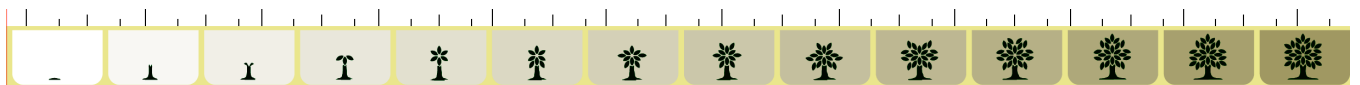


A Waste Recycling Strategy for The City of London

Prepared with assistance from:
Waste Diversion Ontario
Continuous Improvement Fund



August, 2014



London
CANADA

TABLE OF CONTENTS

1. Introduction	1
2. Overview Of The Planning Process.....	2
3. Study Area	2
4. Stated Problem, Goals And Objectives.....	3
5. Current Solid Waste Trends, Practices And System And Future Needs .	3
6. Planned Recycling System	9
7. Monitoring And Reporting.....	25
8. Conclusion	26

APPENDIX A.....Public Consultation Program

APPENDIX B.....Community Characteristics

APPENDIX C.....Historical Waste Generation and Diversion

APPENDIX D.....Garbage and Blue Box Composition Data

APPENDIX E.....Existing Waste Diversion Program Data

APPENDIX F.....Potential Materials to be added to the Blue Box Program

1. Introduction

This Waste Recycling Strategy (WRS) was initiated by The Corporation of the City of London (the City) to develop a plan to increase the efficiency and effectiveness of its recycling programs and maximize the amount of blue box material diverted from disposal. Specifically, the purpose of this recycling plan is to:

- Maximize capture rates of blue box materials through existing and future waste diversion programs
- Improve the cost effectiveness of recycling in our community

The City manages its residential solid waste through a number of existing programs and services including curbside garbage and recycling collection, multi-residential garbage and recycling collection, curbside yard material collection from April to December, two 'EnviroDepot' drop locations which accept various waste streams, a Household Special Waste Depot for the safe disposal of residential hazardous waste and the W12A Landfill site which accepts residential garbage and recycling as well as other waste streams from the residential and IC&I sectors.

The City faces a number of waste management challenges that this Waste Recycling Strategy will consider. In particular, this strategy will help the City:

- Increase diversion
- Meet the Waste Diversion Ontario (WDO) requirement for Ontario Municipalities to have a diversion strategy in place
- Maximize program funding through the adoption of Blue Box best practices
- Explore opportunities that could increase the capture rate of recyclable materials and reduce overall recycling costs

This Waste Recycling Strategy was developed with support from the Continuous Improvement Fund (CIF) and using the CIF's *Guidebook for Creating a Municipal Waste Recycling Strategy*.

2. Overview of the Planning Process

This Waste Recycling Strategy was prepared through the efforts of the City of London Solid Waste Management Division staff and include:

- Four season waste audit of City garbage and recycling conducted in 2012/2013
- Review of the waste management programs of other municipalities
- Dedicated page on the City website providing information and allowing feedback
- Public consultation program including:
 - Participation meetings with local community groups
 - Outreach in a mixed-use public 'storefront' over a month-long period
 - Staffed display at local community events
 - Interactive display toured through over 15 public City facilities
 - Consolidation and review of public communications stemming from feedback request in public displays, billboard advertising, social and traditional media

Information on the public consultation program is provided in Appendix A.

3. Study Area

The study area for this Waste Recycling Strategy consists of the City of London and will address recycling within the residential curbside and multi-residential sectors.

This plan will not focus on materials generated within the industrial, commercial and institutional sector (IC&I) as in most cases these locations independently manage the collection of their solid waste. This does not preclude commercial locations located along existing residential recycling routes which are thereby permitted to participate in the curbside collection program.

4. Stated Problem, Goals and Objectives

Management of municipal solid waste, including the diversion of blue box materials, is a key responsibility for all municipal governments in the Province of Ontario. Factors that encourage or hinder municipal blue box recycling will vary greatly between locales and depend on a municipality's size, geographic location and population. The key drivers that led to the development of this particular Waste Recycling Strategy include:

- Identifying opportunities for waste management system efficiencies
- Improving the diversion rate and recovering more recyclables
- Servicing a growing population

The purpose of this Waste Recycling Strategy (WRS) is to provide the City with a plan for improving the blue box recycling program over the next 5 years. Specifically the goals of the WRS will include:

- To provide direction on the future evolution of the City's residential recycling program
- To identify how to best increase residential waste diversion through recycling
- To identify opportunities for improving cost efficiencies
- To increase participation in the recycling program

5. Current Solid Waste Trends, Practices and System and Future Needs

5.1 Community Characteristics

In 2012 for waste generation purposes, the City of London had a total population of 387,700, which consisted of a permanent population of 367,400 and seasonal student population of 20,300 (approximately 50,000 students generate equivalent waste as 20,300 permanent residents). The municipality is home to approximately 117,000 single-family households as well as 50,100 multi-residential households. More details on the demographics of the City of London are provided in Appendix B.

5.2 Historical Waste Generation and Diversion

The tables below summarize the historical waste generation and blue box diversion rates for the City from 2002 to 2012.

Table 1: Residential Solid Waste Generated and Diverted

Material	2002		2007		2012	
	Tonnes	% of Total	Tonnes	% of Total	Tonnes	% of Total
Blue Box Recyclables	21,500	15%	27,200	17%	26,500	17%
Organics Program	21,100	15%	24,300	16%	28,700	19%
Other	6,500	4%	8,700	6%	11,400	8%
Total Diverted	49,100	34%	60,200	39%	66,500	44%
Total Disposed	93,500	66%	93,200	61%	86,100	56%
Total Generated	142,600		153,400		152,600	

Table 2: Residential Recycling Generated through Blue Box

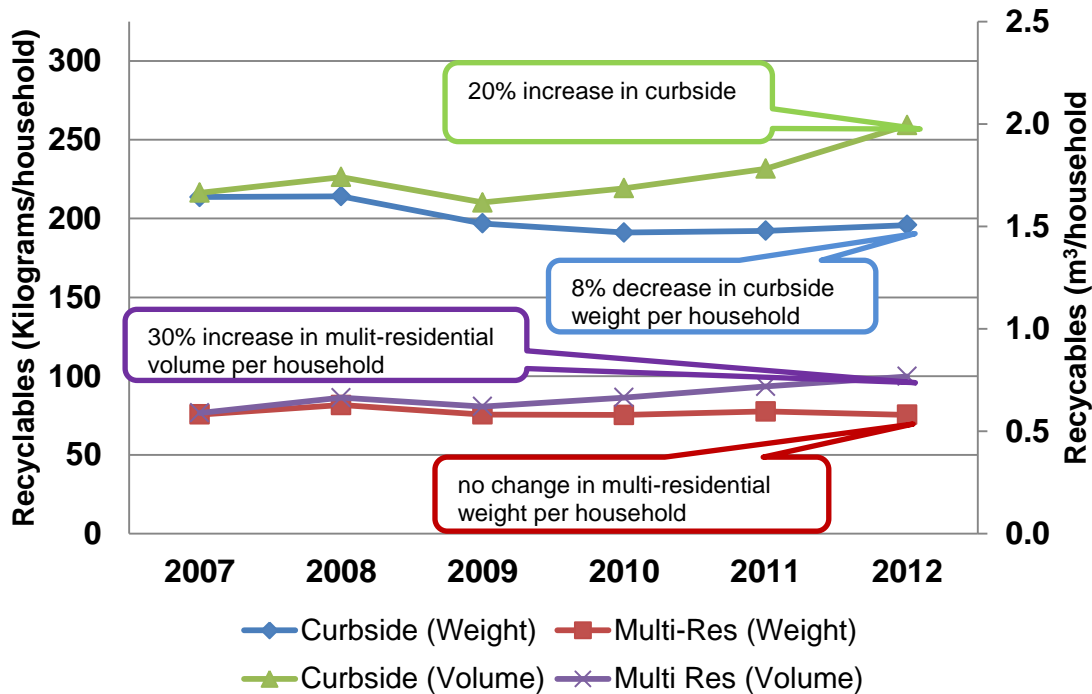
	2002		2007		2012	
	Tonnes	%	Tonnes	%	Tonnes	%
1. Paper (ONP/OMG/fine papers)	11,400	53%	14,400	53%	14,300	54%
2. Paper Packaging (OCC, OBB)	4,800	22%	6,800	25%	5,900	22%
3. Plastics	800	4%	1,600	6%	2,500	10%
4. Metals	1,200	6%	1,300	5%	1,400	5%
5. Glass	3,300	15%	3,100	11%	2,400	9%
Total	21,500		27,200		26,500	

More details on the historical waste generation and diversion for the City of London are provided in Appendix C.

It can be noted that the above tables show the weight of recyclables is lower in 2012 than 2007. This is a result of a number of factors including:

- “Light weighing” of existing packaging (e.g., thin-walling of PET plastic bottles)
- Transition of materials away from heavier (e.g., glass) to lighter packaging (e.g., plastics, multi-laminate pouches, etc.)
- Introduction of deposit return for LCBO bottles

It is noted that although the weight of recycled materials was marginally lower between 2012 and 2007, the volume of recyclables had gone up 20-30% (see below). This means the effort (and cost) to recycle a tonne of recyclable is increasing.



Currently, the City generates approximately 152,600 tonnes of residential solid waste per year. Of this, 26,400 tonnes or 17% is diverted through the blue box program.

5.3 Current Curbside & Multi-Residential Waste (Garbage & Recycling) Composition

A four season curbside waste audit was conducted in the City between the summer of 2012 and the spring of 2013. This data was used to estimate the current composition of the City's garbage and recyclables. Details of the curbside waste audits, their results and the resulting estimates of the compositions of the City's garbage and recyclables are presented in Appendix D.

A high level summary of what remains in the garbage is presented in Table 3.

Table 3 indicates there is approximately 15,000 tonnes of Blue Box recyclables still available for diversion in London's garbage. This consists of approximately 11,000 tonnes of recyclable materials that is part of the City's program and 4,000 tonnes of recyclables of materials that could potentially be added to the City's program.

Table 3: Summary of 2012 Garbage Composition

Material Category	2012					
	Curbside (Single Family Dwellings)		Multi-Residential		Total	
	Total tonne/yr	% Blue Box Capture ^a	Total tonne/yr	% Blue Box Capture ^a	Total tonne/yr	% Blue Box Capture ^a
Blue Box Recyclables						
Paper	3,853	83%	3,510	42%	7,363	74%
Plastic	997	67%	657	30%	1,654	58%
Metal	652	66%	460	26%	1,112	57%
Glass	509	81%	436	35%	945	71%
<i>Total Blue Box Recyclables</i>	6,011	80%	5,063	39%	11,074	71%
Other Potential Blue Box Materials						
Beverage Cups/Ice Cream Containers	352		121		473	
Expanded Polystyrene	256		83		339	
Plastic Bags/Film	2,388		773		3,161	
<i>Total Other Potential Blue Box</i>	2,996		977		3,973	
Other						
Municipal Hazardous & Special Waste	254		46		300	
Food Waste	22,065		6,919		28,983	
Yard Waste	1,193		312		1,504	
Textiles	1,842		818		2,660	
Construction & Demolition	1,899		843		2,742	
Carpeting	958		426		1,384	
Electronics	648		288		935	
Other Non-recyclable Materials	19,784		7,209		26,993	
<i>Total Other</i>	48,643		16,860		65,503	
Grand Total	57,650		22,900		80,550	

Notes (a) Percentage of material that is not in the garbage (placed in Blue Box).

5.4 Future Residential Waste (Garbage & Recycling) Quantities

Information from the report *A Study of the Optimization of Blue Box Material Processing System in Ontario* (June, 2012) was used to estimate how the waste generation rates would change in the future. This report suggests there will be significant changes to generation rates between now and 2025. In general the generation rates for paper, metals and glass will decrease while the generation rates for paper packaging and plastics will continue to increase. Information of the forecasted changes to the waste generation rates is presented in Appendix D.

5.5 Existing Recycling Programs and Services

A description of the City's various waste diversion programs and the quantity of material diverted by each program in 2012 is presented in Appendix E. Programs specific to Blue Box recycling are summarized below:

- **Residential Curbside Recycling:** The City of London has a two stream curbside recycling program collected alongside household garbage on a 6 day work-schedule. Residents may place separated fibres and containers at the curb for collection inside plastic Blue Boxes. This program diverted 22,960 tonnes in 2012.
- **Multi-Residential Recycling:** Multi-Residential locations may receive scheduled pickup of recyclable materials separated into two streams within 95 gallon carts. The City also has 4 or 6 yard bins at 50 buildings for separate collection of cardboard. This program diverted 3,290 tonnes in 2012.
- **Depots:** Three 'EnviroDepot' locations across the city that accepts household garbage, yard materials, blue box recyclables, tires, propane tanks & cylinders, batteries, electronics, compact fluorescent light bulbs and tubes, empty oil and anti-freeze containers, construction and demolition materials, and scrap metal. The City also operates a Household Special Waste Depot at the W12A landfill that accepts hazardous and special waste from residents and small businesses. This program diverted 370 tonnes of Blue Box recyclables in 2012.
- **Public Space Recycling:** Public space recycling is available within the Downtown Core as well as at various municipally run facilities and selected parks across the city. This program diverted 50 tonnes in 2012.

Collection of residential waste is provided to the residents primarily by the City, while recycling collection is provided mainly by contractors. These programs and services are paid for by funding from stewards (funding from Waste Diversion Ontario), general taxes, and revenues from the sale of recyclables.

Once recyclable materials have been collected, they are taken to the City of London Manning Drive Regional Material Recovery Facility, located in London, Ontario.

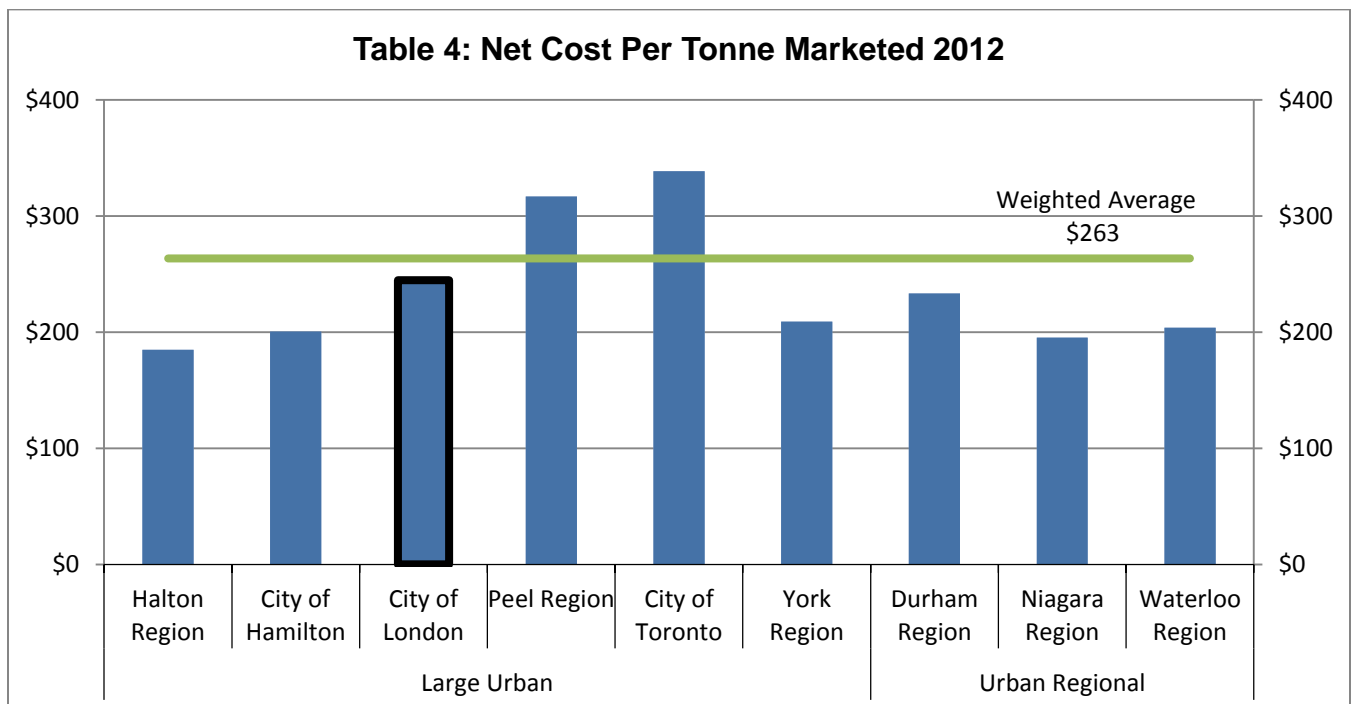
Potential collection-related program changes that may affect recycling collection services include:

- Collection of new material types
- Elimination of plastic bags as an approved recycling container
- Institution of a Downtown Core OCC cardboard collection program
- Expansion of the Multi-Residential OCC cardboard collection program

5.6 Recycling Costs

Comparison to Other Municipalities

In 2012, the total net annual recycling cost for the City of London was \$6,527,860. This amounts to \$245 per tonne marketed, or \$17 per capita. As the table below shows, net annual recycling costs for the City are below average for its WDO municipal grouping. The costs for some of the municipalities in the Urban Regional municipal grouping are also presented for comparison purposes.



6. Planned Recycling System

6.1 Evaluation of Waste Recycling Best Practices

The City reviewed a number of options for consideration in its Waste Recycling Strategy based on proven best practices including those from *KPMG Blue Box Program Enhancement and Best Practices Assessment Project* (2007) and a review of practices in other municipalities. A summary of the options reviewed are provided below with more detailed provided in Section 6.2.

