



The Regional Municipality of Durham
To: The Works Committee
From: Commissioner of Works
Report: 2009-WR-5
Date: March 24, 2009

SUBJECT:

Moving Towards a 70% Diversion Target for Municipal Solid Waste

RECOMMENDATIONS:

THAT the Works Committee recommends to Regional Council that:

- a) This report be received for information.
-

REPORT:

Attachment No.1: Report from Golder Associates Limited (provided on a CD)

1. BACKGROUND

In December 1999, the Regional Municipality of Durham (Region) approved the *Region of Durham Long Term Waste Management Strategy Plan: 2000 to 2020* (Region of Durham Works Department, Waste Management Services). One of the major components of the plan was to divert at least 50% of the residential waste from disposal by the year 2007 or earlier. The Integrated Solid Waste Management System implemented by the Region has met this target and is considered the best system in Ontario for an urban center with a population greater than 50,000.

Subsequently, on January 23, 2008, Durham Regional Council directed that:
"The Region of Durham agrees to continue to support an aggressive residual garbage diversion and recycling program in order to achieve and/or exceed on or before December 2010, a 70 percent diversion recycling rate for the entire Region and that such aggressive programs shall continue beyond 2010."

Golder Associates Ltd. was retained to conduct an assessment of the residential Solid Waste Management System currently in place and to make recommendation on achieving a 70% waste diversion rate.

2. DISCUSSION

The consultant's evaluation of the garbage composition indicated that with 100% participation and 100% capture rates utilizing the existing recycling and composting programs, the Regional diversion rate would be 71%. It is unrealistic to expect 100% participation and capture rates. Therefore, the study identified several options to improve the diversion rate under two (2) major programs:

- Increasing waste diversion in the existing system
- Implementing new waste diversion opportunities

Regional staff continue their review of the consultant proposals, and will present a detailed multi-year diversion strategy and multi-year business plan within the 2010 Solid Waste Management Servicing and Financing Study, Business Plans and Budget, early in the new year, including financial and anticipated property tax impacts.

2.1 Increasing Waste Diversion in Existing System

The overall objective of the Region's multi-year diversion program is to achieve an 85% diversion rate for recyclables, 75% diversion rate for compostables and 50% diversion rate at the transfer stations. It is anticipated that an overall 63.3% diversion rate could be achieved over the next three (3) year period with 70% diversion attainable over a six year time-frame. To achieve this goal, the following potential projects, are being considered by staff, along with any service and/or resource implications:

a) Improved service and enforcement for Curbside Collection

- Service level changes (currently being implemented)
- Implement bylaws and enforcement (currently under development)

b) Improved capture rate for Curbside Collection

- Increased Blue Box receptacle capacity
- Improved promotion and education
 - Including a recognition and rewards plan
 - Targeted communications to non-participants

c) Improved Special Waste Diversion

- New schedule for Municipal Hazardous Solid Waste (MHSW) and Waste Electronics and Electrical Equipment (WEEE) special events
- No charge for depot drop-off of WEEE

d) Improved Capture Rate for Transfer Stations

- Modification of signage and site layout
- Extended hours and staffing during peak periods
- Financial disincentive for non-sorted loads
- Additional Transfer Station

2.2 Implementing New Waste Diversion Opportunities

The prioritization, development and implementation of new waste diversion initiatives will move the Region towards a 70% diversion rate. A significant development effort, as well as partnership negotiations, will be necessary for the majority of the proposed initiatives presented within the consultant report to be implemented. Several years will be required for these initiatives to realize their full potential. The first two (2) projects noted below have potential to augment diversion such that the 70% diversion rate is achieved. The remaining three (3) projects could be considered in the event markets are developed or further diversion is desired. The servicing and financial implications of the following are currently being investigated:

a) Expand material acceptable for drop-off

There are several new materials that could be accepted at the transfer stations for which markets and processing have already been developed. Staff are investigating the potential for these new initiatives to be implemented commencing 2010 and which could increase diversion rates by 0.6 percent, including:

- Polystyrene recycling at transfer stations;
- Mattress recycling at transfer stations; and,
- Textile recycling at transfer stations or collection.

b) Implement Reuse

The implementation of initiatives to improve the reuse component of diversion will necessitate the development of partnerships with various agencies. Staff are also investigating the possibility that the commencement of reuse service could begin as early as 2010, but a longer implementation period will be required. The following possible reuse initiative could increase diversion by 3.6 percent:

- Book returns (partner with libraries);
- Reuse center at the DRDC (partner with charitable organizations);
- Municipal-wide curb-side reuse days (garage sales); and,
- Take back programs with retailers (retail partners).

c) Implement Source Separated Organics (SSO) for Multi-residential units

Providing SSO services to multi-residential units have proven to be a challenge in other urban centers. The provision of appropriate infrastructure, services and education will require significant effort. The expansion of the SSO project to multi-residential households could further increase diversion by 0.9 percent.

d) Implement Additional Plastics Recycling

The proposed initiative related to additional plastics recycling requires manufacturer input to develop markets for materials captured. Once markets have been developed, the Regional collection system would need to be upgraded to accommodate this initiative. Additional plastic recycling could increase diversion by 2.4 percent.

e) Composting of Pet Waste

The inclusion of pet waste in the organics composting program requires additional investigation and new infrastructure. It is not recommended to include pet waste in the existing composting program. The pet waste initiative could increase diversion by 1.8 percent.

3. FINANCIAL IMPLICATIONS

The estimated operating and capital costs, as well as other implications, of the proposed initiatives which could assist the Region in achieving the 70% diversion target are being reviewed by Regional staff and a detailed multi-year diversion strategy and business plan will be presented within the 2010 Annual Solid Waste Servicing and Financing Study and Solid Waste Management Business Plans and Budgets over the next five (5) years.

4. CONCLUSION

The existing Integrated Solid Waste Management System implemented by the Region has met the 50% diversion target and is considered the best system in Ontario for an urban center with a population greater than 50,000. Golder Associates Ltd. report entitled "70% Waste Diversion Study" identifies additional initiatives that can be implemented to achieve further diversion towards achieving

a 70% diversion rate over the next five (5) years. These initiatives will be analyzed with the results presented in the 2010 Annual Solid Waste Servicing and Financing Study.

Clifford Curtis, P. Eng., MBA,
Commissioner of Works

Recommended for Presentation to Committee

G. H. Cūbitt, M.S.W.,
Chief Administrative Officer

WM4/rw/em

March 2009

THE REGIONAL MUNICIPALITY OF DURHAM

70% Waste Diversion Study

Submitted to:
Regional Municipality of Durham
Public Works Department
Waste Management Services
605 Rossland Road E.
Whitby, ON L1N 6A3

FINAL DRAFT

REPORT

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Cost Details for Proposed Waste Diversion Programs



1.0 BACKGROUND

The Region of Durham ("Region") is an upper tier government that is located directly east of the City of Toronto. The Region has a population of approximately 574,000 people and includes the following eight constituent municipalities:

- The Town of Ajax;
- The Township of Brock;
- The Municipality of Clarington;
- The City of Oshawa;
- The City of Pickering;
- The Township of Scugog;
- The Town of Whitby; and
- The Township of Uxbridge.

The Region has assumed responsibility for the provision of waste management services to residents for the constituent municipalities, including:

- Collection, processing and marketing of blue box recyclables;
- Disposal of residual garbage ("garbage");
- Composting of source separated organic waste ("SSO waste");
- Composting of leaf and yard waste ("yard waste");
- Operation of a rural landfill site (Brock Township);
- Operation of three waste transfer facilities (Brock Township, Oshawa and Port Perry);
- Operation of three depots for the collection of Municipal Hazardous and Special Waste ("MHSW");
- Operation of three depots for the collection of Waste Electronics and Electrical Equipment ("WEEE");
- Education and promotion of waste reduction programs; and
- Long term planning for waste management.

With the exception of the City of Oshawa and the Town of Whitby, the Region has also assumed responsibility for the collection of residual garbage, food waste, yard waste, Christmas trees, and bulky goods for the lower tier municipalities. In 2008, the Region issued and awarded a tender for the collection of these wastes from residents in the Townships of Brock, Scugog, Uxbridge, and the Municipality of Clarington. Separate waste collection contracts have also been issued for the Towns of Ajax and Pickering.

In December 1999, the Region approved the *Region of Durham Long Term Waste Management Strategy Plan: 2000 to 2020* (Region of Durham Works Department, Waste Management Services). One of the major components of the plan was to divert at least 50% of the residential waste from disposal by the year 2007 or earlier. In order to achieve this goal, the Region has implemented a waste management system that includes the following components:



- Blue box recycling;
- Composting of SSO waste;
- Composting of yard waste;
- Diversion of MHSW;
- Diversion of WEEE;
- Drywall recycling;
- Diversion of wood and brush;
- Diversion of used tires; and
- Diversion of white goods and scrap metal.

The Region also supports and promotes “at home” waste diversion programs, such as the reusable goods program, backyard composting, grasscycling and plastic bag recycling.

Since 1999, the Region has proceeded with an Environmental Assessment process to secure capacity to manage the post-diversion residual garbage generated within the Region. As part of this process, residents have strongly supported increasing diversion programs to reduce the amount of waste sent to disposal. In response to the comments from the public, on January 23, 2008, Durham Regional Council directed that:

The Region of Durham agrees to continue to support an aggressive residual garbage diversion and recycling program in order to achieve and/or exceed on or before December 2010, a 70 percent diversion recycling rate for the entire Region and that such aggressive programs shall continue beyond 2010.

According to the Waste Diversion Ontario (“WDO”) Municipal Datacall, the Region achieved 48% diversion of the residential waste stream in 2007. As such, the Region wishes to investigate existing and potential options that will allow them to increase the residential waste diverted from landfill to 70% by 2010. The purpose of this report is to develop a plan that will allow the Region to achieve this goal.



2.0 CURRENT WASTE MANAGEMENT SYSTEM

In 2007, waste collection, diversion and disposal services were provided to approximately 201,700 households across the Region, of which 89% were single family households and 11% were multi residential (apartment, condominium, townhouse) households.

Single family households divide their waste between five different waste streams for curbside collection, which include:

- Blue box recyclables;
- SSO waste;
- Yard waste;
- Bulky and metal goods; and
- Residual garbage

Multi residential households have access to curbside collection for three waste streams, which include:

- Blue box recyclables;
- Bulky and metal goods; and
- Residual garbage.

Single family and multi residential household service levels during 2007 are summarized in Table 1.

Table 1: Households Receiving Curbside Collection (2007)

Service Type	Single Family Households	Multi Residential Households
Residual Garbage	179,530	22,190
Blue Box Recyclables	179,530	22,190
Yard Waste	179,530	0
SSO Waste	179,530	0
Bulky Goods & Scrap Metal	179,530	22,190

2.1 Waste Collection

2.1.1 Blue Box Recycling

Blue box recyclables are collected in two streams, "containers" and "fibres". Containers include aluminum cans, glass jars and bottles, metal beverage and food cans, plastic bottles with a twist-off top, plastic tubs and lids, aluminum pie plates, empty paint and aerosol cans, and aseptics and gabletop cartons. Fibres include newspaper, corrugated containers, magazines, catalogues, telephone books, boxboard, writing and computer papers, envelopes, hard and soft cover books, and general residential mixed paper (junk mail, flyers, envelopes, shredded paper, etc.).

The frequency of the collection of blue box recyclables varies across the Region. The blue box collection service levels for each municipality are summarized in Table 2. Recyclables that are collected in the regional Blue Box Program are processed at the Region's Material Recovery Facility located at 4590 Garrard Road in Whitby. At this site, the various recoverable products are separated and prepared for market.



Table 2: Blue Box Recycling Collection Service Levels (2007)

Municipality	Collection Period	Collection Frequency
Town of Ajax	Tues – Fri	Weekly
Township of Brock	Tues – Fri	Bi weekly
Municipality of Clarington	Tues – Fri	Bi weekly
City of Oshawa	Mon – Fri	Weekly
City of Pickering	Tues – Fri	Weekly
Township of Scugog	Tues – Fri	Bi weekly
Township of Uxbridge	Tues – Fri	Bi weekly
Town of Whitby	Mon – Fri	Weekly

2.1.2 SSO Waste

Since 2006, all single family households in the Region have had access to curbside SSO waste diversion (“Green Bin Program”). Organic materials accepted in the Region’s Green Bin Program are listed in Table 3.

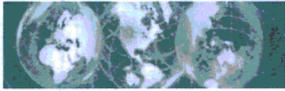
Table 3: Accepted SSO Waste Types for Regional Curbside Collection

Organic Waste Type	Description/Examples
Food Waste	vegetables (cooked/raw/peelings), corn cobs and husks, carrots, broccoli, cucumber, fish, fruits (whole/peelings) oranges, apples, melons, pineapple, potatoes, tea bags, bones, meat, shellfish, poultry, frozen foods, bread, toast, coffee grounds, filters
Plate Scrapings	salad & salad dressing, rice, popcorn, pizza, peanut butter, pasts, gravy
Baking Wastes	muffins, grease/lard, fat, flour, eggs and egg shells, margarine, spices, cake, cookies, sugar, cereals, oatmeal, oats
Dairy Products	mayonnaise, yogurt, sour cream, butter, cheese, eggs
Paper Fibres	moulded pulp paper egg cartons, moulded pulp paper beverage trays, paper towels, tissues, napkins, paper plates and cups
Other	hair, sawdust, wood shavings, dryer lint, bedding from pet cages, house plants, flowers, pumpkins

SSO collected by the Green Bin Program is initially processed at the Miller Waste Systems Pickering Facility located at 1220 Squires Beach Road in Pickering, then sent for final curing at a separate Miller Waste facility in the Municipality of Clarington.

2.1.3 Yard Waste

Yard waste collection services are generally available from mid-April through late November. Collection frequency varies between the Regional municipalities. Yard waste that is acceptable to set out for municipal collection includes leaves, yard waste, branches, hedges, shrubs, flowers, organic garden plant materials, pumpkins, crab apples, gourds, and garden waste. Grass clippings are not permitted in the municipal yard waste collection program due to potential odour problems. Yard waste is currently hauled to the Miller Waste composting site in the Municipality of Clarington to be composted.



2.1.4 Bulky and Metal Goods

Bulky and metal goods are collected by either the Region or the lower-tier municipality. Acceptable bulky goods generally consists of oversized household and furniture waste materials including mattresses, sinks, toilets, carpet and underlay, televisions, sofas, loveseats, dressers, vacuums, suitcases, and desks, which are sent for landfill disposal. Acceptable metals goods, including but not limited to appliances, metal file cabinets, metal bed frames, air conditioners, bicycle frames and metal furniture are diverted to a scrap metal recycler. Table 4 outlines the specifics of the bulky and metal goods program in each municipality.

Table 4: Bulky and Metal Goods Collection Service Levels (2007)

Municipality	Collection Service Level
Town of Ajax	Metals goods collected on a bi-weekly basis on residual garbage collection day Bulky goods collected on a bi-weekly basis on residual garbage collection day Residents able to set out two metal and two bulky goods items per collection
Township of Brock	Service provided on "call-in" basis
Municipality of Clarington	Metal goods collected weekly on regular collection day Bulky goods service provided on "call-in" basis
City of Oshawa	Service provided on "call-in" basis \$25 per pick-up, free for seniors
City of Pickering	Metals goods collected on a bi-weekly basis on residual garbage collection day Bulky goods collected on a bi-weekly basis on residual garbage collection day Residents able to set out two metal and two bulky goods items per collection
Township of Scugog	Service provided on "call-in" basis
Township of Uxbridge	Service provided on "call-in" basis
Town of Whitby	Service provided on "call-in" basis One free pick-up per year and \$25 for subsequent pick-ups

2.1.5 Residual Garbage

Residual garbage collected from single family and multi residential households is primarily delivered to either a Regional or private-sector waste transfer site, where it is loaded into tractor trailers and hauled to the State of Michigan for disposal. The Region operates a single landfill site, the Brock Township Landfill Site, which is designated by the Region to receive waste only from Brock Township.

As Ontario strives to decrease and eliminate cross border disposal of residential waste by the end of 2010, the Region is undertaking an Environmental Assessment and procurement process to develop an Energy-from-Waste Facility to offer an alternative method for managing future post-diversion residual waste.

Regional households are subject to varied residual garbage bag limits, which is dependant on the frequency of their collection services. Households residing in the Town of Ajax, City of Oshawa, City of Pickering and Town of Whitby are permitted to set out a maximum of four bags of residual garbage for free at each biweekly collection event, while households residing in the Municipality of Clarington and the Townships of Brock, Scugog and Uxbridge are permitted to set out a maximum of three bags weekly. Additional bags over the established bag limit require a Garbage Bag Tag that is purchased from the municipality. Residual collection garbage service levels for each municipality are summarized in Table 5.



Table 5: Residual Garbage Collection Service Levels (2007)

Municipality	Collection Period	Collection Frequency	Bag Tag Fee
Town of Ajax	Tues-Fri	Bi weekly	\$1.50
Township of Brock	Tues-Fri	Weekly	\$1.50
Municipality of Clarington	Tues-Fri	Weekly	\$1.50
City of Oshawa	Mon-Fri	Bi weekly	\$1.00
City of Pickering	Tues-Fri	Bi weekly	\$1.50
Township of Scugog	Tues-Fri	Weekly	\$1.50
Township of Uxbridge	Tues-Fri	Weekly	\$1.50
Town of Whitby	Mon-Fri	Bi weekly	\$1.50

2.2 Waste Transfer Sites

In addition to the Brock Township Landfill Site, the Region also operates three waste transfer facilities that are open to the public for the receipt of residual garbage and waste for diversion. These sites are located at 1640 Ritson Rd in Oshawa, 1623 Reach Street in Port Perry and at the Brock Township Landfill Site. Residents from the Region can drop off residual garbage for disposal at any of the transfer sites. The transfer sites and the Brock Township Landfill Site also have depots for the diversion of specific waste, such as:

- Blue box recyclables (container materials and fibres);
- Yard waste;
- Wood and brush;
- Scrap metal;
- Tires (max 5/day);
- Appliances/white goods;
- WEEE;
- Drywall; and
- MHSW (including antifreeze, fluorescent light bulbs/tubes, oil and oil filters, mercury thermometers/thermostats, propane tanks, batteries, paints and stains, pesticides and herbicides)

All vehicles using the disposal/transfer sites are subject to waste disposal charges ("tipping fees"). Tipping fees are based on the weight of material disposed, with a minimum charge of \$5.00/vehicle load. A tipping fee of \$120/tonne applies to both residual garbage and waste acceptable for diversion, whether or not the load is dedicated (i.e. contains only one of the waste types accepted) or mixed (i.e. contains a mixture of more than one of the waste types accepted). There is no charge for the drop off of dedicated loads of MHSW.



3.0 CURRENT WASTE DIVERSION EFFICIENCY

3.1 Residential Waste Generation

According to the 2007 WDO Datacall, a total of 236,117 tonnes of residential waste was generated in the Region in 2007. This includes:

- 194,976 tonnes of residential waste collected in the municipal waste collection system;
- 28,853 tonnes of waste delivered to Regional waste disposal/transfer sites by residents; and
- 12,288 tonnes of waste managed directly by residents through programs such as backyard composting, grasscycling, reuse, and LCBO bottle return.

As shown in Figure 1, the amount of waste being managed directly by residents or dropped off at depots located at the transfer facilities is relatively small compared to the quantity of waste being collected curbside.

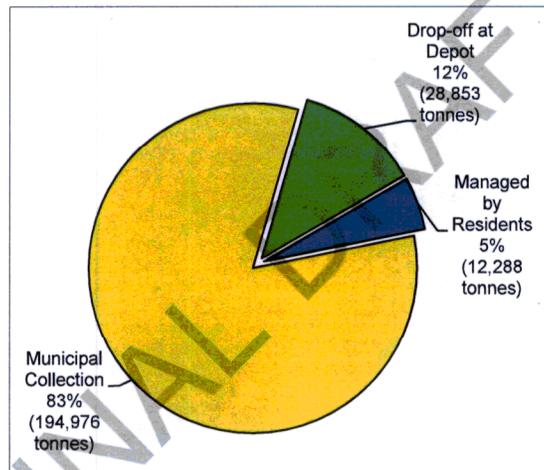


Figure 1: Contribution of Waste Generation (2007)

Of the 194,976 tonnes of residential waste collected in the regular municipal collection system, 54,409 tonnes consisted of blue box recyclables, 43,969 tonnes was SSO, and 96,163 tonnes was bagged residual garbage. An additional 435 tonnes of waste was collected in the bulky and metal goods collection. Figure 2 shows the relative proportion of waste collected curbside.

