2016

CIF Project No.872: Multi-Residential Audits & Superintendent Training

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Background

Toronto is unique among large Ontario municipalities in that multi-residential buildings (apartments and condominiums) make up approximately 55% of the dwelling units in the city. Solid Waste Management Services (SWMS) currently provides services to approximately 4,500 multi-residential buildings or 422,000 units. In 2014, the combined residential diversion rate of 53% represents the diverted tonnage achieved by both single-family homes and multi-unit residential buildings. Separately, residents living in single-family homes had a diversion rate of 66% and those living in multi-unit residential buildings achieved a rate of 26%.

SWMS has undertaken actions to improve waste diversion performance in the multi-residential sector. In June 2013, a Customer Service and Waste Diversion Implementation unit was established to roll out the Green Bin organics program to all multi-residential buildings that receive City collection services. This unit is also responsible for providing individual assistance to buildings to improve their waste diversion programs. By the end of 2015, there were a total of 4,237 buildings (approximately 358,000 units) buildings participating in or committed to participate in the Green Bin organics program.

To support waste diversion in the multi-residential sector, SWMS has developed specific advertising and education campaigns that are targeted to apartment residents, such as the "Please Get with the Program" and "Feed our Gardens" campaign. (Please refer to Appendix A for samples.) Conducting waste composition studies is also a regular part of the SWMS' efforts to monitor and continuously improve diversion in multi-residential buildings in Toronto.

Project Description and Goals

This project is comprised of two parts: a series of seasonal multi-residential waste audits to better understand current disposal and waste diversion participation patterns; and workshops for property managers and superintendents to educate them on current SWMS programs and services, and encourage buildings to increase waste diversion.

Waste Composition Study:

In order to make any improvements in multi-residential waste diversion, it is critical to understand the current situation especially in context of the historical trends. As such, it is important to measure progress on a regular basis by conducting waste composition studies. Seasonal waste audits were conducted in 2014 and 2015 and results were compared against previous years' audit data. The goal was to summarize the following:

- Diversion rates and Blue Bin recycling capture rates for curbside collected locations and for front-end collected locations;
- composition of the waste stream and changes over time;
- Blue Bin recycling material trends;
- impact of the Green Bin organics program on recycling rates;

- trends of quantities of Blue Bin recyclables and Green Bin organics found in the garbage stream;
- changes in capture rates for various Blue Bin recycling materials; and
- potential modifications to promotion and education based on audit findings.

Workshops for Property Managers and Superintendents:

KPMG's report *Blue Box Program Enhancement and Best Practices Assessment Project*, recommends training property managers and superintendents in all aspects of the waste management system to improve performance in the Blue Bin recycling program. Superintendents and building/property managers play a critical role in the success of any waste diversion program in multi-residential buildings, therefore it is imperative that they are knowledgeable of the City's programs and services, and are made aware of any programmatic or service changes. Two half-day workshops were provided to multi-residential property managers, owners and superintendents. The goal of the workshops was to provide attendees with the tools and resources, and encourage them to take to action to increase diversion.

The effectiveness of the training was evaluated by reporting on the following:

- Number of workshop attendees;
- number of attendees that took or requested education resources;
- number of attendees that requested presentations to their residents; and
- post workshop survey results.

Additionally, dedicated training sessions were held for the managers and staff of the Toronto Community Housing Corporation (TCHC). TCHC manages approximately 400 multi-residential buildings and is one of the largest property managers in the City. During the months of August and September 2015, 17 workshops were held and training was delivered to over 430 TCHC staff.

Findings

Waste Composition Study:

Multi-Residential waste composition studies were undertaken in 2014 and 2015. The studies were conducted on twenty separate buildings, all of which are participating in the Green Bin organics Program. The audits were conducted seasonally over a two week period per season (ten buildings were audited during the first week, and the remaining ten during the second week). A total of four audits were undertaken in 2014, and a total of three were undertaken in 2015. The consultant auditor was instructed to use an audit methodology as outlined by CIF, using the standard audit

categories for Blue Bin materials. The City of Toronto expanded the categories to include those materials collected under the City's diversion programs. The raw data for the 2014 and 2015 audits can be found in Appendix B.