Table 5: Review of Best Blue Box Best Practices

Status	Description of Options/Best Practices ^a	Warrants Additional Attention?
Promotion and Outreach		
Currently in use	<p>Public Education and Promotion Program</p> <p>Public education and promotion programs are crucial for ensuring the success of local recycling programs. Well-designed and implemented education and promotion programs can have impacts throughout the municipal recycling program, including participation, collection, processing, and marketing of materials. Furthermore, having a P&E plan contributes toward the amount of WDO funding a municipality receives as identified in best practice section of the WDO municipal datacall. For example, benefits of public education and promotion programs include:</p> <ul style="list-style-type: none"> • Greater participation levels and community involvement • Higher diversion rates • Less contamination in recovered materials, potentially leading to higher revenues • Lower residue rates at recycling facilities <p>Stewardship Ontario has prepared a Recycling Program Promotion and Education Workbook and other materials, which are available on Stewardship Ontario's Recyclers' Knowledge Network (http://www.stewardshipontario.ca/download/recycling-pe-workbook/)</p>	<p>Yes (Details are provided in Section 6.2.1)</p>

Status	Description of Options/Best Practices ^a	Warrants Additional Attention?
Currently in use	<p>Training of Key Program Staff</p> <p>A well-trained staff can lead to greater cost and time efficiencies and improved customer service. Knowledgeable staff (including both front line staff and policy makers) have a greater understanding of their municipal programs and can perform their responsibilities more effectively. There are a number of low-cost training options available. The CIF holds periodic Ontario Recycler Workshops that discuss recycling program updates (http://cif.wdo.ca/events/orw/index.htm). The MWA, Waste Diversion Ontario (WDO), the association of Municipalities of Ontario (AMO), Stewardship Ontario and the Solid Waste Association of Ontario (SWANA) can also be sources of information guides, workshops, or training on recycling or solid waste management.</p>	<p>No</p> <p>(Regular training of staff already occurs and will continue)</p>
Collection		
Currently in use	<p>Optimization of Collection Operations</p> <p>The purpose of optimizing collection operations is to collect more recyclables using fewer financial, capital and human resources. This requires critically assessing both collection and processing operations (as the two are closely linked) and making changes that reduce costs while at the same time increases capture of blue box materials. The relevant options for optimization vary according to the size, composition and location of municipalities, as well as their available processing options.</p>	<p>No</p> <p>a) Contractor has final say on many collection aspects (e.g., trucks, routes) b) Collection RFP based on CIF model contract; c) detailed analysis of system previously completed</p>
Currently in use	<p>Established and Enforced Policies that Induce Waste Diversion</p> <p>Non-monetary incentives like bag limits restrict the number of garbage bags a resident may dispose per collection. These restrictions encourage residents to divert more recyclables in order not to exceed the bag limit.</p> <p>Bag limits can also be used in conjunction with bag tags (e.g., user fees). For example, some municipalities allow residents to dispose of a number of bags for free, with additional bags requiring a purchased bag tag.</p>	<p>Yes</p> <p>a) Details are provided in Section 6.2.2</p>

Status	Description of Options/Best Practices ^a	Warrants Additional Attention?
Currently in use	<p>Enhancement of Recycling Depots Where curbside collection programs are not feasible, recycling depots provide an inexpensive means for municipalities to divert recyclable materials from disposal. Enhancements to recycling depots may include (but are not limited to):</p> <ul style="list-style-type: none"> • Providing satellite depots to improve public access and convenience; • Enhancing the conditions at the landfill depot (e.g., landscaping, general cleanliness, maintenance); • Incorporating friendly, easy-to-read signage; <p>Providing additional part-time staff to address seasonal fluctuations and visiting traffic.</p>	<p>No</p> <p>a) Curbside/ Multi-residential collection available to all residents b) enhancements to existing depots already underway</p>
Currently in use	<p>Provision of Free Blue Boxes Providing free blue boxes helps to ensure that residents have sufficient storage capacity for recyclables. While this is initially done at the roll-out of the blue box program, many municipalities offer free boxes to new residents or residents moving into new homes. Some municipalities also offer one extra free box or bin for residents per year. However, in municipalities offering only basic recycling services, one blue box container may be sufficient</p>	<p>Yes</p> <p>a) Details are provided in Section 6.2.3</p>
Currently in use	<p>Collection Frequency The efficiency of curbside collection of recyclables is dependent on a number of factors, including the rural nature of the community, the types of recyclable materials included in the recycling program, the type of equipment used to collect the recyclables, among other things. In some circumstances, bi-weekly collection of recyclables can be more cost-effective than weekly collection, assuming that collected tonnages remain the same overall and residents have enough storage capacity to accommodate storing their blue box materials for two weeks.</p>	<p>No</p> <p>a) see response to <i>Optimization of Collection Operations</i> b) curbside collection frequency is same as garbage</p>

Status	Description of Options/Best Practices ^a	Warrants Additional Attention?
Transfer and Processing		
Currently in use	Optimization of Processing Operations Similar to the optimization of collection operations, the purpose of optimizing processing operations is to process more blue box materials for less cost. Processing operations may be optimized either through upgrading or maximizing the use of existing processing equipment, or by partnering or contracting with processing facilities in other communities. Because processing and collection are directly linked, examination of one must be reviewed with the other.	No a) see response to <i>Optimization of Collection Operations</i>
Currently in use	Optimization of Materials Being Collected The types of materials collected by London has increased over the years with the most recent expansion in 2011 when cardboard cans, more plastics (#3, #6, #7 and #1 clamshells) and aerosol cans were added. Recyclable materials not part of the City's program and collected by other municipalities will be considered/analyzed for addition on a regular basis.	Yes a) Details are provided in Section 6.2.4
Partnerships		
Currently in use	Multi-Municipal Collection and Processing of Recyclables Small and medium-sized municipalities often face considerable cost and capital challenges when looking to collect and process recyclables from its residents. However, working collaboratively with other municipalities to provide these services can increase economies of scale and allow for the sharing of resources.	Yes a) Details are provided in Section 6.2.5
Currently in use	Standardized Service Levels and Collaborative Haulage Contracting Collaborative haulage contracts for blue box materials can take advantage of increased purchasing power through municipal partnerships and ensures that the partner municipalities provide common levels of services to its residents. Standardizing collection programs among municipal partners increases the amount of materials being diverted from disposal, allows for common education and promotion materials, increases collector efficiencies, and can potentially reduce overall costs.	Yes a) Details are provided in Section 6.2.5

Status	Description of Options/Best Practices ^a	Warrants Additional Attention?
Additional Research		
Currently in use	<p>Assess Tools and Methods to Maximize Diversion</p> <p>Waste recycling programs fail or succeed based on their ability to overcome public barriers to participation. Additional research on the appropriate tools and methods can help how best to maximize opportunities to divert Blue Box materials from the waste stream and reduce waste going to disposal. Possible topics may include:</p> <ul style="list-style-type: none"> • The types of waste diversion behaviours currently undertaken in each household; • Perceived barriers to participation in waste diversion programs; • Willingness to participate in waste recycling programs; • How residents receive information or learn about local waste recycling programs; • The tools residents need to increase their participation in recycling programs. <p>This information can be collected through telephone surveys and focus groups. Methods and tools identified through the survey can be tested for performance using focus groups or through a pilot project.</p>	<p>Yes</p> <p>a) Details are provided in Section 6.2.6</p>
Administration		
Currently in use	<p>Following Generally Accepted Principles for Effective Procurement and Contract Management</p> <p>A considerable number of municipalities in Ontario contract out the collection and processing of recyclables. To ensure that municipalities obtain good value for money, municipalities should follow generally accepted principles (GAP) for effective procurement and contract management. Key aspects of GAP include planning the procurement well in advance, issuing clear RFPs, obtaining competitive bids, and including performance-based incentives.</p>	<p>No</p> <p>a) Already follow GAP principles; collection, processing RFPs based on CIF model contract; processing contract has performance based incentives, etc.</p>

Note: a) For more information: Stewardship Ontario, Blue Box Program Enhancement and Best Practices Assessment Project Final Report, Volume 1.

6.2 Overview of Planned Initiatives

The City reviewed a number of options for consideration in this Waste Recycling Strategy and the following initiatives are being considered to improve overall waste diversion.

6.2.1. Public Education and Promotion Program

The following public education and promotion initiatives are proposed:

- *Targeted promotion to increase the capture of boxboard, mixed household paper, plastics and aluminum foil/trays and proper sorting of recyclables*
- *Increase education and promotion funding (as budgets permit) and/or in-kind services to the recommended “Blue Box” best practice of \$1 per household to implement new incentive programs (e.g., reward programs such as the Gold Box) and/or other encouragement/engagement programs*
- *Continue to develop annual Public Education and Promotion plan*

Target Key Materials

Existing programs are the easiest place to find more materials to divert from landfill. Programs such as Blue Box recycling are already deep-rooted in our community. Residents understand the program and the program infrastructure is in place.

Waste audits conducted in 2012 show there are 11,000 tonnes of recyclable materials still being disposed of in the garbage. The incremental cost to capture more of these recyclables through the existing collection program is small compared to the cost to provide new programs.

The best way to increase the capture rate of missed recyclables is with enhanced communication and education and different methods of reaching the target audiences. This should focus on the key materials that have a combination of a low capture rate and significant quantity still in the garbage.

Table 6 – Key Recyclable Materials to Target

<i>Material</i>	<i>Existing Capture Rate</i>	<i>Quantity in Garbage (tonnes)</i>
Boxboard	60%	1,900
Household Paper	40%	1,700
Plastic Containers	60%	1,600
Aluminum Foil/Trays	10%	200

Recommended materials to focus on are boxboard (e.g., cereal boxes), mixed household paper, plastics and aluminum foil and trays as shown in Table 6.

Education and Promotion Funding

WDO best practices report recommends that a municipality spend approximately \$1 per household on promotion and education for recycling in addition to the free newspaper ads provided by industry.

London's current budget is approximately \$80,000. At \$1 per household the budget would be approximately \$170,000. Given current budget constraints it is not practical to increase to this level in the short term, and alternative strategies will need to be identified. Staff will look at opportunities to increase exposure and awareness of our programs taking advantage of low and no cost media options. The additional funding can go towards promotion programs such as incentive programs.

Existing Education/Promotion Program

- ✓ Annual \$70,000 budget for recycling
- ✓ Annual \$30,000 budget for other waste diversion programs
- ✓ Newspaper ads provided without charge, as an in-kind industry stewardship obligation to pay for Blue Box program costs

Annual Promotion and Education Plan

More and more each year staff is challenged to develop innovative and cost effective methods of communicating our program information and key messages to the London community. The traditional media outlets, such as newspaper, radio and television ads, which previously represented our main means of communicating, are now only one part of the much wider range of methods being used to inform and educate the public about our programs. The new media offer great opportunities to connect with more people. To help us meet these challenges and benefit from the wide range of media for getting our messages out to Londoners, an annual Promotion & Education (P&E) Plan is created to provide direction, key messages and budget allocations for the year.



In general, the goals of the public education and promotion are to:

- Increase participation levels
- Increase the capture rate of materials from participating residents
- Reduce the amount of contamination and cross contamination placed in recycling containers

2014 Priorities

The Sort it Right! Campaign was launched in late 2012 and has been the key focus for the Blue Box program through 2013 and will continue in 2014. The goal of the campaign is to minimize the amount of recycling errors (non-recyclables and recyclables placed in the wrong Blue Box) received at the MRF to less than 3% by the end of 2014. Providing positive feedback to the majority of London residents that take the time to recycle correctly is also a priority. Thank you cards are currently being used. Other options include curbside recognition of perfect recyclers through stickers on Blue Boxes, or awarding a special box, such as a gold box. The gold box program in Hamilton provides a gold recycling box to residents who have been found to be sorting their recyclables properly.

A second priority for 2014 will be public education in the multi-residential sector. While curbside households normally capture roughly 70% of their recyclable materials, multi-residential locations only manage to capture close to 30% of their total recyclable materials. While the main goal of additional P&E programs may be to boost overall capture rates, effective P&E will also have positive effects across the recycling system from collection and processing, through to the final marketing of materials.

6.2.2. Established and Enforced Policies that Induce Waste Diversion

Policy initiatives proposed are:

- *Additional investigation into reducing the bag limit in conjunction with a user pay system for “extra” curbside garbage*

Other policy initiatives such as Full User Pay and Mandatory Recycling By-law (with and without clear bags for garbage) will not be considered at this time.

Background

Although there are high levels of resident participation in the City diversion programs, participation is voluntary, and does not require residents to first minimize the quantity of waste being generated in the home. There are a number of "behaviour change initiatives" that could be undertaken to encourage both waste reduction (i.e., not produced in the first place) and waste diversion of recyclables and compostables. As waste diversion programs mature and all practical programs have been implemented, behaviour change initiatives become the key tools remaining to increase diversion.

Some of these programs are not costly to implement and may generate revenue (e.g., user pay for garbage) or reduce costs (e.g., every other week garbage collection). Other programs would require support by businesses and residents, and could range from tougher enforcement of waste by-laws (e.g., garbage container and weight limits) to City policies and by-laws that would impact how business is conducted and consumer behaviour (e.g., banning plastic bags in London). Some residents may see these programs as inconvenient or "going too far".



Below are some common behaviour change initiatives that may have a role in London in the future. Most of these initiatives will require a change to current Council policies and practices and be implemented through a by-law.

Bag Limits

Reducing the container limit will encourage participation in the various waste diversion programs as well as reducing garbage generation.

The City of London currently has a 4 Container Limit for garbage collection for single family households. The City's container limit takes into consideration the longer cycle times between collections which varies from 8 to 12 days throughout the year. This is equivalent to 2.3 to 3.5 containers per week or an average of 3.2 containers per week over the entire year. Many Ontario municipalities have a one or two container limit per week.

Consideration to reducing the bag limit in conjunction with a user pay system for "extra" curbside garbage is recommended because:

- The quantity of curbside garbage per household has been reduced by 17% since the introduction of the 4 Container Limit in 2007
- Many municipalities have a 1 or 2 container limit
- Allowing residents to pay for "extra" garbage will provide convenience to residents who currently drive extra garbage to the EnviroDepots

Under the current six day cycle, consideration should be given to reducing the container limit to three containers per week with residents having the option of purchasing tags for additional containers.

Staff is currently examining various potential collection schedules, including a return to weekly garbage collection. If the City implements weekly garbage collection, consideration should be given to reducing the container limit to 2 bags per week with residents having the option of purchasing tags for additional containers.

Collection Frequency

Reducing garbage collection frequency to every other week can result in an even greater desire to participate in waste diversion programs and reduce garbage generation. Municipalities with every other week garbage collection typically have weekly Green Bin collection which allows residents to get rid of materials that are likely to smell if stored for two weeks. Without a Green Bin program, it is possible to reduce collection to every other week in the winter when cooler weather can help control odours but not the summer. This type of collection schedule is called “seasonal collection” (weekly collection in the summer and bi-weekly collection in the winter).

Consideration should be given to a seasonal collection schedule as part of the City’s review of potential collection schedules.

Mandatory Recycling By-Law

The vast majority of Londoners participate in various diversion programs although there are those that refuse to participate in these voluntary programs. The City could explore developing a mandatory by-law for the diversion of materials for which there are programs. Enforcement of the by-law would require additional staff. Some municipalities have residents use clear bags so that recyclables could be easily spotted in the garbage. This is more common in the Maritimes but the City of Markham recently became the first large municipality in Ontario to require the use of clear bags.

Consideration to a mandatory recycling by-law and/or the use of clear bags should not be considered until other behavior change initiatives have been implemented.

Full User Pay

Some smaller municipalities have gone to full user pay systems where residents pay for every container of garbage placed to the curb. Full user pay systems encourage participation in the various waste diversion programs as well as reducing one's garbage generation.

A full user pay system is typically not practical in larger municipalities unless the municipality has a cart based garbage collection system. This the case in Toronto where residents pay an annual fee ranging from \$224 to \$430 per year per household depending on the size of cart they select. A full user pay system is not recommended for London at this time.



6.2.3. Provision of Free Blue Boxes

The following initiatives are proposed to increase resident's capacity to store Blue Box materials:

- *In 2014 provide residents of newly constructed homes with two Blue Boxes at no cost*
- *In 2014 establish a multi-residential recycling cart purchase program that sells roll-out carts at cost*
- *By 2015 begin selling Blue Boxes at cost from the City's EnviroDepots*
- *By 2015 provide front-end collection of cardboard at larger multi-residential buildings*
- *By 2016 to 2019, begin providing free replacement Blue Boxes for broken ones*

Blue Boxes

The City currently provides two free Blue Boxes to newly constructed homes. Consideration will be given to expand the program by providing replacement Blue Boxes at cost or for free. This will result in more boxes in the system which will increase the capacity to recycle and provide convenience for residents. Further benefits include:

- Improved ability of residents to sort recyclables into two streams
- More room to recycle more
- Improved litter control by reducing overflowing boxes and the use of other containers (e.g., cardboard boxes, laundry baskets, etc.) and broken Blue Boxes

- Increase access to recycling for those less able to purchase Blue Boxes
- Waste Diversion Ontario recognizes providing free or below cost recycling containers as a best practice and municipalities are financially rewarded in their funding grant
- Minimal cost to implement ; there is no added cost for selling Blue Boxes at cost and it would cost approximately \$5,000 per year to provide a second Blue Box to new homes

It is estimated that such a program could cost approximately \$100,000 per year but given the benefits above this expenditure may be warranted.

Blue Carts

The Blue Cart is the standard container for recycling collection in multi-residential buildings. The benefits of making carts more accessible are similar to those of providing more Blue Boxes. More carts in the system will increase the capacity to recycle and provide convenience for residents. Some specific benefits include:

- Improved ability of residents to sort recyclables into two streams
- More capacity to recycle
- Improved building maintenance and litter control by reducing overflowing carts
- A lower price recycling container is an incentive for building owners/property managers to increase their recycling efforts and reduce their garbage

In 2010 the City received a grant from the Continuous Improvement Fund (Waste Diversion Ontario) to increase the number of recycling carts in our program. The goal of the grant program was to increase the number of carts to the best practices recommendation of 50 litres capacity per multi-residential unit (i.e., 1 cart per 7 units). London used the grant to subsidize the cost of carts for building owners and property managers. We continue to make subsidized carts available, and work towards the best practices recommended number of carts.

The following provides an overview of number of carts:

- Since 2009, prior to the grant program, we have increased the number of carts to from 25 litres to 38 litres per unit (our goal is 50 litres per unit).
- There are 5,350 recycling carts in the program (compared to 3,400 in 2009)

The original “subsidized” cart program is drawing to an end and given its success should be replaced with a permanent “at cost” cart program.

6.2.4. Optimization of Materials Being Collected

The following initiatives are proposed with respect to adding new materials to the Blue Box program:

- *Add mixed polycoat (includes hot/cold beverage cups & ice cream containers) and blister packaging (i.e., consumer plastic packaging such as rigid plastic around toys, hardware, etc.) beginning October 2014 with the new Waste Reduction and Conservation calendar*
- *Investigate metal cookware and single use batteries in 2016 to 2019 noting these designated materials and do not receive funding*

It is proposed to not consider adding film plastic (e.g., plastic bags) or expanded foam polystyrene (EPS) at this time.

Background

The existing Blue Box program already includes all “low hanging fruit”. These are materials that can be managed at a reasonable cost or materials that constitute a large portion of the waste stream.

A review of other municipalities in Ontario found nine “more difficult” to recycle materials that are being recycled by at least one municipality. Financial, environmental and social considerations as well as technical issues of adding these materials to the City’s recycling program are presented in Appendix F and summarized below.

Materials That May be Added in the Short Term

Further investigation in the short term is recommended for mixed polycoat (e.g., coffee cups) and blister packaging (rigid plastic around toys, hardware, etc.).

Each of these materials is currently being recycled by one or more municipalities in Ontario but research is required to confirm strength of end markets and processing costs for addition to the City’s program in 2014.

Materials That May be Added in the Mid-Term

Further investigation in the mid-term is recommended for batteries and metal cookware.



**Mixed
Polycoat**



**Blister
Packaging**



**Single Use
Batteries**



**Metal
Cookware**

Each of these materials is currently being recycled by one or more municipalities in Ontario but research is required to:

- Further examine alternative collection methods for single use batteries (e.g., collection with Blue Box or separate collection with electronics)
- Confirm processing costs and changes to the City's Material Recovery Facility to accommodate metal cookware in the future

Materials not to be Added at this Time



Film Plastic



Expanded Foam



Textiles

Film plastic (e.g. plastic bags), expanded foam polystyrene (EPS) and textiles are not recommended for inclusion in the recycling program at this time because:

- Potential to contaminate other recyclables and/or damage processing equipment
- Processing costs are significantly greater than revenue
- Residents can already take film plastic (e.g., grocery bags) to many retail outlets for recycling and textiles to drop-off locations throughout the City for reuse
- EPS does not have stable North American markets and its capture rate is very low (< 20%) at Material Recovery Facilities

Consideration will be given to collecting film and EPS at the EnviroDepots as part of a pilot project.

6.2.5. Multi-Municipal Collection and Processing of Recyclables

The following initiatives are proposed with respect to multi-municipal collection and processing of recyclables:

- *London will continue to seek additional municipal partners to use its Manning Drive Material Recovery Facility to process their Blue Box recyclables*

Background

The Manning Drive MRF opened in August 2011 servicing the City of London which generates approximately of 26,000 tonnes of Blue Box recyclables per year. Since opening, nine other municipalities/organizations have started to use the new MRF. These municipalities/organizations are Alymer, Bayham, Central Elgin, Dutton-Dunwich, Malahide, Thames Centre, St. Thomas, Waste Management (Commercial Recyclables) and Western University. The MRF now generates approximately 33,000 to 34,000 tonnes per year of materials for end markets.