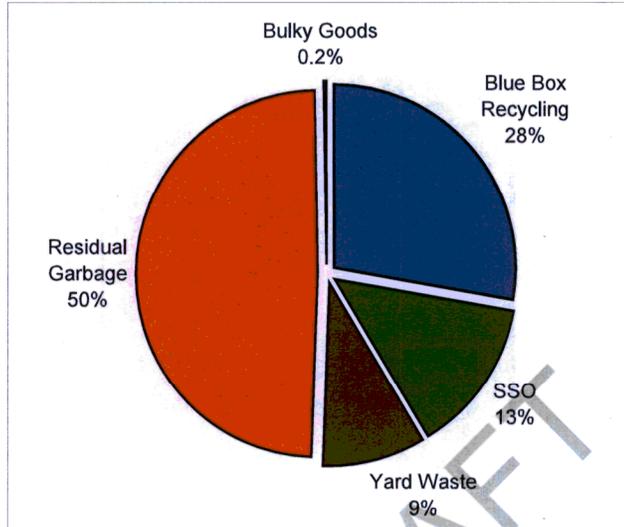


Figure 2: Composition of Curbside Collected Waste (2007)

As shown in Figure 3, of the waste dropped off at Regional waste transfer sites, the majority (19,849 tonnes) was residual garbage that was sent for disposal. In 2007, approximately 28% of the waste received at the waste disposal sites was recovered through programs such as blue box, yard waste, scrap metal, drywall, wood waste, MHSW and tire recycling.

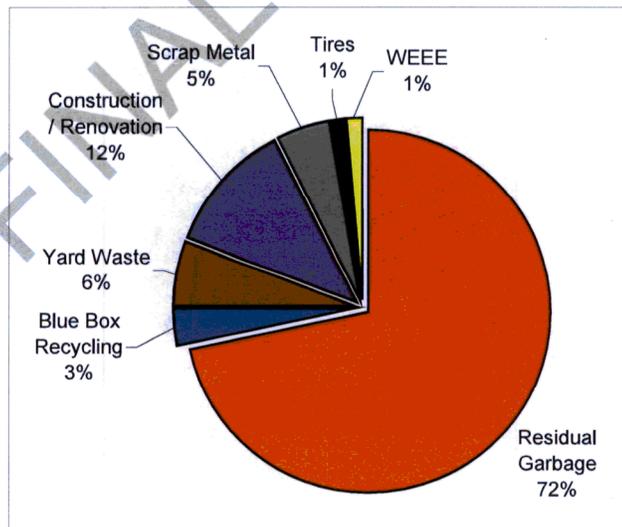


Figure 3: Composition of Waste Dropped-Off at Regional Waste Disposal/Transfer Sites (2007)



3.2 Residential Waste Diversion

There are a number of different methods that can be utilized to calculate waste diversion. The most accepted methodology utilized in Ontario is called the Generally Accepted Principle, or GAP analysis. GAP analysis has been adopted as a standard for municipal waste measurement reporting. The GAP analysis process was initiated in late 1999 to address a need to develop a common reporting framework that could be used by municipalities across Canada to report waste generation, diversion and disposal.

The annual Municipal Datacall carried out by WDO compiles information on residential materials diverted and disposed by Ontario municipalities. This data can be utilized to calculate a Residential GAP analysis diversion rate for each municipality participating in the Municipal Datacall.

The Municipal Datacall Residential GAP analysis diversion rate calculation includes:

- An allowance for provincial deposit systems based on the deposit containers returned from the residential sector (i.e. beer store);
- An allowance for residential on-property management through backyard composting, grasscycling and evapotranspiration resulting from use of aerated carts for organics programs;
- Municipally operated (directly or through contracted services) reuse activities;
- Municipally operated (directly or through contracted services) recycling activities including blue box materials, Other Recyclables, WEEE and MHSW;
- Municipally operated (directly or through contracted services) centralized composting activities for household organics, leaves and yard waste; and
- Disposal of residual garbage, and recycling and composting processing residues through energy-from-waste and landfill.

Based on the GAP process the waste diversion rate for the Region in 2007 was 48%, as shown in Table 6. This is a significant increase in the waste diversion rate since 2005, when 35% of the waste generated in the Region was diverted from landfill. The increase in waste diversion during the two year period is due mainly to the implementation of the SSO waste collection and composting program to all single family households.



Table 6: 2007 GAP Waste Diversion Rate

Program	Managed by Residents (tonnes)	Regional Collection (tonnes)	Drop-Off (tonnes)	Total (tonnes)
Reuse	115	n/a	n/a	115
LCBO Return to Vendor	3,150	n/a	n/a	3,150
Backyard Composting	5,472	n/a	n/a	5,472
Grasscycling	3,551	n/a	n/a	3,551
Blue Box Recycling	n/a	54,409	887	55,296
Organics (SSO & Yard Waste)	n/a	43,969	1,650	45,619
WEEE	n/a	410	386	796
Bulky Goods*	n/a	-	292	292
Scrap Metal	n/a	-	1,305	1,305
C&D Waste	n/a	n/a	3,242	3,242
Tires	n/a	n/a	367	367
MHSW**	n/a	24	875	899
Residential Residual Garbage	n/a	96,164	19,849	116,012
Blue Box Residue				5,071
Organics Residue				1,699
Total Waste Generation	12,288	194,976	28,853	236,117
Total Waste Diversion	12,288	98,788	8,129	112,435
Waste Diversion Rate	100%	50.7%***	28.2%**	47.6%****

* Refers to household items and gently used clothing deposited in the Salvation Army charitable donation containers located at each waste disposal site/transfer station.

** Source separated MHSW is sent for safe disposal (i.e. does not contribute to waste diversion total).

*** Reflects pre-processing diversion rate.

**** Reflects post-processing diversion rate; residue removed from blue box and organics diversion programs for landfill disposal.

The WDO website publishes the GAP waste diversion rates for all Ontario municipalities, calculated based on the audited Municipal Datacall information submitted annually. By comparison, the overall GAP waste diversion rate for all municipalities across the province was 39% in 2007. The average GAP waste diversion for the Urban Regional Municipal Grouping that includes the Region was 40% in 2007. The Region was amongst the top ten waste diversion rates reported for the 2007 period and demonstrated the highest GAP waste diversion rate of all municipalities amongst the Large Urban, Urban Regional and Medium Urban Municipal Groupings. Table 7 shows the GAP waste diversion rate for other large municipalities, including their respective waste diversion targets.



Table 7: GAP Waste Diversion Rate for Major Ontario Municipalities

Municipality	GAP Waste Diversion Rate (2007)	Target Waste Diversion Rate	Target Date
Durham, Regional Municipality of	47.6%	70%	2010
York, Regional Municipality of	45.7%	65%	2010
Waterloo, Regional Municipality of*	44.5%	ne	ne
Hamilton, City of	43.0%	65%	2008
Toronto, City of	42.8%	70%	2010
Niagara, Regional Municipality of*	41.6%	65%	2012
Peel, Regional Municipality of	40.6%	70%	2016
Simcoe, County of*	40.5%	50%	2009
London, City of	39.7%	+60%	ne
Halton, Regional Municipality of	36.9%	60%	2010
Essex-Windsor Solid Waste Authority*	32.6%	60%	2010
Ottawa, City of*	32.3%	40%	2007

* Other "Urban Regional" municipalities grouped alongside the Region of Durham, as per the classification system utilized by the WDO Municipal Datacall

"na" Information not available.

"ne" Formal waste diversion target not established.

3.3 Per Capita and Per Household Waste Generation Rates

Per capita or per household waste generation rates are often credited to be a more inclusive indicator of waste management performance, as they reflect both population fluctuations and waste reduction efforts. According to the WDO Municipal Datacall, the total per capita waste generation in the Region decreased slightly between 2005 and 2007, from 409 kg/capita to 392 kg/capita, respectively. Per capita and per household waste disposal, diversion and generation rates are shown in Table 8.

Table 8: Regional Per Capita and Per Household Waste Generation Rates

	2005		2006		2007	
	kg/capita	kg/hhld	kg/capita	kg/hhld	kg/capita	kg/hhld
Waste Disposal	266	794	239	702	205	613
Waste Diversion	143	427	171	503	187	557
Total Waste Generation	409	1221	410	1205	392	1171

Statistics Canada reports national waste generation, diversion and disposal data every two years. As outlined in the Statistics Canada's *Waste Management Industry Survey Business and Government Sectors 2006* (2008), residential waste generation in Canada was 398 kg/capita in 2006. Since 1998, national per capita waste generation and waste diversion have both increased, as shown in Table 9.



Table 9: National Residential Per Capita Waste Generation Rates

Year	Disposal (kg/capita)	Diversion (kg/capita)	Generation (kg/capita)	Waste Diversion Rate
1998	233	77	316	25%
2000	295	70	365	19%
2002	302	89	391	23%
2004	275	105	379	27%
2006	283	115	398	29%

(Statistics Canada, 2000, 2003, 2007¹, 2008)

As shown in Figure 4, the 2006 residential waste generation rate in the Region was 410 kg/capita, which was very close to the National residential waste generation rate of 398 kg/capita. However, the quantity of waste diverted per capita in the Region was 49% higher than the National average (171 kg/capita compared to 115 kg/capita), while the quantity of waste disposed per capita in the Region was approximately 16% lower than the 2006 national average (239 kg/capita compared to 283 kg/capita).

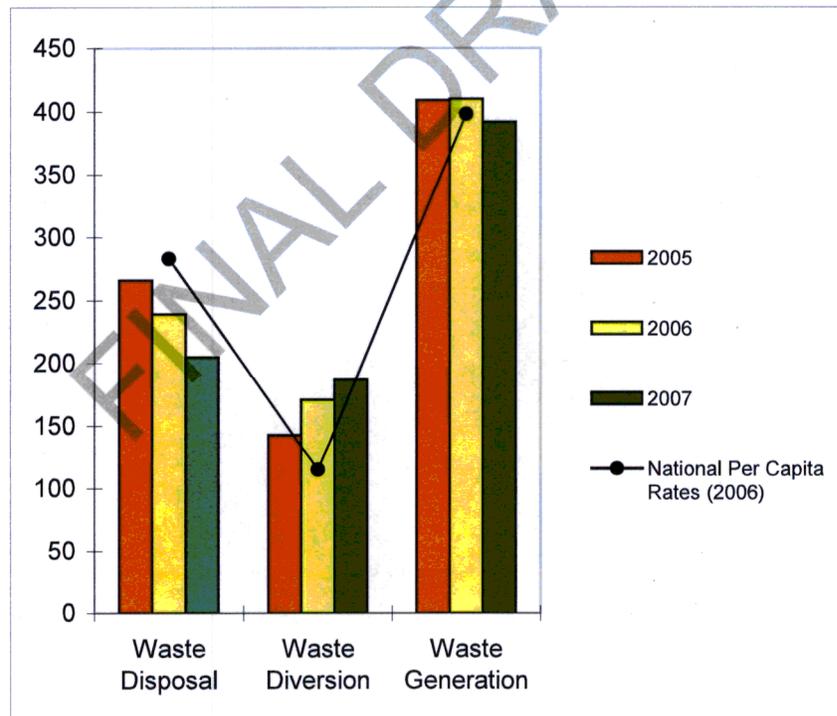


Figure 4: Durham Per Capita Waste Quantities (2005-2007) Compared to National 2006 Data



3.4 Waste Reduction

While the GAP waste diversion rate calculation includes many factors, it does not take into account waste reduction, which is the first and most important “R” in the 3R’s hierarchy. This can be attributed to the degree of difficulty in accurate measurement. Although a decrease in total waste generation following the implementation of a waste management strategy can be an indication of waste reduction, economic and social factors may also be at play.

Considerable effort has taken place in the past years to promote waste reduction, particularly in the area of light-weighting and downsizing packaging. Increased fuel costs have promoted a decrease in the bulk and weight of packaging. Packaging reduction initiatives have been made possible by concentrating the product (e.g. laundry detergent) in smaller containers, light-weighting the containers, and shifting from metal and glass containers to lighter weight plastic (e.g. pop, food and liquor bottles). Although this reduces the weight of the overall waste being generated, it means that the weight of materials collected for recycling decreases in a greater proportion to the general waste stream. Municipalities essentially need to collect more recyclables in order to recover the same amount of weight.

The Region also promotes a number of “at home” initiatives that encourage waste reduction. These include the promotion of:

- plastic bag take-back programs in local stores;
- charitable organizations (e.g. Goodwill, Salvation Army and the Canadian Diabetes Association) for the donation of lightly used clothing, house wares and sporting goods;
- charitable organizations (e.g. Habitat for Humanity) for the donation of reusable construction and renovation materials; and
- the use of reusable bags and bottles.

In calculating a true waste diversion rate in the Region, it is important that these waste reduction factors be taken into account in a manner that is measurable and traceable. As indicated in Table 8, the Region’s per capita waste generation rate decreased between 2005 and 2007 from 409 kg/capita to 392 kg/capita, respectively. This equates to a 17 kg/capita decrease in waste generation. As such, it is estimated an additional 2-4% of diversion is realized as a result of the impact of waste reduction efforts within the Region. In other words, the baseline waste diversion rate for the Region increases to 50%.



4.0 RESIDENTIAL SURVEY

Golder Associates Ltd., on behalf of the Region, conducted a survey in November 2008 to obtain information on residents' opinions and attitudes toward the Region's current and future waste management services. The survey was distributed at the Oshawa and Port Perry transfer stations to residents on November 26, 2008. A total of 154 completed surveys were returned, out of 531 surveys that were distributed. The results of the survey are summarized below. Detailed responses, including additional comments provided by respondents are provided in Appendix A.

4.1 Demographics

The survey was completed by 154 respondents residing within the Region. As shown in Figure 5, the majority of the residents responding to the survey lived in the Town of Whitby, the City of Oshawa or the Township of Scugog.

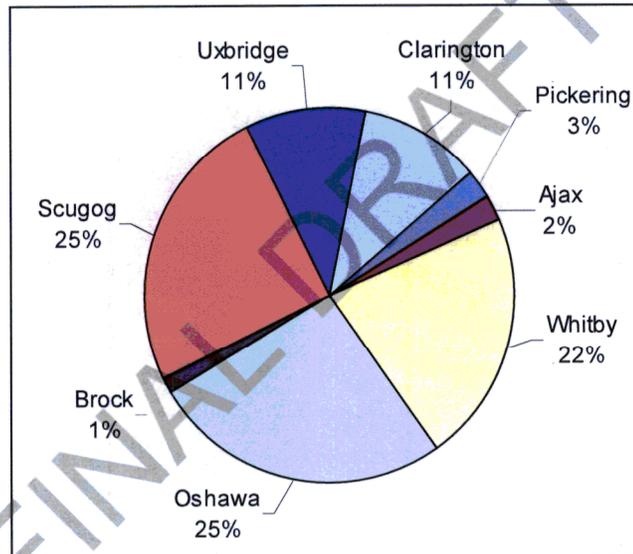


Figure 5: Residents Responding to Waste Management Services Survey

4.2 Summary of Findings

The summary of findings arising out of the survey results are presented below and are organized among the following topics:

- General household information;
- Recycling;
- Composting;
- Waste Disposal Sites;
- Educational Information; and
- A general summary.

Each is discussed in more detail in the following sections.



4.2.1 General Household Information

- Ninety percent (90%) of the households had only adults (twelve and over) residing in the household;
- Only 10% of households had children under twelve;
- The average number of people per household for the respondents was three (3);
- The majority of households (66%) produced between one and two bags of residual garbage per week, with a notable 17% of households producing a half bag of residual garbage per week. The remaining 17% of the households produced three bags or more.

4.2.2 Recycling

- Virtually all (98%) of the respondents claimed that they recycle;
- The majority (75%) of respondents believed that they are currently recycling as much as they can;
- When questioned on program modifications that would encourage respondents to recycle more, 19% cited bigger blue boxes and 25% cited a desire for more information about what to recycle;
- Respondents generally have positive views toward recycling. However, comments received indicated a desire for an expanded Blue Box Program that accepts more recyclable articles;
- Seven respondents voiced concerns regarding putting household residual garbage into clear plastic bags.

4.2.3 Composting

- Seventy five percent (75%) of respondents reported that they separated organics to set out for SSO collection. Those who reported that they did not participate in the Region's Green Bin Program noted that they either had their own backyard composter, or stopped because of pests such as fruit flies, maggots, inconvenience, and/or cost and durability of the biodegradable bags approved for use in the program;
- The majority (67%) of respondents believed that they are currently composting as much as they can;
- Sixteen percent (16%) of respondents stated that bigger green bins would encourage them to divert more SSO waste, while 17% of respondents indicated a desire for more information regarding what to compost.

4.2.4 Waste Transfer Sites

- Sixty seven percent (67%) of respondents reported that they visit a Region transfer station 1-4 times per year;
- According to the results of the survey, the types of waste that are most frequently taken to the transfer site are construction/renovation materials and hazardous waste. Twenty eight percent (28%) of respondents reported that they typically disposed of garbage at the transfer station.

4.2.5 Educational Information

- The majority (84%) of respondents believe that they have enough information on managing their waste, and find the information received useful;
- Seventy nine percent (79%) of respondents reported a preference for the delivery of waste management related education information by means of the waste calendar, with 43% indicating that they liked receiving information pamphlets sent in the mail.



- Support for mainstream media was low. Eight percent (8%) of respondents indicated that they liked to receive waste management information via newspaper ads, while only 5% of indicated that they preferred radio ads.

4.2.6 General Summary

- The majority of respondents find it convenient to separate recyclable and organic kitchen waste from their residual garbage;
- The final question of the survey asked respondents to rank the options suggested to encourage residents to divert more waste from disposal. Many respondents did not answer this question correctly, but instead checked off the options that they preferred. However, from the information gathered, the most frequent suggestion was to provide more information about how and what to recycle and compost to ensure that people make less residual garbage. Most residents strongly disagreed with having to pay for each bag set out for collection. Otherwise, the opinions were generally split between making residents pay for each bag over one per collection, and requiring residents to put residual garbage out in clear plastic bags.
- It was strongly suggested that everything bearing a recycling symbol should be accepted in the blue box, and that respondents were in favour of regulations for packaging.
- Concerns were expressed regarding putting residual garbage out in clear plastic bags, and paying for each bag set out, due to possible negative consequences (such as increases in illegal dumping).



5.0 WASTE DIVERSION POTENTIAL

In order to determine how to increase waste diversion rates it is important to understand the composition of the material currently being sent for disposal. It is then possible to determine if these materials can be managed by programs currently in place, or if additional waste diversion programs need to be implemented.

Waste composition data was compiled based on an audit of post-diversion waste from single family households that was conducted in the Town of Whitby from April 16 – 19, 2007¹. The post-diversion residential waste collected in the Region includes waste from multi residential units, which is typically a different waste mix from what is generated from single family households. Because waste composition data was not available for multi residential households in the Region, data was utilized from multi residential waste audits conducted in the City of Toronto (downtown and Scarborough areas) in 2006 and 2007. As is the case in the Region, the multi residential households in the City of Toronto are provided with blue box collection, but did not have access to SSO collection when the audits were completed. It is therefore assumed that the post-diversion waste composition would be similar.

Both waste audit data sets (single family and multi residential) were conducted in accordance with the methodologies and material categories prescribed by Stewardship Ontario's residential waste audit program.

5.1 Single Family Households

A preliminary evaluation of the diversion performance for single family households revealed a waste diversion rate of 52%². As indicated by the waste audit data, it was found that 54% of the material found in the residential residual garbage from single family households could be diverted through existing waste diversion programs in the Region. As shown in Figure 6, the breakdown of the post-diversion waste from the audit is as follows:

- 1% of the material is MHSW;
- 13% of the material is recyclable through the Blue Box Program;
- 31% of the material is compostable in the SSO waste or yard waste composting program;
- 9% of the material is recyclable through other recycling programs (i.e. bulky goods, WEEE, C&D, textiles); and
- 46% of the material is residual that is not currently recyclable or compostable in the Region.

¹ Jacques Whitford Ltd., Region of Durham – Audit of Town of Whitby's Post-Diversion Residual garbage Materials Collected at Curbside, June 8, 2007.

² Waste diversion rate is based on an assessment of available 2007 blue box, SSO and residual garbage curbside collection tonnage data for multi residential households located in the Towns of Ajax and Whitby, and the Cities of Pickering and Oshawa, compared to total curbside collection tonnages.

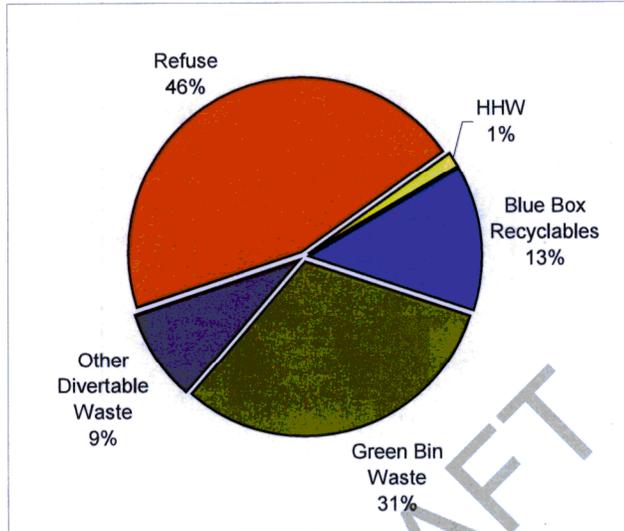


Figure 6: Composition of Post-Diversion Residual Garbage from Single Family Households

In further analyzing the composition of the waste in the residential residual garbage that is not recoverable in the Region's current waste management program (the refuse fraction), it was found to have the composition shown in Figure 7.