The data from the 2014 and 2015 audits were compared to the previous audits undertaken in 2008, 2010-11, and 2012. In the 2014 and 2015 audits, a sample of buildings on front-end collection (using 3, 4, or 6 cubic yard steel bins for garbage and recycling) and curbside cart collection (using 95 gallon carts for garbage and recycling) were studied. The results were tabulated separately for front-end and curbside buildings and also as a combined number.

Spring 2014 Audit: A building's recycling load

Fall 2014 Audit: A building's recycling load

The above photos illustrate the variation in quality of Blue Bin recycling material from one building to another. The photo on the left shows several black garbage bags as well as large plastic items that are not accepted in the Blue Bin recycling stream. The photo on the right shows materials that are predominantly Blue Bin recycling materials.

Study Limitations

When considering the impacts of the workshops, it is important to note the limitations of using audit data as the sole performance metric to measure success. The City regularly conducts multi-residential audits as an on-going measure of program performance. However, as there are many factors that can impact audit results such as promotion and education campaigns, work undertaken by our Customer Service and Waste Diversion Implementation unit, program changes (i.e. addition of a new material in the Blue Bin program) or the implementation of a new diversion program (i.e. Green Bin organics program), it is challenging to associate an impact to a specific tactic, such as the workshops for property managers and superintendents. Limitations of the audit results also arise from the relatively small audit sample size (20 out of 4,500 buildings were audited in 2014/2015).

Blue Bin Capture Rates and Overall Diversion

Figure 1 is a comparison of Blue Bin recycling capture rates and diversion rates over a period of time. The 2012 audit was the first study to include buildings that were

participating in the Green Bin organics program. This is the main reason for the increase in overall diversion from the 2008 audits.

Figure 1 Blue Bin Capture Rates and Overall Diversion Rates

	2008 Audit	Combined 2010-2011 Audit	2012 Audit	Combined 2014	Front-End 2014	Curbside 2014	Combined 2015	Front-End 2015	Curbside 2015
Recycling Recovery Rate	45%	48%	49%	56%	44%	71%	44%	36%	52%
Diversion Rate	14%	16%	26%	19%	16%	25%	16%	13%	19%

(Shaded sections include green bin materials in diversion rate)

The Blue Bin capture rate remains fairly steady when averaged over the years at approximately 48%, however, curbside collected buildings generally have a higher Blue Box recycling capture rate than those on front-end collection. This is the case for both the 2014 and 2015 audits.

Different buildings are selected each year for the audits, therefore a decrease of the curbside recycling recovery rate from 71% in 2014 to 52% in 2015 does not reflect a decrease in recycling recovery in general, but rather that a particular set of buildings were higher performers one year than another group of buildings audited the next year.

SWMS provides collection services to over 4,500 multi-residential buildings. Of these approximately 2,800 receive front-end collection service and 1,700 receive curbside cart collection. As outlined in the *City of Toronto Requirements for Garbage, Recycling and Organics Collection Services for New Developments and Redevelopments,* buildings over 30 units in size are serviced by front-end collection.

The difference in capture rate performance between front-end and curbside collection service may be due to a number of reasons. Smaller buildings on curbside collection may have a stronger sense of community and less anonymity, and it may be easier to encourage residents to participate in the diversion programs. Also, recycling areas in smaller buildings may be more accessible if the resident is only required to travel shorter distances whereas recycling areas in a large multi-storey building may be located outdoors or on the first floor.

However, convenience is only one factor that impacts recycling performance. Multi-residential buildings with tri-sorters, or three separate chutes do not necessarily perform any better than a regular building that has a dedicated and motivated superintendent or property manager. A building's recycling performance depends on a combination of factors: equal access/convenience, commitment of superintendent/owner, constant education, capacity and incentives.

Diversion rates have improved over the years between 2008 and 2015, which could be attributed to the formation of a customer service unit that is dedicated to implementing the Green Bin organics program and improving customer service provision to multi-residential buildings.