The City contracts out the operation of the MRF. The per tonne processing fee paid to the contractor varied based on the quality of material, whether or not Blue Bags are allowed and the quantity of material processed. As more materials is processed, the per tonne processing fee is lowered.

It is estimated that the City will save approximately \$450,000 to \$500,000 annually in reduced processing fees because of the additional material being processed from other municipalities. The other municipalities using the facility also benefit from the lower per tonne processing fees.

Potential Future Savings

The per tonne processing fee paid to the contractor will continue to drop until the facility is processing over 40,000 tonnes per year. If this annual rate is achieved London will save a further \$200,000 per year. The other municipalities using the MRF will also save addition funds.

London will continue to seek additional municipalities to use the Manning Drive MRF in order to reduce processing costs. London will seek “partner” municipalities whose pricing varies (like London) as well as bid on RPPs and tenders for those municipalities who want to have a fixed price. The Municipality of West Elgin is scheduled to start using the facility in 2015 as a partner municipality. They City will be responding to directly or as a subcontractor to the Oxford County (4,000 tonnes) RFP that is scheduled to be released in the Fall 2014.

6.2.6. Standardized Service Levels and Collaborative Haulage Contracting

The following initiative with respect to standardized service levels:

- *Continue to standard services and promotion/education across all municipalities using the London MRF*

Background

In 2012 London signed partnership agreements with six local municipalities for processing of Blue Box recyclables at the Manning Drive Regional Material Recovery Facility (MRF). At that time the partner municipalities (Aylmer, Bayham, Central Elgin, Dutton-Dunwich, Malahide, Thames Centre), changed their programs to collect the same as in London's program. This harmonization of Blue Box programs across the seven municipalities has offered considerable shared benefits. For residents the immediate benefit is common information about their recycling program across all partner municipalities. As residents travel across the communities (for work, school, entertainment, etc.) they will access this common information about their recycling program from the various local media (TV, radio, news and community papers) and in social interactions (e.g., from friends and family living in adjacent communities). For municipalities there is savings of P&E budgets and staff time as all are able to share in design templates and work cooperatively on media buy and production costs.

Building regional MRF partnerships was a key focus for 2013 and will continue through 2014 as we explore ways to promote common messages and share resources. Community partnerships have been fostered in new areas including working with youth groups, a local theatre company and community organizations.



St. Thomas began using the Manning Driver MRF in March 2014 and has aligned its Blue Box program with the other municipalities using the Manning Drive MRF. We expected St. Thomas to also join London and the other municipalities using the MRF in providing common messaging and sharing resources.

6.2.7. Assess Tools and Methods to Maximize Diversion

City staff will continue to examine public barriers to participation. Additional research on how best to maximize opportunities to divert Blue Box materials from the waste stream and reduce waste going to disposal will be undertaken as required and resources are available. Possible topics may include:

- The types of waste diversion behaviours currently undertaken in each household

- Perceived barriers to participation in waste diversion programs
- How residents receive information or learn about local waste recycling programs
- The tools residents need to increase their participation in recycling programs

This information can be collected through telephone surveys and focus groups.

7. Monitoring and Reporting

The monitoring and reporting of the City's recycling program is considered a Blue Box program fundamental best practice and will be a key component of this Waste Recycling Strategy. The City of London currently monitors many aspects of its Blue Box program as outlined in the table below.

Table 7 - Recycling System Monitoring		
Monitoring Topic	Monitoring Tool	Frequency
Total Waste Generated	Measuring of garbage, recyclables and waste reduction measures following the rules of the GAP DataCall	Annually
Overall Diversion Rate	Formula {(Blue Box materials + other diversion) / Total Waste Generated} following the rules of the GAP DataCall	Annually
Total Blue Box Recyclables Collected	Weight and volume of Blue Box material collected. Weight is based on weigh scale data. Volume is an estimate based on assumed density of the individual materials	Weight – monthly Volume – annually
Blue Box Recyclables in Residue	Composition audit of material being shipped to landfill;	Six to ten times per year
Blue Box Contamination and Cross Contamination	Composition audit of material being shipped to landfill plus audit MRF data	Three to six times per year
Blue Box Recyclables in Garbage	Composition audit of material in Blue Box and Garbage	Every five to six years in conjunction with review of Waste Recycling Strategy
Opportunities for Customer Improvement	Tracking calls/complaints received to the municipal office	On-going
Program Participation	Monitoring of curbside set out rates	Every one to three years

Table 7 - Recycling System Monitoring		
Monitoring Topic	Monitoring Tool	Frequency
Review of Waste Recycling Strategy	A periodic review of the Waste Recycling Strategy to monitor and report on progress, to ensure that the selected initiatives and programs are being implemented and to move forward with continuous improvement.	Every five to six years

The current monitoring of the City's Blue Box recycling program is considered sufficient and no additional monitoring is recommended at this time. The monitoring of the systems allows comparison against the baseline established for the current system. Once the results are measured, they will be reported to Council and the public.

8. Conclusion

The City of London's Waste Management System is based on a Continuous Improvement Strategy (management philosophy) and Sustainable Waste Management. This strategy, which was approved by Municipal Council in 1997, has been the foundation for going forward. It uses an active framework that recognizes integrated waste management as an important environmental service in the community. By effectively allocating financial and human resources, this environmental service contributes to the protection of human health and the environment. By supporting an integrated system of waste reduction (i.e., not producing waste in the first place), recovery of materials that can be recycled and composted, and ensuring that what remains is handled in an environmentally responsible manner, this strategy provides the mechanism for continuous improvement of the waste management system. Since this strategy was approved over fifteen years ago, the City of London has steadily increased its performance to the current level of 44% waste diversion while having one of the lowest total waste management costs in Ontario for urban centres (based on statistics compiled by the Ontario Municipal Benchmarking Initiative – OMBI).

This Waste Recycling Strategy lay the framework for improvements in the City's recycling program over the next few years. This Waste Recycling Strategy included the compilation of baseline data via curbside waste audits, tonnage summaries, staff reports, public consultation and examination of programs in other communities. An increase in the capture rates of specific recyclable materials, an overall increase in capture rates for recyclables and enhancing

service and value to the residents of London are the main objectives of this document. In order to achieve the objectives outlined in the strategy, several initiatives will be implemented over the next few years, including:

- *Targeted promotion to increase the capture of boxboard, mixed household paper, plastics and aluminum foil/trays and proper sorting of recyclables*
- *Increase education and promotion funding (as budgets permit) and/or in-kind services to the recommended “Blue Box” best practice of \$1 per household to implement new incentive programs (e.g., reward programs such as the Gold Box) and/or other encouragement/engagement programs*
- *Continue to develop annual Public Education and Promotion plan*
- *Additional investigation into reducing the bag limit in conjunction with a user pay system for “extra” curbside garbage*
- *Provide residents of newly constructed homes with two Blue Boxes at no cost*
- *Establish a multi-residential recycling cart purchase program that sells roll-out carts at cost*
- *By 2015 begin selling Blue Boxes at cost from the City’s EnviroDepots*
- *By 2015 provide front-end collection of cardboard at larger multi-residential buildings*
- *By 2016 to 2019, begin providing free replacement Blue Boxes for broken ones*
- *Add mixed polycoat (includes hot/cold beverage cups & ice cream containers) and blister packaging (i.e. consumer plastic packaging such as rigid plastic around toys, hardware, etc.) beginning October 2014 with the new Waste Reduction and Conservation calendar*
- *Investigate metal cookware and single use batteries in 2016 to 2019 noting these designated materials and do not receive funding*
- *Continue to seek additional municipal partners to use its Manning Drive Material Recovery Facility to process their Blue Box recyclables*
- *Continue to standard services and promotion/education across all municipalities using the London MRF*

As this Waste Recycling Strategy is a living document, monitoring and reporting of the implementation tools listed above will be ongoing throughout the life of the document. The evaluation tools include conducting curbside waste audits, monthly monitoring of tonnage reports for recyclables being shipped from the MRF and monitoring of inquiries to the City’s Customer Service Unit.

APPENDIX A

Public Consultation Program

The following appendix summarizes public consultation on *ROAD MAP 2.0 The Road to Increased Resource Recovery and Zero Waste*. This document examined all facets of improving waste diversion including the Blue Box Program.

Community Events and Outreach Displays

Location	Type	Duration
Lifestyle Home Show (Western Fair District)	Staffed Display	Jan 23 - Jan 26
Kinsmen Arena	Unstaffed Interactive Display	Feb 6 - Feb 13
North London Community Centre	Unstaffed Interactive Display	Feb 13 - 20
Carling Arena	Unstaffed Interactive Display	Feb 20 - Feb 27
South London Community Centre	Unstaffed Interactive Display	Feb 27 - March 6
Carling Heights Community Centre	Unstaffed Interactive Display	March 6 - March 13
Stoney Creek Community Centre	Unstaffed Interactive Display	March 13 - March 27
Stronach Community Centre	Unstaffed Interactive Display	April 4 - April 11
Home & Garden Show (Western Fair District)	Staffed Display	April 11 - April 13
Kiwanis Seniors' Community Centre	Unstaffed Interactive Display	April 11 - April 17
Medway Community Centre	Unstaffed Interactive Display	April 17 - April 25
CityGreen (located at Citi Plaza)	Staffed Display	March - April
Masonville Library	Unstaffed Interactive Display	April 23 - May 6
Argyle Arena	Unstaffed Interactive Display	April 25 - May 2
Beacock Library	Unstaffed Interactive Display	May 6 - April 13
Earl Nichols	Unstaffed Interactive Display	May 2 - May 16
Hamilton Road Senior Centre	Unstaffed Interactive Display	May 2 - May 16
Crouch Library	Unstaffed Interactive Display	May 13 - May 20
Westmount Library	Unstaffed Interactive Display	May 20 - May 27
Landon Library	Unstaffed Interactive Display	May 27 - June 3
East London	Unstaffed Interactive Display	June 3 - June 11
Byron Library	Unstaffed Interactive Display	June 11- June 18

Unstaffed Interactive Display

PICK the Recycling & Garbage Collection Schedule You Want!

Place a dot under which schedule you prefer.

	Current Schedule	Seasonal	5 Days	Weekly
How Would it Work?	No change – Collection once every 6 business days	Collection on the same day. Garbage is weekly in summer, bi-weekly in winter. Recycling is weekly.	Collection once every 5 business days. The collection day moves forward after a statutory holiday.	Same day collection every week
Number of Collections per year	42	39 - garbage 52 - recycling	50	52
Additional Annual Cost	\$0	\$700,000 to \$1,000,000	\$700,000 to \$900,000	\$1,100,000 to \$1,300,000
Additional Cost per Household	\$0	\$7	\$7	\$10

How to Reduce our Waste?
Share your thoughts!

London CANADA

CityGreen



Typical Bus Shelter Advertisement



Poster Displayed in Community Centres, Libraries, etc.





HOW to Reduce our Waste

You are invited to provide your opinion on London's draft plan for future recycling, composting (organics) and garbage programs.



Full Report available at City Hall and london.ca

Road Map 2.0: The Road Map to Increased Resource Recovery & Zero Waste

The City of London needs your help to identify how we can further reduce the amount of waste we send to landfill. We have produced a report called *Road Map 2.0: The Road to Increased Resource Recovery & Zero Waste*. This overview of the Report highlights key information we seek your input on.



Where Have We Been Since 2007? (Road Map)

In 2007 we released our first *Road Map* and with your input set a course for what we wanted to achieve. Let's review what has been accomplished and then look at our options for the future.

Our Key Accomplishments since 2007

More Materials in the Blue Box



More items accepted at the EnviroDepots



Big Blue Boxes

115,000 Big Blue Boxes Delivered City Wide



Blue Bags and Industry Subsidized Blue Carts

35,000 Blue Bags & 1,900 Subsidized Blue Carts to Condo/Apartment Buildings

Green Bin Pilot Project

One Year Green Bin and Modified Garbage Collection Pilot Project



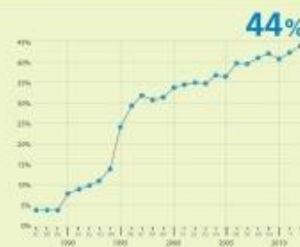
Expanded Depot Hours

"I want to see programs that offer jobs and improvements to the local economy."

Ben Iuremko, Old North



Historical look at London's waste diversion: The percentage that does not go to landfill



1990 – Curbside Blue Box program started
 1995 – More added to the Blue Box
 1996 – Yard material collection started
 2000 – Condo/apartment building recycling started
 2003 – Public space recycling started
 2006 – 4 container garbage limit started
 2009 – More added to the Blue Box
 2011 – More added to the Blue Box

The full *Road Map 2.0* report is available from City Hall or london.ca/environment.
 Space provided through a partnership between industry and Ontario municipalities to support waste diversion programs.

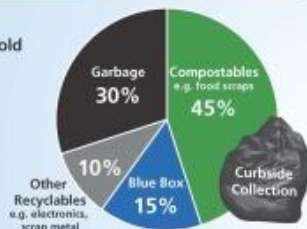
What's Left in the Garbage Bag?

Most of what we put in the garbage could be considered a resource and therefore should be diverted from the landfill. The pie charts below show just how much could be diverted – whether you put your garbage out to the curb, or down the chute into a garbage bin (2012 data). Increased diversion will have a social and financial impact, as well as environmental, so all factors will be considered.

CURBSIDE COLLECTION

For the average London household with curbside collection

70% of materials in the garbage bag could be diverted



CONDO/APARTMENT BUILDINGS

For the average London household with bulk bin collection

70% of materials in the bin could be diverted



Reducing the Amount of Garbage Sent to Landfill. What are Some of the Choices?

"I want programs that are convenient and easy to understand."

Stacey Nicholls, Carling Heights



1 Blue Box Recycling

Here are some options for increasing how much we recycle:

- **Accept more materials** in the Blue Box:
 - coffee cups and ice cream containers
 - plastic 'blister packaging' (the hard-to-remove) clear plastic on toys and tools
 - batteries and metal pots & pans
- Provide **more recycling containers**.
- **More opportunities** to recycle away from home, such as in public spaces and businesses.



2 Organics Management

- **Home Composting**
Home composting has played an important role in waste reduction in London. It is estimated that 500 to 2,000 more tonnes of food scraps could be diverted from landfill.
- **Community Composting**
Community composting is now possible due to recent changes to provincial legislation.
- **Christmas Trees**
Provide curbside collection for composting.
- **Green Bin Program**
A decision about a Green Bin program has been delayed until a more comprehensive review of other options has been completed.



3 EnviroDepots

The EnviroDepots are popular destinations which provide a convenient 'one stop drop-off' for many materials. Options for increasing their effectiveness include:

- **Open a North-end Depot**
 - to complement our depots in the East, West and South ends
- **Accept more materials** for recycling:
 - paint
 - Styrofoam™
 - carpets and mattresses



4 Encouraging & Engaging Londoners

There are a number of initiatives that could be undertaken to encourage both waste reduction (i.e. not produced in the first place) and waste diversion of recyclables and compostables.

Options include:

- decreasing the garbage bag limit
- more awareness and feedback to residents
- user pay system for extra bags
- reducing the frequency of garbage collection
- incentive programs to increase recycling
- mandatory recycling by-law



The full *Road Map 2.0* report is available from City Hall or london.ca/environment.

Space provided through a partnership between industry and Ontario municipalities to support waste diversion programs.

What Technologies Should We Look at to Help Reduce Waste?

There are various technologies that could assist in optimizing materials recovery and creating renewable energy while moving from the City's current diversion rate of approximately 44% towards the Provincial goal of 60% and beyond.



Approximate Costs for Alternative Technologies and Conventional Technologies

Alternative (Resource Recovery) Technologies (a)	Estimated Processing Cost per Tonne (b)
Anaerobic Digestion generally for separated organic matter	\$70 to \$120
Energy-from-Waste (advanced combustion and energy recovery)	\$100 to \$150
Advanced Thermal Treatment (produces charcoal, coke or gas) Examples include gasification, plasma gasification, pyrolysis	\$80 to \$155
Mechanical Biological Treatment (MBT) Examples include a combination of mechanical material sorting followed by composting, anaerobic digestion or bio-drying	\$90 to \$150
Conventional Technologies	Estimated Processing Cost per Tonne (b)
Aerobic Composting Examples include covered windrows, channel, in-vessel, silos, rotary drums	\$80 to \$120
Landfilling (c)	\$30 to \$45

(a) Some technologies require a separated stream of materials; others handle mixed waste.
 (b) Estimated technology cost ranges include annual operating costs and annualized capital costs. Revenue streams from product sales are not included.
 (c) Generally all new, emerging and next generation technologies have some reliance on landfilling. This does not include potential advancements to landfill technology.

"I am concerned about the cost and how it will be paid for. Our taxes are already high enough."

Bob Lyons, Byron West



Understanding Financial Considerations

Approximately 65% of total waste management costs are paid by property taxes and 35% comes from recycling revenues, service fees and stewardship funding from industry. In 2013, it cost Londoners \$5 million (\$30 per household) to serve 170,000 households with our existing waste diversion programs. Below we consider what programs will increase our diversion rate and at what costs.

Diversion rate and level of program changes that are required	40 - 45%	45 - 50%	50 - 60%	60 - 80%
	Minor Changes Recycling improvements	More Changes Recycling & composting improvements	Major Changes New technology for organics	Significant Changes New technology for remaining waste
Diversion Rate: percent of waste diverted from landfill Green = diverted Yellow = landfilled				
Estimated cost range to achieve diversion rate	\$60,000 to \$120,000	\$800,000 to \$1,000,000	\$3,800,000 to \$5,000,000	\$6,000,000 to \$10,000,000
Additional cost at the household level	\$0.35 - \$0.70	\$5 - \$6	\$23 - \$29	\$35 - \$60
Total waste diversion cost per household	\$30 - \$31	\$35 - \$36	\$53 - \$59	\$65 - \$90

What is Your Opinion on the Recycling and Garbage Collection Schedule? Do you want more pick-ups?

Options	How it would work?	Number of Collections per year	Additional Annual Cost	Additional Cost per Household Served
Current Schedule	No change - Collection once every 6 business days	42	\$0	\$0
Seasonal Change	Collection on the same day. Garbage is weekly in summer, bi-weekly in winter. Recycling is weekly.	39 - garbage 52 - recycling	\$700,000 to \$1,000,000	\$7
5 Days	Collection once every 5 business days. The collection day moves forward after a statutory holiday.	50	\$700,000 to \$900,000	\$7
Same Day	Same day collection every week	52	\$1,100,000 to \$1,300,000	\$10

We need to hear from you! See the next page for how to have your say.

Space provided through a partnership between industry and Ontario municipalities to support waste diversion programs.

Recycling and Resource Recovery Help Reduce Energy Use and Reduce Greenhouse Gas Emissions

Most of us know that recycling, composting and reducing the amount of waste we send to landfill is better for the environment. What you might not know is that making cans and newspapers from raw materials like minerals and trees takes far more energy than recycling old cans and newspapers. Plus, a lot of these smelters and paper mills are far away in Northern Ontario or Quebec, while recycling plants are closer to home. Less energy = fewer greenhouse gases. It also means that less land needs to be mined or forests felled for raw materials.

