

Segmentation Analysis
of
Available Recyclables

in the

Greater Toronto Area
and the City of Hamilton & Niagara Region

E&E Fund Project #105 –
Enhanced Blue Box Recovery Project

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1.0 Background

The City of Toronto and the Regions of Peel, York and Durham - in collaboration with MGM Management as the project coordinator - applied for funding support to Stewardship Ontario's Efficiency & Effectiveness Fund (E&E Fund) for a project to increase the recovery rate of under-recovered recyclables in the "Golden Horseshoe" area. This target area consists of those municipalities stated above, plus the City of Hamilton and the Regions of Niagara and Halton. Together, this group of municipalities represents approximately 49% of total households (HH) in Ontario.

The project was recommended by Waste Diversion Ontario's Municipal – Industry Program Committee (MIPC) and approved by the Board of Stewardship Ontario in early 2005, as the Enhanced Blue Box Recovery Project – E & E Project # 105.

This project included two core research areas – technical research and communications research – and was comprised of eight different research projects (summarized below).

Technical Research

In order to determine where available recyclables "resided," four technical research studies were approved under project 105. These were designed to provide supporting information to set priorities for targeting certain sectors of the waste stream, with a view to increasing recovery.

Study 1 – Examined (in cooperation with the Aluminum Association) the Inflow / Outflow of Used Beverage Containers (Project 105 Tech Memo #1)

Study 2 – Developed a protocol to sample and examine residual materials from Material Recycling Facilities (MRF) (Project 105 Tech Memo #2)

Study 3 – Examined the availability of recyclables in public space and school trash (Project 105 Tech Memo #3)

Study 4 – Summarized all data from waste composition audits, public space audits, MRF residue audits, and school recycling in order to estimate available recyclable segments in target municipalities (Project 105 Segmentation Analysis). This is the key technical research document from this project.



Communications Research

The second strand of research consisted of gathering information on householders' attitudes and behaviours regarding Blue Box recycling. This work was managed by McConnell Weaver Communication Management, who sub-contracted to Informa Market Research Co. Ltd. Two main reports – one focusing on qualitative focus group research and the other on the results of a quantitative (benchmark) telephone survey – as well as an Executive Summary of those two documents were produced by Informa. The fourth (and core) report in this area – the Strategic Communications Plan authored by McConnell Weaver – draws on both the technical and communications research and provides the overall direction recommended for the communications campaign. It includes communication messages aimed at specific segments of the target populations where Blue Box recycling can be further optimized in the “Golden Horseshoe” area.

2.0 Segmentation Analysis - Methodology

Stewardship Ontario (SO) staff received and compiled raw data from municipal waste composition audits, conducted in 2005. The waste composition audit data was from single family and multi-family waste composition audits conducted by municipalities. All audits were conducted using Stewardship Ontario protocols, to assure they were conducted fairly and by a statistically valid methodology.

The “target area” for this Segmentation Analysis is the “Golden Horseshoe” area of Ontario which includes:

- Region of Durham
- Region of York
- City of Toronto
- Region of Peel
- Region of Halton
- City of Hamilton
- Region of Niagara

The target area contains 49% of all Ontario single and multi-family households, according to SO data and information received in the Annual Data Call conducted by Waste Diversion Ontario.

From the data received, Stewardship Ontario staff developed tonnages per year for all waste handled within the target area. Data was then examined to determine the amounts of broad categories of materials that are being recycled, and those not yet recovered in each of the municipalities where waste composition audits were available. The material categories examined were:

- Printed paper
- Paper Packaging
- Plastics
- Metals
- Glass

The WDO Data Call indicates that for the target municipalities 434,588 tonnes of blue box materials were marketed in 2004.

From this examination an overall recovery rate and a material specific recovery rate was calculated, for multi-family (MF) and single family (SF) households, for those municipalities where waste composition audit data was available. These indicators were then used to “estimate” approximate performance of MF and SF households for the remaining GTA, Hamilton and Niagara municipalities.

This analysis is not expected to be overly precise. It is completed with an understanding that we are attempting to indicate an “order-of-magnitude” availability of recyclables not yet recovered in the target area. This analysis uses Data Call recovery figures for existing recovery and estimates “available recyclables” based upon a limited number (12) of waste composition audits in SF & MF Households.

Upon calculating the “order-of-magnitude” availability of recyclables for a given target area municipality, we then considered what recyclables may be untapped from Schools, Public Space garbage receptacles and MRF Residues. These estimates were made drawing from independent studies conducted in 2005 (Public Spaces & MRF Residue) and by TetraPak Canada (Schools – 2005). Appendix 2 summarizes the reported tonnes captured from schools in 2004, as well as the findings from the TetraPak study.

For each target municipality an estimate of the tonnes recycled and the tonnes not recycled (available) is made. The gross revenues that would be generated by recovering 10% of the available recyclables, by material category, is presented. Additionally, we estimated what each 1% of increase in material tonnes would provide in average gross revenue, should these materials be recovered for recycling. Average scrap revenues (2005) were used for this estimation, based upon the CSR Price Sheet and the report “ Ontario Blue Box Mass Balance Report & Markets Update 2003/ 2004 “, Stewardship Ontario, December 13, 2005.

It should be noted that the “available tonnes” may be somewhat over-estimated since some municipal programs may not collect all items included in waste composition audit analysis.

3.0 Sources of Data

This segmentation analysis relies on data drawn from the eleven following waste composition audits:

- Durham Region – Single family audits - 4 audits completed in 2005
- Toronto – Single family audits - 4 audits completed in 2005
- Toronto – Multi – Family audit 2005 – 1 audit (10 buildings) conducted in 2005
- Peel Region – Multi-Family audit – 1 audit conducted in 2005
- Peel region – Single Family audit - 1 audit conducted in 2005

Material Recycling Facility residue data was obtained through internal work done by Stewardship Ontario, in an analysis entitled “MRF and MRF residue for Top 30 Municipalities (2003 WDO – Data call) - Ranked by Tonnes Residue Generated”. This summary of quantities of blue box materials collected and the resultant residuals appears as Appendix 1 of this report. A Protocol for MRF Residue Sampling was also developed and is presented under separate cover (Protocol for MRF Residue Sampling - Technical Memorandum # 2).

To estimate the amount of recyclables available in public space garbage and in schools, we relied on waste composition work completed in 2005, and on independent school waste audit studies respectively, presented under separate cover in the GTA Public Space and Schools Opportunity Analysis (Technical Memo # 3).

4.0 Findings

4.1 Single & Multi-Family Households – GTA, Hamilton & Niagara Region

As shown in the Table below, there are 2.3 million households in the target area including the Regions of Durham, York, Peel, Halton, Niagara and the Cities of Toronto and Hamilton.

The number of households in the target area represents 49% of the total in the Province. The proportion of multi-family households (MF) to single-family (SF) households in the target area (34% MF compared to 27% as a provincial average) is considerably above the average across the whole Province. This is not surprising considering the compact population densities experienced in the Cities of Toronto and Hamilton and to some extent in York and Peel Regions.

TARGET AREA - Distribution of Households by Type

	Toronto	Peel	York	Durham	Halton	Hamilton	Niagara
Single Family Households	506,800	255,500	187,964	167,070	121,298	136,080	140,805
Multi-Family Households	473,372	84,500	76,402	21,338	26,712	60,175	29,723
% of HH within Target Area	980,172 43%	340,000 15%	264,366 12%	188,408 8%	148,010 6%	196,255 9%	170,528 7%
			Total HH - In All Ontario	Distribution by Type - All Ontario	Total HH in Target Area	Distribution by Type - Target Area	Proportion of Ontario HH in Target Area
			Single Family Households	3,407,644	73%	1,515,517	66%
			Multi-Family Households	1,258,133	27%	772,222	34%
			Total	4,665,777		2,287,739	49%

4.2 Recyclables & Gross Revenues Available – GTA, Hamilton & Niagara Region

This Segmentation Analysis attempts to estimate the tonnages of available recyclables present in the garbage stream in the target area. While it is obvious that only a portion of the recyclables is reasonably likely to be recovered, it is important to understand the “order-of-magnitude” of the materials not being recovered, and where they reside.