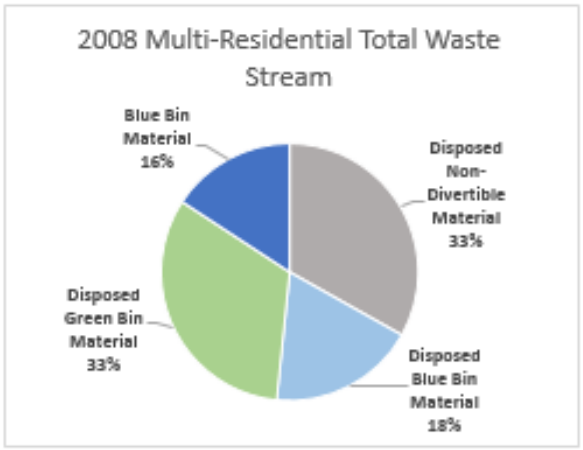
Total Waste Stream Composition

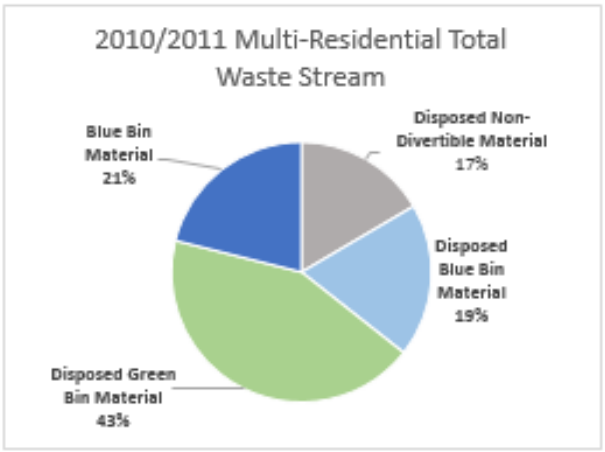
Since 2008, there have been a number of changes to Toronto's waste management system. In July of 2008, a volume based rate system for waste was introduced. Starting in 2009, the implementation of the Green Bin organics program in multi-residential buildings was initiated. Several new materials were added to the Blue Bin Program, such as: polystyrene and plastic shopping bags in 2009, mixed rigid plastics in 2012 and plastic film in 2015.

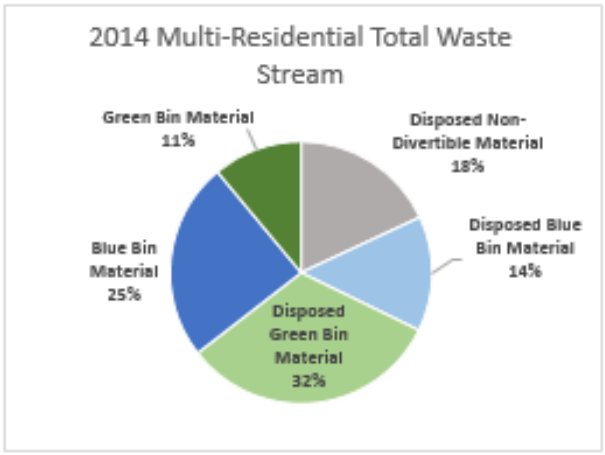
Figure 2 Total Waste Stream Composition (kg/hh/year)

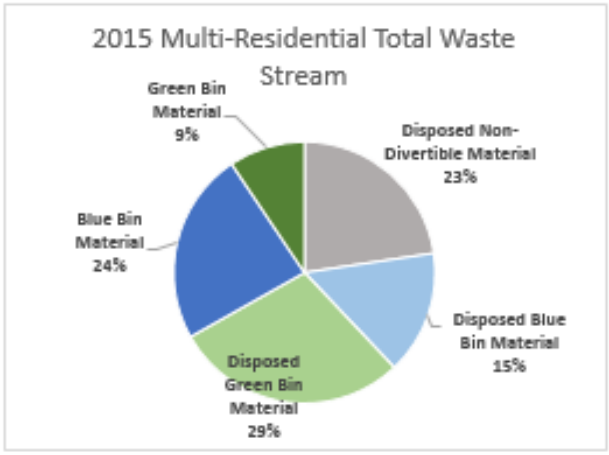
Year	Disposed Non-Divertible Material	Disposed Blue Bin Material	Disposed Green Bin Material	Blue Bin Material	Green Bin Material	Blue Bin Contamination
2008	249.05	138.96	245.03	118.67	NA	14%
2010/2011	108.23	124.73	283.04	138		25%
2012	125.61	156.82	358.57	257	116	36%
2014	120.05	94.26	214.44	162.66	73.35	24%
2015	131.93	89.11	168.38	138.49	54.79	36%