When food scraps and other compostable organic matter are sent to landfills, they produce methane (a potent greenhouse gas) as these materials decompose. By composting or reducing organic matter sent to landfill through alternative resource recovery technologies (see previous page) we can reduce greenhouse gas emissions. In fact, we are also able to make biofuels and other products from some of these technologies!



How to Reduce our Waste

We Need to Hear from You!

-  london.ca/environment
-  es@london.ca
-  @CityofLdnOnt or #ReduceLdnWaste
-  facebook.com/LondonCanada
-  Solid Waste 519-661-2500 ext 8413

"My main concern is the environment. What are we leaving for the next generation?"

Grace Coeby, Fairmount



Community Energy Action Plan

Give us your feedback on ANOTHER important community engagement project

Recycling and resource recovery is just one way we can reduce energy use in London. London's draft Community Energy Action Plan outlines what we can all work on over the next 5 years. Tell us what you think of our draft plan – and what actions you have taken or plan to take to reduce your energy use.

Find out more at london.ca/environment.



The full *Road Map 2.0* report is available from City Hall or london.ca/environment.

Space provided through a partnership between industry and Ontario municipalities to support waste diversion programs.

Summary of Comments from Community Engagement

<i>Year</i>	<i>Proposed Programs/Initiatives</i>	<i>General Support</i>		<i>Suggested Alternatives/ Comments</i>
		<i>Yes</i>	<i>No</i>	
2013	• North end EnviroDepot	49	1	
	• Delay Green Bin	9	78	
Early 2014 Adoption	• Two Blue Boxes for new homes	28	3	• Different colours for paper and container boxes
	• Multi-residential recycling cart purchase program	30	0	
	• Vegetable oil and used motor oil collection to the EnviroDepots	26	1	• Vegetable oil drop off for commercial, not residential • Exemption period at curb
Further Investigation in the Short Term (2014 to 2015)	• Add mixed polycoat & blister packaging to the Blue Box program	49	0	
	• Sell Blue Boxes at EnviroDepots at cost	29	0	
	• Front end bin cardboard collection at multi-residential buildings	27	0	
	• Start downtown cardboard collection	24	0	• Full Blue Box recycling recommended by five
	• Increase public space recycling	36	0	
	• Facilitate purchase of recycling services by BIAs/commercial areas	29	0	
	• Targeted education/awareness programs for selected Blue Box materials	54	0	
	• Increase education and awareness funding (as budgets permit)	10	3	• Blue Box program should be standardized across Ontario
	• Explore source reduction of food waste	3	0	
	• Examine the role of community composting	13	1	

Summary of Comments from Community Engagement

Year	Proposed Programs/Initiatives	General Support		Suggested Alternatives/ Comments
		Yes	No	
<i>Further investigation in the Mid-term (2016 to 2019)</i>	<ul style="list-style-type: none"> Add single use batteries and metal cookware to the Blue Box program 	28	0	
	<ul style="list-style-type: none"> Provide replacement Blue Boxes to residents 	28	3	<ul style="list-style-type: none"> Only provide to those that request
	<ul style="list-style-type: none"> Add paint, expanded foam polystyrene, carpets and mattresses to EnviroDepots 	39	1	<ul style="list-style-type: none"> Ban the use of expanded foam polystyrene Exemption period at curb
	<ul style="list-style-type: none"> Increase home composting 	25	5	<ul style="list-style-type: none"> Too difficult in winter Not possible in apartments
	<ul style="list-style-type: none"> Explore a reduced bag limit with user pay system for extra garbage 	59	23	<ul style="list-style-type: none"> User pay for bulky items User pay after Green Bin implemented Limit bulky item collection to four times a year
	<ul style="list-style-type: none"> Begin semi-annual curbside collection of electronics, scrap metal and batteries 	1	0	<ul style="list-style-type: none"> Retailers already take-back
<i>Delayed – Future Consideration</i>	<ul style="list-style-type: none"> Add film plastic, expanded foam polystyrene and textiles to the Blue Box 	25	0	<ul style="list-style-type: none"> Add light bulbs
	<ul style="list-style-type: none"> Add film plastic to the EnviroDepots 	29	1	<ul style="list-style-type: none"> Can be taken back to grocery stores
	<ul style="list-style-type: none"> Examine full User Pay for garbage 	5	0	
	<ul style="list-style-type: none"> Mandatory Recycling Bylaw (with and without clear bags for garbage) 	26	11	

Summary of Comments from Community Engagement

Year	Proposed Programs/Initiatives	General Support		Suggested Alternatives/ Comments
		Yes	No	
Financial Considerations	<ul style="list-style-type: none"> 40-45% Diversion = \$60,000 to \$120,000 (\$0.35 - \$0.70 per hhld) 	3	0	
	<ul style="list-style-type: none"> 45-50% Diversion = \$800,000 to \$1,000,000 (\$5 - \$6 per household) 	8	0	
	<ul style="list-style-type: none"> 50-60% Diversion = \$3,800,000 to \$5,000,000 (\$23-\$29 per household) 	6	0	
	<ul style="list-style-type: none"> 60-80% Diversion = \$6,000,000 to 10,000,000 (\$35 -\$60 per household) 	23	0	
Other Potential Initiatives	<ul style="list-style-type: none"> Recycling Containers at community mail boxes for paper 	7	0	
	<ul style="list-style-type: none"> Reducing over-circulation of flyers and newspapers 	9	0	
	<ul style="list-style-type: none"> Take Back programs 	4	0	
	<ul style="list-style-type: none"> Furniture re-use/exchange programs 	5	0	
	<ul style="list-style-type: none"> School programs 	4	0	
	<ul style="list-style-type: none"> Community workshops 	1	0	
	<ul style="list-style-type: none"> Incentives for living green 	3	0	
	<ul style="list-style-type: none"> Newsletters to residents/neighbourhood groups 	4	0	
	<ul style="list-style-type: none"> Support resident groups and ambassador and volunteer programs 	1	0	
	<ul style="list-style-type: none"> Waste reward programs for top performing residents (i.e. gold box) 	5	0	
	<ul style="list-style-type: none"> Encouraging smarter consumer practices 	2	0	
	<ul style="list-style-type: none"> All of the Above 	22	0	

APPENDIX B

Community Characteristics

Summary

Based on City of London Planning documents, in 2012 London had a total population of 387,690; this represents a 3.9% increase from the 2007 population of 373,310. When compared to Canadian Census data for the period between 2006 and 2011, this growth was lower than the Ontario average population increase of 5.7%.

The population projections for the City of London we're based on estimates contained in the report *Employment, Population, Housing and Non-Residential Construction Projections, City of London, Ontario, 2011 Update* prepared by the Altus Group in 2012 for the City of London. The update report provides population estimates for the years 2016, 2021, 2026, 2031, 2021, 2036 and 2041.

These population estimates were used to develop permanent population projections for the period 2013 to 2043. For the period 2014 to 2041, the report's estimates were used for the years that a population estimate existed. For other years, the population was estimated by interpolation. For the period 2042 to 2043, it was assumed the rate of population growth would be the same as the period 2036 to 2041.

Seasonal population projections were developed to account for the large number of out of town students living off campus and attending UWO and Fanshawe College. The growth in the number of students was assumed to match the growth in permanent population.

The population projections for City of London for the period 2013 to 2043 are presented in Table B-3

Table B-1 City of London Historical Population

Year	London ¹	Westminster ²	Seasonal ³	Total
1977	243,080	5,950	9,920	258,950
1978	245,820	5,950	10,060	261,830
1979	248,590	5,950	10,270	264,810
1980	251,390	5,950	10,410	267,750
1981	254,280	5,950	10,530	270,760
1982	257,250	5,950	10,790	273,990
1983	260,220	5,940	11,000	277,160
1984	263,190	5,940	11,170	280,300
1985	266,160	5,940	11,230	283,330
1986	269,150	5,930	11,290	286,370
1987	275,950	6,100	11,460	293,510
1988	282,750	6,270	11,580	300,600
1989	289,550	6,450	11,750	307,750
1990	296,350	6,640	12,080	315,070
1991	303,170	6,830	12,400	322,400
1992	306,200	7,030	12,600	325,830
1993	316,280	0	12,710	328,990
1994	319,370	0	13,070	332,440
1995	322,550	0	13,250	335,800
1996	325,650	0	13,390	339,040
1997	327,820	0	13,540	341,360
1998	329,990	0	13,710	343,700
1999	332,160	0	13,980	346,140
2000	334,330	0	14,120	348,450
2001	336,500	0	14,330	350,830
2002	339,700	0	15,630	355,330
2003	342,900	0	16,740	359,640
2004	346,100	0	17,320	363,420
2005	349,300	0	17,640	366,940
2006	352,400	0	17,900	370,300
2007	355,100	0	18,210	373,310
2008	357,800	0	18,550	376,350
2009	360,500	0	19,000	379,500
2010	363,200	0	19,430	382,630
2011	366,100	0	19,870	385,970
2012	367,400	0	20,290	387,690

Notes

1. From City of London Planning Department documents.
2. Population includes the Township of Westminster prior to 1993. In 1993 the Township of Westminster became part of the City of London.
3. Equivalent seasonal population (students) is calculated in Table A-2.

Table B-2 City of London Seasonal Student Population

Year	Enrollment ¹		Equivalent Population		Total Equivalent Population ²
	UWO	Fanshawe	UWO	Fanshawe	
1977	18,000	5,400	8,320	1,600	9,920
1978	18,250	5,500	8,430	1,630	10,060
1979	18,500	5,800	8,550	1,720	10,270
1980	18,750	5,900	8,660	1,750	10,410
1981	19,000	5,900	8,780	1,750	10,530
1982	19,250	6,400	8,890	1,900	10,790
1983	19,500	6,700	9,010	1,990	11,000
1984	19,750	6,900	9,120	2,050	11,170
1985	20,000	6,700	9,240	1,990	11,230
1986	20,250	6,500	9,360	1,930	11,290
1987	20,500	6,700	9,470	1,990	11,460
1988	20,750	6,700	9,590	1,990	11,580
1989	21,000	6,900	9,700	2,050	11,750
1990	21,250	7,600	9,820	2,260	12,080
1991	21,500	8,300	9,930	2,470	12,400
1992	21,750	8,600	10,050	2,550	12,600
1993	22,000	8,600	10,160	2,550	12,710
1994	22,250	9,400	10,280	2,790	13,070
1995	22,500	9,600	10,400	2,850	13,250
1996	22,750	9,700	10,510	2,880	13,390
1997	23,000	9,800	10,630	2,910	13,540
1998	23,250	10,000	10,740	2,970	13,710
1999	23,500	10,500	10,860	3,120	13,980
2000	23,750	10,600	10,970	3,150	14,120
2001	24,000	10,900	11,090	3,240	14,330
2002	26,000	12,200	12,010	3,620	15,630
2003	28,000	12,800	12,940	3,800	16,740
2004	29,000	13,200	13,400	3,920	17,320
2005	29,300	13,800	13,540	4,100	17,640
2006	29,600	14,200	13,680	4,220	17,900
2007	29,900	14,800	13,810	4,400	18,210
2008	30,200	15,500	13,950	4,600	18,550
2009	30,900	15,880	14,280	4,720	19,000
2010	31,600	16,260	14,600	4,830	19,430
2011	32,300	16,650	14,920	4,950	19,870
2012	33,000	16,970	15,250	5,040	20,290

Notes

1. Enrollment from UWO and Fanshawe registry up to 2008. Assumed to grow at same rate of population growth after 2008.
2. The equivalent population was calculated using the following assumptions: a) 70% of UWO students are from out of town and live off campus; b) 45% of Fanshawe students are from out of town and lived off campus and d) they lived in London for 8 months or 66% of the year. Estimates of the percentage of students living off campus are based on information provided by the UWO Housing Office.

Table B-3 Population Projections for the City of London

Year	Permanent ^{1,2}	Equivalent Seasonal ^{3,4}	Total
2013	368,700	20,300	389,000
2014	370,000	20,400	390,400
2015	371,300	20,500	391,800
2016	372,700	20,600	393,300
2017	375,200	20,700	395,900
2018	377,700	20,800	398,500
2019	380,200	21,000	401,200
2020	382,700	21,100	403,800
2021	385,400	21,300	406,700
2022	389,500	21,500	411,000
2023	393,600	21,700	415,300
2024	397,700	21,900	419,600
2025	401,800	22,200	424,000
2026	405,700	22,400	428,100
2027	408,900	22,600	431,500
2028	412,100	22,700	434,800
2029	415,300	22,900	438,200
2030	418,500	23,100	441,600
2031	421,900	23,300	445,200
2032	425,500	23,500	449,000
2033	429,100	23,700	452,800
2034	432,700	23,900	456,600
2035	436,300	24,100	460,400
2036	439,800	24,300	464,100
2037	443,400	24,500	467,900
2038	447,000	24,700	471,700
2039	450,600	24,900	475,500
2040	454,200	25,100	479,300
2041	457,600	25,200	482,800
2042	461,300	25,400	486,700
2043	465,000	25,600	490,600

Notes

1. Population projections for the period 2006 to 2041 based on *Employment, Population, Housing and Non-Residential Construction Projections, City of London, Ontario, 2011 Update* (Altus Group, 2012).
2. Population projections beyond 2041 were extrapolated by assuming the same rate of growth rate after 2041 as immediately prior to 2041.
3. Equivalent seasonal population (students) is calculated assuming 66% of students enrolled in post-secondary education are out of town students living off-campus for eight months of the year. Therefore each actual student represents 44% "equivalent" garbage of a permanent resident.
4. Growth in post-secondary enrollment is assumed to match population growth.

APPENDIX C

Historical Waste Generation and Diversion

Historical Residential Waste Diversion Quantities

Year	Blue Box Recycling				Composting				Other						Total Residential Diversion								
	Curbside (tonnes)	Mult ¹ : Residential (tonnes)	Depot ³ (tonnes)	Public Space ⁴ (tonnes)	Subtotal (tonnes)	Home Composting ⁵ (tonnes)	Home Recycling ⁶ (tonnes)	Yard Material ⁷ Collection (tonnes)	Depot ⁸ (tonnes)	Fall Leaf Collection (tonnes)	Christmas Trees ⁹ (tonnes)	Subtotal (tonnes)	Bar ¹¹ (tonnes)	WEEE ¹² Electronics (tonnes)	Appliances ¹³ (tonnes)	Tree ⁸ (tonnes)	Recreation Materials ¹⁴ w/eco2 ¹⁶ (tonnes)	Toilets/Small Household Item Reuse (tonnes)	HSW Depot ¹⁷ (tonnes)	Brewery Retail ¹⁸ (tonnes)	Subtotal (tonnes)		
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1981	4,900	0	0	0	4,900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,900	
1982	5,000	0	0	0	5,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,000	
1983	5,100	0	0	0	5,100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,100	
1984	5,200	0	0	0	5,200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,200	
1985	5,300	0	0	0	5,300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,300	
1986	5,400	0	0	0	5,400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,400	
1987	5,500	0	0	0	5,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,500	
1988	5,750	0	0	0	5,750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	5,760	
1989	5,500	0	0	0	5,500	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	5,520	
1990	10,650	0	0	0	10,650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	10,690	
1991	11,800	0	190	0	11,990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	12,040	
1992	12,330	0	190	0	12,520	0	0	0	0	0	60	60	0	0	0	0	0	0	0	60	0	12,640	
1993	12,480	0	210	0	12,690	0	0	0	0	0	110	1,410	0	0	0	0	0	0	0	70	0	17,980	
1994	13,460	0	300	0	13,760	4,800	2,000	200	4,650	2,950	100	4,150	1,140	0	2,200	40	0	0	0	100	0	34,480	
1995	15,250	0	490	0	15,740	5,500	3,500	2,900	4,190	2,500	130	18,720	1,160	0	2,220	40	0	0	0	2,220	0	37,980	
1996	16,030	0	450	0	16,480	5,600	3,500	4,800	6,370	3,300	120	23,690	1,180	0	1,800	0	0	0	0	110	0	33,090	
1997	16,890	0	460	0	17,350	5,700	3,700	4,600	3,060	3,100	130	20,290	1,210	0	1,820	0	0	0	0	180	0	40,780	
1998	16,890	0	460	0	17,350	5,700	3,700	4,600	3,060	3,100	130	20,290	1,210	0	1,820	0	0	0	0	180	0	40,780	
1999	17,310	1,000	380	0	18,690	5,700	3,700	6,200	2,110	3,400	130	21,240	1,230	0	1,850	0	0	0	0	120	0	33,200	
2000	17,220	1,780	370	0	19,370	5,300	3,700	5,590	6,160	2,820	140	23,710	1,240	0	1,870	410	0	0	0	180	0	43,130	
2001	17,480	2,120	380	0	19,980	5,300	3,700	5,110	3,120	4,410	140	21,780	1,250	0	1,870	420	0	0	0	910	0	48,870	
2002	18,800	2,250	450	0	21,500	5,300	3,750	3,950	3,740	4,510	150	21,400	1,260	0	1,940	450	0	0	0	140	0	50,280	
2003	20,110	2,370	380	0	22,860	5,300	3,800	5,050	3,200	4,260	100	21,710	1,270	10	1,970	450	0	0	0	160	0	55,090	
2004	21,200	2,480	270	30	23,980	5,300	3,800	5,370	4,790	4,010	140	23,410	1,280	10	2,000	460	0	0	0	180	0	58,010	
2005	21,470	2,560	610	40	24,680	5,300	3,850	4,860	4,730	4,010	150	22,900	1,290	20	2,030	400	0	0	0	190	0	60,960	
2006	24,850	2,820	170	40	27,880	5,300	3,850	6,360	5,900	4,230	130	25,770	1,290	20	2,050	540	0	0	0	180	0	74,470	
2007	24,200	2,770	180	50	27,200	5,300	3,850	4,790	5,640	4,710	130	24,420	1,300	50	2,070	620	0	0	0	210	0	75,010	
2008	24,270	3,090	200	60	27,620	5,330	3,950	5,340	6,400	6,400	130	27,550	1,300	50	2,090	750	0	0	0	240	0	85,900	
2009	22,570	3,080	280	50	25,980	5,360	3,950	7,270	8,410	6,200	130	31,320	1,300	50	2,110	790	0	0	0	220	0	103,860	
2010	22,110	3,150	220	50	25,530	5,400	3,950	5,450	7,230	3,150	120	25,300	1,020	280	0	2,130	740	0	0	220	0	103,860	
2011	22,520	3,290	310	50	26,170	5,420	3,950	5,000	10,610	3,630	120	28,730	810	460	30	2,150	730	0	0	240	0	113,310	
2012	22,670	3,290	370	50	26,380	5,440	3,950	4,540	9,920	4,680	120	28,650	640	560	90	2,750	720	0	0	400	0	124,260	
2013	22,420	3,370	460	50	26,300	5,490	3,950	5,230	11,160	4,130	120	30,080	780	430	100	2,760	720	0	0	450	0	126,860	
Totals	489,850	39,420	7,780	490	537,540	106,240	70,400	92,610	111,390	77,650	2,710	461,000	21,950	1,940	220	39,680	8,280	49,800	980	3,900	20,900	147,650	1,146,190

Notes and Assumptions

- Weighted quantities.
- City of EmroDepots (Clarks Road & Oxford St) and depot at the WDA Landfill.
- Estimate based on number of units sold through City program. From 1993 to 1999, it is assumed that 80% of the units are being used and these units divert 135 kg per unit. Beginning in 2000 it is assumed each compostar diverts 100 kg/year to be consistent with GAP process.
- Estimate assumes curbside grasses are introduced in 1995 reduces grass generation by 20%.
- Includes fall pumpkin depot collection and pay per bag grass clippings.
- Estimate based on the actual number of trees to fill a truck, x # of trucks filled, x kg per tree.
- Estimate based on generation rate of 12 kg per hold per year (e.g., 300 kg recycled every 25 years). Ban on curbside collection of white goods/legals metal items in effect as of 1995. Beginning in 2010, amount diverted by Ban reduced by quantities collected at Depots.
- Estimate based on one 160-capsule/year and 110 lbs per tonne. It was assumed the recovery rate was 75% from 1995 to 1996 and 60% after 1997 (local fire recycler closed in 1997). Beginning in 2012, as WDO Datacall "GAP" process (7.1 kilograms diverted/capita).
- Estimate based on 80% of weighted materials to City depots (assume 20% process residuals) plus 50% of available material not taken to City depots. Generation rate of scrap metal is estimated to be 2.4 kg/capita/yr. Generation rate of wood/C2D waste is estimated to be 15 kg/capita/yr.
- Estimates from up to 1999 based on 1.5 kg/capita collected, 3 kg/compressed cylinder collected at the HSW Depot. Estimates from 2000 to 2010 use various conversion factors consistent with "GAP" process. Estimates from 2011 onwards from Steward Ontario Datacall for MMSW.
- Blowers Retail deposit return reported effective 2001 as per WDO "GAP" process.