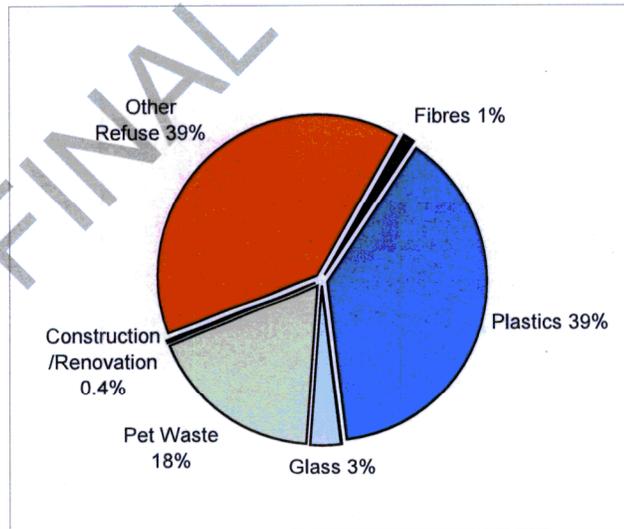
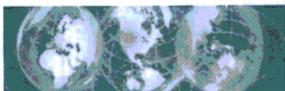


Figure 7: Composition of the Refuse Fraction from Single Family Households

As indicated, a large portion (39%) of the refuse fraction consists of plastics not currently included in the Region's Blue Box Program, such as plastic film, polystyrene packaging, and laminated plastics (e.g. chip bags). An equal proportion of the refuse fraction (39%), referred to in Figure 6 as "other refuse", consisted of miscellaneous wastes, such as diapers and sanitary products, carpeting, and ceramics. Pet waste also represented a significant proportion of the refuse fraction from single family households (18%).



A detailed breakdown of the “plastics” disposed of by single family households that did not have the potential to be captured by the Region’s current Blue Box Program (“non-divertable plastics”) is provided in Table 10.

Table 10: Composition of the Non-Divertable Plastics Found Within the Residual Garbage of Single Family Households

NR Plastic Type	Material Description*	% Composition of Total Residual Garbage	% Composition of Total Non-Divertable Plastics
PET Other Packaging	#1 bakery, clamshells, trays, ovenable/microwaveable trays, egg cartons. No bottles and jars.	0.3%	2.0%
Other Bottles, Jars and Jugs	#4 LDPE, #5 PP, mixed resin, mustard, ketchup, some juices.	0.1%	0.5%
Polystyrene Packaging	#6 PS, trays, clamshells, cups & lids, pill and vitamin bottles, seedling trays, PS used to protect boxed product, “peanuts”, etc. Non-packaging PS (e.g. plastic cutlery) goes into the “Durable Plastic Products” category.	1.7%	9.6%
Large HDPE & PP Pails and Lids	> 4 litres and < 25 litres HDPE & PP pails, lawn, garden, pool supplies, kitty litter, paint, etc.	0.0%	0.0%
PE Plastic Bags & Film – Packaging	HDPE and LDPE retail carry-out bags/sacks, dry cleaning bags, bread bags, frozen food bags, milk bags, toilet paper and towelling, over-wrap, lawn seed, soil, peat moss, etc.	2.9%	16.4%
PE Plastic Bags & Film – Non-Packaging	HDPE & LDPE garbage bags, kitchen catchers, blue or clear bags for recyclables, sandwich and freezer bags, etc.	1.9%	11.0%
Laminated/Other Plastic Film & Bag in Box Liners	Laminated plastic pouches and plastic bag-in-box liners for wine and other alcoholic beverages	5.0%	28.1%
Other Rigid Plastic Packaging	Blister packaging, tubes for pharmaceutical & health care/cosmetic products, plant pots, unmarked/coded packaging, etc.	2.0%	11.4%
Durable Plastic Products	Non-packaging such as VCR tapes, CDs, toys, games, Tupperware, etc. Include multi-material items that are mainly plastic – e.g. plastic toy truck with metal axels. Plastic shoes, gloves, and clothing go in “Textiles”.	3.7%	20.9%
Total		17.6%	100.0%

* As defined by Stewardship Ontario’s Waste Audit Program.



5.2 Multi Residential Households

Waste diversion performance amongst multi residential households ranks significantly lower than single family households, at 18%.² Multi residential households in the Region do not currently have access to curbside collection of SSO waste. It is therefore expected that the post-diversion waste from multi residential households contains a greater percentage of compostable organics. It is also recognized that it is sometimes more difficult to recycle in multi residential households because of the limited space for additional waste containers and more difficulty in accessing recycling collection centres. It is therefore expected that there would be more recyclable material contained in the waste stream from multi residential households.

Based on the waste audit data from the City of Toronto, it was found that 36% of the material found in the residential residual garbage from multi residential households could be diverted through existing waste diversion programs in the Region. As shown in Figure 8, the breakdown of the post-diversion residential residual garbage from the audit is as follows:

- 1% of the material is MHSW;
- 23% of the material is recyclable through the Blue Box Program;
- 42% of the material is compostable in the SSO waste or yard waste composting program;
- 13% of the material is recyclable through other recycling programs (i.e. bulky goods, WEEE); and
- 21% of the material is residual that is not currently recyclable or compostable in the Region.

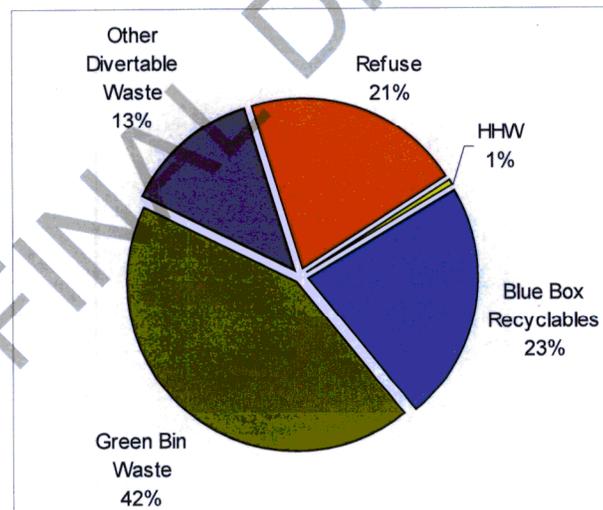


Figure 8: Composition of the Post-Diversion Residual Garbage from Multi Residential Households

In further analyzing the composition of the waste in the residential residual garbage that is not recoverable in the Region's current waste management program (the refuse fraction), it was found to have the composition shown in Figure 9.

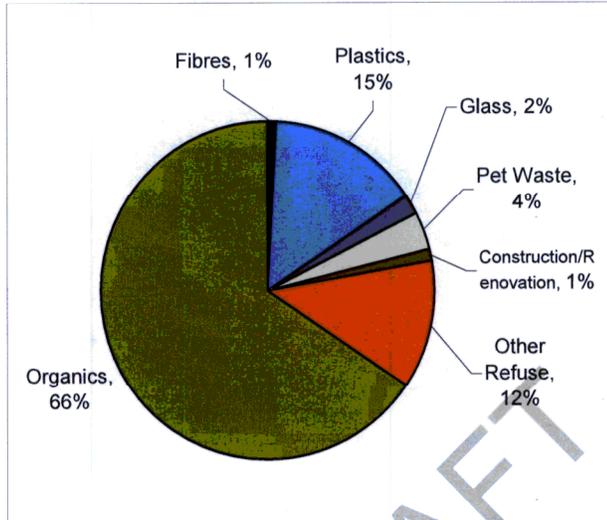


Figure 9: Composition of the Refuse Fraction from Multi Residential Households

Compostable SSO and yard wastes comprise nearly three quarters of the refuse fraction of the residual garbage disposed of by multi residential households. Again, a large portion of the refuse fraction consists of plastics not currently included in the Region's Blue Box Program (15%) and miscellaneous or "other refuse" wastes (12%). Pet waste represented only 4% of the refuse fraction from multi residential households.

A detailed breakdown of the "plastics" disposed of by multi residential households that did not have the potential to be captured by the Region's current Blue Box Program ("non-divertable plastics") is provided in Table 11.

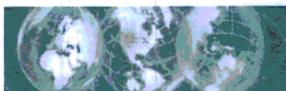


Table 11: Composition of the Non-Divertable Plastics Found Within the Refuse Fraction from Multi Residential Households*

NR Plastic Type	Material Description*	% Composition of Total Residual Garbage	% Composition of Total Non-Divertable Plastics
PET Other Packaging	#1 bakery, clamshells, trays, ovenable/microwaveable trays, egg cartons. No bottles and jars.	0.1	1.6%
Other Bottles, Jars and Jugs	#4 LDPE, #5 PP, & #7 mixed resin, mustard, ketchup, some juices.	0.1	1.6%
Polystyrene Packaging	#6 PS, trays, clamshells, cups & lids, pill and vitamin bottles, seedling trays, PS used to protect boxed product, "peanuts", etc. Non-packaging PS (e.g. plastic cutlery) goes into the "Durable Plastic Products" category.	0.6	7.3%
Large HDPE & PP Pails and Lids	> 4 litres and < 25 litres HDPE & PP pails, lawn, garden, pool supplies, kitty litter, paint, etc.	0.1	1.1%
PE Plastic Bags & Film – Packaging	HDPE and LDPE retail carry-out bags/sacks, dry cleaning bags, bread bags, frozen food bags, milk bags, toilet paper and towelling, over-wrap, lawn seed, soil, peat moss, etc.	3.6	40.9%
PE Plastic Bags & Film – Non-Packaging	HDPE & LDPE garbage bags, kitchen catchers, blue or clear bags for recyclables, sandwich and freezer bags, etc.	1.0	10.6%
Laminated/Other Plastic Film & Bag in Box Liners	Laminated plastic pouches and plastic bag-in-box liners for wine and other alcoholic beverages	0.8	9.5%
Other Rigid Plastic Packaging	Blister packaging, tubes for pharmaceutical & health care/cosmetic products, plant pots, unmarked/coded packaging, etc.	0.7	7.9%
Durable Plastic Products	Non-packaging such as VCR tapes, CDs, toys, games, Tupperware, etc. Include multi-material items that are mainly plastic – e.g. plastic toy truck with metal axels. Plastic shoes, gloves, and clothing go in "Textiles".	1.7	19.5%
Total		8.7%	100.0%

* As defined by Stewardship Ontario's Waste Audit Program.

5.3 Overall Waste Diversion Potential

A relatively high percentage of recyclable and compostable wastes were observed in the residential residual garbage of both single family and multi residential households. Increased residential waste diversion could be achieved if residents diverted all recyclable and compostable wastes using the existing waste diversion programs.



Based on the composition analysis of the post-diversion residential residual garbage, the potential waste diversion rate if all residents separated 100% of their recyclable and compostable materials can be estimated. Using the same GAP analysis methodology as utilized in Section 3.2 (and excluding any factor for waste reduction), it can be estimated that the waste diversion rate for the Region would **increase from 48% to 71%** if **all residents separated 100% of their recyclable and compostable materials**. This is shown in Table 12.

Table 12: Adjusted GAP Waste Diversion Rate Based on 100% Capture Through Existing Waste Diversion Programming

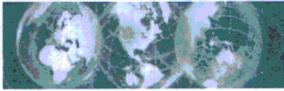
Program	Managed by Residents (tonnes)	Regional Collection (tonnes)	Drop-off Depot (tonnes)	Total (tonnes)
Reuse	115			115
LCBO Return to Vendor	3,150			3,150
Backyard Composting	5,472			5,472
Grasscycling	3,551			3,551
Blue Box Recycling		68,192	887	69,079
MHSW		1322	875	2,151
Organics		70,732	1,650	76,930
WEEE		410	386	796
Bulky Goods		8,756*	292**	9,049
Scrap Metal			1,305	1,305
C&D Waste			3,242	3,242
Tires			367	367
Residential Residual Garbage		45,564.54	19,849	60,882
Blue Box Residual				6,217
Organics Residual				2,895
Total Waste Generation	12,288	194,976	28,826	236,117
Total Waste Diversion	12,288	148,090	8,129	168,507
Waste Diversion Rate	100%	76%	28%	71%

* Other recyclable waste is shown as bulky goods although it would be managed through several diversion programs.

** Refers to household items and gently used clothing deposited in the Salvation Army charitable donation containers located at each waste disposal site/transfer station.

It is generally unrealistic to expect 100% capture for all recyclable and compostable materials. Based on the current capture of recyclables and compostables and an analysis of the residual waste stream, it can be determined that the Region is currently achieving high capture rates in the existing waste diversion programs, particularly:

- 80% capture rate for blue box recyclables; and
- 62% capture rate for organics (leaf & yard and SSO).



By comparison, in their 2007 annual report, Stewardship Ontario reported that the recovery rate of Ontario's Blue Box Program in 2006 was estimated at 63%. Reliable and comparable provincial or national data for organic waste curbside collection programs is not currently available.

It is not surprising that the capture rate for blue box recyclables is higher than that for organics. The Blue Box Program is more mature than the Green Bin Program, and is well recognized and accepted. Also, many residents have real or preserved concerns with flies or maggots when separating SSO waste, or do not like the added cost of the biodegradable bags. It is therefore expected that it may be some time before the capture rates being achieved with the Blue Box Program are realized with the Green Bin Program.

Increasing waste diversion in existing programs must be a vital component of the Region's plan to reach 70% waste diversion. This includes waste diversion activities taking place at Regional transfer stations, which is further examined in Section 6.0. Potential modifications to the existing waste management system that will have a contribution and their projected impact on waste diversion are highlighted in Section 7.0 *Increasing Waste Diversion in Existing Programs – Current Activities* and Section 8.0 *Increasing Waste Diversion In Existing Programs – Additional Considerations*.

FINAL DRAFT



6.0 TRANSFER SITE INSPECTION

As noted in Section 3.0, 12% of the total residential waste stream generated in 2007 was dropped off at a Regional disposal/transfer site. Although there is considerable opportunity for the recovery of material at the transfer sites, only 28% of the waste is actually being recycled, while the rest of the material is deposited in bins as residual garbage, which is being sent to landfill.

A visual inspection of operations at the Oshawa and Port Perry Waste Transfer Sites was conducted on November 26, 2008. The objective of the site inspection was to:

- investigate the types of wastes being disposed of by residents at this waste disposal sites;
- evaluate visitor compliance with available waste diversion programs; and
- identify challenges to effective waste diversion.

Key observations from the waste disposal site survey's are detailed below. Site photographs are provided in Appendix B.

6.1 Waste Transfer Site Layout

Upon arrival at both the Oshawa and Port Perry waste transfer sites, vehicles pass over a weigh scale; the total vehicle weight and the material types (residual garbage, blue box recyclables, scrap metal, drywall, etc.) for drop-off are recorded. A tipping fee of \$120/tonne applies to both residual garbage and waste acceptable for diversion, whether or not the load is dedicated (i.e. contains only one on the waste types accepted) or mixed (i.e. contains a mixture of more than one of the waste types accepted). There is no charge for the drop off of dedicated loads of MHSW.

As vehicles proceed to the waste segregation area, a Site Attendant provides direction to the appropriate location(s) to unload. The unloading area is comprised of multiple waste segregation containers, which are numbered and dedicated to a specific material type, as indicated by posted signage. Residents disposing of mixed loads of waste must either walk or drive between different segregation containers in order to properly separate their residual garbage from waste acceptable for diversion. Once unloaded, vehicles pass over an outbound scale and the applicable tipping fee is calculated based on the net weight loss of the vehicle.

The Oshawa and Port Perry waste transfer sites are generally similar with respect to the types of waste accepted for disposal and diversion. The drop-off/pick-up facility for the Region's Paint Reuse Program is unique to the Oshawa waste transfer site, while the Port Perry waste transfer site's proximity to a rural farming community makes it an ideal location to host the Region's Bale Wrap recycling Program.

6.2 Transfer Site Disposal and Diversion Practices

At the time of the site survey, the residual garbage bin was observed to be the most commonly used disposal container by residents at both the Oshawa and Port Perry waste transfer sites. Waste observed in the residual garbage bin generally consisted of, but was not limited to, building materials, toys, furniture, carpeting, clothing, plastic containers, cardboard and opaque garbage bags. The largest amount of waste which could potentially be recovered and diverted was recyclable plastic containers, wood and cardboard materials. One possible explanation for the amount of cardboard boxes discarded into the general waste bin is that the cardboard boxes are used as a residents' handling/storage medium of their waste and is consequently thrown into the waste bin.

In addition to the items outlined above, reusable materials such as clothing, books and toys were observed within the residual garbage bins. The Oshawa waste transfer site supports a small used clothing and small household items "donation" bin. However, the bin is located near the exit of the site away from view and is not accessible to residents prior to exiting the scale area. A donation bin was not observed at the Port Perry waste transfer site.



The wood bin at the Oshawa waste transfer site was observed to be full at the time of the site survey. Metal and brass products were observed in the wood bin. These products could be recovered for scrap metal value, but were typically attached to other wood products.

A couple of practices were observed at the Oshawa waste transfer site that contributed to an increase in the capture of recoverable wastes. These included:

- A metal lattice grate (6"x6" squares) was constructed on the open top bins that were used for the collection of recyclable containers and fibres. This grate helped residents to properly de-bag blue box recyclables brought to the site;
- Site Attendants manually removed recoverable materials improperly disposed of by residents from the residual garbage bins; and
- A separate unloading area has been established at the Oshawa Transfer Station to manage large mixed loads of waste during periods of high traffic volumes. Vehicles directed to this separate area unload all of their wastes in a single area, to be sorted and disposed of at a later time by Regional Site Attendants as time provides, thus ensuring efficient traffic flows in the waste segregation area.

Although use of the Oshawa and Port Perry waste transfer sites is restricted to residents, Site Attendants commented that small construction businesses occasionally access the sites.

6.3 Factors Effecting Successful Waste Diversion

Factors effecting successful waste diversion at the Regional waste transfer sites include logistical challenges that hinder a resident's ability to effectively separate their waste, as well as resident lack of interest to participate.

Logistical constraints are most prevalent at the Oshawa wastes transfer site and could be partly related to the site's size and layout. During high traffic periods, space amongst the unloading zones is congested, particularly for vehicles reversing into the various unloading areas. Criss-cross vehicle traffic was noted by the Site Attendants as being common. This is attributed to the fact that not all material bin types are located on each side of the unloading zone. Residents must change parking spaces a second time (or more) in order to unload all of their respective waste types. Furthermore, Site Attendants commented that vehicles often park in front of the incorrect disposal bin, thus increasing the waiting time other visitors wanting to deposit material in that bin. Bin signage indicating acceptable waste types are small and difficult to read, and are only printed on one side so they are not visible from all locations in the site.

With the exception of dedicated loads of MHSW, the same tipping fee (\$120 per tonne) is charged for all material brought to the transfer stations whether or not the load is separated for recovery and diversion or mixed waste being deposited in the "garbage" bin. This does not provide any incentive for residents to separate out recyclable materials. The County of Simcoe has set a tipping fee schedule to specifically encourage residents to segregate recyclables. Their regular tipping fee is \$115 per tonne, however a fee of \$230 per tonne is charged for "mixed waste" that contains divertable material that has not been adequately sorted by material type and disposed of at the proper location by the customer.

The following factors are potential contributors to a lack of waste diversion at the waste transfer sites:

- Confusion - Lack of large signs to designate bins for segregated materials in the unloading area; multiple cars in a small area converging at limited waste bins; bins for specific waste are located only on one side of the unloading area thus the resident must drive to multiple locations; residents forgetting the waste bin numbers provided to them by the Site Attendant.
- Poor judgment or ignorance - Residents purposely disregard separating their waste at the facility due to time constraints (long wait time) and not wanting to drive or walk to different bins. In particular,



residents pay the same to drop off segregated waste or mixed waste. The Region may want to consider a reduced tipping fee if waste is properly segregated for recovery.

- Lack of Understanding: the resident is unaware or unsure of what materials can be recycled at the facility and therefore their waste is not separated prior to arriving on-site.
- There is no incentive for residents to separate materials that can be diverted from disposal. The Region may wish to implement a tiered tipping fee based on the amount of material that is segregated for material recovery.

6.4 Traffic Volume Analysis

A comparison of the monthly vehicle frequency at the waste transfer sites indicates that the Oshawa waste transfer site is receiving significantly greater traffic volumes in comparison to the Port Perry site. As indicated in Table 13, there were a total of 200,744 vehicle visits to the Oshawa waste transfer site in 2007, compared to 51,462 visits to Port Perry.

Table 13: Waste Transfer Site Vehicle Traffic Counts (2007)

Month	Brock	Oshawa	Pickering*	Port Perry	Total Vehicles (by month)
January	647	13,049	80	3,478	17,254
February	362	8,103	79	2,172	10,716
March	799	14,273	153	3,862	19,087
April	391	15,240	166	3,892	19,689
May	1,371	23,838	220	5,878	31,307
June	1,230	22,374	217	5,495	29,316
July	1,219	20,584	174	5,053	27,030
August	1,270	20,402	202	5,226	27,100
September	1,068	17,549	154	4,693	23,464
October	997	17,045	150	4,519	22,711
November	869	15,031	160	4,102	20,162
December	557	13,256	90	3,092	16,995
Total Vehicles (by Site)	11,360	200,744	1,801	51,462	265,367

* This Site accepts MHSW exclusively.