* Where disposed means waste sent to landfill (i.e., Blue Bin and Green Bin material found in the garbage stream)







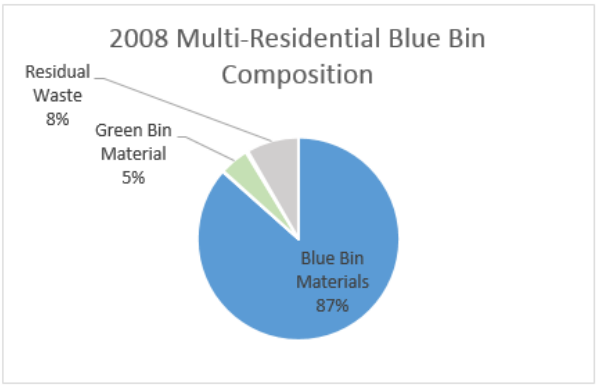


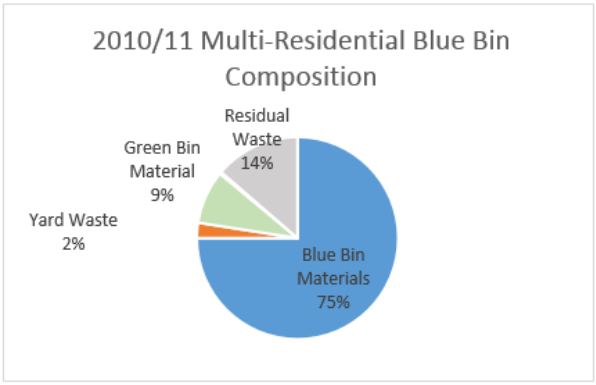
By reviewing the data in Figure 2 – Total Waste Stream Composition, the amount of disposed non-divertible waste is decreasing over time. The amount of recyclable materials has remained consistent, making up approximately 16% of the total waste stream. Green Bin organics material (after the implementation of the Green Bin organics program) has remained around 30% of the total waste stream, but on the whole (organics in the green bin plus organics disposed) is making up a larger percentage of the waste stream than in 2008, jumping from 33% to 38%. This trend however, could be in part due to the light weighting of the other materials in the waste stream whereas the organics is proportionately making up a larger percentage by weight.

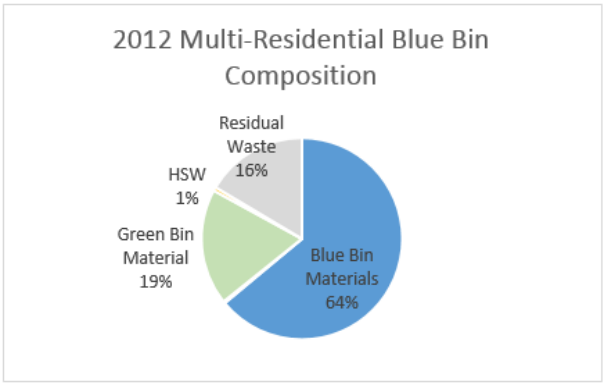
Contamination in the Blue Bin has been increasing from 14% in 2008 to 36% in 2015. Blue Bin composition is reviewed more closely in Figure 3 – Blue Bin Composition. The increase in the percentage of contamination is due to an increase in residual waste (garbage) and organics being found in the blue bins. The amount of residual waste has increased since 2008, perhaps because of the introduction of the volume based rate system in July of 2008. It is possible that the move to a user pay system has driven waste into the blue bin as a method of avoiding fees. Furthermore, the amount of Green Bin organic materials found in the recycling stream has increased as the Green Bin organics program has been rolled out to more buildings and as awareness of this program grows. It is possible that multi-residential dwellers do not relate to the Green Bin organics program terminology and that even the organic materials are considered "recycling."