Of the 824,000 tonnes of Blue box materials diverted in 2004, the target area contributed about 435,000 tonnes or about 53% of total provincial recovery.¹

Of the total Blue Box materials recovered in the target municipalities we estimate that SF HH provided 367,000 tonnes of recyclable materials, or 84% of the diverted tonnage.

The average recycling rate from SF HH in the target area is estimated to be 71%, (based upon estimated recyclables available using waste composition study data vs. recyclables collected); which may suggest that additional opportunities to recover more are limited. However, due to the large number of SF HH this segment has a large amount of unrecovered recyclables remaining in the garbage stream. From examining available waste composition audit data, we estimate that approximately 114,000 tonnes of recyclables remain in SF HH's in the target area. Due to the current high recovery rate, pushing the recovery higher will certainly be challenging, however, the benefits of even modest improvements (1% to 5% increases) would be significant to the overall Blue Box system in Ontario, and in reaching the Minister of the Environment's proposed 60% capture goal.

Multi-family households appear to be the most likely segment where large tonnages of untapped recyclables remain. From examining available waste composition audit data, we estimate that in 2004, MF HH's recycled 69,000 tonnes of material, or about 16% of the total recyclables diverted in the target municipalities. The encouraging finding is that this segment has approximately 115,000 tonnes of recyclable materials yet unrecovered.

In total approximately 250,000 tonnes of recyclables remain in the garbage stream in the GTA, Hamilton and Niagara Region target area (See Appendix 3 – Page 28 for details). Of this, half (115,000 tonnes) of the recyclables still available reside in multi-family households, where recycling opportunities may not be optimized. Our finding is that MF HH's represent the most likely source for the greatest increases in tonnages in the target area.

Our analysis also considered what quantities of recyclables may be available from three other sources: Schools, MRF Residues and from Public Space trash collections. In total our findings are that these three sources may represent another 14,000 tonnes (< 6% of what is available from MF & SF HH). We believe that MRF residue reclaiming and public space trash processing may not be an economically feasible source of marketable recyclables, due to contamination issues and collection costs.

¹ WDO 2004 Data Call – Blue Box Tonnage Data

Whereas school recycling may have educational and public relations value for the Blue Box system, we again believe that this sector may not be economically beneficial based on the relatively low tonnages of recyclables available from target area schools.

Turning to the value of recovering more of the recyclables in the garbage stream, our analysis estimated the total gross revenue of all recyclable scrap if 100% of it was captured. Of course, this is unachievable, therefore we calculated the incremental new revenues from capturing 10% of the available recyclables remaining in the target area garbage stream. Finally, for the purposes of understanding the relative merits of even small increases in tonnage we broke out the gross revenue gains from each 1% of increased recovery with MF HH'S and for SF HH's.

Should a 10% increase in both MF HH and SF HH's be achieved, \$2.86 million of new scrap revenues would flow to municipalities. Of this total SF HH's would contribute \$1.71 million and MF HH's \$1.15 million per year.

Perhaps more realistic is to recognize that for every 1% increase in tonnage from SF HH's municipalities would achieve an additional \$172,000. For every 1% of tonnage increase achieved from MF HH's the gross revenues increase would be about \$ 115,000.

It is most likely that a 10% increase in recovery of recyclables is achievable from multi-family households with a sustained program to make recycling more available, and more important to residents living in these homes. A program aimed at increasing recovery across the target municipalities using communications tools would likely result in an uplift in recovery in SF HH's as well.

Should a 10% increase in MF HH and a 2% increase in SF HH recyclables occur, it is estimated that this would translate to annual tonnage increase of over 20,000 tonnes with gross revenues paid to municipalities in the target area increasing approximately \$1.73 million annually.

Table 1 on the next page illustrates these findings.

Recyclables Available in Garbage Stream – GTA, Hamilton & Niagara Region

Available - Multi-Family Households
Recyclables Estimated to be Available

	MF HH in GTA + Hamilton + Niagara		772,222	HHs
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	41,043	\$4,010,000	\$401,000	\$40,100
Paper Pckg	42,070	\$3,640,000	\$364,000	\$36,400
Plastics	22,574	\$3,690,000	\$369,000	\$36,900
Metals	5,130	\$3,590,000	\$359,000	\$35,900
Glass	7,183	\$80,000	\$8,000	\$800
Total	118,000	\$11,530,000	\$1,153,000	\$115,300

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Available - Single-Family Households
Recyclables Estimated to be Available

	SF HH in GTA + Hamilton + Niagara		1,515,517	HHs
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	32,000	\$3,130,000	\$313,000	\$31,300
Paper Pckg	25,000	\$2,160,000	\$216,000	\$21,600
Plastics	43,000	\$7,040,000	\$704,000	\$70,400
Metals	7,000	\$4,900,000	\$490,000	\$49,000
Glass	7,000	\$80,000	\$8,000	\$800
Total	114,000	\$17,310,000	\$1,731,000	\$173,100

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Recyclables Available in Garbage Stream

Current Estimated Recovery Rate 34%

69,000 tonnes recycled from MF (est.)

Current Estimated Recovery rate 71%

366,000 tonnes recycled from SF (est.)

118,000 tonnes 114,000 tonnes

Currently - 435,000 tonnes Recycled
~250,000 tonnes of recyclables remain in garbage stream from SF & MF Households
61% Overall Recycling rate

6,400 tonnes

Currently recycling 7,500 tonnes from schools in target area

~ 5,000 tonnes

7,600 tonnes

Available from MRF Residue

Available from Schools

	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	3,200	\$320,000	\$32,000	\$3,200
Paper Pckg	1,655	\$170,000	\$17,000	\$1,700
Plastics	938	\$90,000	\$9,000	\$900
Metals	386	\$40,000	\$4,000	\$400
Glass	221	\$20,000	\$2,000	\$200
Total	6,400	\$640,000	\$64,000	\$6,400

Available From Public Space
Recyclables Estimated to be Available

tonnes/ yr.	Gross Revenues@ 100%	Gross Revenues @10%	Gross Revenues per 1% Increase	
Printed Paper	1,310	Contaminated	Contaminated	\$0
Paper Pckg	1,310	\$0	\$0	\$0
Plastics	1,373	\$0	\$0	\$0
Metals	250	\$0	\$0	\$0
Glass	624	\$0	\$0	\$0
Total	4,866	\$0	\$0	\$0

Basis: Toronto public space trash audits 2005, 9 audits; Toronto 5,800 bins generates ~20 tonnes paper, plastics, metal and glass per cycle (1 service of all bins). Assume 5 cycles per week, 50 weeks/yr. ~5,200 tonnes/yr. Highly contaminated, 34% of trash identified as organics. 32% paper & paper pckg, 11% plastics, 5% glass, 2% metals
Multiply Toronto tonnage by population equivalent of GTA+Hamilton+Niagara (2.5 million+ 3.5 million (49% Ontario HH) or 6 million/ 2.5 million = 2.4 multiplier. 50%/printed / 50% paper pckg

4.3 Recyclables & Gross Revenues Available – Detail

4.3.1 Recyclables & Gross Revenues Available – Toronto

For the purposes of assisting the municipal partners in this project recognize the potential for untapped recyclables in their communities, the analysis presents details for each target municipality.

For Toronto, we find that there is a relatively high recovery rate reported across the entire municipality of 60%. Recovery is exceptionally high in single-family households (76%) while multi-family households have a 40% recovery rate only.