High traffic volumes at the Oshawa waste transfer site are likely a factor of its location. The Oshawa transfer station is located in the north Oshawa area, in close proximity to the majority of the Region's dense urban municipalities. Meanwhile, both the Port Perry and Brock waste transfer sites are located in rural settings with significantly lower surrounding population densities.

Based on the vehicle traffic information available, the peak season for residential drop off of waste occurs from May through August. During this four-month period, the Oshawa and Port Perry waste transfer sites received almost half of the total annual traffic (43% and 42%, respectively). Monthly traffic flows at all Region waste transfer sites (Pickering MHSW Depot excluded) are shown in Figure 10.

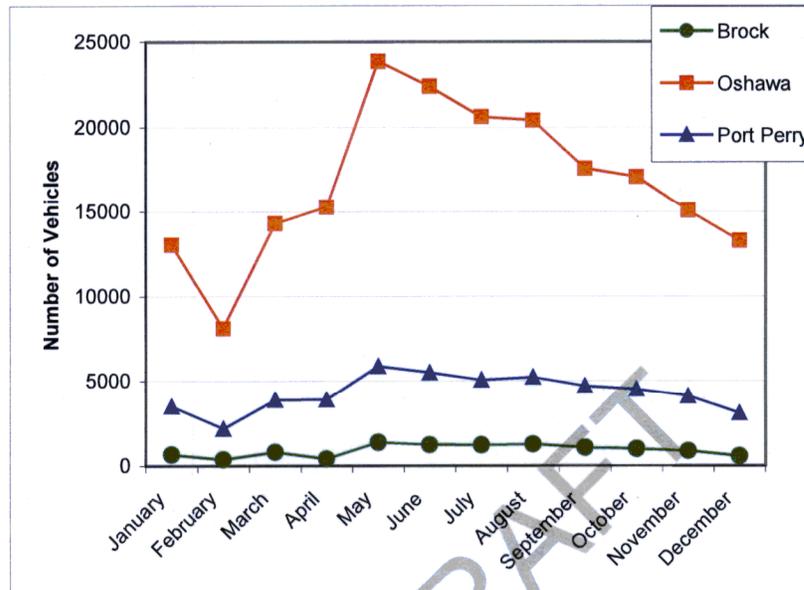
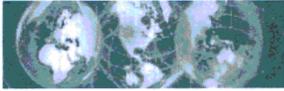


Figure 10: Monthly Vehicle Flow at Waste Transfer Sites (2007)

As cited by the Site Attendants, high traffic volumes at the waste transfer sites challenge efficient waste diversion practices. Logistical constraints as noted in Section 6.3 are heightened, and manual sorting by the Site Attendants becomes unmanageable. This is particularly prevalent at the Oshawa waste transfer site.

6.5 Private Transfer Sites

In addition to the waste disposal/transfer sites owned and operated by the Region, two private transfer sites are advertised for use on the Region's website and in the annual *Waste Management Calendar* publication. As shown in Table 14, a total of approximately 10,800 tonnes of residual garbage was accepted by these facilities in 2007.

Table 14: Private Waste Transfer Site Tonnages (2007)

Facility	Location	Tipping Fees	Residual Garbage Disposal (tonnes)
Miller Waste Systems, Pickering Transfer Station	City of Pickering	\$ 102/tonne	8,000
Waste Management Inc., Courtice Transfer Station	Municipality of Clarington	\$ 102/tonne; minimum charge of \$9.10.	2,800

In calculating overall residential waste diversion for the Region it is important to take into consideration these private facilities. These facilities may be more desirable for residential drop-off of waste for the following reasons:

- Their close proximity to the residents of the Municipality of the Clarington, Town of Ajax and City of Pickering; and
- Lower tipping fees.



A survey of other privately operated transfer stations located within the Region approved to accept residential waste revealed similar findings. For example, the Pebblestone Multi-Services Inc., located in the Town of Whitby accepts non-hazardous residential residual garbage and source separated organic waste for a tipping fee of \$70/tonne.

Of note, the tonnage of residual garbage disposed of by Regional residents at private transfer sites is not accounted for as part of the Municipal Datacall Residential GAP calculation. Taking into account the tonnages shown in Table 14 would result in a 2% decrease in the reported 2007 GAP analysis waste diversion rate for the Region.

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7.0 INCREASING WASTE DIVERSION IN EXISTING PROGRAMS – EDUCATION & ENGAGEMENT

Access to and use of waste diversion programs has increased in Ontario since the mid-1990's. As reported by Statistics Canada, 95% of Ontario households had access to a glass, paper, plastic and/or metal can recycling program in 2006, 98% of whom made use of at least once (2007²). This is backed by findings of a public opinion study prepared for the Resource Recovery Funding Board (RRFB) Nova Scotia, which found that 91% of respondents claimed that their household "always" participated in recycling (Bristol 2008). However, available performance data demonstrates that programs continue to fall short of maximizing diversion through municipal blue box, composting and other recovery systems.

As suggested by the *Blue Box Program Enhancement and Best Practices Assessment Project* ("Best Practices") (KPMG, 2007), after nearly 20 years of recycling services in Ontario most households are aware of the longstanding items eligible for diversion. The current challenges include keeping individuals engaged and motivated, and effectively educating households about items considered to be relatively new additions to waste diversion programming.

It has been widely recognized that effective promotion and education (P&E) is a critical component of a successful waste management strategy. In addition to higher recovery rates, effective P&E can contribute to reduced presence of unacceptable material types in waste diversion streams leading to increased collection efficiencies, improved processing efficiencies, decreased residue levels and higher marketing revenues.

According to Best Practices, a well planned approach to P&E that includes set goals, objectives and means of performance evaluation will provide focus to a community waste management strategy and contribute to setting priorities. In addition, an effective promotion and education program should consider design, deployment and funding. Design, deployment and funding in the context of Regional waste diversion programs are discussed in more detail below.

7.1 Design

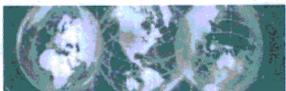
The communication of a clear message to an engaged audience is critical to the design of an effective P&E program. For the purposes of this report, our focus will turn towards the latter of these two design elements.

Investing in market research is one means of identifying a community's target audience. However, where budgetary constraints exist, Best Practices recommends that benefit can be realized from existing research and by gaining insight from the experience of others.

According to Best Practices, women have shown to be a particularly receptive audience for waste management messaging. The strong role that women play in households as primary recyclers is also emphasized by Praxis PR in their "Blue Box Program P&E Review Final Report" (August 2007).

The effect that children have on a household's waste management practices is not quite as clearly understood. While children may often be perceived to be a motivating force behind a household's engagement in waste diversion practice, Praxis PR notes that their impact may depend greatly on age. Educational programming targeting youth is widely established by municipalities and other interest groups across Canada.

On December 10, 2008, a youth workshop aimed at environmental sustainability was held by the Municipality of Clarington's Green Community Advisory Committee. The workshop served to establish a list of the top priorities for community-based environmental initiatives. Elements of waste management comprised the top three priorities established by the twenty five high school students and teachers in attendance, representing four of the community high schools. Concerns raised were specific to the factors constraining their school's desire to maximize waste diversion, including their exclusion from Regional collection service, the low level of service



provided by their private waste management service providers, and a lack of available funds for waste management initiatives (e.g. composting; hazardous waste pick-up; reusable dishware in school cafeterias).

7.2 Deployment

In embarking on a P&E strategy, best practices recommend an integrated communications campaign that utilizes a variety of media formats with both sustained and targeted messaging. Communications mediums utilized by the Region include radio, television and newspaper advertising, as well as promotion and education materials (e.g. pamphlets, annual collection calendar) made available at municipal centres, municipally attended events and distributed by mail.

A quick evaluation of audience sizes targeted by the mass media types used by the Region indicates that newspaper media reaches the greatest number of Region citizens, as summarized in Table 15.

Table 15: Mass Media Audience Sizes Within the Region of Durham

Media Type	Reported Audience	Audience Size ¹ (approx. # of people)
Newspaper:		
Metroland Media Group	176,950 households weekly	513,155
Oshawa Express	35,000 households weekly	101,500
Scugog Standard	35,000 households weekly	101,500
Radio:		
(Durham Radio Inc. - 94.9 The Rock, KX96, CKDO)	127,100 listeners aged >12 weekly	127,100
Television:		
(Chex Channel 12 TV; Rogers Cable TV)	124,000 households ²	359,600

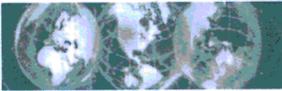
¹ Based on an average household size of 2.9 (Statistics Canada 2006 Census)

² Exact viewing audience data is unavailable. The reported audience size represents the number of households within the Region having cable television services in their home.

Based on the results of the residential survey, a strong preference for information pamphlets sent in the mail and the Region's Waste Management Calendars was indicated over radio and newspaper advertisements. The Region's Waste Management Calendars are published just once a year, however they are distributed to every single family and multi residential household and are used throughout the year.

Similar findings were revealed by the public opinion survey completed for the Resource Recovery Funding Board (RRFB) Nova Scotia. When questioned on their preferred sources of information about household recycling and composting, 59% of respondents stipulated flyers and information sheets as their first choice. However, unlike the results of the Region's survey, RRFB Nova Scotia respondents had a clear distaste for distribution by mail, which appealed to only 8% of respondents. Although only 17% of the RRFB public opinion survey respondents preferred to newspaper communications, newsprint surpassed respondent preference for both television (9%) and radio (2%).

Public education centres can offer a different, more personalized approach to P&E. The development of a waste management-focused education centre is currently being undertaken by the Regional Municipality of York, who will open the doors to their first of three Community Environment Centres sometime this year. In addition to complimenting their P&E efforts, residents are able to drop off materials that are difficult or inappropriate to dispose of at the curb, including reusable goods, building materials and WEEE, concurrently increasing access to the areas waste management system.



An education centre specifically targeted for promotion and education of waste diversion initiatives would be an ideal compliment to the Region's waste diversion efforts. It is suggested that the Education centre be set up at the Region's Material Recovery Facility (MRF) so that residents and school groups can obtain information regarding the Region's waste diversion programs and tour the MRF to view first-hand the importance of properly segregating their recyclables.

7.3 Promotion & Education Expenditures

According to the Best Practices comparison of P&E costs in Ontario municipalities that achieve at least 60% recovery levels, these municipalities spend an average of \$0.83 to \$1.18/household/year on promotion and education for their waste management programs.

A US Curbside Value Partnership study uses \$1/household/year as a general spending guide for existing recycling programs, but recommends \$3 - \$4/household for the implementation of a new program. Other research performed in the United States found that an increase in P&E expenditures of \$1.00/household/year could yield an increase in 1% in the recycling rate for communities with already high P&E expenditures³.

In 2007, the waste diversion promotion and education expenditures for the Region were \$270,000, or \$0.75 per household. This cost was utilized as follows:

- 33% for radio advertising;
- 1% for television advertising;
- 59% for newspaper advertising; and
- 7% for promotion and education materials.

It is apparent that the Region is spending slightly less on P&E than is recommended in various best practices studies. It may be worthwhile for the Region to complete a detailed P&E review, with a goal of ensuring that the P&E expenditures are sufficient and are being allocated efficiently and effectively.

One of the challenges of conducting an effective P&E program in the Region is the Region's close proximity to the City of Toronto. Many residents in the Region access media from Toronto, which promote different waste diversion programs from those in Durham. Other challenges to keep in mind when completing a detailed review of the P&E program are the variation of urban versus rural communities existing in the Region and potential language barriers that may exist for residents that do not have English as their first language.

7.4 Recognition and Reward Programs

A variation on the "polluter pays" concept that is the basis of allocating user fees for residual garbage is the concept of "recycler's win". The objective of the recycler's win concept is to recognize and reward households that fully participate in waste diversion programs. By providing an incentive (i.e. acknowledgement or compensation) recognition and reward programs can be successful in engaging households.

Two interesting examples of programs that recognize and reward waste diversion are:

- The City of Hamilton "Gold Box" Program; and
- The RecycleBank Program.

³ Evaluation the Impacts of Recycling/Diversion Education Programs – Effective Methods and Optimizing Expenditures, Iowa DNR, 2002



Gold Box Program

The stated goal of the City of Hamilton Gold Box Program is to reward and recognize residents putting forth their best efforts to divert recyclables and compostables. Each month a grand prize winner receives a cheque for \$140 and two gold recycling boxes, and each runner-up household receives two gold recycling boxes.

Residents wishing to participate fill in an entry form on-line or in person. By entering the contest, the householder agrees to the collection and sorting of their blue box material, SSO waste and residual garbage. Each month, six properties are randomly selected to have their waste audited. The waste is sorted and weighed to determine the amount of waste each household has diverted from landfill. In order to be declared a winner, the household must meet or exceed the City's waste diversion target of 65%. The grand prize of \$140 and two gold recycling boxes is awarded to the household that diverts the most waste. All other households that divert a minimum of 65% of the total waste set out receive two gold recycling boxes. All winning households are recognized in the local media and by City Council.

A means of evaluating the impact of this program on overall waste diversion within the City of Hamilton is unavailable. Since implementation in 2007, 3,500 households have voluntarily registered for the program, 225 audits have been completed and 212 gold boxes have been awarded.

The annual cost for the City of Hamilton Gold Box program is estimated to be \$30,000, as outlined in Table 16.

Table 16: City of Hamilton Gold Box Program Costs Summary

Expenditure Type	Description	Estimated Annual Cost
Awards	2 x \$140 awards per month	\$3,360
Gold Box	Maximum 50 awarded per month at a cost of \$5 per box	\$3,000
Waste Auditing	Estimated \$1,500 monthly for contracted waste audit services	\$18,000
Education & Promotion	Web-site maintenance, combined promotion with other programs	\$1,000
Administration	Program coordination and communications with public	\$5,000

RecycleBank

Municipalities that participate in the RecycleBank program (see recyclebank.com) allow residents to accumulate credit for the weight of the material that they recycle. The weight of the recyclables set out by each household is scanned and recorded through a computer chip embedded in the 35 or 64 gallon recycling bins when they are tipped into the collection vehicles. The credit can be exchanged for coupons at various businesses, such as Home Depot, Starbucks and Sears. RecycleBank charges the municipality a fee to administer the program.

RecycleBank started in 2004 as a pilot project involving 2,500 households in Philadelphia, and has spread to service over one hundred municipalities in 14 states.

The RecycleBank reward program would likely not be feasible for the Region to implement in isolation due to the cost to the municipality, however it may be considered in conjunction with the implementation of a user pay program. In this way the revenue from the user pay program would fund the expense of the RecycleBank program.



7.5 Environmental Benefit Messaging

The Ontario Ministry of Energy and Infrastructure has been very effective using the Powerwise commercials featuring David Suzuki. These messages tie into society's awareness of the global warming issue. The Region could initiate a campaign demonstrating to residents the greenhouse gas benefits of recycling instead of disposing of waste.

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8.0 INCREASING WASTE DIVERSION IN EXISTING PROGRAMS – CURRENT ACTIVITIES

Having recognized the relationship between achieving the Region's 70% waste diversion target and the participation of waste generators, the Region has begun undertaking a series of waste management system modifications intended to further stimulate households. These modifications include policy mechanisms and incentive programs, or a combination thereof, that serve to stimulate long term behavioural change, such as:

- modified collection schedules; and
- user pay programs.

Each of these mechanisms/ programs and their degree of implementation within the Region are described in more detail in the following sections.

8.1 Modified Collection Schedules

A modified waste collection schedule that makes it more convenient for households to divert waste and less convenient for households to send waste to landfill is endorsed by Best Practices. By reducing residual garbage collection frequencies households are driven to reduce, reuse or recycle rather than bear the cost of waste disposal site tipping fees or bag tags (where user pay requirements are in effect).

While SSO collection across the Region occurs on a weekly basis, blue box and residual garbage collection frequencies vary (refer to Table 2 and Table 5, respectively). Currently, four Regional municipalities are serviced with bi-weekly collection of recyclables and weekly collection of residual garbage. The remainder underwent service level changes in 2006 and now receive weekly blue box recycling and bi-weekly residual garbage collection.

A comparative analysis of the recovery rates of blue box recyclables and SSO waste pre-and post implementation of the 2006 service level changes was completed by the Region. Based on historical program trends experienced in areas of the Region that already have modified collection schedules, the Region estimates the following:

- a 20 – 25% annual increase in blue box tonnages;
- a 5% annual increase in SSO tonnages; and
- a 20 – 25% annual decrease in residual garbage tonnages.

In 2008, the Region issued and awarded a tender for the curbside collection of non-hazardous residual garbage, recyclables and organic wastes from residents in the municipalities that have not yet transitioned to the modified levels of collection services (Township of Brock, Municipality of Clarington, Township of Scugog, and Township of Uxbridge). Effective March 31, 2009, collection services provided in these areas will come on-line with the bi-weekly residual garbage and weekly blue box recycling collection frequencies previously instated in Ajax, Oshawa, Pickering, and Whitby. As specified in the Region's tender number T-434-2008, approximately 10,827 tonnes of blue box recyclables, 2,990 tonnes of SSO waste, and 23,568 tonnes of residual garbage was collected from these four remaining municipalities during 2007.

Based on the waste diversion expectations estimated from the modified collection frequency study and 2007 collection tonnages, an additional 2,165 – 2,707 tonnes per year of blue box recyclables and 150 tonnes per year of SSO waste could be added to current waste diversion tonnages given a Region-wide bi-weekly residual garbage, weekly recycling and weekly SSO collection strategy. In addition, the overall waste residual quantities would decrease by 20-25%, or approximately 5,500 tonnes. **This would equate to a 1.7% increase in waste diversion from a modified collection schedule.**



8.2 User Pay Program

A user-pay waste program is based on a “polluter pays” principle, where residents pay a direct fee for the quantity of waste set out. The objective of the program is to provide an incentive for residents to decrease the amount of waste they generate and to increase their participation in waste diversion programs. A partial user pay program allows for a maximum number of bags to be set out on a weekly, bi-weekly, or annual basis, with a fee for all additional bags. With a full user pay program, residents pay for each bag of waste being set out.

In a study completed by the Association of Municipal Recycling Coordinators (AMRC) it was found that in 2008, nearly 45% of the households in the province paid directly to dispose of at least some of their waste.

Typically with a user pay program, residents are required to purchase a tag or sticker to be placed on the garbage bags. The City of Toronto has implemented a volume based garbage system where residents are charged based on the size of garage carts they use. The user fee can be established to fund the cost for the delivery of a portion of the waste management services (e.g. waste collection), or all of the waste collection, diversion and disposal costs. A study completed by the County of Northumberland in 2004 found that the user fees required to fund the waste management system were as follows:

- A fee of \$2.00 per bag of garbage would cover the cost of collection of garbage and recycling;
- A fee of \$2.60 per bag of garbage would cover the cost of collection of garbage and recycling and garbage disposal; and
- A fee of \$3.50 per bag of garbage would cover the cost of collection of garbage and recycling, garbage disposal and recycling processing.

A full user pay program or a partial user pay program with a very limited number of “free” bags provides the greatest incentive to reduce waste. It was found that recycling tonnages increases ranged from 22% to 86% and waste tonnages decreases ranged from 6% to 61% following implementation of user pay systems in six Ontario municipalities that allowed 1 or no free bags per week⁴.

When a municipality implements a user pay program they may decide to remove the corresponding cost for waste services from the general tax levy. Otherwise, the revenue received for the sale of bag tags may be utilized to fund new waste diversion programs. The costs to administer a user pay program vary depending on how the tags are distributed, but are generally not significant.

While making individuals 100% responsible for their own residual garbage is very effective in reducing waste, the Region is in the process implementing (refer to Section 8.0) and investigating (refer to Section 9.0 and Section 10.0) numerous additional means of further engaging residents in effective waste diversion. Until the Region is able to evaluate the effect of these program adjustments, implementation of a full user pay program should be postponed.

⁴ An Analysis of User Pay System Costs in Ontario, AMRC (September 2008)



9.0 INCREASING WASTE DIVERSION IN EXISTING PROGRAMS – ADDITIONAL CONSIDERATIONS

In addition to being supported by an appropriately designed and funded promotion and education program, achieving the Region's 70% diversion target remains dependant upon the participation of waste generators. Additional strategies not yet implemented in the Region that can contribute to increased participation in existing waste diversion programs include:

- reduced set-out limits
- modified blue box equipment;
- expanded waste collection bans;
- waste disposal policies;
- additional WEEE Event Days; and
- transfer station modifications.

Each of these new strategies are described in more detail in the following sections.

9.1 Reduced Set-Out Limits

Set-out limits, or bag limits, are now common place throughout Ontario. This incentive program establishes a limit with respect to the quantity of waste that will be accepted for curbside collection. Bags set out for collection exceeding the established bag limit are left behind. Imposed limits are typically restricted to residual garbage collection services, while unlimited quantities of diverted wastes are accommodated. Through this stimulus, waste reduction and diversion opportunities become an attractive alternative to seeking out other residual garbage disposal options, which often bear an associated cost.