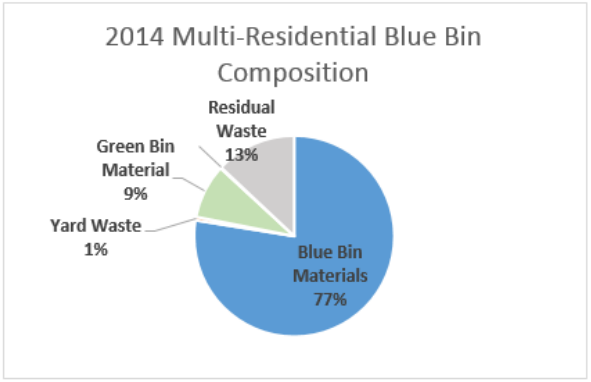
Figure 3 – Blue Bin Composition (kg/hh/year)

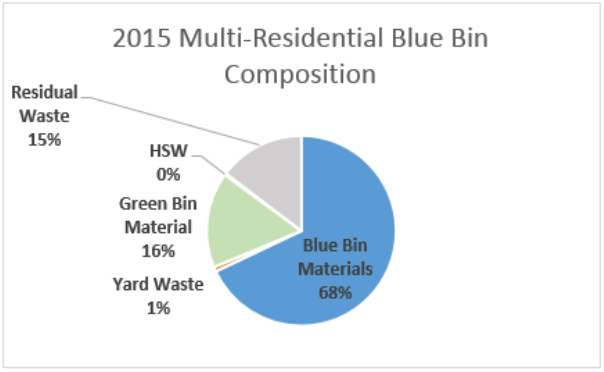
	2008	2010/11	2012	2014	2015
Blue Bin Materials	102.67	103.49	164.63	126.11	90.16
Yard Waste	0.15	3.39	0.79	0.89	1.04
Green Bin Material	5.52	11.8	47.99	14.21	21.6
HSW	0.43	0.42	1.51	0.26	0.37
Residual Waste	9.9	18.9	42.39	21.19	19.47