For Toronto there appears to be significant tonnages of recyclables still available in the single-family garbage stream, but with the extremely high recovery rates we believe that it will be difficult to pull large amounts of new tonnages from this source. If a 2% increase was achieved from SF HH in Toronto, it would provide an additional 540 tonnes of recyclables with gross revenue increases of approximately \$80,000.

Multi-family households in Toronto represent the best opportunity for new tonnages of recyclable to be recovered in this municipality. With 48% of households in Toronto being classified as multi-family, the low recovery rate of recyclables represents a potential source of untapped tonnes. We estimate that 58,000 tonnes of recyclables remain in Toronto's multi-family garbage. A 10% increase in this recovery would result in 5,800 new tonnes of material with annual incremental revenue to the City of Toronto of \$ 568,000.

The combination of recyclable available in schools, MRF residues and in public space trash represents about 6,400 tonnes of recyclable materials. We do not believe that these tonnes are likely to be economically recoverable for the reasons stated in the previous section.

It should be noted that the "available tonnes" may be somewhat over-estimated since some municipal programs may not collect all items included in waste composition audit analysis.

Table 2 on the next page illustrates these findings.



Recyclables Available in Garbage Stream – City of Toronto

Available - Toronto Multi-Family Households
Recyclables Estimated to be Available

	MF HH in Toronto 473,000 HHS			
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	21,000	\$2,050,000	\$205,000	\$20,500
Paper Pckg	22,000	\$1,900,000	\$190,000	\$19,000
Plastics	9,800	\$1,600,000	\$160,000	\$16,000
Metals	2,400	\$1,680,000	\$168,000	\$16,800
Glass	2,900	\$30,000	\$3,000	\$300
	58,100	\$5,680,000	\$568,000	\$56,800

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Available - Toronto Single-Family Households
Recyclables Estimated to be Available

	SF HH in Toronto 507,000 HHS			
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	7,600	\$740,000	\$74,000	\$7,400
Paper Pckg	6,000	\$520,000	\$52,000	\$5,200
Plastics	11,100	\$1,820,000	\$182,000	\$18,200
Metals	1,200	\$840,000	\$84,000	\$8,400
Glass	1,200	\$10,000	\$1,000	\$100
	27,100	\$3,930,000	\$393,000	\$39,300

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Current Estimated Recovery Rate 40%
29,000 tonnes recycled from MF

Current Estimated Recovery rate 76%
129,000 tonnes recycled from SF

Recyclables Available in Garbage Stream
58,000 tonnes 27,000 tonnes

980,000 Households
Currently - 189,000 tonnes Recycled (incl.schools)
85,000 tonnes of recyclables remain in SF & MF Households
62% Current Estimated - Overall Recycling rate

2,600 tonnes
2,547 tonnes currently recycled from Toronto schools

2,100 tonnes

3,500 tonnes

Available From Toronto Schools
Recyclables Estimated to be Available

	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	1,297	\$100,000	\$10,000	\$1,000
Paper Pckg	669	\$57,800	\$5,780	\$578
Plastics	378	\$61,900	\$6,190	\$619
Metals	162	\$110,000	\$11,000	\$1,100
Glass	95	\$1,000	\$100	\$10
	2,600	\$330,700	\$33,070	\$3,307

Basis: 8 school audits extrapolated to 920,000 students, assume 2/3 paper 1/3 paper pckg
Toronto estimate: 33% of all GTA + Hamilton-Niagara enrolment are in City of Toronto

Available From MRF Residues
Recyclable Estimated to be Available
based 189,000 tonnes recyclables processed
17,371 tonnes tonnes residue landfilled,
if 20% recoverable = 3,474 tonnes

Available From Public Space
Recyclables Estimated to be Available

	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	563	Contaminated	Contaminated	\$0
Paper Pckg	563	\$0	\$0	\$0
Plastics	590	\$0	\$0	\$0
Metals	107	\$0	\$0	\$0
Glass	268	\$0	\$0	\$0
	2,093	\$0	\$0	\$0

Basis: Toronto public space trash audits 2005, 9 audits of 40 bins per day;
Toronto's 5,742 bins (3,632 OMG & 2,110 open) collect 4,970 tonnes of garbage per yr.
Waste is highly contaminated. 34% of trash identified as organics 32% paper & paper pckg, 11% plastics, 5% glass, 2% metals. Note: Estimate of available recyclables is weak based upon available data

4.3.2 Recyclables & Gross Revenues Available – Peel Region

For the Region of Peel, we find that there is a relatively high recycling rate reported across the entire municipality of 62%. Recovery is high in single-family households (67%) whereas multi-family households appear to have a relatively low recovery rate at 23%.

For Peel Region there appears to be significant tonnages of recyclables still available in the single-family garbage stream which is estimated to be 19,000 tonnes, but as with Toronto, the high recovery rates currently being achieved will make it difficult to pull large amounts of new tonnages from this source. That being said, should even a 2% increase be achieved in from SF HH in Peel Region, this would provide an additional 500 tonnes of new recyclables with gross revenue increases of \$ 60,000.

Multi-family households in the Region of Peel appear to represent a very good opportunity for new tonnages of recyclable to be recovered for this municipality. With 23% of households in Peel Region being classified as multi-family, and with the reported low recovery rate of recyclables this segment represents a significant potential source of untapped tonnes. We estimate that approximately 20,000 tonnes of recyclables remain in Peel's multi-family garbage. A 10% increase in this recovery would result in 2,000 new tonnes of material with annual incremental revenue to the Region of Peel of \$ 194,000.

The combination of recyclable available in schools, MRF residues and in public space trash represents about 2,200 tonnes of recyclable materials. We do not believe that these tonnes are likely to be economically recoverable for the reasons stated in the previous section. It should be noted that Peel Region reports 3,712 tonnes of recyclables from schools, which is quite a significant contribution to their recycling efforts.

It should be noted that the "available tonnes" may be somewhat over-estimated since some municipal programs may not collect all items included in waste composition audit analysis.

Table 3 on the next page illustrates these findings.

Recyclables Available in Garbage Stream – Region of Peel

Available - Peel Multi-Family Households				
Recyclables Estimated to be Available				
	MF HH in Peel	85,000	HHs	
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	6,400	\$630,000	\$63,000	\$6,300
Paper Pckg	6,400	\$550,000	\$55,000	\$5,500
Plastics	4,300	\$700,000	\$70,000	\$7,000
Metals	1,100	\$770,000	\$77,000	\$7,700
Glass	1,600	\$200,000	\$20,000	\$2,000
	19,800	\$1,940,000	\$194,000	\$19,400

Basis: 12 waste audits: Toronto(5), Durham(4), Peel(3)

Available - Peel Single-Family Households				
Recyclables Estimated to be Available				
	SF HH in Peel	256,000	HHs	
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	5,500	\$540,000	\$54,000	\$5,400
Paper Pckg	4,100	\$350,000	\$35,000	\$3,500
Plastics	6,600	\$1,080,000	\$108,000	\$10,800
Metals	1,400	\$980,000	\$98,000	\$9,800
Glass	1,400	\$200,000	\$20,000	\$2,000
	19,000	\$2,970,000	\$297,000	\$29,700

Basis: 12 waste audits: Toronto(5), Durham(4), Peel(3)

Recyclables Available in Garbage Stream

20,000 tonnes 19,000 tonnes

340,000 Households
Currently - 88,000 tonnes
Recycled (incl. schools)
39,000 tonnes of recyclables
remain in garbage stream from
SF & MF Households

62% Current Estimated -
Overall Recovery rate

Current
Estimated
Recovery Rate
23%
6,200 tonnes recycled

Current
Estimated
Recovery rate
67%
78,000 tonnes recycled

1,200 tonnes

Peel schools recycle 3,712 tonnes of
recyclables annually

< 1,000 tonnes

1,200 tonnes

Available From Peel Schools				
Recyclables Estimated to be Available				
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	330	\$32,132	\$3,213	\$321
Paper Pckg	330	\$28,147	\$2,815	\$281
Plastics	340	\$56,667	\$5,667	\$567
Metals	60	\$42,000	\$4,200	\$420
Glass	160	\$1,813	\$181	\$18
	1,220	\$160,759	\$16,076	\$1,608