According to Best Practices, the implementation of bag limits of less than three per week generally provides sufficient incentive for residents to change their waste disposal practices. This evaluation is based on the fact that households typically set out 2 – 3 bags per household on a weekly basis. Bag limits of 3 or more bags per week do not provide any incentive to the resident to change their habits. By making residual garbage disposal an inconvenience, the attractiveness of waste reduction and diversion improves.

When considering the implementation of set-out limits, collection providers are cautioned to be aware of the importance of adequate quality control in order to avoid increased contamination levels in waste diversion program. "Amnesty days" are suggested by Best Practices as a means of accommodating seasonal peaks in household residual garbage generation (e.g. spring cleaning).

As discussed in Section 2.1.5, bag limits are already in effect throughout the Region. While set-out limits imposed upon residents of the Town of Ajax, City of Oshawa, City of Pickering and Town of Whitby are aligned with Best Practices (four bag limit for each bi weekly collection event), the residents of the Municipality of Clarington and the Townships of Brock, Scugog and Uxbridge are permitted to set out a maximum of three bags each week. Effective March 31, 2009 service level changes are scheduled to take effect within the Region. After this time, all Regional households will be subject to the set-out policy already underway in the Towns of Ajax and Whitby, and the City of Oshawa and Pickering. Additional bags over the established bag limit will require residents to purchase bag tags from the municipality or to transport their residual garbage to a local waste disposal site for disposal in exchange for the applicable tipping fee.

It is important to continually evaluate whether the established bag limit continues to serve as a disincentive for disposal. Based on the results of the residential survey, 83% of Region respondents reported that they put out 2 or less bags of residual garbage each week. As such, the implementation of a bag limit that is lower than two



bags per week (or four bags biweekly) may require future consideration by the Region in order to ensure sufficient incentive for further waste diversion efforts.

In order to achieve the objective of increasing participation in diversion programs and decreasing waste generation, it is important that the set-out limits be consistently enforced. Oftentimes municipalities give in to pressure from residents or politicians to “just get the waste off the street”, and therefore do not stringently enforce the limits. This undermines the credibility of the program and frustrates the collection crews that are then uncertain whether or not to leave the additional bags behind.

Because bag limit strategies have commonly been implemented throughout Ontario and North America simultaneously with user pay programs (discussed in Section 8.2), comparative data for evaluation of the impact of this single stimulus on waste diversion within the Region is difficult. Information available from the City of Peterborough offers some means of evaluation.

Beginning in 1989, residents of the City of Peterborough began transitioning from an 18 bag limit to a 3 bag limit in 1994 and a 2 bag/week limit in 1995. Households that exceeded the two bag limit were required to store waste until a subsequent collection period, or drop the excess residual garbage at the local landfill for a fee. Based on a review of disposal tonnages at the local landfill site (which also accepts waste from the Industrial, Commercial and Institutional sector) between the year prior to implementation of the two bag limit and the five years following implementation of the two bag limit, average changes in waste disposal and diversion included:

- an average decrease in waste disposal of 15%; and
- an average increase in recycling of 23%

It is important to note that the City of Peterborough does not offer an SSO program, with the exception of yard waste composting. Furthermore, the implementation of the residential bag limit coincided with a 4 bag limit on eligible businesses receiving curbside service. The results do account for the respective contributions to increased waste diversion between the residential and commercial sectors.

Applying a 15% decrease in residential waste disposal to 2007 waste tonnages disposed of by the four Regional municipalities currently permitted three bags on a weekly basis, a 2,469 tonne increase in blue box recyclables and a 3,422 tonne decrease in waste disposal could be expected from a Regional-wide strategy minimizing waste generation to two bags per week (collected as four bags on a bi-weekly basis). **This would equate to a 1.2% increase in waste diversion.** Additional waste diversion may be realized with a further reduction in set-out limits.

9.2 Modified Blue Box Equipment

Once considered an industry standard, the 14 gallon blue box container is now being looked at as a potential challenge to effective participation in municipal recycling programs. Increased public education and engagement, increased consumption of packaged goods, and diversifying markets for secondary commodities are all contributing factors to rising volumes of blue box recyclables. A single blue box container (or two containers where two-stream collection systems exist) may no longer provide households with sufficient storage capacity between collection days. Although making available for purchase additional standard sized blue boxes provides households with a solution, insufficient disposal capacity may instead lead to the disposal of readily recyclable waste in the garbage.

In accordance with the recommendations of Best Practices, an increasing number of municipalities are undertaking capacity studies and evaluating the effectiveness of alternative collection equipment on program capture rates. The experiences of the Region of York and the Essex Windsor Solid Waste Authority are summarized below.



During February and March 2008, the Region of York tested the effectiveness of two alternative container systems to optimize capture in the existing Blue Box Programs of two local municipalities; the Town of Richmond, which collects blue box materials on a weekly basis, and the Township of King, with bi-weekly blue box collection. Initially, a 121 litre (27 gallon) wheeled container was distributed to each of the chose participants. The wheeled container served to replace the standard blue box, which was only to be used to facilitate any overflow from the larger grey equipment. Following a brief study period, a secondary study was undertaken. Use of the standard blue box was reinstated, and participants were provided with clear blue plastic bags to manage all overflow. Neither alternative container systems necessitated modification to the recycling collection vehicles. The estimated cost of the trial equipment is approximately \$20, (\$15/wheeled cart/households plus \$5/package of clear blue plastic bags/household).

As reported by the Region of York (Council Meeting, September 18, 2008), the majority of study area households indicated a strong preference for the use of the wheeled containers, as they were easier to use. Evaluation of the effect of the alternative collection systems on overall capture of blue box waste did not reveal either a positive or negative effect. This may be attributed to the duration of the study, which ran for only a four week period each in two separate study locations. However, the results of focus groups and participant surveyed indicated that residents believed they could increase their contribution of recyclables to the Blue Box Program if the larger wheeled carts were made available for use on a permanent basis. Of note, the collection contractors involved in the study expressed a preference for the use of the clear bags, which were quicker to load into the vehicle and better facilitated the identification of unacceptable blue box wastes.

A more comprehensive examination of a cart-based collection system has recently been completed by the Essex-Windsor Solid Waste Authority (December 2008). In response to issues relating to litter caused by overflowing set-out containers, the use of two 35 gallon roll-out carts, one for the collection of paper fibre and one for the collection of containers, was tested by almost five hundred households. The pilot project revealed a 9% increase in participation in the two-stream curbside recycling program and an 8% increase in the capture rate for acceptable recyclable wastes. Furthermore, participants expressed strong support for permanent use of the roll-out carts as they were easier to use.

In order to facilitate collection of the larger, heavier containers during the Essex-Windsor Solid Waste Authority study, a semi-automated collection system was required. Based on the results of time studies conducted to assess the time difference between collecting recyclables set out in roll-out carts versus collecting recyclables set out in the standard 14 gallon containers, the roll-out carts contributed to a 200% increase in collection times. The estimated equipment costs for the study include approximately \$37.50 each for roll-out carts, plus the cost of adaptation to a semi-automated system. Of note, the Essex-Windsor Solid Waste Authority 2-stream recycling program operates on a bi-weekly schedule.

If the performance increase observed in the Essex-Windsor Solid Waste Authority study (**9% increase in waste diversion**) is applied to the blue box collection tonnages recorded by the Region of Durham during 2007, approximately 12,400 tonnes of additional blue box material marketed.

In the Region, one complimentary standard 14 gallon open top blue box container is provided to new residents to facilitate participation in the Blue Box Program. Replacement blue boxes are available free of charge in the event of ordinary wear and tear within the five year warranty period. Additional 14 gallon containers and larger 16 gallon open top blue boxes are available for purchase.

Given the Region's two-stream recycling system, residents are required to purchase at least one additional collection container in order to participate in the program. Subsidizing the cost or providing free blue boxes to residents may be an effective way to provide additional storage capacity for recyclables. As indicated in Table 17, the estimated initial capital costs associated with the provision of one larger capacity collection container within the Region to each single family household (approximately 180,000 units) is estimated to be \$1.3 million to \$9 million depending on container size.



Table 17: Program Implementation Cost Comparison for Larger Capacity Blue Box Equipment

Cost Type	Unit Cost (approx.)	Total Cost (\$)	Annual Debenture for Capital Costs (10 years @ 5% interest compounded annually)
Open Top Collection Container (18 gallon)	\$7.00	\$1,260,000	\$163,176
Open Top Collection Container (24 gallon)	\$10.00	\$1,800,000	\$233,108
Roll-Out Cart (35 gallon)	\$40.00	\$7,200,000	\$932,433
Roll-Out Cart (65 gallon)	\$50.00	\$9,000,000	\$1,165,541

As noted in the Essex-Windsor Solid Waste Authority study, the roll-out containers contributed to as much as a 200% increase in collection times. Assuming a need for a recycling vehicle fleet double the size of the current fleet and a 100% increase in blue box collection operating costs, this would amount to annual blue box curbside collection contract costs totalling approximately \$13,127,000⁵.

When evaluating the cost of providing higher capacity collection containers against the incremental effect on overall waste diversion, it is important that the Region also consider the degree to which capacity issues negatively effect waste diversion participation and capture in the Region. Of note, only 17% of respondents to the residential survey (refer to Section 4.0) indicated that the provision of larger blue boxes may serve as a motivating factor to increase their participation. Capacity concerns may diminish as weekly collection of blue box recyclables takes effect Region-wide this April.

Business Case for Distribution of Larger Blue Boxes

It is anticipated that higher efficiency and effectiveness will be achieved by the provision of one additional complimentary large (e.g. 18 gallon) open top blue box to each single family household. This would serve to better facilitate the existing two-stream collection system, while keeping costs to a minimum. Doing so may also provide an ideal opportunity to further engage and educate households on the Region's Blue Box Program. However, recycling container needs vary based on a number of factors including the homeowner's preference, family size, consumer habits and available storage space. Therefore, the Region may wish to offer alternative containers in various sizes to residents for a fee.

Although there is a capital cost to provide an additional blue box to every household in the Region, the increased capture of recyclables would provide significant ongoing cost savings for the Region. WDO funding is available for both the capital cost of the blue boxes and the processing costs for the additional recyclables collected.

It is reasonable to expect that the provision of an additional blue box to each household would result in the capture of an additional 4,700 tonnes of recyclables a year (a 2% increase in overall diversion). Table 18 outlines the overall cost implications to the Region resulting from the additional recyclables that would be recovered from residents.

⁵ 2007 WDO Datacall



Table 18: Estimated Cost Savings for Providing Larger Capacity Recycling Collection Container

Cost Type	Comments	Cost Implications	
		Credits	Debits
Avoided Cost of Disposal	4700@ \$80/tonne	\$376,000	
Cost to Process Additional Recyclables	4700@ \$50/tonne		\$235,000
Annual Revenue from Material Sold	4700 @ \$50/tonne	\$235,000	
Annual WDO Funding	4700@ \$53/tonne	\$250,000	
Total Annual Cost Savings		\$626,000	

In the Region, the cost for disposal of waste exceeds the cost for processing recyclables. If more recyclables are captured and processed, the Region saves money by avoiding disposal costs. The Region also receives revenue for the materials marketed through the blue box program. The average per tonne revenue for the "basket of goods" collected in Ontario blue box programs averaged \$132 per tonne for the five year period between 2004 and 2008⁶. In recent months, material revenues for recyclables have decreased to an average of \$50 per tonne. Although it is expected that material revenues will increase when the economy recovers, for the sake of this analysis, a conservative revenue of \$50 per tonne has been utilized.

The Region also receives WDO funding from the producers of materials that are collected in the Blue Box Program. The Region will receive \$2,654,276 in WDO funding in 2009 based on the cost of recycling 50,000 tonnes of material in 2007. This equates to \$53 per tonne for WDO funding for recycling, which has been taken into account in the analysis.

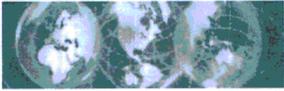
As indicated in Table 17, the cost to provide 18 gallon blue boxes to each household in the Region is \$1,260,000. This capital cost is eligible for 50% WDO funding from the producers of the blue box materials, bringing the net cost for the Region to \$630,000. As shown in Table 18, the annual overall cost savings to the Region for capturing an additional 4700 tonnes per year of recyclables is \$626,000. Therefore the payback for the capital cost of providing the additional blue boxes is just over one year. Not only does the provision of an additional blue box per household increase the waste diversion rate for the Region, it is an excellent financial investment.

9.3 Expanded Waste Collection Bans

Waste collection bans target the portion of readily divertable waste not being captured through voluntary household participation in available alternative waste management programs. In doing so, enforcement is dependant on the waste being visible for inspection (e.g. blue box recyclables that are placed loose in the blue bin). Most commonly, the implementation of this strategy is reliant on the waste collector to refuse the collection of waste that is not properly sorted.

In an effort to expand the extent of waste collection bans, clear bag policies that require residents to set-out their residual garbage in transparent bags are being implemented by waste management authorities. Replacing the common opaque (black/green) residual garbage bag with a bag that is transparent allows for greater ease of enforcing the use of waste diversion programs and reduces overall residual garbage tonnages.

⁶ CSR The Price Sheet



Municipalities in the province of Nova Scotia, where provincial law prohibits the landfill disposal of recyclable, compostable or household hazardous wastes, were amongst the first in Canada to launch clear bag collection strategies. Greater than half of the Nova Scotia municipalities currently have clear bag programs in place. Data collected for 13 of these municipalities since 2005 has shown significant positive effects on waste diversion, including:

- a decrease in residential residual garbage of 41%;
- an increase in recycling tonnage of 35%; and
- an increase in organics tonnage of 38%.

In evaluating the effect of clear bag policies on increased waste diversion in other municipalities, it is important to note that other initiatives, including user pay, bag limits or SSO diversion introduced simultaneously may also be attributable to any observed improvements.

Research conducted by Quinte Waste Solutions through Stewardship Ontario's Effectiveness and Efficiency Fund details the results of multiple clear bag programs in Canada, the results of which can be attributed as directly related to the implementation of a clear bag policy (Quinte Waste Solutions, 2008). This is due to the fact that the implementation of other waste diversion strategies pre-dates the initiation of the clear bag program. Program results, which according to the Quinte Waste Solutions study can be directly attributable to clear bag requirements, demonstrate improved program efficiencies ranging as follows:

- 25% to 37% decreases in residential garbage tonnages;
- 12% to 100% increase in residential recycling tonnages; and
- 24% to 27% increases in residential organics tonnages.

In order to consider the effects of Region-wide implementation, the performance results reported in Nova Scotia have been applied. Based on the results of an analysis of the Region's 2007 waste generation data and the low range of performance improvements cited in the Quinte Waste Solutions study (as outlined above), approximately 24,000 tonnes of residual garbage per year may be removed from the Region's residual garbage stream. Furthermore, an additional 17,000 tonnes of waste per year could be captured for either recycling or composting. **This would equate to a 1.28% increase in waste diversion from a clear bag policy.**

9.4 Waste Disposal Policies

Waste disposal policies, like waste collection bans, target the portion of readily divertable waste not being captured through voluntary household participation in available 3R's programming. Through the enactment of by-laws, the potential punitive implications of waste disposal policies for residents extend beyond that imposed by a refusal of waste collection services.

Section 11 of the *Municipal Act, 2001*, provides that a lower-tier municipality and an upper-tier municipality may pass by-laws respecting matters within specific spheres of jurisdiction including but not limited to waste management. Across Ontario's, waste management by-laws encompassing various aspects of municipal waste management systems are now common. Table 19 provides a summary of by-laws enacted amongst WDO's Urban Regional Municipal Grouping of provincial municipalities at the upper-tier municipality level, including the Region, and the general scope of application.

As indicated in Table 19, waste management by-laws within the Region have been enacted at the lower-tier municipal level. Ajax, Oshawa, Whitby and Pickering have varying policies respecting the source separation, preparation, collection and disposal of waste, some of which are now out of date as waste management responsibilities have shifted towards increasing Regional authority. Waste by-laws enforceable in the Townships of Brock, Scugog and Uxbridge, and the Municipality of Clarington are specific to the control of litter and debris. A public consultation process for a Regional Solid Waste Collection By-Law will soon be beginning in the



Region. Many of the policy principles found in solid waste by-laws of other major provincial municipalities and highlighted in Table 19 will be considered, including mandated source separation.

In order for By-laws to effectively encourage behavioural change in the community, they must be enforced. Active enforcement (i.e. rather than operating on a complaints basis) coupled with appropriate penalties mandate behavioural change. Maximum penalties for individual enforced by WDO Urban Regional municipalities at the upper-tier government level range from \$ 5,000 to \$100,000, as shown in Table 19.

In comparison to waste collection bans enforced by the collection authority or its representatives, enforcement by means of a by-law strategy may be more consistent. Furthermore, by-law enforcement officers have the training and tools to manage potential conflict with residents. The enforcement of waste disposal policies is limited to processes where the waste is visible for inspection by the waste collector, disposal authority or a by-law enforcement officer. Clear bag policies, such as the program currently being pilot tested in the Region (refer to Section 9.3), will expand the scope of enforcement for municipal by-law officers.

Recognizing the importance of consistent and active enforcement, the Region is undertaking a hiring process for two dedicated waste management enforcement officers. However, in taking into consideration the Region's size and the number of households, two additional enforcement officers is recommended at a total annual operating cost of approximately \$132,000 annually (\$66,000 / year salary) and a capital cost of approximately \$80,000 for additional enforcement vehicles. Although the effect of dedicated by-law officers on waste diversion is difficult to quantify, it is reasonable to assume that consistent enforcement will augment program capture rate goals.

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Table 19: Summary of Waste Management By-Laws Enacted by WDO Urban Regional Municipalities in Ontario

Regional Municipality	By-Law	Levels of Service	Material-Specific Collection Prohibitions	Source Separation Mandate	Waste Preparation Standards	Waste Receptacle Standards	Collection Guidelines (e.g. set-out time, location)	Conditions Governing Drop-off Locations (e.g. landfill)	Scavenging	Penalties & Enforcement *
Durham, Regional Municipality of	N/A – enacted by lower-tier municipalities	-	-	-	-	-	-	-	-	-
Essex-Windsor Solid Waste Authority	N/A – enacted by lower-tier municipalities	-	-	-	-	-	-	-	-	-
Niagara, Regional Municipality of	By-Law No. 95-2008, <i>A By-Law to Regulate the Use of the Solid Waste Management System for the Regional Municipality of Niagara</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓ (\$100,000)
Ottawa, City of	By-Law No. 2006-300, <i>Solid Waste Management</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓ (\$20,000)**
Simcoe, County of	N/A – enacted by lower-tier municipalities	-	-	-	-	-	-	-	-	-
Waterloo, Regional Municipality of	By-Law No. 02-011, <i>By-Law to Prohibit and Regulate the Collection of Waste</i>	X	✓	X	✓	✓	✓	X	X	✓ (\$5,000)

* Maximum fine an individual is liable for under the corresponding By-Law if that individual contravenes a provision and is convicted of the offence.

** Liable for not more than \$10,000 for the first offence and not more than \$20,000 for the second offence.



9.5 Additional WEEE Event Days

In addition to voluntarily facilitating the diversion of WEEE through a depot system at Region Waste Disposal/Transfer Sites, the Region has hosted several "mobile" community collection events since 2006. In 2007, 11.6 tonnes of WEEE, consisting primarily of information technology (e.g. desktop computers, lap tops and printers) and audio-visual (e.g. televisions) equipment, was collected at four collection events hosted by the Townships of Brock and Scugog, the Municipality of Clarington and the City of Oshawa.

As summarized in Table 20, a comparison of diversion performance at the Region's waste disposal/transfer sites versus community collection events indicates increased incoming tonnages at the special event days. When averaged over a one year period, receiving rates at mobile events for 2007 are approximately double the average daily collection rates for the depot system.

Table 20: Comparison of Average Daily Collection Rates for WEEE Collection via Regional Waste Diversion Programs (2007)

Collection Method	# of Collection Days	Quantity of WEEE Received (tonnes)	Average Daily Collection Rate (tonnes/day)
Waste Disposal/Transfer Site	260	362.35	1.39
Community Event Days	4.0	11.23	2.81

Higher collection rates at community event days are likely a function of accessibility. Although cost savings can be realized by taking a cooperative approach to WEEE collection and utilizing a permanent location such as a transfer station or materials recycling facility as a depot site, these facilities may be inconvenient to many residents who do not frequent Regional Waste Disposal/Transfer Sites. Instead, WEEE may be either disposed of as residual garbage, or stored for disposal at a later time.

On December 14, 2004, the Ontario Minister of the Environment filed *Ontario Regulation 393/04* (O. Reg. 393/04) under the *Waste Diversion Act, 2002* designating WEEE. Following the subsequent issue of the WEEE Program Request Letter from the Minister of the Environment and an extensive stakeholder consultation process, the WEEE Program Plan was developed by the appointed Industry Funding Organization, OES. On July 9, 2008 the WEEE Program Plan received approval from the Minister of the Environment.

The WEEE Program aims to achieve environmental stewardship and responsible management of WEEE materials in Ontario. It sets out how obligated organizations (the brand owners, first importers and/or assemblers of non-branded products for sale and use in Ontario) that result in WEEE are specified and serve as Stewards under the program. The WEEE Program will be implemented in phase. Phase 1 materials include information technology, telecommunications and audiovisual equipment, each of which is currently accepted by the Region.

