPR is a process for the conversion of organic material to methane rich gas also known as synthetic gas or syngas. The process comprises heating vaporized organic material in the presence of an excess amount of hydrogen gas and superheated steam to produce a methane rich fuel syngas. The syngas can be converted to various fuels or burned directly to create energy. The information below is from GES promotional materials.

Protecting the Environment | Building Your Community | Social Responsibility | Taking Accountability

- Preventing waste from reaching landfills by helping communities meet their waste diversion and reduction targets.
- Leveraging technology that produces no emissions and no toxic waste by-products.
- Destroying hazardous waste like PCBs and contaminated soil.
- Converting municipal solid waste, industrial waste, bio-solids, railway ties, tires and old telephone poles into usable by-products.
- Creating construction jobs and plants that generate full-time employment.
- Starting a local business that stimulates the economy by creating very valuable and saleable commodities.
- Developing local skills by hiring community resources to work with world-class engineering, procurement and construction partners.
- Helping to solve the growing global waste problem by leveraging proven technology.
- Helping communities reach their waste reduction and diversion targets by destroying a broad range of wastes in an environmentally friendly way.
- Embedding businesses into communities to develop skills and create sustainable jobs.
- Converting waste into electricity or green-fuels.
- Partnering with Indigenous groups to generate sustainable own-source revenue opportunities.
- By self-funding construction of our facilities.
- Integrating into existing waste management systems causing little to no disruption.
- Building projects that come fully wrapped with technology warranties and performance guarantees resulting in very low risk.

www.GreenShieldsEnergy.com

About GSE

GSE is a project development company focused on renewable energy projects. Using proven and reliable technologies, we develop, finance, build, own and operate state-of-the art facilities. GSE partners with leading, world-class companies to ensure projects are delivered on time and on budget.

At GSE, we consider ourselves social entrepreneurs with very clear and specific objectives. We help protect the environment by matching innovative technologies with real world problems. Our company aims to become an important part of each community where we work by helping to develop local skills through the creation of long-term jobs. We undertake projects in a socially responsible way, always with a goal to help solve social, environmental and economic issues. Finally, we take full responsibility and are totally accountable for our projects. Our facilities are self-funded; we integrate our technology into existing waste and/or energy systems; and our projects come with full wraps that include technology warranties and performance guarantees.

GSE has over 100 years of combined business experience in project development, finance, manufacturing, renewable energy, real estate development and government contracting. By combining this experience with licensed and proprietary leading edge technologies, we are part of the solution.

The GSE–City of London Partnership

The City of London, Ontario has entered into a partnership with Green Shields Energy (GSE) to investigate the effectiveness of Gas Phase Reduction (GPR) technology to convert various types of solid, non-hazardous waste into green fuel. Subject to final approvals, the project has been designed to lead towards GSE constructing a pilot scale facility in the special policy area (Waste Management Resource Recovery Area) located around the London landfill.

Construction of the pilot scale GPR facility would begin in late 2015 or early 2016 and the plant will be capable of processing one tonne of various wastes per day. The technology is expected to significantly reduce the volume/weight of the material being processed while generating clean synthetic gas, commonly known as syngas. The short-term objective of the collaboration between the City of London and GSE is to confirm the viability of GPR technology to manage various non-hazardous waste streams including household garbage.

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APPENDIX E
Institutional, Commercial & Industrial (IC&I) Organics & Recycling Management

The majority of solid waste generally fits into one of three broad categories:

1. Residential – generated by residents at the place they reside (e.g., single family home, duplex, fourplex, townhouse, condominium complex, high-rise building)

2. Institutional, commercial & industrial (IC&I) – generated by employees, businesses activities and production processes at locations such as hospitals, schools, strip malls, business complexes and individual; buildings; and

3. Construction & demolition (C&D) – generated by the construction, renovation, maintenance and demolition industry from

In London, residential waste diversion has continuously improved and reached 45% in 2014. Construction and demolition waste is banned from the W12A Landfill and the majority of it is recycled at local companies. Waste diversion in the C&D sector remains very high in London.

However little is known about the amount of IC&I waste that is diverted in London. In the report *From Waste to Worth: the Role of Waste Diversion in the Green Economy* (2009), the Ministry of Environment and Climate Change stated

> *at our places of work and play, we only divert about 12 percent (of waste), and that rate appears to be dropping instead of going up*.

Increasing diversion in the London's IC&I sectors offers many benefits for London including reducing waste going to the City's landfill, creating local jobs and increasing business opportunities.

Research by the Conference Board of Canada found "*increased waste diversion results in job creation and GDP growth, and therefore represents a significant economic opportunity for Ontario. We estimate that increasing Ontario's rate of waste diversion from its current 23 per cent to 60 per cent would create about 13,000 jobs and increase GDP by $1.5 billion*". The report also noted that much of this opportunity lies with diverting IC&I waste which has a much lower diversion rate than residential waste.

This above report suggests waste diversion has substantial economic implications and job potential not only across Ontario but right here in London.

There may be a role for the City to support and facilitate improved waste diversion practices in the IC&I sector for organics and recyclables through education and partnerships. Potential opportunities may include:

- The City and/or an organization could facilitate neighbouring or a cluster of businesses to work together to find a common organics service provider (e.g. would likely produce economies of scale to help reduce program costs to participants). This would be of benefit to both the businesses and the service providers. There could also be some negatives impacts which must be examined.

- The City and/or an organization could facilitate the purchase of organics collection and composting service, especially in those areas where the City is providing garbage collection to the businesses. More composting of organics would reduce the quantity of garbage the City is collecting.

In summary, the City could examine opportunities to facilitate increased diversion of organics and recyclables from the IC&I sectors by reviewing:

- other Ontario municipalities and selected cities in Canada,
- legislative and regulatory requirements and associated policies, and
- potential actions that could be undertaken at the municipal government level to increase waste diversion and create local and regional jobs.