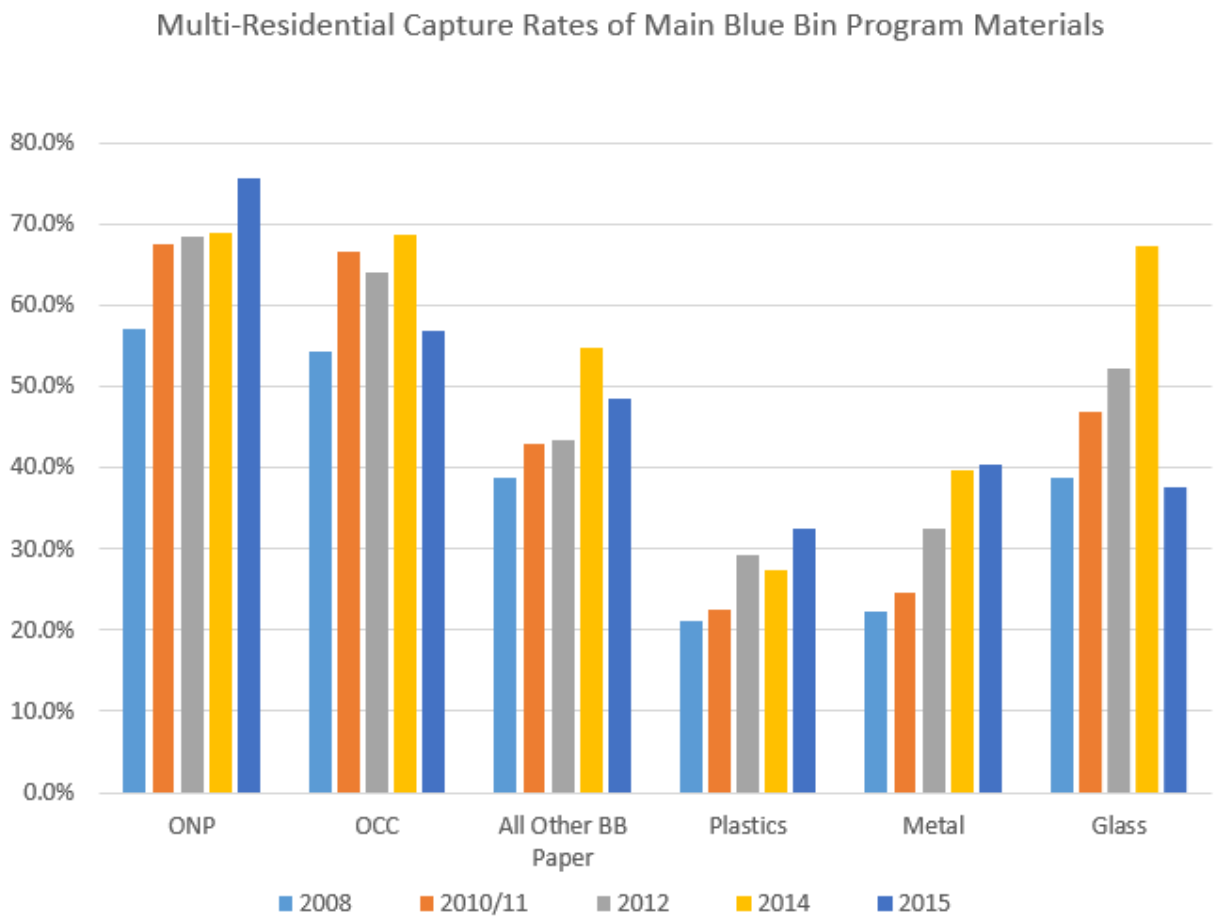


Changes in capture rates for various Blue Bin materials

The quantity and capture rate of six of the main Blue Bin materials was reviewed and compared. Refer to Figure 4 - % Capture Rate of Six Blue Bin Materials.

Figure 4 - % Capture Rate of Six Blue Bin Materials

	2008	2010/11	2012	2014	2015
ONP	57.2%	67.6%	68.6%	68.8%	75.7%
OCC	54.3%	66.7%	64.0%	68.6%	56.9%
All Other BB Paper	38.8%	43.0%	43.3%	54.8%	48.5%
Plastics	21.0%	22.5%	29.2%	27.5%	32.4%
Metal	22.3%	24.6%	32.5%	39.7%	40.3%
Glass	38.8%	46.9%	52.3%	67.2%	37.7%