APPENDIX D

Garbage and Blue Box Composition Data

Existing Composition – Garbage (including compostables) and Blue Box Recyclables

Composition audits of garbage and Blue Box recyclables were conducted in London in 2012/2013 (with funding, coordination and sampling methodology provided by Stewardship Ontario). The audit consisted of four separate sets of audits conducted at specified intervals throughout the year (i.e. spring, summer, fall, winter) to address any issues of seasonality. Each audit included two samples taken over two consecutive collections to address issues of sporadic set out. The audit sample consisted of 100 curbside homes to achieve statistical significance. The same homes were used for each of the four sets of audits.

The audit data was combined with other City data (quantities of garbage and Blue Box recyclables collected from single family homes and multi-residential, multi-residential waste and blue box audits from 2007, etc.) to create the following tables:

- Table D1 – Summary of 2012 Garbage Composition
- Table D2 – Estimated 2012 Curbside Garbage and Recycling Composition
- Table D3 – Estimated 2012 Multi-Residential Garbage and Recycling Composition
- Table D4 – Estimated 2012 Garbage and Recycling Composition

Future Composition - Waste (Garbage and Blue Box Materials Combined)

Estimates of waste quantities (garbage and blue box materials combined) were calculated for 2012, 2016 and 2025 and are shown in tables:

- Table D5 – Estimated 2012 Curbside and Multi-Residential Waste Composition
 - Table D6 – Estimated 2016 Curbside and Multi-Residential Waste Composition
 - Table D7 – Estimated 2025 Curbside and Multi-Residential Waste Composition
- These estimates were made taking the 2012 waste composition and adjusting it based on:

- estimates of future curbside (single family dwellings) and multi-residential units from *Employment, Population, Housing and Non-Residential Construction Projects, City of London, Ontario, 2011 Update* (AltusGroup, 2012)
- expected changes to the generation rate of specific materials using information on projected changes to the generation rates from *Volume 1: Executive Summary A Study of the Optimization of the Blue Box Material Processing System in Ontario Final Report* (Waste Diversion Organization, 2012) (Table D8)

The changes to material generation rates in Table D7 are due to industry introducing new packaging or modifying existing packaging, changing consumer habits and new products being introduced. Examples of recent changes include:

- More fruits and vegetables in “clamshell” packaging
- An increase in light weight and multi material packaging
- Plastic containers replacing glass, aluminum and steel
- An increase in plastic stand-up pouches for food products
- Consumers reading more newspapers and magazines online which reduces the amount of paper for recycling
- An increase in cardboard as more people shop online

Future Composition – Garbage and Blue Box Materials

Projections of the amount of material that would be diverted by the Blue Box program in the future were estimated for three scenarios:

- Table D9 – Estimated 2016 Garbage and Blue Box Composition – Base Case
- Table D10 – Estimated 2025 Garbage and Blue Box Composition – Base Case
- Table D11 – Estimated 2025 Garbage and Blue Box Composition – High Increase in Capture Rate

The composition in Table D9 is based on the implementation of the recommendations in this report. The composition in Table D10 assumes the increased capture rates continues in line with trends from previous years, but there are no substantially new or different initiatives to increase recovery. It is assumed that markets for some materials will strengthen based on current efforts. The composition in Table D11 assumes recovery rates are substantial and will require aggressive promotion, education and incentive programs (e.g., rewards programs for recycling).

The capture rates used to generate Tables D9 to D11 are presented in Table D12.

Table D1: Summary of 2012 Garbage Composition

Material Category	2012					
	Curbside (Single Family Dwellings)		Multi-Residential		Total	
	Total tonne/yr	% Blue Box Capture ^a	Total tonne/yr	% Blue Box Capture ^a	Total tonne/yr	% Blue Box Capture
Blue Box Recyclables						
Paper	3,853	83%	3,510	42%	7,363	74%
Plastic	997	67%	657	30%	1,654	58%
Metal	652	66%	460	26%	1,112	57%
Glass	509	81%	436	35%	945	71%
<i>Total Blue Box Recyclables</i>	6,011	80%	5,063	39%	11,074	71%
Other Potential Blue Box Materials						
Beverage Cups/Ice Cream Containers	352		121		473	
Expanded Polystyrene	256		83		339	
Plastic Bags/Film	2,388		773		3,161	
<i>Total Other Potential Blue Box</i>	2,996		977		3,973	
Other						
Municipal Hazardous & Special Waste	254		46		300	
Food Waste	22,065		6,919		28,983	
Yard Waste	1,193		312		1,504	
Textiles	1,842		818		2,660	
Construction & Demolition	1,899		843		2,742	
Carpeting	958		426		1,384	
Electronics	648		288		935	
Other Non-recyclable Materials	19,784		7,209		26,993	
<i>Total Other</i>	48,643		16,860		65,503	
Grand Total	57,650		22,900		80,550	

Notes

(a) Percentage of material that is not in the garbage (placed in Blue Box).

Table D2: Estimated 2012 Curbside Garbage and Recycling Composition

Material Category	Materials Accepted in London's Blue Box Program	Estimated Curbside Composition (Excludes Bulky Items)						
		City				Per Household		
		Blue Box Material Recycled tonne/yr	Material in Garbage tonne/yr	Total tonne/yr	Capture Rate of Blue Box Materials	Blue Box Material Recycled kg/hhld/yr	Material in Garbage kg/hhld/yr	Total kg/hhld/yr
1. PAPER								
Newsprint	X	7,228	359	7,587	95%	62	3	65
Magazines and Catalogues	X	2,492	172	2,664	94%	21	1	23
Directories / Telephone Books	X	138	30	167	82%	1	0.3	1.4
Mixed Fine Paper	X	1,187	1,189	2,376	50%	10	10	20
Books	X	438	145	583	75%	4	1	5
Other Printed Materials - Non-Recyclable		133	324	457	29%	1	3	4
Total Paper		11,614	2,220	13,834	84%	99	19	118
Targeted BB Paper		11,481	1,895	13,377	86%	98	16	114
2. PAPER PACKAGING								
Gable Top Containers	X	248	83	331	75%	2	0.7	3
Aseptic Containers	X	83	67	150	55%	0.7	0.6	1.3
Spiral Wound Containers	X	53	68	121	44%	0.5	0.6	1.0
Corrugated Cardboard	X	3,821	616	4,437	86%	33	5	38
Boxboard / Cores (Tubes)	X	2,655	1,125	3,780	70%	23	10	32
Polycoat Cups/Ice Cream Containers		52	299	351	15%	0.4	3	3
Other Bleached Long Polycoat Fibre		3	53	57	6%	0.0	0.5	0.5
Other Paper Laminate Categories - Non-Recyclable		25	318	343	7%	0.2	3	3
Tissue/Toweling - Non-Recyclable		13	3,205	3,218	0%	0.1	27	27
Total Paper Packaging		6,954	5,833	12,787	54%	59	50	109
Targeted BB Paper Packaging		6,860	1,958	8,818	78%	58	17	75
3. PLASTICS								
#1 PET	X	1,269	397	1,666	76%	11	3	14
#2 HDPE	X	460	159	620	74%	4	1	5
#3 - #7 Mixed Plastics	X	306	408	714	43%	3	3	6
#6 PS - Expanded Polystyrene		19	256	275	7%	0.2	2	2
Large HDPE & PP Pails & Lids	X	11	33	44	25%	0.1	0.3	0.4
LDPE/HDPE Film		141	2,388	2,529	6%	1	20	22
Plastic Laminates - Mostly Non-Recyclable		31	946	977	3%	0.3	8	8
Other Rigid Plastic Packaging - Mostly Non-Recyclable		171	575	746	23%	1	5	6
Other Plastics - Non-Packaging/Durable - Non-Recyclable		149	942	1,091	14%	1	8	9
Total Plastics		2,558	6,104	8,662	30%	22	52	74
Targeted BB Plastics		2,046	997	3,043	67%	17	8	26

Table D2: Estimated 2012 Curbside Garbage and Recycling Composition (continued)

Material Category	Materials Accepted in London's Blue Box Program	Estimated Curbside Composition (Excludes Bulky Items)						
		City				Per Household		
		Blue Box Material Recycled tonne/yr	Material in Garbage tonne/yr	Total tonne/yr	Capture Rate of Blue Box Materials	Blue Box Material Recycled kg/hhld/yr	Material in Garbage kg/hhld/yr	Total kg/hhld/yr
4. METALS								
Aluminum- Food/Beverage Containers	X	430	112	542	79%	4	1	5
Aluminum - Foil and Trays	X	26	165	191	14%	0.2	1.4	1.6
Steel - Food and Beverage Containers	X	760	222	981	77%	6	2	8
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	26	109	134	19%	0.2	0.9	1.1
Other Aluminum - Non-Blue Box		0.0	11	11	0%	0.0	0.1	0.1
Other Steel - Non-Blue Box		37	457	493	7%	0.3	4	4
Total Metals		1,278	1,075	2,353	54%	11	9	20
Targeted BB Metals		1,242	608	1,849	67%	11	5	16
5. GLASS								
Clear Glass	X	1,591	469	2,060	77%	14	4	18
Coloured Glass	X	518	40	557	93%	4	0.3	5
Other Glass - Non-Blue Box		128	335	463	28%	1	3	4
Total Glass		2,236	844	3,080	73%	19	7	26
Targeted BB Glass		2,109	509	2,618	81%	18	4	22
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE								
Paint & Stain Containers	X	10	44	55	19%	0.1	0.4	0.5
Lubricating Oil Containers		5	7	11	40%	0.0	0.1	0.1
Batteries		2	106	108	2%	0.0	0.9	0.9
Other MHSW		30	101	131	23%	0.3	0.9	1.1
Total MHSW		47	258	305	15%	0.4	2	3
Targeted BB MHSW		10	44	55	19%	0.1	0.4	0.5
7. OTHER MATERIALS								
Food Waste		0.0	22,065	22,065	0%	0.0	188	188
Yard Waste		0.0	1,193	1,193	0%	0.0	10	10
Diapers & Sanitary Products		0.0	3,492	3,492	0%	0.0	30	30
Textiles		0.0	1,842	1,842	0%	0.0	16	16
C&D		0.0	1,899	1,899	0%	0.0	16	16
Carpeting		0.0	958	958	0%	0.0	8	8
Electronics		0.0	648	648	0%	0.0	6	6
Other HSW		0.0	40	40	0%	0.0	0.3	0.3
Other Non-Recyclable Materials		313	9,180	9,493	3%	3	78	81
Total Other Materials		313	41,316	41,629	1%	2.7	352	355
Total Targeted BB		23,749	6,011	29,760	80%	202	51	254
Grand Total		25,000	57,650	82,650	30%	213	491	705

Table D3: Estimated 2012 Multi-Residential Garbage and Recycling Composition

Material Category	Materials Accepted in London's Program	Estimated Multi Residential Composition (excludes bulky items)							
		City					Per Household		
		Blue Box Material Recycled	Material in Garbage recycling units	Material in Garbage non-recycling units	Total	Capture Rate of Blue Box Materials	Blue Box Material Recycled recycling units	Material in Garbage recycling units	Total
		tonne/yr	tonne/yr	tonne/yr	tonne/yr		kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
1. PAPER									
Newsprint	X	1,189	807	134	2,130	56%	25	17	42
Magazines and Catalogues	X	410	291	47	748	55%	9	6	15
Directories / Telephone Books	X	23	22	3	47	48%	0.5	0.5	1
Mixed Fine Paper	X	195	437	43	675	29%	4	9	13
Books	X	72	82	10	165	44%	1.5	1.7	3.2
Other Printed Materials - Non-Recyclable		22	100	8	131	17%	0.5	2	3
Total Paper		1,910	1,739	246	3,895	49%	40	37	77
Targeted BB Paper		1,888	1,639	238	3,765	50%	40	35	74
2. PAPER PACKAGING									
Gable Top Containers	X	39	89	9	137	29%	0.8	2	3
Aseptic Containers	X	8	28	2	39	21%	0.2	0.6	0.8
Spiral Wound Containers	X	6	29	2	38	17%	0.1	0.6	0.7
Corrugated Cardboard	X	300	557	58	915	33%	6	12	18
Boxboard / Cores (Tubes)	X	313	785	74	1,172	27%	7	17	23
Polycoat Cups/Ice Cream Containers		6	97	7	110	6%	0.1	2	2
Other Bleached Long Polycoat Fibre		0.4	16	1	18	2%	0.0	0.3	0.4
Other Paper Laminate Categories - Non-Recyclable		3	98	7	108	3%	0.1	2	2
Tissue/Toweling - Non-Recyclable		2	944	64	1,009	0%	0.0	20	20
Total Paper Packaging		678	2,642	224	3,543	19%	14	56	70
Targeted BB Paper Packaging		667	1,488	145	2,300	29%	14	31	45
3. PLASTICS									
#1 PET	X	177	306	32	515	34%	4	6	10
#2 HDPE	X	64	115	12	192	33%	1	2	4
#3 - #7 Mixed Plastics	X	43	165	14	222	19%	1	3	4
#6 PS - Expanded Polystyrene		3	78	5	86	3%	0.1	2	2
Large HDPE & PP Pails & Lids	X	2	11	1	14	11%	0.0	0.2	0.3
LDPE/HDPE Film		20	723	50	792	2%	0.4	15	16
Plastic Laminates - Mostly Non-Recyclable		4	283	19	306	1%	0.1	6	6
Other Rigid Plastic Packaging - Mostly Non-Recyclable		24	195	15	233	10%	0.5	4	5
Other Plastics - Non-Packaging/Durable - Non-Recyclable		21	299	22	341	6%	0.4	6	7
Total Plastics		356	2,174	170	2,701	13%	7	46	53
Targeted BB Plastics		285	598	59	942	30%	6	13	19

**Table D3: Estimated 2012 Multi-Residential Garbage and Recycling Composition
(continued)**

Material Category	Materials Accepted in London's Program	Estimated Multi Residential Composition (excludes bulky items)							
		City					Per Household		
		Blue Box Material Recycled	Material in Garbage recycling units	Material in Garbage non-recycling units	Total	Capture Rate of Blue Box Materials	Blue Box Material Recycled recycling units	Material in Garbage recycling units	Total
		tonne/yr	tonne/yr	tonne/yr	tonne/yr		kg/hhld/yr	kg/hhld/yr	kg/hhld/yr
4. METALS									
Aluminum- Food/Beverage Containers	X	56	114	11	182	31%	1	2	4
Aluminum - Foil and Trays	X	3	57	4	65	5%	0.1	1.2	1.3
Steel - Food and Beverage Containers	X	100	209	21	329	30%	2	4	6
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	3	39	3	46	7%	0.1	0.8	0.9
Other Aluminum - Non-Blue Box		0.0	3.3	0.2	3.6	0%	0.0	0.1	0.1
Other Steel - Non-Blue Box		4	117	8	129	3%	0.1	2	3
Total Metals		167	539	48	754	22%	4	11	15
Targeted BB Metals		163	419	39	621	26%	3	9	12
5. GLASS									
Clear Glass	X	188	338	35	561	34%	4	7	11
Coloured Glass	X	43	57	7	106	40%	1	1	2
Other Glass - Non-Blue Box		29	197	15	241	12%	0.6	4	5
Total Glass		260	591	57	908	29%	5	12	18
Targeted BB Glass		231	394	42	668	35%	5	8	13
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE									
Paint & Stain Containers	X	0.2	1	0.1	1	17%	0.0	0.0	0.0
Lubricating Oil Containers		0.5	0.8	0.1	1	37%	0.0	0.0	0.0
Batteries		0.2	13	1	14	1%	0.0	0.3	0.3
Other MHSW		4	12	1	17	21%	0.1	0.3	0.3
Total MHSW		5	27	2	34	13%	0.1	1	0.7
Targeted BB MHSW		0.2	1	0.1	1	17%	0.0	0.0	0.0
7. OTHER MATERIALS									
Food Waste		0.0	6,482	437	6,919	0%	0.0	136	136
Yard Waste		0.0	292	20	312	0%	0.0	6	6
Diapers & Sanitary Products		0.0	684	46	730	0%	0.0	14	14
Textiles		0.0	767	52	818	0%	0.0	16	16
C&D		0.0	790	53	843	0%	0.0	17	17
Carpeting		0.0	399	27	426	0%	0.0	8	8
Electronics		0.0	270	18	288	0%	0.0	6	6
Other HSW		0.0	17	1	18	0%	0.0	0.3	0.3
Other Non-Recyclable Materials		125	3,820	266	4,211	3%	3	80	83
Total Other Materials		125	13,520	919	14,565	1%	0.0	198	198
Total Targeted BB		3,234	4,539	524	8,297	39%	68	96	164
Grand Total		3,500	21,234	1,666	26,400	13%	71	361	432

Table D4: Estimated 2012 Garbage and Recycling Composition

Material Category	Materials Accepted in London's Program	Estimated Overall Composition (Excludes Bulky Items)						
		City				Per Household		
		Blue Box Material Recycled tonne/yr	Material in Garbage tonne/yr	Total tonne/yr	Capture Rate of Blue Box Materials	Blue Box Material Recycled kg/hhld/yr	Material in Garbage kg/hhld/yr	Total kg/hhld/yr
1. PAPER								
Newsprint	X	8,416	1,301	9,717	87%	50	8	58
Magazines and Catalogues	X	2,902	510	3,412	85%	17	3	20
Directories / Telephone Books	X	160	54	214	75%	1	0.3	1.3
Mixed Fine Paper	X	1,382	1,669	3,051	45%	8	10	18
Books	X	510	238	748	68%	3	1	4
Other Printed Materials - Non-Recyclable		155	433	588	26%	0.9	3	3
Total Paper		13,525	4,205	17,729	76%	81	25	106
Targeted BB Paper		13,370	3,772	17,141	78%	80	22	102
2. PAPER PACKAGING								
Gable Top Containers	X	287	180	467	61%	2	1	3
Aseptic Containers	X	90	97	187	48%	0.5	0.6	1.1
Spiral Wound Containers	X	59	99	159	37%	0.4	0.6	0.9
Corrugated Cardboard	X	4,122	1,231	5,352	77%	25	7	32
Boxboard / Cores (Tubes)	X	2,968	1,983	4,952	60%	18	12	29
Polycoat Cups/Ice Cream Containers		58	402	461	13%	0.3	2.4	3
Other Bleached Long Polycoat Fibre		4	71	74	5%	0.0	0.4	0.4
Other Paper Laminate Categories - Non-Recyclable		28	423	451	6%	0.2	3	3
Tissue/Toweling - Non-Recyclable		14	4,212	4,226	0%	0.1	25	25
Total Paper Packaging		7,631	8,698	16,330	47%	45	52	97
Targeted BB Paper Packaging		7,526	3,591	11,117	68%	45	21	66
3. PLASTICS								
#1 PET	X	1,446	735	2,181	66%	9	4	13
#2 HDPE	X	524	287	811	65%	3	2	5
#3 - #7 Mixed Plastics	X	348	588	936	37%	2	3	6
#6 PS - Expanded Polystyrene		22	339	361	6%	0.1	2	2
Large HDPE & PP Pails & Lids	X	12	45	57	22%	0.1	0.3	0
LDPE/HDPE Film		161	3,161	3,321	5%	1	19	20
Plastic Laminates - Mostly Non-Recyclable		35	1,248	1,283	3%	0.2	7	8
Other Rigid Plastic Packaging - Mostly Non-Recyclable		195	784	980	20%	1	5	6
Other Plastics - Non-Packaging/Durable - Non-Recyclable		169	1,262	1,432	12%	1	8	9
Total Plastics		2,914	8,449	11,363	26%	17	50	68
Targeted BB Plastics		2,331	1,654	3,985	58%	14	10	24