Basis: 8 school audits extrapolated to 920,000 students, assume 2/3 paper 1/3 paper pckg
Peel estimate: 25% of all GTA + Hamilton+Niagara enrolment are in Region of Peel

Available From MRF Residues
Peel processes 87,000 tonnes - recyclables
Residue 6.8% = 5,900 tonnes
Assumption : 20% marketable or 1,200 tonnes

Available From Peel Public Space				
Recyclables Estimated to be Available				
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	197	\$0	\$0	\$0
Paper Pckg	197	\$0	\$0	\$0
Plastics	206	\$0	\$0	\$0
Metals	37	\$0	\$0	\$0
Glass	94	\$0	\$0	\$0
	730	\$0	\$0	\$0

Basis: Toronto public space trash audits 2005, 9 audits; Toronto 5,800 bins generates ~20 tonnes paper, plastics, metal and glass per cycle (1 service of all bins). Assume 5 cycles per week, 50 weeks/yr. =5,200 tonnes/yr. Highly contaminated, 34% of trash identified as organics. 32% paper & paper pckg, 11% plastics, 5% glass, 2% metals
Multiply Toronto tonnage by population equivalent of GTA+Hamilton+Niagara (2.5 million+ 3.5 million (49% Ontario HH) or 6 million/ 2.5 million = 2.4 multiplier. 50%printed / 50% paper pckg
For Peel Estimate: Peel is 15% of target HHs / population

4.3.3 Recyclables & Gross Revenues Available – York Region

No audit data was available for either SF or MF households for the Region of York. The estimates of available recyclables below are therefore based on available data for SF (Durham, Toronto, and Peel) and for Multi-Family (Toronto and Peel), and applied to the number of households for each category in York.

For the Region of York we assumed a relatively high recovery rate across the entire municipality of 59%. We assumed a high recovery for single-family households (69%) whereas multi-family households appear to have a relatively low recovery rate, which is estimated in the 30% range.

From examining available SF HH waste composition audit data, we estimate that in 2004, York Region had significant tonnages of recyclables still available in the single-family garbage stream (approximately 15,000 tonnes), but as with Toronto and Peel Region, the high recovery rates currently being achieved will make it difficult to pull large amounts of new tonnages from this source. Should a modest 2% increase be achieved from SF HH in York Region that would provide an additional 300 tonnes of new recyclables with gross revenue increases of \$46,000.

From the available MF HH waste composition audit data, we estimate that in 2004, York Region had opportunity for new tonnages of recyclable to be recovered for this type of households. With an estimated 28% of households in York Region being multi-family households, and with the reported low recovery rate of recyclables this segment represents a significant potential source of untapped tonnes. We estimate that 14,400 tonnes of recyclables remain in York Region's multi-family garbage. A 10% increase in this recovery would result in 1,440 new tonnes of material with annual incremental revenue to the Region of York of \$141,000.

The combination of recyclables available in schools, MRF residues and in public space trash represents less than 3,000 tonnes of recyclable materials. We do not believe that these tonnes are likely to be economically recoverable for the reasons stated in the previous section.

It should be noted that the "available tonnes" may be somewhat over-estimated since some municipal programs may not collect all items included in waste composition audit analysis.

Table 4 on the next page illustrates these findings.



Recyclables Available in Garbage Stream – Region of York

Available - York Multi-Family Households
Recyclables Estimated to be Available

	MF HH in York		76,000	HHs
	tonnes/ yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	5,000	\$490,000	\$49,000	\$4,900
Paper Pckg	5,000	\$430,000	\$43,000	\$4,300
Plastics	2,800	\$460,000	\$46,000	\$4,600
Metals	700	\$490,000	\$49,000	\$4,900
Glass	900	\$10,000	\$1,000	\$100
	14,400	\$1,410,000	\$141,000	\$14,100

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Available - York Single-Family Households
Recyclables Estimated to be Available

	SF HH in York		188,000	HHs
	tonnes/ yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	4,400	\$430,000	\$43,000	\$4,300
Paper Pckg	3,300	\$290,000	\$29,000	\$2,900
Plastics	5,700	\$930,000	\$93,000	\$9,300
Metals	900	\$630,000	\$63,000	\$6,300
Glass	1,000	\$10,000	\$1,000	\$100
	15,300	\$2,290,000	\$229,000	\$22,900

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Current
Estimated
Recovery Rate
30%
6,400 tonnes recycled (est)

Current
Estimated
Recovery rate
69%
52,000 tonnes recycled (est.)

Available Recyclables
in Garbage Stream

14,000 tonnes 15,000 tonnes

265,000 Households
Currently - 52,000 tonnes
Recycled
29,000 tonnes of recyclables
remain in garbage stream from
SF & MF Households
59% Current Estimated -
Overall Recycling rate

<1,000 tonnes

York Region reports less
than 100 tonnes recycled
from schools

< 1,000 tonnes

<1,000 tonnes

Available From York Schools
Recyclables Estimated to be Available

	tonnes/ yr.	Gross Revenues@1 00%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	400	\$38,957	\$3,896	\$390
Paper Pckg	200	\$17,048	\$1,705	\$170
Plastics	100	\$16,667	\$1,667	\$167
Metals	50	\$35,000	\$3,500	\$350
Glass	30	\$340	\$34	\$3
	780	\$108,011	\$10,801	\$1,080

Basis: 8 school audits extrapolated to 920,000 students, assume 2/3 paper 1/3 paper pckg
York estimate: 14% of all GTA + Hamilton+Niagara enrolment are in Region of York

Available From York MRF Residues
Recyclables Estimated to be Available
based 250,000 tonnes @ 7% residue
~ 17,000 tonnes (contaminated)
York processes 55,500 tonnes - estimated
Residue 6.8% = 3,800 tonnes
Assumption : 20% marketable or 750 tonnes

Available From York Public Space
Recyclables Estimated to be Available

	tonnes/ yr.	Gross Revenues@1 00%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	160	\$0	\$0	\$0
Paper Pckg	160	\$0	\$0	\$0
Plastics	340	\$0	\$0	\$0
Metals	60	\$0	\$0	\$0
Glass	160	\$0	\$0	\$0
	880	\$0	\$0	\$0

Basis: Toronto public space trash audits 2005, 9 audits; Toronto 5,800 bins generates ~20 tonnes paper, plastics, metal and glass per cycle (1 service of all bins). Assume 5 cycles per week, 50 weeks/yr. ~5,200 tonnes/yr. Highly contaminated. 34% of trash identified as organics. 32% paper & paper pckg, 11% plastics, 5% glass, 2% metals
Multiply Toronto tonnage by population equivalent of GTA+Hamilton+Niagara (2.5 million+ 3.5 million (49% Ontario HH) or 6 million/ 2.5 million = 2.4 multiplier. 50%/printed / 50% paper pckg
For York Estimate: York is 12% of target HHs

4.3.4 Recyclables & Gross Revenues Available – Durham Region

The Region of Durham reports similar recovery rates to those reported by the other municipalities in the target area. Durham Region reported an overall recycling rate of 59% across the entire municipality. Recovery is relatively high in single-family households approaching 62%, whereas multi-family households appear to have a relatively low recovery rate, estimated at 30%.

Durham Region likely has significant tonnages of recyclables still available in the single-family garbage stream (approximately 19,000 tonnes), but as with the other GTA municipalities the high recovery rates currently being achieved may make it difficult to achieve new tonnages from this source. If a 2% increase was achieved from SF HH in Durham Region, it would provide an additional 400 tonnes of new recyclables with gross revenue increases of approximately \$60,000 from this segment.