Recognizing the role that municipal governments have already taken as voluntary collection sites prior to initiation of the WEEE Program and the extent of existing municipal collection infrastructure, the WEEE Program is encouraging municipalities to serve as contracted collectors. Collectors approved through the WEEE Program will receive a weight-based financial incentive for all Phase 1 WEEE collected, sorted and prepared for transport to WEEE contracted processors of \$165/tonne. The financial incentives available for municipal WEEE collection activities, including potential coverage of costs to the Region are shown in Table 21.



Table 21: Potential Municipal Financial Incentives in the WEEE Program Plan

Potential Activity	OES Covers All Costs	\$165/tonne Collection Incentive Payment	OES Covers Transport Costs	OES Covers End-of-Life Processing Costs
Host an OES "Round-Up Event"	Yes	No	Yes	Yes
Established Depot	N/A	Yes	Yes	Yes
Municipally-Run Collection Events	N/A	Yes	Yes	Yes
Municipal Household Pick-Up	N/A	Yes	Yes	Yes

The availability of WEEE for capture is a function of total market sales, product life spans, reuse and refurbishment at the end of a products first useful life, and storage durations following end of life. Utilizing the same assumption developed in the 2005 *Waste Electronic and Electrical Equipment Study* prepared for Waste Diversion Ontario (CSR et. al.), it is estimated that 1% to 3% of the electronic waste (excluding white goods) discarded in the Region is actually collected for recycling.

Based on this assumption and considering that 373.6 tonnes of WEEE was diverted by the Region in 2007, nearly 12,100 tonnes of WEEE may have been discarded during this same period as residual garbage. Assuming a low, but increased capture rate of 30%, an estimated 3,700 tonnes per year of WEEE could be captured for recycling. If one third of this WEEE captured is considered part of an eligible incentive under the WEEE Program Plan, this would amount to a financial incentive payment of approximately \$200,000. **Furthermore, this would equate to a 1.6% increase in waste diversion from increased capture of WEEE potentially facilitated by more frequent mobile collection events.** Increased capture of WEEE waste (and higher financial incentive payments) may be realized by waiving tipping fees for dedicated loads of WEEE waste brought to Regional Transfer Stations/Waste Disposal Sites for diversion.

9.6 Transfer Station Modifications

The vast majority of the waste (72%) brought to the waste transfer stations is sent to landfill because it is not properly separated out by residents. Based on the observations reported in Section 6.0, increased waste diversion at the waste transfer sites may potentially be achieved in the short term by:

- modified signage;
- increased staffing levels during peak periods;
- extended hours of operations during peak periods; and
- the provision of temporary sites within the Region for drop-off of specific waste types during peak periods.

Other potential options that may warrant further consideration include:

- modified site layouts;
- implementing a higher tipping fee if waste is not properly segregated for recovery; and
- increasing the number of waste transfer sites in high density areas of the Region.

Regional transfer site staff estimated that proper segregation of recoverable materials at the transfer sites would result in a 20-25% reduction in the amount of material being placed in the waste disposal bin, or the diversion of an additional 4,466 tonnes.



10.0 ADDITIONAL WASTE DIVERSION OPPORTUNITIES

It is realistic to expect that the Region's waste diversion rate can be increased through increased participation in existing waste diversion programs. However, in order to achieve the Region's goal of 70% waste diversion, it will be necessary for the Region to provide additional waste diversion opportunities for the residential waste stream.

Based on the current waste management system and a review of the waste composition data, it is recommended that the following waste diversion programs be considered:

- Additional plastics recycling,
 - Plastic film recycling,
 - Recycling of other plastics;
- Additional drop-off based programs,
 - Polystyrene recycling,
 - Textile recycling,
 - Mattress recycling;
- Providing SSO collection to multi residential households;
- Reuse programming; and
- Pet waste management.

10.1 Additional Plastics Recycling

10.1.1 Plastic Film Recycling

Plastic film is not currently accepted in the Region's Blue Box Program. This includes products such as plastic grocery bags, retail store carry out bags, rinsed milk pouches and outer bags, bread bags, dry cleaning bags, diaper outer bags, frozen food bags, and overwrap for toilet tissue and paper towels.

Markets for plastic film have been somewhat volatile over the past decades; however markets for this material have developed significantly over the past several years and are generally considered stable at this time. In the late 1990's recyclers had to pay to get rid of plastic film, however the value of this commodity increased to over \$100 per tonne in 2005 and 2006. Market prices for plastic film have dropped since that time, particularly in the latter half of 2008, due to the economic downturn and the falling price of oil. It is considered, however, that in the long term there will be sustainable, positive value markets to manage this material.

Plastic film can be difficult to manage in a MRF due to the lightweight and fluffy nature of the material. If loose, it wraps around pulleys, conveyors and other equipment, and makes it difficult to access other, more valuable, commodities. Best Practices Guidelines (EPIC 2008) recommend that plastic film be kept separate from other materials in the blue box. Residents should be advised to place plastic film separate in either one small grocery bag, or a large clear bag.

The addition of plastic film to the blue box collection program should not increase collection costs since it does not require a separate collection and is material that is already being collected with the residual garbage stream. The incremental cost for processing plastic film will be somewhat offset by material revenue and the savings in the cost for disposal of the material; however it is still an expensive product to recover. The net cost of recycling plastic film as calculated by Stewardship Ontario is \$1,692 per tonne⁷. Taking into account WDO funding and the

⁷ 2009 Steward Fee Setting Methodology



disposal cost offset, it is estimated that the incremental cost for recycling plastic film will be approximately \$900 per tonne.

Based on residential waste audit data, approximately 5% of the residual garbage stream, or 4,800 tonnes, is plastic film. Based on a capture rate of 80% for this material, an additional 3,850 tonnes per year could be captured for recycling. **This would equate to a 1.6% increase in waste diversion from a plastic film recycling program.**

10.1.2 Recycling of Other Plastics

Although the secondary processing of some blue box plastics is technically feasible, often markets are difficult to maintain and considered not generally stable. The quantity of the material recovered typically means that it is considered not economical for many municipalities to separate these materials. This is the case for the following classification of plastics:

- Other PET packaging (#1 bakery, clamshells, trays, ovenable/microwaveable trays, egg cartons);
- Other bottles, jars, and jugs (#4 LDPE, #5 PP, #7 mixed resin, mustard, ketchup, some juices);
- Large HDPE & PP pails and lids (>4 litres and <25 litres HDPE & PP pails, lawn, garden, pool supplies, kitty litter, paint); and
- Other rigid plastic packaging (blister packaging, tubes for pharmaceutical & health care/cosmetic products, plant pots, unmarked/coded packaging).

These plastics are currently not included in the Region's Blue Box Program.

One of the objectives of Stewardship Ontario is to provide for material specific market development where there are market barriers to increasing the recycling of specific blue box materials. With this goal in mind, Stewardship Ontario has issued a Request for Proposals (RFP) with the goal of helping develop sustainable markets for blue box plastic packaging in Ontario. Stewardship Ontario is soliciting proposals for the re-processing of blue box plastic packaging and marketing of the resultant product(s). The plastic materials that the RFP includes are #1-#7 rigid blue box plastic packaging and/or blue box film plastic. The closing date for the RFP is March 5, 2009, with plans to commence negotiations with the preferred respondent(s) in April.

The net cost of recycling other plastics as calculated by Stewardship Ontario is \$1,009 per tonne. Taking into account WDO funding and the disposal cost offset, it is estimated that the incremental cost for recycling plastic film will be approximately \$550 per tonne.

Based on waste audit data for the Region, the total quantity of these other plastics in the Region's residential waste stream is 2,214 tonnes, as indicated in Table 22.

Table 22: Quantities of Other Plastics

Other Plastic Type	Tonnes Disposed/Year
Other PET Packaging	317
Other Bottles, Jars, Jugs	92
Large HDPE & PP Pails and Lids	11
Other Rigid Plastic Packaging	1,794
Total	2,214



Based on a capture rate of 80% for this material, an additional 1,771 tonnes per year could be captured for recycling. **This would equate to a 0.8% increase in waste diversion from a recycling program for other plastics.**

10.2 Additional Drop-Off Based Programs

10.2.1 Polystyrene Recycling

Polystyrene ("PS") is not currently accepted in the Region's Blue Box Program. Recyclable PS includes foam and rigid PS take-out containers for deli, bakery, prepared foods, fresh fruit and vegetables, salad and sandwich boxes; cushion packaging for electronics and other home appliances; foam meat trays and egg cartons; and foam and rigid PS cups and plates.

In the past, the marketing of polystyrene has been an ongoing challenge, culminating in December 2006 with the closure of the only Canadian PS recycling facility operated by the Canadian Polystyrene Recycling Association. The Mississauga facility and equipment has since been bought by the Canadian Polystyrene Recycling Alliance (CPRA), which is owned by a Port Hope-based company that manufactures recycled PS into picture frames and other products.

Another growing market for expanded foam PS or cushion PS packaging used for protection of home electronics and other appliances is Grace Canada. The Ajax, Ontario, company has traditionally sourced its PS primarily from the industrial/commercial sector, but increased demand for the material has spurred Grace Canada to complement this with PS cushion packaging sourced through depot programs at Canadian municipalities.

Grace Canada supplies fire protection, cement and concrete products to the construction industry, and mixes the recycled PS cushion packaging with virgin PS in the manufacturing of its fireproofing products. The Canadian operation employs approximately 100 people in its Ajax facilities.

Although generally thought to comprise a large percentage of the waste stream due to the bulk of the product when used for protective packaging, the quantity of polystyrene generated in small based on overall mass. As indicated in the Region audit of the residential waste stream, only 1.7% of the residual garbage, or 1,630 tonnes, is polystyrene. The overall bulk of the product and the variety of sizes and shapes of PS packaging means that this material is difficult to manage in the blue box and at the MRF. EPIC has developed a Best Practices guide which outlines how to manage PS packaging at a supervised municipal depot (EPIC 2008).

Because residents would be required to bring this material to a depot, it is anticipated that a lower capture rate of 50% would be realized. This would mean that an additional 815 tonnes per year could be captured for recycling. **This would equate to a 0.3% increase in waste diversion from a depot polystyrene recycling program.**

Grace Canada will pay all shipping costs for transporting foam PS or cushion PS packaging from a municipal depot to their facility. The type of collection and hauling system used is dependant on the volume of material recovered. Grace Canada also provides assistance with the development of promotional notices, which they recommend be included on the municipal web site, in community newspapers and distributed in flyers.

Since existing Region waste disposal site infrastructure and staffing can be utilized, there is no incremental cost for implementing and operating the polystyrene recycling program.

10.2.2 Textile Recycling

While many charitable organizations (e.g. Canadian Diabetes Association; Ontario Federation for Cerebral Palsy; Ontario Association for Community Living) offer complimentary collection services for gently used clothing, service is often limited to larger urban centres. Where the availability of front door service presents a challenge, the City of Kawartha Lakes has introduced a curbside textile recycling program. In doing so, the City of Kawartha Lakes has increased accessibility to this reuse and recycling avenue. Residents of the City of Kawartha Lakes are provided with quarterly curbside collection services for used clothing. Between 2007 and



2008, 91.6 tonnes of textiles were collected, or an average of 0.6 kg/capita. Based on the receiving quantities observed within the City of Kawartha Lakes and available waste generation data for the Region, it is estimated that the Region had the potential to divert 361 tonnes of textiles from the residual garbage stream during 2007 through implementation of a similar program. **This would equate to a 0.2% increase in diversion from a textiles diversion and collection program.**

10.2.3 Mattress Recycling

Discarded mattresses take up a significant amount of space in the disposal containers at the waste disposal sites and are bulky to transport to landfill or other disposal facilities. Based on the experience of a local mattress recycling processor, 85% of a typical mattress can be recovered and diverted from landfill⁸. Mattress recycling facilities separate mattresses into the following components for further reuse or recycling:

- Foam is utilized in carpet underpad;
- Metal springs are recycled as scrap metal;
- Wood is used for wood chips or heating products; and
- Felt is used in insulation.

Although retail outlets and mattress associations recommend that people replace their mattresses every 5 to 7 years, it is probably more typical that mattresses are replaced at a frequency of every 10 years. If there is a 1:1 mix of single occupancy to double occupancy for mattresses, there would be approximately 43,000 mattresses from the residential sector in the Region reaching end-of-life each year. This does not include mattresses from hospitals, long-term care facilities and hotels.

Coinciding with efforts focused towards corporate environmental responsibility, retailers such as Sleep Country Canada, have established mattress exchange programs. Customers purchasing new mattresses can have the old one taken away by Sleep Country at the time of delivery. Not-for-profit community organizations, including will also accept donations of gently used, unsoiled mattresses and can contribute to the goal of mattress waste diversion with the Region.

Mattress recycling is a relatively new industry in North America, and until recently the availability of mattress recycling in Ontario has been non-existent. Currently, one mattress recycling service provider operates within the Greater Toronto Area (Recycle Mattress Depot) and MattCanada, a Montreal based operation, will be opening a second facility in Toronto soon. These recyclers receive clean, dry mattresses on a drop-off basis or offer collection services for a fee. On average a tipping fee of \$10 is charged for each mattress.

In addition to providing a waste diversion alternative for old mattresses, Recycle Mattress Depot has expanded their operations to accept other foam/fabric/wood based home furnishings, including box springs, upholstered furniture, futons, metal headboards and frames and raw (untreated) wood items. Three Ontario municipalities (City of Guelph, Halton Region and Regional Municipality of Peel) are in the process of implementing a depot-based waste diversion program for these bulky goods. Accepted bulky items brought by residents to designated transfer stations will be loaded into on-site tractor trailers, to be later removed in exchange for a new trailer on an on-call basis by the processor. Acceptable bulky items collected by a municipality by means of a curbside service may also be loaded into the transfer station trailers, provided they are reasonably clean and dry. Program costs are on a per item basis and depend on transportation distances. The cost of the program to the Region would be approximately \$10 - \$12 per item, which includes the trailer rental fee, transfer of the trailer to and from a Regional depot location, plastic bags that can be provided to residents for protection of acceptable bulky items, and processing⁹.

⁸ Abdul Erdem of MattCanada

⁹ Lawrence Roach of Mattress Recycle Depot



As bulky goods received at the Region's waste disposal sites/transfer stations are currently disposed of as residual garbage, it is difficult to assess the proportion of bulky goods that would be accepted by the Recycle Mattress Depot diversion program. Based on data provided by the Region, a total of 2,183 tonnes of bulky goods, including items that are both accepted and not accepted by Recycle Mattress Depot for processing were collected curbside by within the Region during 2007. Assuming that 25% of this tonnage (546 tonnes) accounts for items that could be diverted by the Recycle Mattress Depot program, **this equates to a 0.2% increase in waste diversion from a mattress and upholstered goods recycling program.**

In order to gain a true estimate of the total annual cost to the Region for the Recycle Mattress Depot waste diversion program, a pilot study is required in order to evaluate incoming waste flows on a per item basis. By also obtaining tonnages for the quantity of bulky goods diverted through the trail program, the Region can assess whether current tipping fees are sufficient to off-set the overall cost of the program.

10.3 SSO Collection to Multi Residential Households

Multi residential waste audit data from the City of Toronto indicates that approximately 42% of the multi residential waste stream is organic material that would be suitable for the Region's SSO program. This would equate to 4,440 tonnes of acceptable SSO material in the Region's multi residential waste stream. Because of the challenges of storing this material in a multi residential household unit, it is probably reasonable to expect a capture rate of only 50% of this material, which would result in an additional 2,220 tonnes per year being captured for composting. **This would equate to a 0.9% increase in waste diversion from a multi residential SSO collection program.**

Implementation of an SSO collection program in multi-residential units would involve both program initiation costs and ongoing operational costs. As with the implementation of the single family SSO program, it is important to supply the participants with the tools necessary to encourage participation in the program.

In the case of the multi residential residents, the tools necessary for participating in the SSO collection program include:

- Kitchen mini-bin containers for each unit;
- Green bin container for each unit;
- Biodegradable liners for the mini-bins and carts; and
- Promotional materials

It is recommended that the collection contractor be responsible to supply 64 gallon SSO collection totes, similar to those being used for the collection of recycling. Program administration would include distribution of the SSO carts and promotional materials and face-to-face education with residents and Building Superintendents. This may involve displays set up in the building lobby at the time of material distribution and/or meetings with the building residents. It is recommended that the Building Superintendents also be provided with posters and stickers and a Superintendent's Handbook.

The total initial capital cost for the implementation of the Multi-residential SSO collection program is estimated to be \$676,320, as indicated in Table 23.

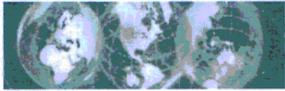


Table 23: Program Implementation Costs for Multi Residential SSO Collection

Cost Type	Unit Cost (\$)	Number of Units	Total Cost (\$)
Kitchen Mini-Bin	\$5	22,190	\$110,950
Green Cart	\$18	22,190	\$399,420
Biodegradable Liner Bags	\$5	22,190	\$110,950
Promotional Materials			\$25,000
Administration			\$30,000
Total Cost (\$)			\$676,320

The implementation of an SSO collection program for multi-residential households would require a separate collection vehicle to pick up from all of the multi-residential units on a weekly basis. The cost to provide this extra collection service is estimated to be \$172,000 per year, with an additional cost of approximately \$300,000 a year for processing the SSO from the multi family households.

10.4 Reuse Programming

It is well recognized that a significant amount of material that is sent for disposal is still quite useable. Many people would be pleased to receive used furniture, clothing, and kitchenware that are no longer desired by the original owner. The difficulty is in providing the infrastructure to ensure that good useable items are available to people who would be able to use them. Furthermore, quantifying the contribution of reuse programs to a municipality's waste diversion rate can be challenging.

As cited in Section 3.2, the Municipal Datacall Residential GAP Analysis diversion rate calculation includes municipally operated (directly or through contracted services) reuse activities. Reuse activities operated by other agencies within the community (e.g. Goodwill, Salvation Army, etc.) are not considered municipal tonnages. Although municipal waste diversion calculations completed independently of the Municipal Datacall process can provide for the contribution of non-municipal reuse strategies, obtaining accurate and consistent means of measurement is often difficult.

A variety of program strategies have been established across municipalities to encourage and facilitate reuse of lightly used residential goods, as summarized below.

10.4.1 Community Reuse Events

Two interesting examples of community reuse events that help to divert useable materials from landfill are:

- City of Toronto Community Environment Days; and
- City of Ottawa Give Away Weekends.

City of Toronto Environment Days

One Community Environment Day is hosted annually by each City of Toronto Councillor within their respective ward. Neighbourhood residents are encouraged to bring unwanted and used household items to a pre-established central collection location, such as a park or a community centre, where items can be donated to attending organizations for reuse or proper disposal. Participating organizations include charities that turn around and sell donated items at their second hand retail outlets (e.g. Goodwill) and the Toronto District School Board who collected art supplies, school supplies and costumes for use in schools. In addition to facilitating reuse, the City of Toronto Community Environment Days provide an opportunity for public education, offer a convenient drop-off location for specialized recycling programs (e.g. WEEE, MHSW, printer cartridges, cell



phones and plastic shopping bags) and offer for sale rain barrels, backyard composters, recycling containers and other City of Toronto program tools.

City of Ottawa Give Away Weekends

On two designated weekends each year, the City of Ottawa encourages residents to place unwanted good quality household items at the curb open for browsing by “treasure hunters”. Items are to be marked free and are to be set-out for browsing only during daylight hours. The Give Away Weekends are advertised by the City of Ottawa in advance. In encouraging diversion before disposal, residents are saved from transporting readily reusable goods to a charitable donation site or municipal waste disposal site, and “treasure hunters” are able to search out a wide number of goods in a very convenient manner. As participants, residents are asked to follow Health’s Canada’s *Facts for Garage Sale Vendors* and refrain from putting goods that pose a potential health and safety concern (e.g. car seats, bath chairs, mattresses) at the curb. The City of Ottawa does not report significant concerns with respect to the clean up of items at the close of each event.

10.4.2 Electronic Forums

The internet has become a readily accessible, convenient means of advertising and coordinating the sale of unwanted household goods, often across vast distances. Public internet sites, such as EBay, Kijiji and Craig’s List are well known searchable electronic classifieds where individuals and organizations can seek out and sell anything from toys and games to jewellery to art. Meanwhile, goods exchange software programs are appearing on the market for purchase by municipalities to facilitate their reuse strategies (e.g. iWasteNot Systems). The City of Peterborough’s PeterboroughReuses.com website and the City of Ottawa’s Take It Back! Program offer good examples of municipally facilitated reuse systems.

PeterboroughReuses.com is an internet based resource established through collaborative efforts of the City of Peterborough, County of Peterborough and the local environmental group, Peterborough Green-Up. The website provides serves as an online “classifieds” database for individuals looking to either purchase or sell used goods. In addition, PeterboroughReuses.com features a green business guide, providing residents with tips on sustainable purchasing practices. The website is jointly administered by the contributing parties. However, users of the site arrange their own exchange of goods.