Table D4: Estimated 2012 Garbage and Recycling Composition (continued)

Material Category	Materials Accepted in London's Program	Estimated Overall Composition (Excludes Bulky Items)						
		City				Per Household		
		Blue Box Material Recycled tonne/yr	Material in Garbage tonne/yr	Total tonne/yr	Capture Rate of Blue Box Materials	Blue Box Material Recycled kg/hhld/yr	Material in Garbage kg/hhld/yr	Total kg/hhld/yr
4. METALS								
Aluminum- Food/Beverage Containers	X	486	238	724	67%	3	1	4
Aluminum - Foil and Trays	X	30	226	256	12%	0.2	1.3	1.5
Steel - Food and Beverage Containers	X	859	451	1,311	66%	5	3	8
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	29	151	180	16%	0.2	0.9	1
Other Aluminum - Non-Blue Box		0.0	14	14	0%	0.0	0.1	0.1
Other Steel - Non-Blue Box		40	582	622	6%	0.2	3	4
Total Metals		1,445	1,662	3,107	47%	9	10	18
Targeted BB Metals		1,404	1,066	2,470	57%	8	6	15
5. GLASS								
Clear Glass	X	1,779	842	2,621	68%	11	5	16
Coloured Glass	X	561	103	664	84%	3	1	4
Other Glass - Non-Blue Box		156	547	703	22%	0.9	3	4
Total Glass		2,496	1,492	3,988	63%	15	9	24
Targeted BB Glass		2,340	945	3,285	71%	14	6	20
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE								
Paint & Stain Containers	X	11	46	56	19%	0.1	0.3	0.3
Lubricating Oil Containers		5	8	13	40%	0.0	0.0	0.1
Batteries		2	120	122	2%	0.0	0.7	0.3
Other MHSW		33	114	148	23%	0.2	1	1
Total MHSW		51	288	339	15%	0.3	2	2
Targeted BB MHSW		11	46	56	19%	0.1	0.3	0.3
7. OTHER MATERIALS								
Food Waste		0.0	28,983	28,983	0%	0.0	173	173
Yard Waste		0.0	1,504	1,504	0%	0.0	9	9
Diapers & Sanitary Products		0.0	4,222	4,222	0%	0.0	25	25
Textiles		0.0	2,660	2,660	0%	0.0	16	16
C&D		0.0	2,742	2,742	0%	0.0	16	16
Carpeting		0.0	1,384	1,384	0%	0.0	8	8
Electronics		0.0	935	935	0%	0.0	6	6
Other HSW		0.0	58	58	0%	0.0	0.3	0.3
Other Non-Recyclable Materials		439	13,266	13,705	3%	3	79	82
Total Other Materials		439	55,756	56,195	1%	0.0	247	247
Total Targeted BB		26,982	11,074	38,056	71%	161	66	227
Grand Total		28,500	80,550	109,050	26%	167	395	561

Table D5: Estimated 2012 Curbside and Multi-Residential Waste Composition

Material Category	Materials Accepted in London's Program	Estimated Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
1. PAPER							
Newsprint	X	7,587	2,130	9,717	65	42	58
Magazines and Catalogues	X	2,664	748	3,412	23	15	20
Directories / Telephone Books	X	167	47	214	1.4	0.9	1.2
Mixed Fine Paper	X	2,376	675	3,051	20	13	18
Books	X	583	165	748	5	3	4
Other Printed Materials ^a		457	131	588	4	3	3
Total Paper		13,834	3,895	17,729	118	77	105
Targeted BB Paper		13,377	3,765	17,141	114	74	102
2. PAPER PACKAGING							
Gable Top Containers	X	331	137	467	3	3	3
Aseptic Containers	X	150	39	188	1.3	0.8	1.0
Spiral Wound Containers	X	121	38	159	1.0	0.7	0.9
Corrugated Cardboard	X	4,437	915	5,352	38	18	32
Boxboard / Cores (Tubes)	X	3,780	1,172	4,952	32	23	29
Polycoat Cups/Ice Cream Containers		351	110	461	3	2	3
Other Bleached Long Polycoat Fibre		57	18	74	0.5	0.4	0.8
Other Paper Laminate Categories ^a		343	108	451	3	2	3
Tissue/Toweling - Non-Recyclable		3,218	1,009	4,226	27	20	25
Total Paper Packaging		12,787	3,543	16,330	109	70	97
Targeted BB Paper Packaging		8,818	2,300	11,118	75	45	66
3. PLASTICS							
#1 PET	X	1,666	515	2,181	14	10	13
#2 HDPE	X	620	192	811	5	4	5
#3 - #7 Mixed Plastics	X	714	222	936	6	4	6
#6 PS - Expanded Polystyrene		275	86	361	2	2	2
Large HDPE & PP Pails & Lids	X	44	14	57	0.4	0.3	0.3
LDPE/HDPE Film		2,529	792	3,321	22	16	20
Plastic Laminates ^a		977	306	1,283	8	6	8
Other Rigid Plastic Packaging ^a		746	233	980	6	5	6
Other Plastics - Non-Packaging/Durable ^a		1,091	341	1,432	9	7	9
Total Plastics		8,662	2,701	11,363	74	53	68
Targeted BB Plastics		3,043	942	3,985	26	19	24

Notes

(a) Mostly non-recyclable material.

**Table D5: Estimated 2012 Curbside and Multi-Residential Waste Composition
(continued)**

Material Category	Materials Accepted in London's Program	Estimated Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
4. METALS							
Aluminum- Food/Beverage Containers	X	542	182	724	5	4	4
Aluminum - Foil and Trays	X	191	65	256	2	1	2
Steel - Food and Beverage Containers	X	981	329	1,311	8	6	8
Steel/Aluminum - Aerosol Containers	X	134	46	180	1	1	1
Other Aluminum - Non-Blue Box		10.5	3.6	14	0.1	0.1	0.1
Other Steel - Non-Blue Box		493	129	622	4	3	4
Total Metals		2,353	754	3,107	20	15	18
Targeted BB Metals		1,849	621	2,470	16	12	15
5. GLASS							
Clear Glass	X	2,060	561	2,621	18	11	16
Coloured Glass	X	557	106	664	5	2	4
Other Glass - Non-Blue Box		463	241	703	4	5	4
Total Glass		3,080	908	3,988	26	18	24
Targeted BB Glass		2,618	668	3,285	22	13	20
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE							
Paint & Stain Containers	X	55	1	56	0.5	0.03	0.2
Lubricating Oil Containers		11	1	13	0.1	0.0	0.1
Batteries		108	14	122	1	0.3	1
Other MHSW		131	17	148	1	0	1
Total MHSW		305	34	339	3	1	2
Targeted BB MHSW		55	1	56	0.5	0.0	0.2
7. OTHER MATERIALS							
Food Waste		22,065	6,919	28,983	188	136	173
Yard Waste		1,193	312	1,504	10	6	9
Diapers & Sanitary Products		3,492	730	4,222	30	14	25
Textiles		1,842	818	2,660	16	16	16
C&D		1,899	843	2,742	16	17	16
Carpeting		958	426	1,384	8	8	8
Electronics		648	288	935	6	6	6
Other HSW		40	18	58	0.3	0.3	0.3
Other Non-Recyclable Materials		9,493	4,211	13,704	81	83	82
Total Other Materials		31,449	10,048	56,194	268	198	247
Total Targeted BB		29,760	8,297	38,056	254	164	226
Grand Total		72,470	21,883	109,050	618	432	562

Table D6: Estimated 2016 Curbside and Multi-Residential Waste Composition

Material Category	Materials Accepted in London's Program	Estimated Curbside Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
1. PAPER							
Newsprint	X	6,959	2,152	9,111	57	37	51
Magazines and Catalogues	X	2,572	796	3,368	21	14	19
Directories / Telephone Books	X	135	42	176	1	1	1
Mixed Fine Paper	X	2,562	801	3,363	21	14	19
Books	X	610	190	799	5	3	4
Other Printed Materials - Non-Recyclable		478	150	629	4	3	3
Total Paper		13,316	4,130	17,446	109	71	97
Targeted BB Paper		12,837	3,980	16,817	105	68	94
2. PAPER PACKAGING							
Gable Top Containers	X	389	177	565	3	3	3
Aseptic Containers	X	176	50	226	1	1	1
Spiral Wound Containers	X	136	47	183	1	1	1
Corrugated Cardboard	X	5,141	1,167	6,309	42	20	35
Boxboard / Cores (Tubes)	X	3,954	1,350	5,304	32	23	29
Polycoat Cups/Ice Cream Containers		395	136	532	3	2	3
Other Bleached Long Polycoat Fibre		64	22	86	0.5	0.4	0.5
Other Paper Laminate Categories - Non-Recyclable		387	133	520	3	2	3
Tissue/Toweling - Non-Recyclable		3,366	1,162	4,528	27	20	25
Total Paper Packaging		14,007	4,244	18,251	114	73	102
Targeted BB Paper Packaging		9,796	2,790	12,586	80	48	70
3. PLASTICS							
#1 PET	X	1,904	648	2,551	16	11	14
#2 HDPE	X	628	214	842	5	4	5
#3 - #7 Mixed Plastics	X	804	275	1,079	7	5	6
#6 PS - Expanded Polystyrene		244	84	328	2	1	2
Large HDPE & PP Pails & Lids	X	46	16	61	0.4	0.3	0.3
LDPE/HDPE Film		2,564	884	3,449	21	15	19
Plastic Laminates - Mostly Non-Recyclable		1,117	385	1,502	9	7	8
Other Rigid Plastic Packaging - Mostly Non-Recyclable		925	318	1,243	8	5	7
Other Plastics - Non-Packaging/Durable - Non-Recyclable		1,141	393	1,534	9	7	9
Total Plastics		9,371	3,217	12,589	76	55	70
Targeted BB Plastics		3,381	1,153	4,534	28	20	25

**Table D6: Estimated 2016 Curbside and Multi-Residential Waste Composition
(continued)**

Material Category	Materials Accepted in London's Program	Estimated Curbside Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
4. METALS							
Aluminum- Food/Beverage Containers	X	550	203	752	4	3	4
Aluminum - Foil and Trays	X	194	72	266	2	1	1
Steel - Food and Beverage Containers	X	963	356	1,319	8	6	7
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	141	52	193	1	1	1
Other Aluminum - Non-Blue Box		11.0	4.1	15	0.1	0.1	0.1
Other Steel - Non-Blue Box		516	148	664	4	3	4
Total Metals		2,375	836	3,211	19	14	18
Targeted BB Metals		1,848	684	2,531	15	12	14
5. GLASS							
Clear Glass	X	1,956	587	2,543	16	10	14
Coloured Glass	X	529	111	641	4	2	4
Other Glass - Non-Blue Box		484	277	761	4	5	4
Total Glass		2,969	975	3,944	24	17	22
Targeted BB Glass		2,485	698	3,183	20	12	18
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE							
Paint & Stain Containers	X	57	2	59	0.5	0.03	0.3
Lubricating Oil Containers		12	2	14	0.1	0.0	0.1
Batteries		113	16	129	1	0.3	1
Other MHSW		137	20	156	1	0	1
Total MHSW		319	39	358	3	1	2
Targeted BB MHSW		57	2	59	0.5	0.0	0.3
7. OTHER MATERIALS							
Food Waste		23,080.5	7,969	31,050	188	136	173
Yard Waste		1,248	359	1,607	10	6	9
Diapers & Sanitary Products		3,653	841	4,493	30	14	25
Textiles		1,927	943	2,870	16	16	16
C&D		1,986	972	2,958	16	17	16
Carpeting		1,003	490	1,493	8	8	8
Electronics		678	331	1,009	6	6	6
Other HSW		42	20	62	0.3	0.3	0.3
Other Non-Recyclable Materials		9,930	4,851	14,781	81	83	82
Total Other Materials		32,896.6	11,574	44,470	268	198	247
Total Targeted BB		30,405	9,306	39,711	248	159	221
Grand Total		75,254	25,015	100,270	613	428	558

Table D7: Estimated 2025 Curbside and Multi-Residential Waste Composition

Material Category	Materials Accepted in London's Program	Estimated Curbside Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
1. PAPER							
Newsprint	X	5,293	1,626	6,919	39	25	35
Magazines and Catalogues	X	2,323	714	3,037	17	11	15
Directories / Telephone Books	X	49	15	64	0.4	0.2	0.3
Mixed Fine Paper	X	3,039	944	3,983	22	15	20
Books	X	678	209	887	5	3	4
Other Printed Materials - Non-Recyclable		532	166	698	4	3	3
Total Paper		11,914	3,674	15,588	87	57	78
Targeted BB Paper		11,382	3,508	14,890	83	54	75
2. PAPER PACKAGING							
Gable Top Containers	X	538	243	782	4	4	4
Aseptic Containers	X	244	69	312	2	1	2
Spiral Wound Containers	X	176	60	236	1	1	1
Corrugated Cardboard	X	6,966	1,571	8,537	51	24	43
Boxboard / Cores (Tubes)	X	4,395	1,491	5,886	32	23	29
Polycoat Cups/Ice Cream Containers		510	175	685	4	3	3
Other Bleached Long Polycoat Fibre		82	28	111	1	0.4	1
Other Paper Laminate Categories - Non-Recyclable		499	171	670	4	3	3
Tissue/Toweling - Non-Recyclable		3,741	1,283	5,025	27	20	25
Total Paper Packaging		17,152	5,091	22,243	126	79	112
Targeted BB Paper Packaging		12,319	3,434	15,753	90	53	79
3. PLASTICS							
#1 PET	X	2,519	852	3,370	18	13	17
#2 HDPE	X	648	219	868	5	3	4
#3 - #7 Mixed Plastics	X	1,036	353	1,389	8	5	7
#6 PS - Expanded Polystyrene		160	55	215	1	1	1
Large HDPE & PP Pails & Lids	X	51	17	68	0.4	0.3	0.3
LDPE/HDPE Film		2,647	907	3,554	19	14	18
Plastic Laminates - Mostly Non-Recyclable		1,477	506	1,984	11	8	10
Other Rigid Plastic Packaging - Mostly Non-Recyclable		1,389	474	1,863	10	7	9
Other Plastics - Non-Packaging/Durable - Non-Recyclable		1,268	434	1,702	9	7	9
Total Plastics		11,195	3,817	15,012	82	59	75
Targeted BB Plastics		4,254	1,441	5,695	31	22	29

**Table D7: Estimated 2025 Curbside and Multi-Residential Waste Composition
(continued)**

Material Category	Materials Accepted in London's Program	Estimated Curbside Composition (excludes bulky items)					
		City			Per Household		
		Curbside tonne/yr	Multi-Res tonne/yr	Total tonne/yr	Curbside kg/hhld/yr	Multi-Res kg/hhld/yr	Average kg/hhld/yr
4. METALS							
Aluminum - Food/Beverage Containers	X	567	208	775	4	3	4
Aluminum - Foil and Trays	X	200	74	274	1	1	1
Steel - Food and Beverage Containers	X	913	335	1,248	7	5	6
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	156	58	214	1	1	1
Other Aluminum - Non-Blue Box		12.2	4.5	17	0.1	0.1	0.1
Other Steel - Non-Blue Box		574	164	738	4	3	4
Total Metals		2,423	844	3,266	18	13	16
Targeted BB Metals		1,837	675	2,512	13	10	13
5. GLASS							
Clear Glass	X	1,677	500	2,177	12	8	11
Coloured Glass	X	454	95	549	3	1	3
Other Glass - Non-Blue Box		538	306	844	4	5	4
Total Glass		2,669	901	3,569	20	14	18
Targeted BB Glass		2,131	595	2,725	16	9	14
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE							
Paint & Stain Containers	X	64	2	65	0	0.0	0.3
Lubricating Oil Containers		13	2	15	0.1	0.0	0.1
Batteries		126	18	144	1	0.3	1
Other MHSW		152	22	174	1	0	1
Total MHSW		355	43	398	3	1	2
Targeted BB MHSW		64	2	65	0	0.0	0.3
7. OTHER MATERIALS							
Food Waste		25,658	8,802	34,459	188	136	173
Yard Waste		1,387	397	1,783	10	6	9
Diapers & Sanitary Products		4,060	929	4,989	30	14	25
Textiles		2,142	1,041	3,183	16	16	16
C&D		2,208	1,073	3,281	16	17	16
Carpeting		1,115	542	1,656	8	8	8
Electronics		753	366	1,119	6	6	6
Other HSW		46	23	69	0.3	0.3	0.3
Other Non-Recyclable Materials		11,038	5,358	16,396	81	83	82
Total Other Materials		36,570	12,783	49,352	268	198	247
Total Targeted BB		31,986	9,655	41,640	234	150	209
Grand Total		82,276	27,153	109,429	603	421	548

Table D8: Assumed Change 2016 to Per Household Generation

Material	Assumed Change 2016 to Per Household Generation^a	Assumed Change 2025 to Per Household Generation^b
Newspaper	-12%	-40%
Telephone Books	-23%	-75%
Old Magazines	-8%	-25%
Other Printed Paper	3%	10%
OCC	11%	35%
Gable Top	12%	40%
Paper Laminates	8%	25%
Aseptic	12%	40%
OBB	0%	0%
PET	9%	30%
HDPE	-3%	-10%
PS	-15%	-50%
Film	-3%	-10%
Plastic Laminates	9%	30%
Other Plastics	18%	60%
Aluminum Food & Beverage Cans	-3%	-10%
Foil and Other Aluminum	-3%	-10%
Steel Cans	-6%	-20%
Aerosol	0%	0%
Paint Cans	-9%	-30%
Food & Beverage Glass Clear	-9%	-30%
Food & Beverage Glass Coloured	-9%	-30%

Notes

(a) Assumed to be 30% of the estimated change for the year 2025.