No audit data was available for MF households for Durham Region. The estimates of available recyclables for MF below are therefore based on available MF data from Toronto and Peel, and applied to the number of MF HH in Durham.

Multi-family households in the Region of Durham represent a modestly good opportunity for new tonnages of recyclable to be recovered for this municipality, due mainly to the lower occurrence of MF HH in the region (MF HH ~ 11% of total HH's). With 11% of its households being multi-family households, and with the reported low recovery rate of recyclables, this segment represents a potential source of untapped tonnes, estimated to be about 3,300 tonnes of recyclables remaining in Durham Region's multi-family garbage. A 10% increase in this recovery would result in 330 new tonnes of material with annual incremental revenue to the Region of Durham of \$32,000.

The combination of recyclable available in schools, MRF residues and in public space trash represents less than 1,500 tonnes of recyclable materials. We do not believe that these tonnes are likely to be economically recoverable for the reasons stated in the previous section.

It should be noted that the "available tonnes" may be somewhat over-estimated since some municipal programs may not collect all items included in waste composition audit analysis.

Table 5 on the next page illustrates these findings.

Recyclables Available in Garbage Stream – Region of Durham

Available - Durham Multi-Family Households
Recyclables Estimated to be Available

	MF HH in Durham 21,000		HHs	
tonnes/ yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1%	Increase
Printed Paper	1,000	\$100,000	\$10,000	\$1,000
Paper Pckg	1,000	\$90,000	\$9,000	\$900
Plastics	800	\$130,000	\$13,000	\$1,300
Metals	200	\$140,000	\$14,000	\$1,400
Glass	300	\$0	\$0	\$0
	3,300	\$320,000	\$32,000	\$3,200

Basis: 12 waste audits: Toronto(5), Durham(4), Peel(3)

Available - Durham Single-Family Households
Recyclables Estimated to be Available

	SF HH in Durham 167,000		HHs	
tonnes/ yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1%	Increase
Printed Paper	5,600	\$550,000	\$55,000	\$5,500
Paper Pckg	4,100	\$350,000	\$35,000	\$3,500
Plastics	7,200	\$1,180,000	\$118,000	\$11,800
Metals	1,200	\$840,000	\$84,000	\$8,400
Glass	1,300	\$10,000	\$1,000	\$100
	19,400	\$2,930,000	\$293,000	\$29,300

Basis: 12 waste audits: Toronto(5), Durham(4), Peel(3)

Current
Estimated
Recovery Rate
30%
1,800 tonnes estimated

Current
Estimated
Recovery rate
62%
39,000 tonnes recycled (est.)

Available Recyclables in
Garbage Stream
3,300 tonnes 19,000 tonnes

188,000 Households
Currently - 44,000 tonnes
Recycled
23,000 tonnes of recyclables
remain in garbage stream in
SF & MF Households
59% Current Estimated -
Overall Recycling rate

< 300 tonnes

< 500 tonnes

No recycling reported for
Durham schools

~ 600 tonnes

Available From Durham Schools
Recyclables Estimated to be Available

tonnes/ yr.	Gross Revenues @100%	Gross Revenues @10%	Gross Revenues per 1%	Increase
Printed Paper	100	\$9,739	\$974	\$97
Paper Pckg	100	\$8,524	\$852	\$85
Plastics	40	\$6,667	\$667	\$67
Metals	20	\$14,000	\$1,400	\$140
Glass	10	\$113	\$11	\$1
	270	\$39,043	\$3,904	\$390

Basis: 8 school audits extrapolated to 920,000 students, assume 2/3 paper 1/3 paper pckg
Durham estimate: 5% of all GTA + Hamilton+Niagara enrolment are in Region of Durham

Available From Durham MRF Residue
Durham processes 44,000 tonnes of recyclables
@ 6.8% = 2,992 tonnes of residue ; 20% recoverable = 600 tonnes

Available From Durham Public Space
Recyclables Estimated to be Available

tonnes/ yr.	Gross Revenues @100%	Gross Revenues @10%	Gross Revenues per 1%	Increase
Printed Paper	100	Contaminated \$0	Contaminated \$0	\$0
Paper Pckg	100			
Plastics	110	\$0	\$0	\$0
Metals	20	\$0	\$0	\$0
Glass	50	\$0	\$0	\$0
	380	\$0	\$0	\$0

Basis: Toronto public space trash audits 2005, 9 audits; Toronto 5,800 bins generates ~20 tonnes paper, plastics, metal and glass per cycle (1 service of all bins). Assume 5 cycles per week, 50 weeks/yr. =5,200 tonnes/yr. Highly contaminated, 34% of trash identified as organics. 32% paper & paper pckg, 11% plastics, 5% glass, 2% metals
Multiply Toronto tonnage by population equivalent of GTA+Hamilton+Niagara (2.5 million+ 3.5 million (49% Ontario HH) or 6 million/ 2.5 million = 2.4 multiplier. 50% printed / 50% paper pckg
For Durham Estimate: Durham is 8% of target HHs

4.3.5 Recyclables & Gross Revenues Available – Halton Region

No audit data was available for either SF or MF households for Halton Region. The estimates of available recyclables below are therefore based on available data for SF (Durham, Toronto, and Peel) and for Multi-Family (Toronto and Peel), and applied to the number of households for each category in Halton.

Based on these estimates, an overall recovery rate of 62% was assumed for Halton Region. Recovery is estimated to be high in single-family households where we assumed an average SF HH rate of recovery of 69%. Multi-family households were deemed to have a relatively low recycling recovery rate which was set at 30% for the purposes of this analysis.

Halton Region likely has significant tonnages of recyclables still available in the single-family garbage stream (approximately 10,000 tonnes), but as with the other GTA municipalities the high recovery rates currently being achieved may make it difficult to achieve new tonnages from this source. If a 2% increase was achieved from SF HH in Halton Region, this would provide an additional 200 tonnes of new recyclables with gross revenue increases of approximately \$30,000 from this segment.

Multi-family households in the Region of Halton represent a relatively small opportunity for new tonnages of recyclable to be recovered for this municipality, due mainly to the lower occurrence of MF HH in the region (MF HH ~ 18% of total HH's), and the smaller population of the municipality. Although 18% of households in Halton are multi-family households, and likely have a low recovery rate of recyclables; there appears to be only about 5,500 (was 5,200) tonnes of recyclables available in the Halton garbage stream. A 10% increase in this recovery would result in 550 new tonnes of material with annual incremental revenue to the Region of Halton of about \$54, 000.

The combination of recyclable available in schools, MRF residues and in public space trash represents less than 1,500 tonnes of recyclable materials. We do not believe that these tonnes are likely to be economically recoverable for the reasons stated in the previous section. Halton reported 770 tonnes were recovered from schools in 2004.

It should be noted that the “available tonnes” may be somewhat over-estimated since some municipal programs may not collect all items included in waste composition audit analysis.

Table 6 on the next page illustrates these findings.



Recyclables Available in Garbage Stream – Region of Halton

Available - Halton Multi-Family Households
Recyclables Estimated to be Available

	MF HH in Halton		27,000 HHs	
	tonnes/ yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	2,000	\$200,000	\$20,000	\$2,000
Paper Pckg	2,000	\$170,000	\$17,000	\$1,700
Plastics	1,000	\$160,000	\$16,000	\$1,600
Metals	200	\$140,000	\$14,000	\$1,400
Glass	300	\$0	\$0	\$0
	5,500	\$540,000	\$54,000	\$5,400

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Available - Halton Single-Family Households
Recyclables Estimated to be Available

	SF HH in Halton		121,000 HHs	
	tonnes/ yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	2,800	\$270,000	\$27,000	\$2,700
Paper Pckg	2,100	\$180,000	\$18,000	\$1,800
Plastics	3,700	\$610,000	\$61,000	\$6,100
Metals	600	\$420,000	\$42,000	\$4,200
Glass	600	\$10,000	\$1,000	\$100
	9,800	\$1,490,000	\$149,000	\$14,900

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Current Estimated Recovery Rate 30%
2,200 tonnes recycled (est.)