The City of Peterborough reports that their cost share for the project, which is provided to Peterborough Green-Up to cover their responsibilities relating to the website, is \$5,250 annually. An evaluation of the effect of the website on the City and County’s waste generation rates has not been completed. It is reported that the site receives approximately 750,000 hits per month, which is likely not an accurate indication of the website’s success as each visit to the website, whether it results in a completed transaction or not is recorded as a hit.

The City of Ottawa’s Take It Back! Program provides an alternate approach to electronic forums. Through the Take It Back! Program, residents can search and access a database of nearly 600 local retailers registered with the City of Ottawa as either a reuse or recycle depot for a specific waste good(s). Retailers are responsible for sustainable management of the waste types collected at their own cost. In partnering with the City of Ottawa to increase improved product stewardship, retailers receive increased awareness of their business through City-wide advertising of the program and participating partners. An evaluation of the program’s contribution to the City’s waste management program revealed that approximately 500 tonnes of waste are diverted from the municipal waste management to program partners each year.

10.4.3 Reuse Centres

Municipal reuse centres function in a similar capacity to charitable second hand goods stores. Waste items, including dishes, furniture, small appliances, books and magazines, lighting fixtures, sporting goods, toys and games, sinks, doors, faucets, and other useable goods resulting from renovation projects are accepted from residents free of charge. After an assessment of their condition, sorting and weighing for the purposes of tracking waste diversion, items in clean, working order are made available for sale for use by others rather than



sent for landfill disposal. Goods considered to be in too poor a condition for reuse (residue) is sent to landfill for disposal. Benefits of municipal reuse centres include:

- promotion of the idea and benefits of reuse;
- provide affordable items to individuals and organizations;
- serve as a centre for waste diversion education; and
- contribute to municipal social programming through partnerships with local community organizations.

Beyond the blue box is an example of a well-established Reuse Centre that promotes reduction, re-use and recycling of waste in Northumberland County. The facility accepts a wide range of useable items that may otherwise be destined for disposal, such as clothing, sports equipment, dishes, furniture, lighting, and toys. Almost 700 tonnes of materials went for reuse from the facility in 2007, which is equivalent to the amount of waste sent to landfill from 6,000 homes in Northumberland County.

Another objective of the operation is to provide work, social interaction and training opportunities for developmentally challenged individuals. The facility employs seven full-time staff and provides work experience for 15 developmentally challenged individuals, including five full-time employees, five part-time employees and five high school students. They have also helped over 100 young people perform hundreds of hours of community service under the Community Probations Services Program.

Beyond the Blue Box commenced operation in 1992 with assistance from a 3-year Federal Environmental Partners' grant of \$100,000. The operation is now fully funded through proceeds from the sale of reusable items and donations from the community. In 2007, revenues received from items sold through the facility exceeded \$300,000. The Not-for-Profit organization is managed by a volunteer Board of Directors. Municipal support for the operation includes a tax rebate from the Town of Cobourg (approximately \$9000) and a rebate on landfill tipping fees from the County of Northumberland (approximately \$6000). Until 2007, the waste diverted through Beyond the Blue Box was included in the County's waste diversion rate because the operation was supported by the municipality. In 2007 the GAP definition of reuse was revised to include only waste that is diverted at municipally operated reuse facilities.

The operating model established by Beyond the Blue Box could be utilized as an example in setting up and operating a municipal Reuse Centre. The operation is currently self-funded with revenues for the facility exceeding \$200,000 a year, consisting mainly of revenue from sales of donated used merchandise, along with some public donations and investment interest.

The service area for Beyond the Blue Box is considered to be the 45,000 residents of West Northumberland. The facility effectively diverts approximately 700 tonnes of items a year that otherwise would likely have been disposed of. It can be assumed that a network of reuse centres servicing the Region would be able to divert approximately 8,500 tonnes of waste from disposal for reuse. This would equate to a **3.6% increase in diversion**.

10.5 Pet Waste Management

Pet waste is not currently accepted in the Region's Green Bin Program. This includes animal feces, bedding and kitty litter. Given the implementation of set out container weight limits in most municipalities, the disposal of pet waste can present a significant expense to households setting out multiple bags of pet waste each collection period. Where a user pay program exists, the disposal of pet waste also comes at a cost.

The ban of pet waste from municipal SSO programs is primarily attributed to a concern from processors with respect to the use of plastic bags for pet waste collection. Most residents use non-compostable plastic bags to pick up pet waste and then place the plastic bag in with their organics. Plastics bags cause problems at the composting facility because they get caught in the turning equipment and contaminate the end product.



Moreover, contamination removal when performed by manual labourers may present health and safety concerns.

The impact of pet waste disposal on municipal waste diversion is often surprising. Based on the available waste audit results, approximately 18% of the refuse fraction of single family household residual garbage and 4% of the refuse fraction of multi family household residual garbage in the Region consisted of pet waste (refer to Figure 6 and Figure 8, respectively). As indicated in Table 24, municipalities across Ontario have varying methods of dealing with pet waste other than residual garbage disposal.

Table 24: Pet Waste Management Strategies for Other Ontario Municipalities

Municipality	Management Strategy
Niagara, Regional Municipality of	Accepts pet waste for composting in the Regions' Green Bin Program; pet waste to be wrapped in paper or placed in a compostable bag.
Ottawa, City of	SSO Pilot Project accepts kitty litter for composting. All other residents are encouraged to flush pet waste down the toilet for treatment at a municipal sewage treatment facility, or to dispose of pet waste in the residual garbage (quantities not to exceed 10% by volume of the residual garbage container or bag).
Toronto, City of	Accepts pet waste in the City's Green Bin Program for composting via anaerobic digestion.
Waterloo, Regional Municipality of	Accepts pet waste in the Municipality's Green Bin Program for windrow composting.
York, Regional Municipality of	Accepts pet waste in the Municipality's Green Bin Program for composting via anaerobic digestion.
Sarnia, City of	Residents are encouraged to flush pet waste down the toilet for treatment at a municipal sewage treatment facility, or to dispose of pet waste wrapped in plastic bags in the residual garbage.

Alternatively, rather than commingled collection with ordinary household organic wastes and composting, the City of San Francisco is undertaking a pilot project investigating the efficiency and effectiveness of pet waste conversion into a biofuel. More often, municipalities as well as environmental organizations promote eco-friendly pet waste management to the home owner, including the purchase of various available pet waste disposal/digester systems and the use of biodegradable kitty litter.

Given worker health and safety and public concerns surrounding the co-collection of food, tissue and pet waste, the Region should exercise caution when deciding whether to add pet waste to the list acceptable Green Bin Program materials. However, the significant contribution of pet waste to the residential residual garbage stream may warrant further investigation of alternative management options where pet waste is collected independently.

Based on waste audit data, the total quantity of pet waste in the single family and multi-family waste stream is 6967 tonnes per year. Given the development of an appropriate waste diversion program and assuming an overall capture rate of 60%, the diversion of pet waste would **equate to a 1.8% increase in waste diversion throughout a pet waste management program**. For the reasons outlined above, it is recommended that pet waste not be collected and processed with the current green bin waste without further study. Therefore the capital and operating cost for composting pet waste cannot be determined at this time.



11.0 REACHING 70% WASTE DIVERSION

11.1 Maximizing the Existing Waste Management System

As discussed, it is generally unrealistic to expect 100% capture for all recyclable and compostable materials. Enhanced promotion and education efforts and the implementation of the other participation stimuli, as outlined in Section 7.0 and Section 8.0, will contribute to improved resident engagement. This will result in an increase in the capture of both blue box recyclables and SSO waste. Furthermore, the implementation of modifications to Regional waste transfer operations (refer to Section 6.0) are also expected to result in higher recovery rates for depot based waste diversion programs.

It is reasonable to expect that the outlined changes to the existing waste management system will be able to have the following effects on the waste diversion programs for the Region:

- An increase in the capture rate for blue box recyclables to 85%;
- An increase in the capture rate for organics (leaf & yard waste and SSO) to 75%; and
- A 22% increase in the recovery of recyclables at transfer stations to achieve 50% diversion.

By implementing a mixture of participation stimuli to increase participation in the waste diversion programs currently in place within the Region, it is reasonable to expect that the **waste diversion rate could be increased to 63.3%**.

11.2 Creating New Waste Diversion Opportunity

Despite focused effort aimed at maximizing the effectiveness of the existing waste management system, the Region will be challenged to meet their goal of achieving and or exceeding “*on or before December 2010, a 70 percent diversion recycling rate for the entire Region.*” It therefore will be necessary for the Region to provide additional waste diversion opportunities for the residential waste stream as detailed in Section 10.0.

Many of the programs outlined in Section 10.0 are currently practiced or have been studied by other municipalities in Ontario. Table 25 outlines the GAP waste diversion rate for other large municipalities in the province, as well as the availability of the additional waste diversion programs, as outlined in Section 10.0, in these communities.

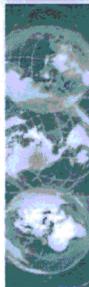


Table 25: GAP Waste Diversion Rate and Supplementary Waste Diversion Programs for Other Ontario Municipalities

Supplementary Waste Diversion Program	Durham, Regional Municipality of	Essex-Windsor Solid Waste Authority *	Halton, Regional Municipality of	Hamilton, City of	Kawartha Lakes, City of	Niagara, Regional Municipality of *	Northumberland, County of	Ottawa, City of *	Peel, Regional Municipality of	Simcoe, County of *	Toronto, City of	Waterloo, Regional Municipality of *	York, Regional Municipality of
SSO Collection in Multi Residential Households			✓	✓	✓ ¹	✓				✓	✓		
Plastic Film Recycling			✓	✓	✓	✓	✓		✓		✓	✓	✓
Polystyrene Recycling			✓	✓	✓	✓	✓		✓		✓		✓
Other Plastics Recycling			✓	✓	✓	✓	✓				✓	✓	
Pet Waste Composting			✓	✓		✓		✓ ²			✓	✓	✓
WEEE Recycling		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Reuse Centres		✓	✓	✓	✓	✓	✓		✓				✓
Textile Recycling					✓								
Mattress Recycling					✓								
GAP Waste Diversion Rate (2007)	47.6%	32.6%	36.9%	43.0%	40.7%	41.6%	39.0%	32.3%	40.6%	40.5%	42.8%	44.5%	45.7%
Target Waste Diversion Rate	70%	60%	60%	65%	50%	65%	na	40%	70%	50%	70%	ne	65%
Target Date	2010	2010	2010	2008	na	2012	na	2007	2016	2009	2010	ne	2010

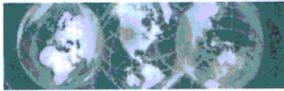
* Other "Urban Regional" municipalities grouped alongside the Region of Durham, as per the classification system utilized by the WDO Municipal Datacall

"na" Information not available.

"ne" Formal waste diversion target not established.

¹ Multi residential SSO collection is only available to households of <5 units.

² Pilot project; acceptable pet waste is limited to kitty litter.



It is reasonable to expect that creating new waste diversion opportunities will have the potential to further increase waste diversion by 9.4%. Table 26 outlines the effect that these changes would have on the overall waste diversion rate for the Region. By implementing a mixture of participation stimuli to increase participation in the waste diversion programs and the introduction of new opportunities for waste diversion, it is estimated that the **waste diversion rate could be increased to 72.7%**.

Table 26: Adjusted GAP Waste Diversion Rate Based on Additional Waste Diversion Opportunities

Program	Estimated Increase in Waste Diversion	Overall Waste Diversion Rate
<i>Baseline 50% Waste Diversion</i>		
Increasing Capture in Existing Program:		
Modified Collection Schedule	1.7%	51.7%
Reduced Set Out Limits	1.2%	52.9%
Modified Blue Box Equipment	2.0%	54.9%
Expanded Waste Collection Bans/Waste Disposal Policies	4.9%	59.8%
Additional WEEE Event Days	1.6%	61.4%
Transfer Station Modifications	1.9%	63.3%
New Waste Diversion Opportunities:		
Plastic Film Recycling	1.6%	64.9%
Other Plastics Recycling	0.8%	65.7%
Polystyrene Recycling	0.3%	66.0%
Textile Recycling	0.2%	66.2%
Mattress Recycling	0.2%	66.4%
SSO Collection in Multi Residential Households	0.9%	67.3%
Reuse Programming	3.6%	70.9%
Pet Waste Management	1.8%	72.7%

11.3 Future Waste Management Considerations

In Ontario, municipalities have long been responsible for the planning, development and operation of management systems for the residential waste stream. The cost for these programs has traditionally been borne by the municipal taxpayers. In recent years, the concept of *zero waste* is gaining popularity in many jurisdictions around the world. It generally refers to an approach that puts more responsibility on producers to redesign products in a more sustainable way in order to design waste out of products and packaging completely.

A Zero Waste system would include changes in the way products are made, used and delivered to the marketplace. It attempts to reduce a product's environmental footprint not only at end-of-life, but "upstream"



during the stages of natural resource extraction, manufacturing, transportation and distribution. It attempts to extend the useful life of the product.

The concept works well with true extender producer responsibility which is based on the concept that producers of products and packaging assume "cradle to cradle" responsibility for their products, instead of transferring lifecycle costs onto the municipalities or taxpayers. With zero waste, businesses would be fully responsible for the end-of-life management of their products, and would therefore have a financial incentive to become truly sustainable.

The zero waste vision is that products would be managed in manufacturer networks, reverse distribution systems or possibly by municipalities collecting material under contract to private businesses. Industry will pay for the reuse and recycling of its products, as well as anything that needs final disposal, which should be as close to zero as possible.

The roots of a zero waste concept was initiated in Ontario in 2002 when the Waste Diversion Act (WDA) was enacted to promote the reduction, reuse and recycling of waste and to provide for the development, implementation and operation of waste diversion programs.

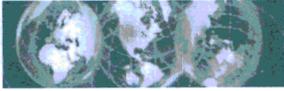
In October 2008, the Ontario Ministry of the Environment issued a discussion paper for public consultation entitled "*Towards a Zero Waste Future: Review of Ontario's Waste Diversion Act, 2002*". This paper was the result of the requirement that the province conduct a review of the Waste Diversion Act and the Blue Box Program Plan. The discussion paper states:

"This review of the Act provides an opportunity to present the vision of zero waste as a goal, and discuss how we can make concrete steps in that direction today and take advantages of the opportunities that a zero waste vision presents."

A concurrent review of the Blue Box Program Plan (BBPP) is being conducted by the WDO and has involved an extensive consultation process with stakeholders including municipalities, producers, and non-government organizations. Based on this consultation process, WDO has prepared a draft preliminary report with a number of recommendations for the BBPP review¹⁰. Several of these recommendations could have a significant affect on the Region's waste management planning process. In particular the recommendations summarized as follows:

- 1) To set 5-year performance target for blue box materials, including a collection target of 85%.
- 2) To improve the methodology to calculate waste diversion by including materials collected through programs other than municipal programs (such as retailer programs, private contractors and charities).
- 3) To establish a process to select blue box materials to be collected in all municipalities in order to standardize the materials collected in different areas of the province.
- 4) To promote Ontario processing and end markets as part of Ontario's green economy.
- 5) To move the municipal delivery of blue box services under the BBPP towards full EPR funding over a five year period, with the Industry Funding Organization assuming full financial responsibility for the blue box system at a date specified during the five year transition period.
- 6) To increase collection of blue box waste by encouraging municipalities to utilize the full range of available tools to restrict disposal (e.g. disposal bans, bag limits, clear bags, bi-weekly garbage collection etc.) and increase the cost of disposal fees.

¹⁰ Waste Diversion Ontario, Draft Preliminary Report for Consultation Blue Box Program Plan Review, February 6, 2009



- 7) To increase recycling by utilizing “dirty MRFs” to recover marketable materials from public spaces and blue box residues, with these materials counting towards recycling targets.
- 8) To recover energy from residual blue box waste, with the portion of blue box material contributing to energy recovery counting towards the recovery target.
- 9) To refer “problem” products and packages for consideration as a separate diversion program plan.

If these recommendations are accepted, the method of calculating waste diversion will change, with new opportunities for waste diversion credits. If the materials collected in blue box programs are standardized, the Region may be mandated as to what materials to collect. A full EPR funding model would mean that the producers would take over full responsibility for the blue box program.

These initiatives have been incorporated into the recommended Business Case for the Region's 70% Diversion Plan in the following section.

FINAL DRAFT



12.0 BUSINESS CASE

It is apparent that the Region has a well-developed waste diversion program and is currently achieving the highest waste diversion rate of all the major centres based on the audited WDO data. It is important that efforts to increase waste diversion be well planned and that programs are implemented in a manner that will not jeopardize the system that is already in place. It is also important that new programs be communicated with the residents, who are an integral component of program success.

Finally, the Region should be cognisant of the potential changes that may occur for municipal waste management programs as a result of the WDA and BBPP reviews, and ensure that any new programs implemented are complementary to the provincial programs.

12.1 Implementation Schedule

The Region of Durham is anxious to reach 70% diversion by 2010. This is an ambitious goal, particularly in light of the fact that it has taken 20 years to reach the current diversion rate of 50%. It should be recognized that the Region already has in place the waste diversion programs for the "low hanging fruit" and additional waste diversion efforts will be more difficult, costly to implement and operate, and may not have the high returns of the current programs.

It is recommended that the systems be put in place to increase participation in existing programs first. This involves making improvements at the transfer stations to encourage segregation of recyclables. It also involves participation stimuli such as increased promotion and education, providing additional blue boxes, implementing a recognition and reward program and waste disposal bans.

Following that, new waste diversion programs should be implemented in a phased approach based on those programs with the highest returns for the cost and the ease with which they can be implemented. The collection of polystyrene, textiles and mattresses would be done through depots at existing transfer stations and therefore those programs can be put in place easily with little capital expenditures.

It is recommended that the Region wait on adding additional plastics to the blue box program until the results of the Stewardship Ontario Plastics Recycling Initiative is complete and the BBPP review is further developed.

Table 27 outlines a proposed plan for the implementation of waste diversion programs to increase diversion. Details on the capital and operating costs for the changes necessary to increase participation in existing waste diversion programs are included in Appendix C.

The Region may wish to seek out partnerships with existing private sector firms or charity groups to help implement some of these waste diversion programs. Local companies may be willing to act as collection points for scrap steel or paper wastes in return for being able to keep these materials. Existing charities may be interested in operating the reuse facilities in return for a share of the profits. It is important to note however, that currently in order for the municipality to be able to get credit for any diversion programs through the GAP waste diversion calculation, the municipality must actually operate the facility, either directly or through contract.



Table 27: Proposed Waste Diversion Plan Implementation Schedule

Program	Capital Cost to Implement	Annual Incremental Cost (\$/yr)	Increase in Waste Diversion	Cumulative Waste Diversion	Implementation Date
<i>Status Quo 50% Waste Diversion</i>					
Increasing Capture in Existing Program:					
Modified Collection Schedule			1.7%	51.7%	2009
Reduced Set Out Limits			1.2%	52.9%	2009
Modified Blue Box Equipment	\$630,000		2.0%	54.9%	2010
Increased Promotion and Education	\$50,000	\$80,000	2.0%	56.9%	2010
Waste Collection Bans/Policies	\$80,000	\$132,000	2.9%	59.8%	2010
Increased WEEE Event Days	-	EPR	1.6%	61.4%	2010
Transfer Station Modifications	\$2,003,000	\$290,000	1.9%	63.3%	2010/2011
New Waste Diversion Opportunities:					
Polystyrene Recycling	\$30,000	-	0.3%	63.6%	2009
Textile Recycling	\$30,000	\$40,000	0.2%	63.8%	2009
Mattress Recycling	\$30,000	\$110,000	0.2%	64.0%	2009
Reuse Programs	\$3,000,000	\$300,000	3.6%	67.6%	2010/2011
Other Plastics Recycling	\$500,000	\$975,000	0.8%	68.4%	2011 (Pending Plastics Recycling Initiative)
Plastic Film Recycling	\$500,000	\$3,465,000	1.6%	70.0%	2011 (Pending Plastics Recycling Initiative)
SSO Collection in Multi Residential Households	\$680,000	\$480,000	0.9%	70.9%	2012
Pet Waste Composting	?	?	1.8%	72.7%	2013 (Pending further investigation)



12.2 Program Phase- In

When a new waste diversion program is implemented, the anticipated increase in waste diversion does not happen immediately. There is typically a phase-in period of 2-5 years when the program is put in place, residents are informed about the program, and the residents change their behaviour so that the desired results are realised. Sometimes the phase-in period can happen fairly quickly, such as when residents that are accustomed to weekly garbage collection are reduced to bi-weekly garbage collection. Sometimes it is anticipated that the phase-in period will be longer, such as when reuse opportunities are put in place and residents adapt to being able to take advantage of these opportunities.

Table 28 takes into account the phase-in period for the various programs that are recommended for the Region to achieve 70% diversion. As indicated, it is unlikely that 70% diversion can be realized by the end of 2010. Taking into account the time required for the new programs to "mature", a more reasonable target date for achieving 70% diversion is 2013.