(b) From *Executive Summary a Study of the Optimization of the Blue Box Material Processing System in Ontario Final Report* (Waste Diversion Organization, 2012)

Table D9: Estimated 2016 Garbage and Blue Box Composition – Base Case

Material Category	Materials Accepted in London's Program	Estimated 2016 Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
1. PAPER					
Newsprint	X	8,502	1,215	9,717	88%
Magazines and Catalogues	X	2,986	427	3,412	88%
Directories / Telephone Books	X	188	27	214	88%
Mixed Fine Paper	X	1,373	1,678	3,051	45%
Books	X	570	178	748	76%
Other Printed Materials - Non-Recyclable		0.0	588	588	0%
Total Paper		13,618	4,111	17,729	77%
Targeted BB Paper		13,618	3,523	17,141	79%
2. PAPER PACKAGING					
Gable Top Containers	X	304	164	467	65%
Aseptic Containers	X	101	87	188	54%
Spiral Wound Containers	X	69	89	159	44%
Corrugated Cardboard	X	4,282	1,070	5,352	80%
Boxboard / Cores (Tubes)	X	3,219	1,733	4,952	65%
Polycoat Cups/Ice Cream Containers	X	202	259	461	44%
Other Bleached Long Polycoat Fibre	X	0.0	74	74	0%
Other Paper Laminate Categories - Non-Recyclable		0.0	451	451	0%
Tissue/Toweling - Non-Recyclable		0.0	4,226	4,226	0%
Total Paper Packaging		8,176	8,154	16,330	50%
Targeted BB Paper Packaging		7,975	3,143	11,118	72%
3. PLASTICS					
#1 PET	X	1,527	654	2,181	70%
#2 HDPE	X	568	243	811	70%
#3 - #7 Mixed Plastics	X	374	562	936	40%
#6 PS - Expanded Polystyrene	X	0.0	361	361	0%
Large HDPE & PP Pails & Lids	X	20	37	57	35%
LDPE/HDPE Film		141	3,180	3,321	4%
Plastic Laminates - Mostly Non-Recyclable		0.0	1,283	1,283	0%
Other Rigid Plastic Packaging - Mostly Non-Recyclable		0.0	980	980	0%
Other Plastics - Non-Packaging/Durable - Non-Recyclable		0.0	1,432	1,432	0%
Total Plastics		2,630	8,733	11,363	23%
Targeted BB Plastics		2,489	1,496	3,985	62%

**Table D9: Estimated 2016 Garbage and Blue Box Composition – Base Case
(continued)**

Material Category	Materials Accepted in London's Program	Estimated 2016 Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
4. METALS					
Aluminum- Food/Beverage Containers	X	507	217	724	70%
Aluminum - Foil and Trays	X	27	229	256	11%
Steel - Food and Beverage Containers	X	917	393	1,311	70%
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	63	117	180	35%
Other Aluminum - Non-Blue Box		0.0	14	14	0%
Other Steel - Non-Blue Box		218	404	622	35%
Total Metals		1,732	1,375	3,107	56%
Targeted BB Metals		1,514	957	2,470	61%
5. GLASS					
Clear Glass	X	1,835	786	2,621	70%
Coloured Glass	X	523	141	664	79%
Other Glass - Non-Blue Box		0.0	703	703	0%
Total Glass		2,358	1,631	3,988	59%
Targeted BB Glass		2,358	927	3,285	72%
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE					
Paint & Stain Containers	X	15	41	56	28%
Lubricating Oil Containers	X	6	7	13	48%
Batteries		0.0	122	122	0%
Other MHSW		0.0	148	148	0%
Total MHSW		22	317	339	6%
Targeted BB MHSW		15	41	56	28%
7. OTHER MATERIALS					
Food Waste		0.0	28,983	28,983	0%
Yard Waste		0.0	1,504	1,504	0%
Diapers & Sanitary Products		0.0	4,222	4,222	0%
Textiles		0.0	2,660	2,660	0%
C&D		0.0	2,742	2,742	0%
Carpeting		0.0	1,384	1,384	0%
Electronics		0.0	935	935	0%
Other HSW		0.0	58	58	0%
Other Non-Recyclable Materials		0.0	13,704	13,704	0%
Total Other Materials		0.0	41,497	41,497	0%
Total Targeted BB		27,969	10,088	38,056	73%
Grand Total		28,535	65,818	94,353	30%

Table D10: Estimated 2025 Garbage and Blue Box Composition – Base Case

Material Category	Materials Accepted in London's Program	Estimated 2025 - Natural Cap. Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
1. PAPER					
Newsprint	X	6,227	692	6,919	90%
Magazines and Catalogues	X	2,733	304	3,037	90%
Directories / Telephone Books	X	57	6	64	90%
Mixed Fine Paper	X	1,992	1,992	3,983	50%
Books	X	710	177	887	80%
Other Printed Materials - Non-Recyclable		0.0	698	698	0%
Total Paper		11,719	3,869	15,588	75%
Targeted BB Paper		11,719	3,171	14,890	79%
2. PAPER PACKAGING					
Gable Top Containers	X	547	235	782	70%
Aseptic Containers	X	187	125	312	60%
Spiral Wound Containers	X	118	118	236	50%
Corrugated Cardboard	X	7,256	1,281	8,537	85%
Boxboard / Cores (Tubes)	X	3,826	2,060	5,886	65%
Polycoat Cups/Ice Cream Containers	X	342	342	685	50%
Other Bleached Long Polycoat Fibre	X	0.0	111	111	0%
Other Paper Laminate Categories - Non-Recyclable		0.0	670	670	0%
Tissue/Toweling - Non-Recyclable		0.0	5,025	5,025	0%
Total Paper Packaging		12,277	9,966	22,243	55%
Targeted BB Paper Packaging		11,935	3,818	15,753	76%
3. PLASTICS					
#1 PET	X	2,359	1,011	3,370	70%
#2 HDPE	X	607	260	868	70%
#3 - #7 Mixed Plastics	X	625	764	1,389	45%
#6 PS - Expanded Polystyrene	X	0	215	215	0%
Large HDPE & PP Pails & Lids	X	27	41	68	40%
LDPE/HDPE Film		178	3,376	3,554	5%
Plastic Laminates - Mostly Non-Recyclable		0.0	1,984	1,984	0%
Other Rigid Plastic Packaging - Mostly Non-Recyclable		0.0	1,863	1,863	0%
Other Plastics - Non-Packaging/Durable - Non-Recyclable		0.0	1,702	1,702	0%
Total Plastics		3,796	11,216	15,012	25%
Targeted BB Plastics		3,619	2,076	5,695	64%

**Table D10: Estimated 2025 Garbage and Blue Box Composition – Base Case
(continued)**

Material Category	Materials Accepted in London's Program	Estimated 2025 - Natural Cap. Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
4. METALS					
Aluminum- Food/Beverage Containers	X	543	233	775	70%
Aluminum - Foil and Trays	X	41	233	274	15%
Steel - Food and Beverage Containers	X	874	374	1,248	70%
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	86	129	214	40%
Other Aluminum - Non-Blue Box		0.0	17	17	0%
Other Steel - Non-Blue Box		295	443	738	40%
Total Metals		1,838	1,428	3,266	56%
Targeted BB Metals		1,543	969	2,512	61%
5. GLASS					
Clear Glass	X	1,741	435	2,177	80%
Coloured Glass	X	439	110	549	80%
Other Glass - Non-Blue Box		0.0	844	844	0%
Total Glass		2,180	1,389	3,569	61%
Targeted BB Glass		2,180	545	2,725	80%
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE					
Paint & Stain Containers	X	20	46	65	30%
Lubricating Oil Containers	X	8	8	15	50%
Batteries		0.0	144	144	0%
Other MHSW		0.0	174	174	0%
Total MHSW		27	371	398	7%
Targeted BB MHSW		20	46	65	30%
7. OTHER MATERIALS					
Food Waste		0.0	34,459	34,459	0%
Yard Waste		0.0	1,783	1,783	0%
Diapers & Sanitary Products		0.0	4,989	4,989	0%
Textiles		0.0	3,183	3,183	0%
C&D		0.0	3,281	3,281	0%
Carpeting		0.0	1,656	1,656	0%
Electronics		0.0	1,119	1,119	0%
Other HSW		0.0	69	69	0%
Other Non-Recyclable Materials		0.0	16,396	16,396	0%
Total Other Materials		0.0	49,352	49,352	0%
Total Targeted BB		31,016	10,625	41,640	74%
Grand Total		31,838	77,591	109,429	

Table D11: Estimated 2025 Garbage and Blue Box Composition – High Increase in Capture Rate

Material Category	Materials Accepted in London's Program	Estimated 2025 - High Cap. Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
1. PAPER					
Newsprint	X	6,227	692	6,919	90%
Magazines and Catalogues	X	2,733	304	3,037	90%
Directories / Telephone Books	X	57	6	64	90%
Mixed Fine Paper	X	2,390	1,593	3,983	60%
Books	X	799	89	887	90%
Other Printed Materials - Non-Recyclable		0.0	698	698	0%
Total Paper		12,206	3,382	15,588	78%
Targeted BB Paper		12,206	2,684	14,890	82%
2. PAPER PACKAGING					
Gable Top Containers	X	586	195	782	75%
Aseptic Containers	X	234	78	312	75%
Spiral Wound Containers	X	165	71	236	70%
Corrugated Cardboard	X	7,683	854	8,537	90%
Boxboard / Cores (Tubes)	X	4,120	1,766	5,886	70%
Polycoat Cups/Ice Cream Containers	X	411	274	685	60%
Other Bleached Long Polycoat Fibre	X	55	55	111	50%
Other Paper Laminate Categories - Non-Recyclable		0.0	670	670	0%
Tissue/Toweling - Non-Recyclable		0.0	5,025	5,025	0%
Total Paper Packaging		13,255	8,988	22,243	60%
Targeted BB Paper Packaging		12,789	2,964	15,753	81%
3. PLASTICS					
#1 PET	X	2,528	843	3,370	75%
#2 HDPE	X	651	217	868	75%
#3 - #7 Mixed Plastics	X	694	694	1,389	50%
#6 PS - Expanded Polystyrene	X	0.0	215	215	0%
Large HDPE & PP Pails & Lids	X	34	34	68	50%
LDPE/HDPE Film		178	3,376	3,554	5%
Plastic Laminates - Mostly Non-Recyclable		0.0	1,984	1,984	0%
Other Rigid Plastic Packaging - Mostly Non-Recyclable		0.0	1,863	1,863	0%
Other Plastics - Non-Packaging/Durable - Non-Recyclable		0.0	1,702	1,702	0%
Total Plastics		4,084	10,928	15,012	27%
Targeted BB Plastics		3,907	1,788	5,695	69%

Table D11: Estimated 2025 Garbage and Blue Box Composition – High Increase in Capture Rate (continued)

Material Category	Materials Accepted in London's Program	Estimated 2025 - High Cap. Garbage and Blue Box Composition			
		Blue Box tonne/yr	Garbage tonne/yr	Total tonne/yr	Capture Rate
4. METALS					
Aluminum- Food/Beverage Containers	X	582	194	775	75%
Aluminum - Foil and Trays	X	82	192	274	30%
Steel - Food and Beverage Containers	X	936	312	1,248	75%
Steel/Aluminum - Aerosol Containers (Non-MHSW)	X	107	107	214	50%
Other Aluminum - Non-Blue Box		0.0	17	17	0%
Other Steel - Non-Blue Box		369	369	738	50%
Total Metals		2,076	1,191	3,266	64%
Targeted BB Metals		1,707	805	2,512	68%
5. GLASS					
Clear Glass	X	1,850	326	2,177	85%
Coloured Glass	X	466	82	549	85%
Other Glass - Non-Blue Box		0.0	844	844	0%
Total Glass		2,316	1,253	3,569	65%
Targeted BB Glass		2,316	409	2,725	85%
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE					
Paint & Stain Containers	X	33	33	65	50%
Lubricating Oil Containers	X	8	8	15	50%
Batteries		0.0	144	144	0%
Other MHSW		0.0	174	174	0%
Total MHSW		40	358	398	10%
Targeted BB MHSW		33	33	65	50%
7. OTHER MATERIALS					
Food Waste		0.0	34,459	34,459	0%
Yard Waste		0.0	1,783	1,783	0%
Diapers & Sanitary Products		0.0	4,989	4,989	0%
Textiles		0.0	3,183	3,183	0%
C&D		0.0	3,281	3,281	0%
Carpeting		0.0	1,656	1,656	0%
Electronics		0.0	1,119	1,119	0%
Other HSW		0.0	69	69	0%
Other Non-Recyclable Materials		0.0	16,396	16,396	0%
Total Other Materials		0.0	49,352	49,352	0%
Total Targeted BB		32,958	8,682	41,640	79%
Grand Total		33,978	75,451	109,429	31%

Table D12: Capture Rates

Materials	Estimated 2012 Capture Rates for London			Estimated Capture Rates for Ontario from <i>A study of the Optiza of Blue Box Material Processing System in Ontario</i> (June, 2012)			Projected Short Term Change London's Capture Rate (2016)			Projected Long Term Change to Overall London's Capture Rate	
	Curbside	Multi-Residential	Overall	2010	Natural Growth 2025	High Growth 2025	Curbside	Multi-Residential	Overall	Natural Growth 2025	High Growth 2025
1. PAPER											
Newsprint	95%	56%	87%	97%	98%	98%	95%	65%	88%	90%	90%
Magazines and Catalogues	94%	55%	85%	97%	98%	98%	95%	65%	88%	90%	90%
Directories / Telephone books	82%	48%	75%	97%	98%	98%	95%	65%	88%	90%	90%
Mixed Fine Paper	50%	29%	45%	56%	60%	75%	50%	30%	45%	50%	60%
Books	75%	44%	68%	-	-	-	85%	50%	76%	80%	90%
Other Printed Materials -Non recyclable	29%	17%	26%	-	-	-					
Total Paper	84%	49%	76%								
Targeted BB Paper	86%	50%	78%								
2. PAPER PACKAGING											
Gable Top Containers	75%	29%	61%	34%	50%	75%	76%	32%	65%	70%	75%
Aseptic Containers	55%	21%	48%	12%	30%	75%	60%	35%	54%	60%	75%
Spiral wound containers	44%	17%	37%	1%	5%	30%	50%	25%	44%	50%	70%
Corrugated Cardboard	86%	33%	77%	87%	88%	95%	90%	50%	80%	85%	90%
Boxboard / cores (tubes)	70%	27%	60%	55%	60%	80%	75%	35%	65%	65%	70%
Polycoat cups/Ice Cream Containers	15%	6%	13%	1%	5%	30%	50%	25%	44%	50%	60%
Other bleached long polycoat fibre	6%	2%	5%	1%	5%	30%	0%	0%	0%	0%	50%
Other paper laminate categories - Non recyclable	7%	3%	6%	-	-	-					
Tissue/Toweling - Non recyclable	0%	0%	0%	-	-	-					
Total Paper Packaging	54%	19%	47%								
Targeted BB Paper Packaging	78%	29%	68%								
3. PLASTICS											
#1 PET	76%	34%	66%	61%	65%	75%	80%	40%	70%	70%	75%
#2 HDPE	74%	33%	65%	57%	60%	75%	80%	40%	70%	70%	75%
#3 - #7 Mixed Plastics	43%	19%	37%	19%	40%	60%	45%	25%	40%	45%	50%
#6 PS - Expanded polystyrene	7%	3%	6%	4%	10%	50%	0%	0%	0%	0%	0%
Large HDPE & PP Pails & Lids	25%	11%	22%	-	-	-	40%	20%	35%	40%	50%
LDPE/HDPE Film	6%	2%	5%	6%	15%	40%	5%	2%	4%	5%	5%
Plastic Laminates - mostly non recyclables	3%	1%	3%	1%	1%	10%	0%	0%	0%		
Other Rigid Plastic Packaging - mostly non recyclable	23%	10%	20%	-	-	-			0%		
Other Plastics - non-packaging/durable - Non recyclable	14%	6%	12%	-	-	-					
Total Plastics	30%	13%	26%								
Targeted BB Plastics	67%	30%	58%								

Table D12: Capture Rates (continued)

Materials	Estimated 2012 Capture Rates for London			Estimated Capture Rates for Ontario from <i>A study of the Optiza of Blue Box Material Processing System in Ontario</i> (June, 2012)			Projected Short Term Change London's Capture Rate (2016)			Projected Long Term Change to Overall London's Capture Rate	
	Curbside	Multi-Residential	Overall	2010	Natural Growth 2025	High Growth 2025	Curbside	Multi-Residential	Overall	Natural Growth 2025	High Growth 2025
4. METALS											
Aluminum- food/Beverage Containers	79%	31%	67%	50%	55%	75%	80%	40%	70%	70%	75%
Aluminum - foil and trays	14%	5%	12%	9%	20%	50%	12%	6%	11%	15%	30%
Steel - food and beverage containers	77%	30%	66%	61%	65%	75%	80%	40%	70%	70%	75%
Steel/aluminum - aerosol containers (non-MHSW)	19%	7%	16%	28%	30%	50%	40%	20%	35%	40%	50%
Other Aluminum - non-Blue Box	0%	0%	0%	-	-	-					
Other steel - Non-Blue Box	7%	3%	6%	-	-	-	40%	20%	35%	40%	50%
Total Metals	54%	22%	47%								
Targeted BB Metals	67%	26%	57%								
5. GLASS											
Clear Glass	77%	34%	68%	89%	90%	95%	80%	40%	70%	80%	85%
Coloured Glass	93%	40%	84%	71%	72%	80%	90%	45%	79%	80%	85%
Other Glass - non-Blue Box	28%	12%	22%	-	-	-					
Total Glass	73%	29%	63%								
Targeted BB Glass	81%	35%	71%								
6. MUNICIPAL HAZARDOUS AND SPECIAL WASTE											
Paint & Stain containers	19%	17%	19%	-	-	-	30%	20%	28%	30%	50%
Lubricating Oil Containers	40%	37%	40%	-	-	-	50%	40%	48%	50%	50%
Batteries	2%	1%	2%	-	-	-					
Other MHSW	23%	21%	23%	-	-	-					
Total MHSW	15%	13%	15%								
Targeted BB MHSW	19%	17%	19%								
7. OTHER MATERIALS											
Food Waste	0%	0%	0%	-	-	-					
Yard Waste	0%	0%	0%	-	-	-					
Diapers & Sanitary Products	0%	0%	0%	-	-	-					
Textiles	0%	0%	0%	-	-	-					
C&D	0%	0%	0%	-	-	-					
Carpeting	0%	0%	0%	-	-	-					
Electronics	0%	0%	0%	-	-	-					
Other HSW	0%	0%	0%	-	-	-					
Other non-recyclable materials	3%	3%	3%	-	-	-					
Total Other Materials	1%	1%	1%								
Total Targeted BB	80%	39%	71%								
Grand Total	30%	13%	26%								

APPENDIX E

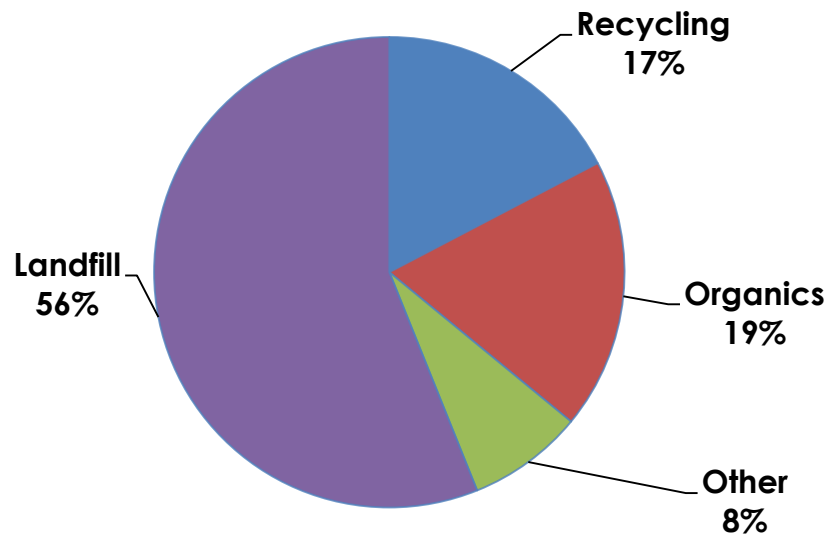
Existing Waste Diversion Program Data

A description of the City's various waste diversion programs and the quantity of material diverted by each program in 2012 is provided below. These data are summarized in Table E-1 and Figure E-1.