Current Estimated Recovery rate 69%
31,000 tonnes recycled (est.)

Available Recyclables in Garbage Stream
5,500 tonnes 9,800 tonnes

148,000 Households
Currently - 35,000 tonnes Recycled (incl. schools)
15,000 tonnes of recyclables remain in garbage stream in SF & MF Households
62% Current Estimated - Overall Recycling rate

< 500 tonnes

Schools recycle 770 tonnes in Halton

< 300 tonnes

< 500 tonnes

Available From Halton Schools
Recyclables Estimated to be Available

	tonnes/ yr.	Gross Revenues @100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	200	\$19,478	\$1,948	\$195
Paper Pckg	100	\$8,524	\$852	\$85
Plastics	100	\$16,667	\$1,667	\$167
Metals	20	\$14,000	\$1,400	\$140
Glass	10	\$113	\$11	\$1
	430	\$58,782	\$5,878	\$588

Basis: 8 school audits extrapolated to 920,000 students, assume 2/3 paper 1/3 paper pckg
Halton estimate: 7% of all GTA + Hamilton+Niagara enrolment are in Region of Halton

Available From Halton MRF Residues
Recyclables Estimated to be Available based 250,000 tonnes @ 7% residue ~ 17,000 tonnes (contaminated)
Halton processes 34,000 tonnes - estimated Residue 6.8% = 2,300 tonnes
Assumption : 20% marketable 460 tonnes

Available From Halton Public Space
Recyclables Estimated to be Available

	tonnes/ yr.	Gross Revenues @100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	80	Contaminated	Contaminated	\$0
Paper Pckg	80	\$0	\$0	\$0
Plastics	80	\$0	\$0	\$0
Metals	10	\$0	\$0	\$0
Glass	40	\$0	\$0	\$0
	290	\$0	\$0	\$0

Basis: Toronto public space trash audits 2005, 9 audits; Toronto 5,800 bins generates ~20 tonnes paper, plastics, metal and glass per cycle (1 service of all bins). Assume 5 cycles per week, 50 weeks/yr. ~5,200 tonnes/yr. Highly contaminated, 34% of trash identified as organics. 32% paper & paper pckg, 11% plastics, 5% glass, 2% metals
Multiply Toronto tonnage by population equivalent of GTA+Hamilton+Niagara (2.5 million+ 3.5 million (49% Ontario HH) or 6 million/ 2.5 million = 2.4 multiplier. 50%printed / 50% paper pckg
For Halton Estimate: Halton is 6% of target HHs

4.3.6 Recyclables & Gross Revenues Available – Hamilton

No audit data was available for either SF or MF households for Hamilton. The estimates of available recyclables below are therefore based on available data for SF (Durham, Toronto, and Peel) and for Multi-Family (Toronto and Peel), and applied to the number of households for each category in Hamilton.

Based on these estimates, we used an overall recovery rate of 59% for Hamilton. Recovery is estimated to be high in single-family households where we assumed an average SF HH rate of recovery of 69%. Multi-family households were deemed to have a relatively low recycling recovery rate which was set at 30% for the purposes of this analysis.

Hamilton likely has significant tonnages of recyclables still available in the single-family garbage stream (approximately 11,400 tonnes), but as with the other GTA municipalities the high recovery rates currently being achieved may make it difficult to achieve new tonnages from this source. Should a 2% increase in recovery be achieved from SF HH in Hamilton, it would provide an additional 220 tonnes of new recyclables with gross revenue increases of approximately just below \$32,000 from this segment annually.

Multi-family households in Hamilton represent a more significant opportunity for new tonnages of recyclable to be recovered for this municipality, due mainly to the higher proportion of MF HH in Hamilton compared to the Regions of Halton or Durham and similar to Toronto (MF HH ~ 31% of total HH's). These possibly under-serviced MF HH's in Hamilton may represent opportunities for significant new tonnages of recyclable to be collected. There appears to be just under 11,000 tonnes of recyclables available in the Hamilton MF HH garbage stream. A 10% increase in this recovery would result in 1,140 new tonnes of material with annual incremental revenues of just under \$110,000.

The combination of recyclables available in schools, MRF residues and in public space trash represents less than 1,600 tonnes of recyclable materials. We do not believe that these tonnes are likely to be economically recoverable for the reasons stated in the previous section. Hamilton reported it collected 200 tonnes of recyclables in 2004.

It should be noted that the "available tonnes" may be somewhat over-estimated since some municipal programs may not collect all items included in waste composition audit analysis.

Table 7 on the next page illustrates these findings.



Recyclables Available in Garbage Stream – City of Hamilton

Available - Hamilton Multi-Family Households				
Recyclables Estimated to be Available				
	MF HH in Hamilton		60,000 HHs	
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	4,000	\$390,000	\$39,000	\$3,900
Paper Pckg	4,000	\$350,000	\$35,000	\$3,500
Plastics	2,200	\$360,000	\$36,000	\$3,600
Metals	500	\$350,000	\$35,000	\$3,500
Glass	700	\$10,000	\$1,000	\$100
	11,400	\$1,110,000	\$111,000	\$11,100

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Available - Hamilton Single-Family Households				
Recyclables Estimated to be Available				
	SF HH in Hamilton		136,000 HHs	
	tonnes/yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	3,200	\$310,000	\$31,000	\$3,100
Paper Pckg	2,400	\$210,000	\$21,000	\$2,100
Plastics	4,100	\$670,000	\$67,000	\$6,700
Metals	700	\$490,000	\$49,000	\$4,900
Glass	700	\$10,000	\$1,000	\$100
	11,100	\$1,690,000	\$169,000	\$16,900

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Current Estimated Recovery Rate 30%
5,100 tonnes recycled (est.)

Current Estimated Recovery rate 69%
33,000 tonnes recycled (est.)

Available Recyclables in Garbage Stream

11,500 tonnes 11,600 tonnes

196,000 Households
Currently - 38,000 tonnes Recycled
23,000 tonnes of recyclables remain in garbage stream from SF & MF Households
59% Current Estimated - Overall Recycling rate

< 700 tonnes

Hamilton schools recycle 200 tonnes per year

< 300 tonnes

< 600 tonnes

Available From Hamilton Schools				
Recyclables Estimated to be Available				
	tonnes/yr.	Gross Revenues @100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	300	\$29,217	\$2,922	\$292
Paper Pckg	200	\$17,048	\$1,705	\$170
Plastics	100	\$16,667	\$1,667	\$167
Metals	40	\$28,000	\$2,800	\$280
Glass	20	\$227	\$23	\$2
	660	\$91,158	\$9,116	\$912

Basis: 8 school audits extrapolated to 920,000 students, assume 2/3 paper 1/3 paper pckg
Hamilton estimate: 10% of all GTA + Hamilton+Niagara enrolment are in City of Hamilton

Available From Hamilton MRF Residues				
Recyclables Estimated to be Available				
based 250,000 tonnes @ 7% residue				
~ 17,000 tonnes (contaminated)				
Hamilton processes 41,000 tonnes - estimated Residue 6.8% = 2,800 tonnes				
Assumption : 20% marketable 560 tonnes				

Available From Hamilton Public Space				
Recyclables Estimated to be Available				
	tonnes/yr.	Gross Revenues @100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	80	Contaminated \$0	Contaminated \$0	\$0
Paper Pckg	80	\$0	\$0	\$0
Plastics	80	\$0	\$0	\$0
Metals	10	\$0	\$0	\$0
Glass	40	\$0	\$0	\$0
	290	\$0	\$0	\$0

Basis: Toronto public space trash audits 2005, 9 audits; Toronto 5,800 bins generates ~20 tonnes paper, plastics, metal and glass per cycle (1 service of all bins). Assume 5 cycles per week, 50 weeks/yr. ~5,200 tonnes/yr. Highly contaminated. 34% of trash identified as organics. 32% paper & paper pckg, 11% plastics, 5% glass, 2% metals
Multiply Toronto tonnage by population equivalent of GTA+Hamilton+Niagara (2.5 million+ 3.5 million (49% Ontario HH) or 6 million/ 2.5 million = 2.4 multiplier. 50%/printed / 50% paper pckg
For Hamilton Estimate: Hamilton is 9% of target HHs

4.3.6 Recyclables & Gross Revenues Available – Niagara Region

No audit data was available for either SF or MF households for Niagara. The estimates of available recyclables below are therefore based on available data for SF (Durham, Toronto, and Peel) and for Multi-Family (Toronto and Peel), and applied to the number of households for each category in Niagara.