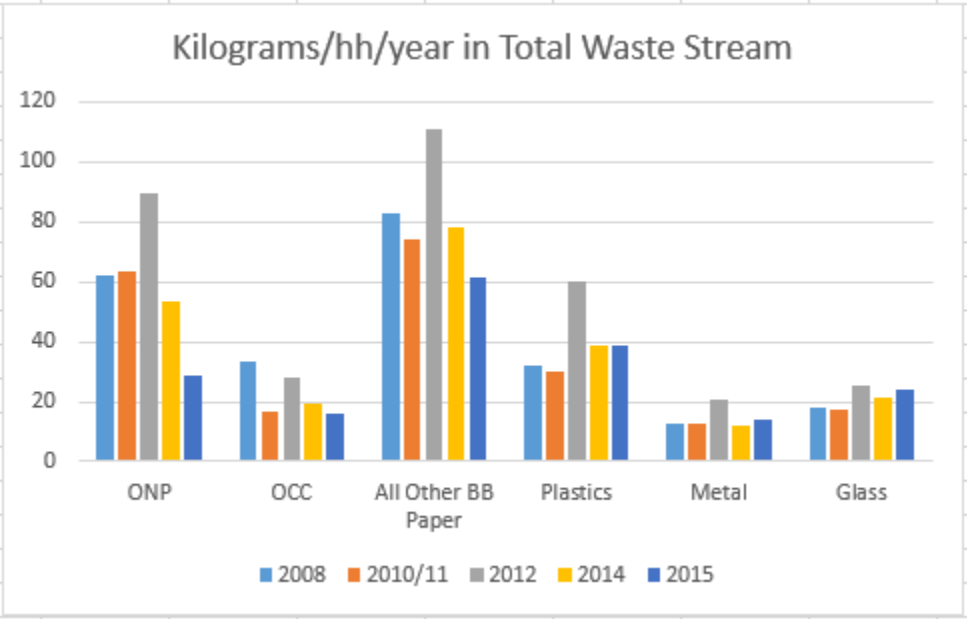


It can be seen that capture rates for old newspaper (ONP), old corrugated cardboard (OCC), all other Blue Bin (BB) paper (including kraft paper, boxboard, molded pulp, magazines, fine paper, composites and gable top containers), plastics, metal and glass, has increased over the years.

Some interesting trends can also be seen by reviewing the kilograms of these materials available in the total waste stream (in the Blue Bin and in the garbage). Refer to Figure 5 – Total kg/hh/year of Blue Bin Items Available in the Waste Stream.

Figure 5 – Total kg/hh/year of Blue Bin Items Available in the Waste Stream

	2008	2010/11	2012	2014	2015
ONP	62.27	63.65	89.65	53.48	28.81
OCC	33.66	16.7	28.24	19.11	16.18
All Other BB Paper	82.63	74.3	110.84	78.23	61.56
Plastics	32.09	29.75	60.14	38.89	38.63
Metal	12.68	12.97	20.44	11.89	14.32
Glass	18.28	17.43	25.24	21.49	23.99



The total kilograms of these six categories in the total waste stream seems to support the light weighting trend occurring in packaging materials over the past years. The total amount of ONP and OCC has decreased since 2008, and there is small increase in plastics. Plastics have also been light weighted, however goods have increasingly come packaged in mixed rigid plastics, plastic film or plastic laminate containers.

The review of the past years' audit data and comparison with more recent audit data has brought some interesting trends to light. Overall, capture rates of some Blue Bin materials has increased; however, contamination rates have also increased. Light weighting of ONP and OCC can be seen, as can moderate increases in plastics. Most surprising is the large increase of Green Bin organic materials contaminating the recycling stream.

It is possible that multi-residential dwellers associate organic waste diversion with "recycling". "Green Bin", a program terminology used for single-family households may not be suitable for use with multi-residential buildings. Multi-residential dwellers will likely not see Green Bins in their buildings as they are provided beige in-unit kitchen catchers to collect their organic materials. As such, they may not associate organic waste diversion with the colour green. Another example of using modified terminology is to use "composting" organic material rather than "recycling", which is typically associated with the colour blue. Multi-residential dwellers may also not understand that the two materials are processed differently.

Due to these findings, it is recommended that terminology be reviewed and modified for multi-residential dwellers and incorporated in future communication materials and education campaigns.

Workshops for Property Managers and Superintendents:

Superintendents and building/property managers play a critical role in the success of any waste diversion program in multi-residential buildings and so it is important that they understand the City's programs and services. Providing training to property managers and superintendents is recognized as a best practice in Blue Box program enhancement. The benefit of training for building staff is also substantiated by a study undertake by Genivar (May 26, 2010) for the City's Tower Renewal Office (funded in part by CIF Project #178), recommending that the City sponsor building management training workshops.

SWMS hosted two Multi-Residential Waste Diversion Workshops on October 23, 2014. The workshops followed the format as outlined by the Continuous Improvement Fund

Multi-Residential Workshop toolkit. The workshops were facilitated by Janet Robins of Robins Environmental & Design, who was retained through an issuance of a purchase call document (Please refer to scope of work outlined in Appendix C). The workshops hosted facilitated discussions on capture rates, barriers and challenges and successes related to recycling (and organics programs) in multi-residential buildings. A wide range of promotional and educational materials were available free to the attendees. (Please refer to Appendix D for samples.) The workshop was promoted using multiple tactics, including mailed invitations to over 1,800 multi-residential property management groups and owners, direct distribution of approximately 300 invitations to buildings by the Customer Service and Waste Diversion Implementation unit, advertisement in the GTAA Building Blocks magazine, and posted information on the City's SWMS' web page.