Table E-1: 2012 CITY OF LONDON RESIDENTIAL WASTE MANAGEMENT PROGRAMS – ESTIMATED TONNES DIVERTED

PROGRAMS	Single Family Households	Multi- Residential Households	Total Tonnes
<i>Recycling</i>			
a) Curbside Recycling Program	22,960	0	22,960
b) Multi-Residential Recycling Program	0	3,290	3,290
c) City Depots (EnviroDepots, W12A)	260	110	370
d) Public Space Recycling (est.)	30	20	50
Subtotal	23,250	3,420	26,680
<i>Organics Management</i>			
e) Home Composting Program (estimate)	5,460	0	5,460
f) Grasscycling (estimate)	3,950	0	3,950
g) Curbside Yard Material Collection	4,540	0	4,540
h) Depot Yard Material Collection	9,920	0	9,920
i) Fall Leaf Collection	4,680	0	4,680
j) Christmas Tree Recycling	100	20	120
Subtotal	28,650	20	28,670
<i>Other Programs</i>			
k) Waste Electronics & Electrical Equipment	1,030	270	1,300
l) Tire Recycling	2,200	550	2,750
m) Wood Waste/ Construction & Demolition Waste	4,540	0	4,540
n) Scrap Metal	650	70	720
o) Textile/Small Household Item Reuse	320	80	400
p) Municipal Household Special Waste	330	80	410
q) Brewers Retail Container Recycling	1,710	430	2,140
Subtotal	10,780	1,480	12,260
Total Waste Diverted	62,680	4,920	67,600
Total Waste Delivered Directly to Landfill	60,310	22,900	83,210
Residual Waste Delivered to Landfill	2,680	180	2,860
Total Waste Disposed	62,990	23,080	86,070
Total Waste	125,670	28,000	153,670
Diversion Rate	50%	18%	44%

Figure E-1 - 2012 Waste Diversion



Blue Box Recycling Programs

Curbside Recycling – 22,960 tonnes

The City collects a wide range of recyclables from all curbside households. The materials collected in 2012 were newsprint & flyers; household paper; magazines, catalogues & books; paper egg cartons & boxes; cardboard boxes; glass bottles & jars; aluminum food & beverage cans; steel food & beverage cans; foil containers & foil; empty metal paint cans; empty aerosol cans; plastic bottles, jugs & tubs; milk & juice cartons; drink boxes & cardboard cans. Plastic plant pots/trays and large plastic pails were added to the program in 2013.

Materials collected were taken to the City's Manning Drive Regional Material Recovery Facility (MRF) for processing and subsequent shipping to various end markets. This facility also receives recyclables from other City programs and other municipalities. Material is weighed upon entering and leaving the MRF.

Approximately 99% of incoming recyclable materials (or 96% of the total incoming material) was shipped to end markets in 2012. A portion of this material is allotted to each program (curbside, multi-residential, other municipalities) equal to the percentage of incoming recyclables from each source.

Multi-Residential Recycling – 3,290 tonnes

The City collects recyclables from multi-residential buildings at no cost.

The property owner is responsible for purchasing and providing 95 gallon carts for residents to place their recyclables in. As a result, a few multi-residential buildings do not have recycling because the property owner has not provided carts. In 2012, 47,870 multi-residential units had access to on-site recycling and 3,830 units did not. Residents from buildings without on-site recycling must take their recyclables to one of three City EnviroDepots. City staff have made numerous attempts to further reduce the number of units without on-site access to recycling. Enforcement for this service lies with the Ministry of the Environment.

The materials collected, how they are processed and calculation of the quantity recycled is the same as the curbside Blue Box program.

Depot Recycling – 370 tonnes

As noted above, the City operates three EnviroDepots (Oxford Street, Clarke Road and W12A Landfill) that accept a range of materials including Blue Box recyclables. The Blue Box materials collected, how they are processed and calculation of the quantity recycled is the same as the curbside Blue Box program.

Public Space Recycling – 50 tonnes

The City has 42 EnviroBins located throughout the Downtown, Old East Village, Richmond Row and Wortley Village, for use by the residents when they are out shopping or going to restaurants and/or for the residents that live above some commercial establishments. Each EnviroBin has three compartments: containers, paper and garbage. The Blue Box materials accepted is the same as the curbside Blue Box program.

Organic Programs

Home Composting– 5,460 tonnes

The City sells composters at cost at its Oxford Street and Clarke Road EnviroDepots. In the 1990's the City also sold composters at "truck load sale events". Over the years the City has sold 54,600 composters including 240 in 2012. The *Manual on Generally Accepted Principles (GAP) for Calculating Municipal Solid Waste System Flow* recommends that municipalities assume each composter sold diverts 100 kilograms per year.

Grasscycling – 5,460 tonnes

The City stopped collecting grass clippings in 1995 and started promoting grasscycling. Grasscycling refers to leaving grass clippings on the lawn when mowing.

Because grass consists largely of water (80% or more), contains little lignin, and has high nitrogen content, grass clippings easily break down and return to the soil within one to two weeks, acting primarily as a fertilizer supplement and, to a much smaller degree, a mulch. Grasscycling can provide 15-20% or more of a lawn's yearly nitrogen requirements.

It is estimated that not collecting grass diverts on average approximately 45 kilograms of grass per curbside household.

Curbside Yard Material Collection – 4,540 tonnes

The City provides curbside collection of yard materials. This includes plant trimmings, brush and branches up to 10 cm in diameter. In 2012 yard materials were collected on a six week cycle and each home received four collections.

The collected yard materials are transported to TRY Recycling's composting facility for processing. The incoming material is weighted. On average about five percent of the incoming material becomes process residuals and 95% is either consumed during the composting process or is made into compost and sold. In 2012 4,540 tonnes of yard materials were collected curbside of which approximately 200 tonnes would become process residuals.

Curbside Fall Leaf Collection – 4,680 tonnes

The City provides curbside collection of fall leaves beginning in mid-October. Yard materials are also collected with the fall leaves. In 2012 fall leaves were collected on a three week cycle and each home received three collections.

The collected yard materials are transported to TRY Recycling's composting facility for processing. On average about 5% of incoming material becomes residue. How they are processed and the calculation of the quantity composted is the same as for yard materials.

Depot Yard Material Collection – 9,920 tonnes

Residents can drop off yard materials at the City EnviroDepots year round. The collected yard materials are transported to TRY Recycling's composting facility for processing. How they are processed and the calculation of the quantity composted is the same as for yard materials.

Depot Christmas Tree Collection – 120 tonnes

The City operates depots at six locations to collect Christmas trees for the 1st week of January each year. The trees are chipped on-site at the Depot locations and taken to TRY Recycling where they are chipped and composted and to W12A Landfill where they are chipped and used for daily cover.

Other Programs

Waste Electronics and Electrical Equipment Recycling – 1,130 tonnes

Waste Electronics and Electrical Equipment (WEEE) recycling is made up of three components. The first component is electronics collected at the EnviroDepots and shipped for recycling. In 2012 the EnviroDepots collected 560 tonnes of material electronics were shipped through the Ontario Electronic Stewardship (OES) program.

The second component is appliances collected at the EnviroDepots and recycled. 2012, 100 tonnes of appliances were collected and recycled.

The third component was the amount of appliances taken to local scrap metal dealers because they are no longer collected at the curb. It was estimated there were an additional 640 tonnes of material diverted because of the ban on appliances.

Tire Recycling – 2,300 tonnes

The annual Municipal Datacall administered by Waste Diversion Ontario (WDO) compiles information on materials diverted and disposed by Ontario municipalities. Most of the information used by the WDO is provided by the local municipality but some of information comes from programs administered by provincial organizations. In the case of tires, information on the quantity of tires recycled in a community is provided by the Ontario Tire Stewardship. This organization looks after the Used Tires Program in Ontario and ensures tires are reused or recycled.

The 2012 WDO Datacall shows 2,300 tonnes of tires being recycled/reused in the City of London. Included in this total is called 120 tonnes of tires collected at the three City EnviroDepots as part of the Used Tire Program.

Wood, Renovation Material & Construction/Demolition Material Recycling – 4,540 tonnes

The City banned the collection of wood waste, renovation materials and construction/demolition waste in the 1980's. At the time the average household produced about 15 kilograms of wood waste and renovation material waste each year. At the time of the ban it was assumed about half of this material would be recycled and about half would likely continue to be landfilled as residents would hide small amounts wood waste and renovation materials in their garbage bags for collection.

Beginning in 2004, the City's EnviroDepots began to accept wood waste and renovation materials (including shingles) for recycling. The material is taken to TRY Recycling for processing where approximately 80% is made into useable products and 20% becomes residual and is landfilled.

In 2012, the EnviroDepots received 4,240 tonnes of wood waste and renovation materials. Approximately 3,390 tonnes of this material was recycled and 850 tonnes became residual waste and was landfilled.

It was assumed that approximately ½ the residential renovation materials not taken to an EnviroDepots (1,150 tonnes) was taken to a private construction and demolition waste recycling companies (TRY Recycling and Green Valley Recycling) and recycled while other 50% (1,150 tonnes) was placed in the garbage or disposed of privately.

Scrap Metal Recycling – 720 tonnes

The City stopped the collection of scrap metal (e.g., barbeques, bicycles, etc.) and appliances in the 1990's. At the time the average person produced about 2.5 kilograms of scrap metal each year. At the time of the ban it was assumed about half of this material would be recycled and about half would likely continue to be landfilled as residents would hide small amounts of metal in their garbage bags for collection.

Beginning in 2004, the City's EnviroDepots began to accept scrap metal for recycling. The material is taken to Zubick's for processing. It is assumed 100 percent of the metal is recycled. In 2012, the EnviroDepots received 500 tonnes of scrap metal.

It was assumed that approximately half the residential renovation materials not taken to an EnviroDepots (220 tonnes) was taken to other scrap metal dealers and recycled while other 50% (220 tonnes) was placed in the garbage.

Textile/Small Household Item Reuse/Recycling– 400 tonnes

In 2012, residents could take textiles, books and small household items to a Goodwill drop off located at the Oxford Street and Clarke Road EnviroDepots. Goodwill has estimated that they received 400 tonnes of material at these locations.

MHSW Recycling– 410 tonnes

The City collects all forms of Municipal Hazardous and Special Waste (MHSW) at the HSW depot at the W12A landfill including paints, solvents, pesticides, oil filters, used oil, antifreeze, batteries, florescent bulbs, compressed cylinders and oil & antifreeze containers. Some of these materials (batteries, florescent bulbs, compressed cylinders and oil & antifreeze container) are also collected at the Oxford Street and Clarke Road EnviroDepots.

The materials are shipped to various processing facilities across Ontario licensed to accept this material. The majority of the material is recycled including paint, antifreeze and oil.

The estimate of the weight of material diverted is based on a combination of actual weights for some materials and estimated weights based on the volume shipped for other materials.

Brewer's Retail /LCBO Bottle Recycling/Reuse– 1,710 tonnes

The 2012 WDO Datacall shows 1,710 tonnes of Brewer's Retail and Liquor Control Board of Ontario (LCBO) containers being recycled/reused in the City of London. This information is provided to the WDO from Brewer's Retail.

APPENDIX F

Potential Materials to be Added to the Blue Box Program

Introduction

The City of London accepts 14 categories of recyclable materials in its Blue Box program: newsprint & flyers; household paper; magazines, catalogues & books; paper egg cartons & boxes; cardboard boxes; glass bottles & jars; aluminum food & beverage cans; steel food & beverage cans; foil containers & foil; empty metal paint cans; empty aerosol cans; plastic bottles, jugs, tubs & trays; milk & juice cartons; drink boxes and cardboard cans.

The existing Blue Box program includes all “low hanging fruit”, materials that can be managed at a reasonable cost or constitute a large portion of the waste stream. A review of other municipalities in Ontario found six “more difficult” to recycle materials that are being recycled by at least one municipality. These materials are:

1. Mixed Polycoat (e.g., coffee cups, cold beverage cups, ice cream containers)
2. Batteries (limited to single use batteries)
3. Metal Cookware (e.g., pots, pans)
4. Blister Packaging (e.g., rigid plastic around toys, hardware)
5. Film plastic (e.g., plastic bags)
6. Expanded Polystyrene (e.g., meat trays, foam cups, packaging materials)

The financial, environmental and social considerations as well as technical issues of adding these materials to the City’s Blue Box recycling program are presented in Tables F-1 and F-2.

In summary, the following materials require further investigation before a final recommendation can be made with respect to adding them to the Blue Box Program: mixed polycoat (e.g., coffee cups, cold beverage cups, ice cream containers); batteries (limited to single use batteries); metal cookware (e.g., pots, pans); and blister packaging (e.g., rigid plastic around toys, hardware).

The following materials are not recommended to be added to the Blue Box Program: film plastic (e.g., plastic bags) and expanded polystyrene (e.g., meat trays, foam cups, packaging materials).

Table F-1: Overview of Key Environmental, Social & Financial Considerations and Technical Issues of Materials that Need Further Investigation

Consideration		Material Recommended for Further Investigation	
		Mixed Polycoat (e.g., coffee cups, ice cream containers)	Blister Packaging (e.g., rigid packaging around toys)
Environmental	<i>Estimated Annual Tonnes Diverted</i>	190	40
	<i>Estimated Annual Units Diverted (a)</i>	15,000,000	1,000,000
	<i>Annual GHG Savings Equivalent to (b)</i>	400 tonnes 100 cars removed from the road	80 tonnes 24 cars removed from the road
	<i>Annual Energy Savings Equivalent to (c)</i>	3,300 GJ 100 homes supplied with electricity	2,400 GJ 70 homes supplied with electricity
Social	<i>Public Support</i>	<ul style="list-style-type: none"> • Strong • 10% to 20% of material already being placed in Blue Box 	<ul style="list-style-type: none"> • Average • 5% of material already being placed in Blue Box
	<i>Resident Issues</i>	<ul style="list-style-type: none"> • May be confusion where to place (paper products or containers) • Light weight materials may increase street litter on windy days 	<ul style="list-style-type: none"> • Removes some confusion of which plastics are recyclable • Light weight materials may increase street litter on windy days
Financial	<i>Additional Col-lection Cost (d)</i>	\$0	\$5,000
	<i>Estimated Pro-cessing Cost (d)</i>	\$30,000 to \$40,000	\$3,000
	<i>Market/Revenue</i>	<ul style="list-style-type: none"> • Limited markets but growing • \$60 to \$120/tonne (\$7,000 to \$15,000/yr) 	<ul style="list-style-type: none"> • Limited markets but growing • \$30 to \$50/tonne (\$1,000 to \$2,000/yr) • Some municipalities staring to collect
Technical	<i>Collection Issues</i>	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
	<i>Processing Issues</i>	<ul style="list-style-type: none"> • Regional MRF capable of processing • Possible contamination issues from lids being left on or food placed inside container 	<ul style="list-style-type: none"> • Regional MRF capable of processing • Possible contamination issues if resident does not remove paper inside plastic packaging

Notes

- (a) Based on average size of units.
- (b) *Estimated Greenhouse Gas (GHG)* savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model*.
- (c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.
- (d) Estimates provided by current contractor (Miller Waste Systems).

Table F-1 continued on next page

Table F-1: Overview of Key Environmental, Social & Financial Considerations and Technical Issues of Materials that Need Further Investigation

Consideration		Material Recommended for Further Investigation	
		Batteries (e.g., single use batteries)	Metal Cookware (e.g., pots, pans)
Environmental	Estimated Annual Tonnes Diverted	35	80
	Estimated Annual Units Diverted (a)	1,500,000	50,000
	Annual GHG Savings Equivalent to (b)	Not available	140 tonnes 30 cars removed from the road
	Annual Energy Savings Equivalent to (c)	Not available	1,700 GJ 50 homes supplied with electricity
Social	Public Support	• Strong	• Average
	Resident Issues	• Communication plan required to reach residents about how to use program (program only for single use batteries and collection only twice per year)	• Residents may place other metal items (non-cookware) in Blue Box in error
Financial	Additional Col-lection Cost (d)	\$15,000	\$10,000
	Estimated Pro-cessing Cost (d)	\$0	\$30,000 to \$40,000
	Market/Revenue	• Ontario • Stable • \$300 to \$700/tonne (\$10,000 to \$25,000/yr)	• Ontario • Stable • \$200 to \$350/tonne (\$8,000 to \$15,000/yr)
Technical	Collection Issues	• Residents may set out batteries on non-collection weeks by mistake	• None
	Processing Issues	• No processing issues • Regional MRF capable of processing	• No processing issues • Modifications required to MRF to handle larger metal pieces (\$60,000)

Notes

- (a) Based on average size of units.
- (b) Estimated Greenhouse Gas (GHG) savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model*.
- (c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.
- (d) Estimates provided by current contractor (Miller Waste Systems).

**Table F-2: Overview of Key Environmental, Social, Financial Considerations
& Technical Issues of Materials not Recommended to be Added to the Blue Box
Recycling Program**

Consideration		Material not Recommended to be Added	
		Film Plastic (e.g., grocery bags)	Expanded Foam Polystyrene (e.g., meat trays)
Environmental	Estimated Annual Tonnes Diverted	400	60
	Estimated Annual Units Diverted (a)	50,000,000	7,500,000
	Annual GHG Savings Equivalent to (b)	400 tonnes 100 cars removed from the road	60 tonnes 15 cars removed from the road
	Annual Energy Savings Equivalent to (c)	18,000 GJ 500 homes supplied with electricity	2,600 GJ 80 homes supplied with electricity
Social	Public Support	• Strong	• Strong
	Resident Issues	<ul style="list-style-type: none"> • Light weight materials may increase street litter on windy days • Residents can already recycle plastic bags at many retail outlets 	<ul style="list-style-type: none"> • Light weight materials may increase street litter on windy days • Some packaging is too large to collect
Financial	Additional Col-lection Cost (d)	\$200,000 to \$225,000	\$125,000 to \$150,000
	Estimated Pro-cessing Cost (d)	\$400,000 to \$450,000	\$150,000 to \$200,000
	Market/Revenue	<ul style="list-style-type: none"> • North American • Stable • Revenue significantly less than processing cost • 0 to \$30/tonne (\$0 - \$15,000/yr) 	<ul style="list-style-type: none"> • Limited Markets • Unstable • Revenue significantly less than processing cost • \$300 to \$700/tonne (\$10,000 - \$25,000/yr)
Technical	Collection Issues	• None	• None
	Processing Issues	<ul style="list-style-type: none"> • Regional MRF capable of processing • May cause cross-contamination • May increase equipment maintenance requirements 	<ul style="list-style-type: none"> • Regional MRF capable of processing • May cause cross-contamination and increase equipment maintenance • Low capture (majority breaks up goes to residue); only 180 tonnes recycled from 3.0 million homes with program in 2012

Notes

- (a) Based on average size of units.
- (b) Estimated Greenhouse Gas (GHG) savings are the emissions avoided equivalent to the specified number of cars being removed from the road per year (i.e., the recycling of these materials has avoided the GHG emissions equivalent to the identified number of vehicles per year). GHG savings were estimated using the *EPA Warm Model*.
- (c) Estimated energy savings equivalent to the amount of electricity not being used by the specified number of homes per year (i.e., the recycling of these materials has avoided the equivalent electricity consumption requirements of the identified number of homes per year). Energy savings were estimated using the *EPA Warm Model*.
- (d) Estimates provided by current contractor (Miller Waste Systems).