Based on this, we attributed an overall recovery rate of 63% for Niagara. Recovery is estimated to be high in single-family households where we assumed an average SF HH rate of recovery of 69%. Multi-family households were deemed to have a relatively low recycling recovery rate which was set at 34% for the purposes of this analysis.

Niagara Region likely has significant tonnages of recyclables still available in the single-family garbage stream (approximately 11,500 tonnes) , but as with the other GTA municipalities the high recovery rates currently being achieved may make it difficult to achieve new tonnages from this source. If a 2% increase was achieved from SF HH in Niagara, it would provide an additional 230 tonnes of new recyclables with gross revenue increases of approximately just above \$34,000 from this segment annually.

Multi-family households in Niagara Region represent a modest opportunity for new tonnages of recyclable to be recovered, due mainly to the lower proportion of MF HH in Niagara Region (17%) compared to Toronto or Hamilton (MF HH > 30% of total HH's). However, MF HH's in Niagara Region are possibly currently under-serviced, representing opportunities for significant new tonnages of recyclable to be collected. We estimate there is just under 5,800 tonnes of recyclables available in the Niagara Region MF HH garbage stream. A 10% increase in this recovery would result in 580 new tonnes of material with annual incremental revenues to the Region of Niagara of \$57,000.

The combination of recyclable available in schools, MRF residues and in public space trash represents less than 1,500 tonnes of recyclable materials. We do not believe that these tonnes are likely to be economically recoverable for the reasons stated in the previous section. Niagara Region reported it recovered 300 tonnes of recyclables from schools in 2004.

It should be noted that the “available tonnes” may be somewhat over-estimated since some municipal programs may not collect all items included in waste composition audit analysis.

Table 8 on the next page illustrates these findings.



Recyclables Available in Garbage Stream – Region of Niagara

Available - Niagara Multi-Family Households
Recyclables Estimated to be Available

	MF HH in Niagara		30,000 HHS	
	tonnes/ yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	2,000	\$200,000	\$20,000	\$2,000
Paper Pckg	2,000	\$170,000	\$17,000	\$1,700
Plastics	1,100	\$180,000	\$18,000	\$1,800
Metals	300	\$210,000	\$21,000	\$2,100
Glass	400	\$0	\$0	\$0
Total	5,800	\$570,000	\$57,000	\$5,700

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Available - Niagara Single-Family Households
Recyclables Estimated to be Available

	SF HH in Niagara		141,000 HHS	
	tonnes/ yr.	Gross Revenues@100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	3,300	\$320,000	\$32,000	\$3,200
Paper Pckg	2,500	\$220,000	\$22,000	\$2,200
Plastics	4,300	\$700,000	\$70,000	\$7,000
Metals	700	\$490,000	\$49,000	\$4,900
Glass	700	\$10,000	\$1,000	\$100
Total	11,500	\$1,740,000	\$174,000	\$17,400

Basis: 12 waste audits; Toronto(5), Durham(4), Peel(3)

Current Estimated Recovery Rate 30%
2,500 tonnes estimated

Current Estimated Recovery rate 69%
36,000 tonnes recycled (est)

Available Recyclables in Garbage Stream
5,800 tonnes 11,500 tonnes

170,000 Households Currently - 39,000 tonnes Recycled
18,000 tonnes if recyclables remain in garbage stream in SF & MF Households
63% Current Estimated - Overall Recycling rate

< 500 tonnes

< 400 tonnes

Niagara Region schools recycled 284 tonnes per year

< 600 tonnes

Available From Niagara Schools
Recyclables Estimated to be Available

	tonnes/ yr.	Gross Revenues@ 100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	200	\$19,478	\$1,948	\$195
Paper Pckg	100	\$8,524	\$852	\$85
Plastics	100	\$16,667	\$1,667	\$167
Metals	20	\$14,000	\$1,400	\$140
Glass	10	\$113	\$11	\$1
Total	430	\$58,782	\$5,878	\$588

Basis: 8 school audits extrapolated to 920,000 students, assume 2/3 paper 1/3 paper pckg
Niagara estimate: 6% of all GTA + Hamilton+ Niagara enrolment are in Region of Niagara

Available From Niagara MRF Residues
Recyclables Estimated to be Available

based 250,000 tonnes @ 7% residue
~ 17,000 tonnes (contaminated)
Niagara processes 39,000 tonnes - estimated
Residue 6.8% = 2,600 tonnes
Assumption : 20% marketable 530 tonnes

Available From Niagara Public Space
Recyclables Estimated to be Available

	tonnes/ yr.	Gross Revenues@ 100%	Gross Revenues @10%	Gross Revenues per 1% Increase
Printed Paper	90	Contaminated \$0	Contaminated \$0	\$0
Paper Pckg	90	\$0	\$0	\$0
Plastics	100	\$0	\$0	\$0
Metals	20	\$0	\$0	\$0
Glass	40	\$0	\$0	\$0
Total	340	\$0	\$0	\$0

Basis: Toronto public space trash audits 2005, 9 audits; Toronto 5,800 bins generates ~20 tonnes paper, plastics, metal and glass per cycle (1 service of all bins). Assume 5 cycles per week, 50 weeks/yr. ~5,200 tonnes/yr. Highly contaminated. 34% of trash identified as organics. 32% paper & paper pckg, 11% plastics, 5% glass, 2% metals
Multiply Toronto tonnage by population equivalent of GTA+Hamilton+Niagara (2.5 million+ 3.5 million (49% Ontario HH) or 6 million/ 2.5 million = 2.4 multiplier. 50% printed / 50% paper pckg
For Niagara Estimate: Niagara is 7% of target HHS

APPENDIX 1:

MRF and MRF residue for Top 30 Municipalities (2003 WDO Datacall) - Ranked by Tonnes Residue Generated