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Table 28: Proposed Waste Diversion Plan Phase-In Schedule

Program	Phase-In Period						
	2009	2010	2011	2012	2013	2014	2015
Modified Collection Schedule							
Reduced Set Out Limits							
Modified Blue Box Equipment							
Increased WEEE Event Days							
Polystyrene Recycling							
Textile Recycling							
Mattress Recycling							
Increased Promotion and Education							
Waste Collection Bans/ Policies							
Transfer Station Modifications							
Reuse Programs							
Other Plastics Recycling							
Plastic Film Recycling							
SSO Collection in Multi Residential Households							
Pet Waste Composting							
Waste Diversion Rate	53.2%	59.3%	63.7%	67.6%	70.5%	72.1%	72.7%



Report Signature Page

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13.0 REFERENCES

Bristol (2008). *RRFB Nova Scotia: 2008 Public Opinion Research* prepared for RRFB Nova Scotia. Bristol Omnifacts Research, June 2008.

EPIC (2008). *Best Practices Guide for Depot Collection of Polystyrene Cushion Packaging*. EPIC, July 2008.

KPMG (2007). *Blue Box Program Enhancement and Best Practices Assessment Project*, Volume 1. KPMG, July 2007.

Ontario Electronic Stewardship (2008). *Final Waste Electrical and Electronic Equipment (WEEE) Program Plan*. Ontario Electronic Stewardship, March, 2008.

Praxis PR (2007). *Blue Box Program P&E Review Final Report*. Praxis PR, August 2007.

Quinte Waste Solutions (2008). *The Use of Clear Bags for Garbage as a Waste Diversion Strategy: Background Research on Clear Garbage Bag Programs Across North America, 2008*.

Statistics Canada (2000). *Waste Management Industry Survey Business and Government Sectors 1998*, Catalogue No. 16F0023XIE. Ottawa, Canada.

Statistics Canada (2003). *Waste Management Industry Survey Business and Government Sectors 2000*, Catalogue No. 16F0023XIE. Ottawa, Canada.

Statistics Canada (2007¹). *Waste Management Industry Survey Business and Government Sectors 2004*, Catalogue No. 16F0023XIE. Ottawa, Canada.

Statistics Canada (2007²). *EnviroStats, "Recycling in Canada"*. Catalogue no. 16-002-XIE; Vol.I (no. 1). Minister of Industry, 2007.

Statistics Canada (2008). *Waste Management Industry Survey Business and Government Sectors 2006*, Catalogue No. 16F0023XIE. Ottawa, Canada.



APPENDIX A

Residential Survey Summary of Results

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**Region of Durham 70% Waste Diversion Study:
Residential Survey Summary of Results**

General Household Information		Survey Question	Total Responses	% of Total Responses
1. In which municipality do you reside?				
	Pickering		4	2.6%
	Ajax		3	1.9%
	Whitby		33	21.4%
	Oshawa		40	26.0%
	Brock		2	1.3%
	Scugog		38	24.7%
	Uxbridge		16	10.4%
	Clarington		16	10.4%
2. How many people reside in your household?				
	Adults (12 and over)		-	89.5%
	Children (under 12)		-	10.5%
Total number of people in each household:				
	1		8	5.2%
	2		68	44.2%
	3		25	16.2%
	4		36	23.4%
	5		11	7.1%
	6		3	1.9%
	7		3	1.9%
3. On average, how many bags of garbage does your household produce each week?				
	1/2 bag		26	16.9%
	1 bag		51	33.1%
	2 bags		50	32.5%
	3 bags		19	12.3%
	4 bags		7	4.5%
	5 bags or more		1	0.6%

**Region of Durham 70% Waste Diversion Study:
Residential Survey Summary of Results**

Survey Question	Total Responses	% of Total Responses
Recycling		
4. Do you separate recyclables to set out in the blue box each collection?		
Yes	151	98.1%
No. If not, why?	3	1.9%
Did, but stopped. If stopped, why?	0	0.0%
Did not answer question	0	0.0%
5. What would encourage you to recycle more material? (Please check all that apply)		
If I had a bigger blue box	29	18.8%
If I had to pay for each bag of garbage set out	8	5.2%
If I could only put out 1 bag a week and had to pay for additional bags	11	7.1%
If I had to put garbage out in a clear bag so that collectors could enforce recycling by refusing garbage pick up	10	6.5%
If I had more information about how and what to recycle	38	24.7%
If I was recognized or awarded for being a good recycler	19	12.3%
I am currently recycling as much as I can	115	74.7%
Other (please describe)	36	23.4%
Did not answer question	2	1.3%
Composting		
6. Do you separate organics to set out in the green bin each collection?		
Yes	116	75.3%
No. If not, why?	29	18.8%
Did, but stopped. If stopped, why?	7	4.5%
Did not answer question	1	0.6%
7. What would encourage you to compost more material? (Please check all that apply)		
If I had a bigger green bin	24	15.6%
If I had to pay for each bag of garbage set out	5	3.2%
If I could only put out 1 bag a week and had to pay for additional bags	6	3.9%
If I had to put garbage out in a clear bag so that collectors could enforce recycling by refusing garbage pick up	11	7.1%
If I had more information about how and what to compost	27	17.5%
If I was recognized or awarded for being a good composter	16	10.4%
I am currently recycling as much as I can	104	67.5%
Other (please describe)	12	7.8%
Did not answer question	12	7.8%

**Region of Durham 70% Waste Diversion Study:
Residential Survey Summary of Results**

Survey Question	Total Responses	% of Total Responses
Waster Disposal Sites		
8. How often do you visit a Region of Durham Waste Disposal Facility to dispose of your waste?	104	67.5%
1-4 times/year		
monthly	28	18.2%
weekly	5	3.2%
never	16	10.4%
9. What waste do you typically dispose of at the Waste Disposal Facilities? (Please check all that apply)		
Garbage	43	27.9%
scrap metal	38	24.7%
Appliances	25	16.2%
Blue Box Recyclables	15	9.7%
Construction/Renovation	85	55.2%
Hazardous Waste	78	50.6%
Yard Waste	33	21.4%
Electronics	48	31.2%
Wood	47	30.5%
Tires	19	12.3%
Answered 'never' in Q8	15	9.7%
Did not answer question	4	2.6%
Educational Information		
10. Do you find the information you get on how to manage your waste (i.e. pamphlets, newsletters) useful?		
Yes	129	83.8%
No	16	10.4%
Don't remember	5	3.2%
Did not answer question	4	2.6%
11. How would you like to receive this information on how to manage your waste?		
Information Pamphlets sent in the mail	62	40.3%
Waste Calender	122	79.2%
Radio Ads	8	5.2%
Newspaper Ads	12	7.8%
Did not answer question	7	4.5%

**Region of Durham 70% Waste Diversion Study:
Residential Survey Summary of Results**

General Summary	Survey Question	Total Responses	% of Total Responses
	12. Do you find it convenient to separate your recyclables and organic kitchen waste from your garbage?	127	82.5%
	Yes		
	No	21	13.6%
	Did not answer question	6	3.9%
	13. What do you think is the best way to ensure that people make less garbage?*	<i>Ranking</i>	
	Make them pay for each bag of garbage set out	5	-
	Make them pay for each bag of garbage over 1 bag per collection	2	-
	Make them put their garbage out in a clear bag so that collectors could enforce waste diversion programs by refusing	2	-
	Provide more information about how and what to recycle and compost	1	-
	Recognize or award them for putting out less garbage	4	-
	Other (please describe)	<i>See Comments Summary</i>	-
	* Survey respondents were asked to rank the choices provided, with 1 being best and 6 being worst. Only 32.6% of respondents answered this question correctly. The results provided indicate how the choices were ranked (on average) based on the 60.7% of surveys that correctly addressed the question. 6.7% of respondents did not provide any answer at all.		

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Region of Durham 70% Waste Diversion Study: Resident Survey Comments

The following comments were received from survey respondents. Comments have been generally grouped into categories and are transcribed directly as received.

Consumer Packaging:

- Force retailers and suppliers to stop over packaging, 90% of our garbage is packaging.
- The emphasis is on the garbage the consumer has. Where did he get it? Why not address the producer of the plastic bags, blister packs, plastic egg cartons...etc...
- Manufacturers create most of garbage by over packaging.
- First start with manufacturers (from one package of cookies) I collect plastic, cardboard, cling film. There needs to be controls before products get to consumers. I can fill a garbage bag on shopping day just from packaging.
- Make manufacturers use less packaging (a big box with very little in it).
- Encourage packaging reduction in stores. Encourage use of recyclable packaging in stores. We probably wouldn't have any garbage at all if we could recycle the last few things in our garbage bins.
- Get the companies and stores to change to packaging that is more recyclable. START AT THE SOURCE!!! WHY IS THE BURDEN PLACED ON THE END USER?!?
- Government needs to encourage manufacturers of goods to STOP using so much packaging. Improvement at this level would reduce volume at the curbside.
- Reduce the packaging from the manufacturer. Go back to paper bags and cardboard boxes in all stores. Go back to metal or plastic garbage cans this would eliminate the larger plastic bags.
- We need to be able to recycle all packaging material that comes into our homes. Putting regulations on producers and distributors with regards to how a product or food item is packaged. Greater fines for roadside dumping!
- Why are there no rules for company packaging? They should be the ones who should pay if they want to continue with their plastics/styrofoam packaging.

Resident Costs:

- I strongly disagree with the waste disposal fee structure. It promotes illegal dumping. Take the money currently used to clean up illegal dumping and apply it as a subsidy to reduce the waster disposal fees. DUH!
- Pay per use would result in more illegal dumping.
- I agree with enforcement. We have a neighbour who lives alone and puts 3 bags out a week--never a green or blue box or yard waste. In PEI they have coloured buns for garbage that is put in loose so collector can see. I warning and then a fine. Region needs to get serious and consistent.
- I feel most people would like to reduce and recycle but if you limit the number of garbage bags or use clear bags you'll increase illegal dumping there has to be enforcement of the rules and possible fines.
- Find a means to recycle 100%, refusal to pick up may/will result in roadside dumping--which would cost us all!!
- Don't charge any more. Taxes are all ready sinful. Soon most autoworkers will be out of work, that should lessen the garbage. No money, no garbage.
- We should not have to pay for schemes--This would just cost everybody--people who pay and the cost of people to collect--people will do the right thing, just give them a chance.
- Don't be stupid. Increasing my costs when I am already overtaxed will only get a negative reaction and retaliation. Such as dumping my refused pick up illegally. Don't be dumb asses! Charging extra for "services" that are tax funded is nothing more than a cash grab to cover the costs for the next union contract.
- If people have to pay for each bag of garbage, most will not recycle. Weekly pick up of blue boxes would help because ours and many people I talk to have boxes overflowing and therefore put it in the garbage.

Region of Durham 70% Waste Diversion Study: Resident Survey Comments

- Our family is a one income family, I was supporting 3 adult children, plus one of their fiancée. That made a total of 6 adults with one income. Our family is recycling everything we can, we do our best to keep our garbage down to 2 bags per week, but not always possible, and penalizing large families that already have a hard time is inexcusable, plus are we not paying the highest property taxes around?
- I believe punishments leads to illegal roadside dumping--I prefer education.
- Making people pay more on top of our taxes will only encourage road side drops and piling on top of neighbours piles. Garbage is a fact of life - packaging is a huge part of my trash! Styrofoam is the worst!
- If there wasn't a change a the waste disposal facility for recyclables or yard waste it would be worth the public's time and effort.
- Large objects i.e. refrigerators shouldn't cost money when transferred by self to transfer station when it doesn't cost anything to have it picked up at curb side.
- I don't think we should have to pay for garbage pick-up, my taxes are already too high and are going up again. MPAC are thieves.
- As tax payers we don't need taxed more, we already pay for garbage. I believe the average for people recycling and composting is very high, from stats published in the newspapers.
- Making people pay for garbage will lead to more littering, especially country roads.
- Dump charges are excessive and people dump on private property. Today I paid \$6.00 to dispose of someone else's dumped garbage at my office building.
- It's ridiculous that you pay if you deliver recyclable materials to disposal sites, but free at the curb. So its easier to put it in the garbage, if it's not convenient to place in the blue boxes, but could be delivered to the disposal sites.

Clear Bag Policies:

- Please target (and penalize) those who don't properly recycle. Don't penalize those who do recycle by charging them for their legitimate waste (garbage).
- Recycling to be successful depends on cooperation of both parties. Clear bags give too much discretion and power to pickup staff. It is also a serious intrusion of privacy. What would the average person do with a bag of garbage when pick up was refused? That just promotes confrontation. Its cheaper and better to pickup at curb, then a rural roadside ditch. If you keep cutting service, and ever increasing restrictions there will become a public back lash that will negate recycling efforts.
- Privacy don't want to encourage some individuals to go through garbage and leave mess. Also, hopefully this wouldn't encourage some individuals to dispose of their waste in other ways i.e. business dumpsters or park garbage cans or the roadside.
- I think enforcement (via clear bag scenario) or charging for each bag (including initial) may encourage/escalate illegal dumping from some households.
- Clear bags are invasion of privacy. Perhaps limit of 2 bags (dark) for pickup. Go back to weekly curbside pick-up for all waste. Get rid of expensive kitchen waste program. Send all waste (other than blue box) to incinerator.
- Do not do clear bags.
- CLEAR BAGS ARE STUPID!!
- The idea of garbage police, not to mention any of my neighbours, being able to track my monthly cycle by the presence of my 'personal' bag of garbage in the larger clear bag is the most offensive thing I can imagine. I would far rather pay for additional bags than have someone making an arbitrary decision at curbside. I think the frustration of that will only lead to people dumping garbage.

Recycling and Composting:

- Need to recycle more plastics, not all are being collected at present time....Peel region takes everything and recycles (Mississauga/Port Credit).
- Diapers should be recycled.

Region of Durham 70% Waste Diversion Study: Resident Survey Comments

- Dump it on the steps of the retailer if it can't be recycled. With 2 cats 44lbs a week of dirty litter here goes my quota. Must pay at the Ritson waste facility 1-2 times a month.
- Why is Durham's policy not include diapers in composting (Markham does) I can't recycle all plastic containers (fruit and salads) like in other jurisdictions.
- I think recycling of garbage could be much better if the cost of compost bags would become a lot cheaper. Not every household has 2 incomes supporting families, these bags are not affordable.
- It would be a GREAT HELP if you would make sure the igloos in Greenbank are emptied REGULARLY! I don't know who is responsible for them and if other people in other areas have the same problem. I do know when we work hard to recycle and those responsible for emptying those igloos don't seem to care it really makes us feel like WHY should WE CARE! This is at least the third time in the past year they have been overflowing.
- If you would like to provide a green bin (see form for address).
- Since the green bin came in, I have less and less garbage to set out. Blue Box excellent program and I really like the way the calendar works, no one should go wrong with when and what to put out.
- I like that Durham is more efficient in this program than those to the north. They were advanced before GTA. Well Done!!
- I do not like the 4 bags every 2 weeks. I have diapers and need to get garbage out every week. 2 bags a week would be better for me, but the truck would have to come by more often. Maybe garbage bins could be provided to residents that have to wait 2 weeks.
- Need clear instructions about sorting. Need to reduce source.
- Start leaf collection early -- and every 2 weeks. Recycle the "clam shell" containers from stores.
- Our garbage volume would go down considerably if the blue box program would accept those items prohibited on page 11 of the residential waste management calendar Nov'08-Nov'09.
- It is sometimes confusing what can and cannot be put in blue boxes re: plastics.
- I have my own composter--gardeners love compost.
- We try to follow your instructions as good as we can. We spilled some juice from red beets on the garbage bag, but the boy left it, thinking it was blood!
- Encourage people to recycle scrap metal, wood and construction materials with no charge at waste disposal facility--only garbage should be charged for.
- My wife and I firmly believe in the 3 Rs but there is only one way to make people recycle etc. Change the rules and laws so that people have to follow the plan, and fine them when they don't comply. Anything else is just pie in the sky dreams and people should be able to scavenge at the depot. I have to buy a new DVD drive for my computer, I could have removed one from a computer at the depot. Best thing--reuse. and another thing when people come to the depot make them put things in the right bin. Stop worrying about their feelings and worry about the kind of world they are leaving for my grandchildren. (name and number left on survey form).
- I think people will recycle more when the collection is weekly. I don't think garbage bi-weekly is a good idea. We had it in Oshawa and hated it in the summer.
- Education is the key. Some items are confusing. More info. i.e. Paper towel rolls, styrofoam. Make it easy and reasonable and people will do it.
- Manufacturers use way too much. Use recyclable cardboard instead of plastic packaging. I recently received a new HP computer keyboard without any plastic packaging, it was all cardboard, and all was recycled. The Region seems to want plastic in the garbage so that it will provide energy for the proposed incinerator. The public wants to do the right thing and recycle, give us the chance to do it better by accepting more plastics or creating laws so that all plastic is suitable for recycle.
- Please do something about the composting problem.

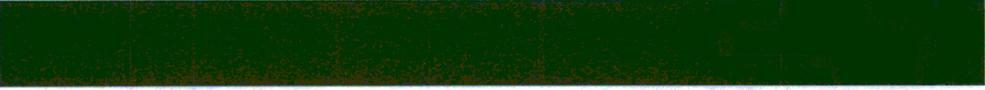
Miscellaneous:

- The program in Scarborough seems to be working. Bigger Bins.
- Nice to win an award if I was away on holidays or something and was recognized for not putting garbage out.

Region of Durham 70% Waste Diversion Study: Resident Survey Comments

- Educate the young children and they will promote the elder to comply.
- Thanks for including "Me" in Survey.
- Give people less money they'll have less garbage opps that's the plan! Love Conservative!
- In older homes there is very little space inside (usually kitchens) to have multiple bins for sorting. New homes should be developed with bin storage in mind. Why are some items with the recycle symbol not acceptable and if put in the bin, the entire bin is left and not picked up.
- Better incentive programs.
- Let private sector do it, Government should regulate diversion levels.
- A monetary reward system to pay consumers at transfer stations for disposing of recyclables e.g.: scrap metal/hazardous waste (less charge per ton for recyclables).
- Every household is different - People that have children, more than 5 people in a household--unfair to make a large household pay.
- Extreme draconian measures will probably result in a major increase in unlawful dumping and its attendant dangers.
- We are a two family residence, using 2 bags per family.
- Recycle collectors always scatter our 4 blue boxes, makes you want to just put out one, thus less recycling. We have contacted department (sent photos) but problem still continues.

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APPENDIX B

Waste Disposal Site Survey Photographs

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Photograph 1: View of a general waste bin at the Oshawa Transfer Station.



Photograph 2: View of a second general waste bin located at the Oshawa Transfer Station.



Photograph 3: View of a general waste bin located at the Port Perry Transfer Station.



Photograph 3: View of the wood bin located at the Oshawa Transfer Station.

Completed by:	KEJ
Reviewed by:	AB



APPENDIX C

Cost Details for Proposed Waste Diversion Programs

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Appendix C: Capital and Operating New Program Costs

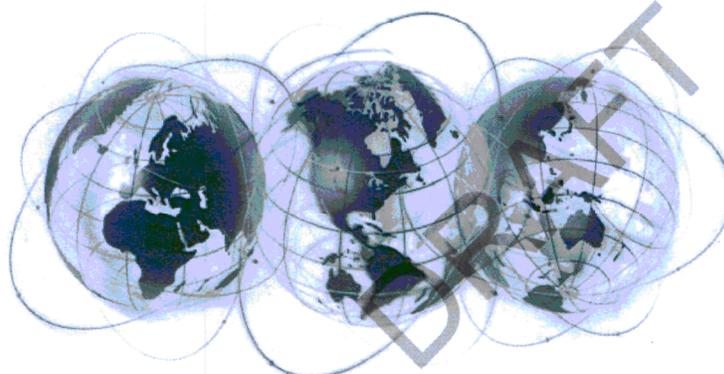
Waste Diversion Initiative	Description	Annual Capital Cost	Annual Operating Costs					
			2009	2010	2011	2012	2013	
Transfer Station Upgrades								
Modified Signage	\$1,000 per site	\$3,000						
Modified Site Layout	\$100,000 per site	\$300,000						
Increased Staffing	1 additional staff May-Aug (2sites)		\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
Extended Hours	additional 20 hours/week May-Aug (2 sites)		\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
Additional Temporary Sites	2 additional sites May-Aug	\$200,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000
Increased Transfer Stations	1 additional transfer site	\$1,500,000	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000	\$180,000
Subtotal		\$2,003,000	\$290,000	\$290,000	\$290,000	\$290,000	\$290,000	\$290,000
Tiered Tipping Fees	5000 tonnes at additional \$80/tonne		-\$400,000	-\$400,000	-\$400,000	-\$400,000	-\$400,000	-\$400,000
Participation Stimuli								
Increased P&E Expenditures*	increase from \$.75/hh to \$1.00/hh	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
Recognition and Reward Program	one blue box/hh		\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
Additional blue boxes	2 vehicles & by-law enforcement officer	\$630,000						
Waste Disposal Bans		\$80,000	\$132,000	\$132,000	\$132,000	\$132,000	\$132,000	\$132,000
TOTAL		\$2,763,000	\$502,000	\$502,000	\$502,000	\$502,000	\$502,000	\$502,000

* P&E Expenditures include development of P&E Strategy and Marketing Plan

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