Rank by Total BB Materials Marketed	Name of Municipality	Total Residential BB Waste Collected 2003 (tonnes)	Total Residential BB Waste Marketed (tonnes)	Total Residential BB Waste Residue Disposed (tonnes) *	Percent Residue** (%)	MRF(s) Used	
						Name of MRF	Name of MRF
1	City of Toronto	159,693	148,798	10,895	6.8%	Miller Waste Systems	Turtle Island Recycling Corporation
2	Region of Peel	88,458	82,231	6,227	7.0%	Waste Management of Canada	Sandhill Disposal and Recycling Inc.
8	City of Hamilton	36,390	30,780	5,610	15.4%	Canadian Fibres Ltd	
9	Region of Niagara	30,593	26,977	3,616	11.8%	Niagara Recycling	
20	County of Northumberland	9,651	6,982	2,669	27.7%	Northumberland County MRF	
5	Region of Durham	40,675	38,491	2,184	5.4%	Miller Waste Systems	
4	Region of York	45,631	43,516	2,115	4.6%	Miller Waste Systems	LaRues Waste and Recycling
18	City of Guelph	10,291	8,236	2,055	20.0%	Haycore Canada	Cleveland Recycling
3	City of Ottawa	68,835	66,798	2,037	3.0%	Halton Recycling Limited	Metro Waste Recycling
10	Essex-Windsor	25,281	23,712	1,569	6.2%	Windsor Disposal Services	
6	Region of Halton	35,492	33,988	1,504	4.2%	Halton Recycling Ltd (HRL Ltd)	
24	City of Thunder Bay	6,129	4,888	1,241	20.3%	Recool Canada	
11	City of London	23,731	22,743	988	4.2%	Halton Recycling Inc	Waste Management
13	Quinte Waste Solutions	12,429	11,461	968	7.8%	Waste Management Canada Corp	
27	Bruce Area Solid Waste Recycling	5,190	4,388	802	15.5%	Bruce Area Solid Waste Recycling	
7	Region of Waterloo	32,839	32,102	737	2.2%	HGC Management Inc.	
12	County of Simcoe	18,716	17,994	722	3.9%	Mid Ontario Disposal	Canadian Waste
14	Bluewater	11,768	11,058	710	6.0%	Bluewater Recycling Association	
17	City of Kingston	10,277	9,669	608	5.9%	BFI Canada Ltd.	
22	County of Oxford	6,576	6,089	487	7.4%	Halton Recycling Ltd.	City of Woodstock
29	City of Sarnia	4,497	4,097	400	8.9%	Canadian Waste Services Inc.	
16	City of Greater Sudbury	10,402	10,018	384	3.7%	Waste Management of Canada	
25	District of Muskoka	5,108	4,781	327	6.4%	Capital Environmental Resources Inc.	
19	City of Peterborough	7,598	7,277	321	4.2%	HGC Management	
15	City of Barrie	10,785	10,557	228	2.1%	Frith/ Capital Environmental	
21	City of Kawartha Lakes	6,676	6,466	210	3.1%	Northumberland County	Metro Waste Paper
28	County of Peterborough	4,365	4,196	169	3.9%	City of Peterborough	
26	City of Brantford	4,780	4,645	135	2.8%	Halton Recycling	
30	City of Sault Ste. Marie	3,978	3,852	126	3.2%	Green Circle Environmental	
23	Town of Newmarket	6,071	6,071	0	0.0%	LaRue Waste & Recycling	

*(Residential Blue Box Waste Collected) – (Residential Blue Box Waste Marketed)

**((Residential Blue Box Waste Collected – Residential Blue Box Waste Marketed) ÷ (Residential Blue Box Waste Collected))

Total Tonnes processes (30 municipalities) 742,903
 Total residue reported (30 municipalities) 50,043 6.7% Residue

APPENDIX 2 - School Recycling Data

Tonnes collected from schools as reported by municipalities in 2004 Data Call

Municipality	School Tonnes Collected
Halton	769
Durham	N/A
Toronto	2,547
Guelph	N/A
York	16
Hamilton	204
Peel	3,700
Niagara	284
TOTAL	7,520

Enrolment Statistics - Golden Horseshoe (GH) Schools								
	Students	% of Total GH	Total	Elementary	High School	Adult Enrolment	# of Elem. Schools	# of High Schools
Toronto District Public School Board			270,000	175,000	90,000	5,000	451	102
Toronto Catholic District School Board			87,500	59,300	28,200		168	31
Sub-total by Municipality	357,500	33%						
Peel District School Board			144,000	102,000	42,000		189	32
Peel Catholic District School Board			127,000	58,000	29,000	40,000	115	22
Sub-total by Municipality	271,000	25%						
York District Public School Board			105,000	70,350	34,650		137	37
York Catholic District School Board			52,524	37,342	15,182		37	12
Sub-total by Municipality	157,524	14%						

Enrolment Statistics - Golden Horseshoe (GH) Schools (cont'd)								
	Students	% of Total GH	Total	Elementary	High School	Adult Enrolment	# of Elem. Schools	# of High Schools
Halton District Public School Board			49,200	33,400	15,800		55	15
Halton Catholic District School Board			27,000	18,000	9,000		36	7
Sub-total by Municipality	76,200	7%						
Durham District Public School Board			31,700	21,200	10,500		28	18
Durham Catholic District School Board			26,100	18,100	8,000		44	7
Sub-total by Municipality	57,800	5%						
Hamilton & Niagara Combined (estimated)			176,000	112,640	54,560	8,800		
		84%	1,096,024	705,332	336,892	53,800	1,260	283
Total students:		100%		64%	31%	5%		
			1,096,024					

Opportunity Analysis - Recyclables in Golden Horseshoe Schools

Total Students in Elementary Schools	705,332
Total Students in Secondary Schools	336,892
Total Reported - Adult Students	53,800
	1,096,024

Recyclables Available	Paper	PET	HDPE	Alum Cans	Glass	Tetra	Gable	Total
kg / capita / yr.	3.74	0.76	0.16	0.35	0.24	0.62	0.37	6.24
Total Recyclables Not Recovered (kg)	4,093,650	832,978	178,104	387,718	263,046	675,425	408,269	6,839,190
Total Recyclables Not Recovered (tonnes)	4,094	833	178	388	263	675	408	6,839
50% Recover of Available (tonnes / yr)	2,047	416	89	194	132	338	204	3,420
33% Recover of Available (tonnes / yr)	1,351	275	59	128	87	223	135	2,257
Approx Scrap price (per tonne)	\$100	\$425	\$500	\$1,800	\$0	\$75	\$75	
Approx value of Recyclables @ 50% recovery	\$204,682	\$177,008	\$44,526	\$348,947	\$0	\$25,328	\$15,310	\$815,801
Approx value of Recyclables @ 33% recovery	\$135,090	\$116,825	\$29,387	\$230,305	\$0	\$16,717	\$10,105	\$538,429

Source: Waste audits conducted in Halton Region by R. Bull Environmental Services for Tetra Pak Canada Inc, in *GTA Public Space and Schools Opportunity Analysis - Technical Memorandum #3*

APPENDIX 3 - Summary of Recyclables by Target Municipality

Municipality	Available from Multi-Family ¹	Available from Single Family ²	Available from Schools ³	Available from MRF Residue ⁴	Available from Public Space Trash ⁵	Total by Municipality
(basis 2004)	(Tonnes)	(Tonnes)	(Tonnes)	(Tonnes)	(Tonnes)	(Tonnes)
City of Toronto	58,000	27,000	2,600	3,500	2,100	93,200
Region of Peel	20,000	19,000	1,220	1,200	730	42,150
Region of York	14,000	15,000	780	750	880	31,410
City of Hamilton	11,500	11,600	660	560	290	24,610
Region of Durham	3,300	19,000	270	625	380	23,575
Region of Niagara	5,800	11,500	430	530	340	18,600
Region of Halton	5,500	9,800	430	460	290	16,480
	118,100	112,900	6,390	7,625	5,010	250,025

Notes:

- 1 Available from Multi-Family homes – this estimate is based on waste composition audit data for multi-family homes conducted by municipalities, and the number of MF HH in each municipality.
- 2 Available from Single Family homes – this estimate is based on waste composition audit data from single family waste homes conducted by municipalities, and the number of SF HH in each municipality.
- 3 Available from Schools: this estimate is based on available data from Golden Horseshoe municipalities, and from student population data; an estimate of the per student availability was generated, then applied to the total student population in the target area.
- 4 Available from MRF Residue: WDO data obtained, showing an average residue for 30 municipalities of 6.7 % - this was then applied to processed tonnages per target municipality to form an estimate.
- 5 Available from Public Space Trash: Data from City of Toronto - Public Space Audit 2005, used to an estimate on a kilo per capita basis then applied to target municipalities.