Break-out sessions facilitated by staff

Sorting activity led by staff

A total of 39 multi-residential staff attended the workshops.

As part of the measurement of the success of the workshops, attendees were requested to complete an evaluation form. Seventy four percent of workshop participants completed the evaluation form. Over 72% responded that they would recommend the workshop to their peers and 67% gave the workshop a ranking of four or five out of five as it relates to the usefulness of the sessions. Several participants commented that the City should do sessions more often, while others commented that finding time to attend workshops is difficult due to their busy workdays.

Of the 39 attendees, eight requested presentations for their residents, four requested additional promotional materials and one ordered in-unit recycling containers for their residents. Of the eight attendees who requested presentations, four were delivered and three had left or moved to different buildings since their attendance at the workshop, and one property manager felt that the building was doing well and did not feel that a presentation was needed for their residents after all.

Toronto Community Housing Corporation Workshops

Since the October 2014 workshops, SWMS has been involved in a special project with the Toronto Community Housing Corporation (TCHC). As part of the special project, workshops dedicated to TCHC were developed and delivered during the months of August and September of 2015. Seventeen workshops were delivered to over 430 TCHC superintendents and managers. Also as part of this project, a SWMS staff was seconded to TCHC to further support the initiative. Having this connection with TCHC

made it possible to make attendance at the workshops mandatory. However, although attendance was mandatory and well received by those that attended and rated positively in the evaluation surveys, it was difficult to achieve good attendance.

Measuring Workshop Performance

One potential means to validate performance is to conduct pre and post waste audits at similar buildings (own/rental, chute/recycling room, number of units/storeys, demographics, etc.), where one building's superintendent attends and commits to implement learnings from the workshop and the other building's superintendent does not attend. However, it is difficult to guarantee that learnings from having attended a workshop can and will be fully implemented.

Another challenge facing multi-residential diversion is the high turnover rate of property managers, owners and superintendents. This is exemplified by the eight attendees who requested presentations from City staff and three attendees who had moved since the October 2014 workshop. This finding is further supported by work undertaken by Spinnaker Recycling Corp. for City of Toronto, Tower Renewal Office. Tower Renewal had undertaken a pilot study in 10 buildings in 2011 to test different methods of improving diversion. Spinnaker Recycling found that all 10 locations experienced staff, management or ownership changes during the course of the pilot and that the turnover made it difficult to execute and maintain waste diversion improvements with lasting success. The study also found that tenant turnover also impacts the success of measurement efforts. Results of this project are outlined in a CIF Project #315 report entitled: *Tower Renewal Waste Diversion Phase 2* (May 2013).

Previous projects undertaken by SWMS found that building staff plays a significant role in the building's diversion performance. For example, a superintendent who attended the October 2014 workshop was recently recognized for greatly reducing their building's garbage and improving diversion. The superintendent plays a very active role in the building's waste management system by providing residents with clear plastic bags for their recycling, which he sorts through before placing materials in the correct waste bins. The superintendent also monitors the Green Bin organics and garbage bins several times a day to remove contaminants.

While successful multi-residential diversion is achievable, as demonstrated by the building with a superintendent that is very involved in the waste management system, applying this best practice to all multi-residential buildings is not entirely achievable. However, providing training and information to those that have a role in overseeing waste management in buildings can have a positive impact. It is important to continue training and learn from best practices to encourage more property managers and superintendents to improve diversion at their buildings.

Recommendations

Waste Composition Study:

Review of the recent audit findings and comparison with historical data shows the value of analyzing audit data to elucidate trends. Analysis found that contamination in the recycling stream is increasing. This finding could be in part due to multiple changes in diversion programs in recent years, such as moving to a volume based rate system, addition of new materials to the Blue Bin recycling program, and implementation of the Green Bin organics program. Regular and constant communication is necessary to continuously educate residents, superintendents and building owners as it was found through experience and studies that high turnover impacts the long-term success of diversion performance.

Further research on developing terminology appropriate to multi-residential dwellers, perhaps through focus group testing, should be undertaken. This should further be supported with educating multi-residential dwellers on the differences between the Blue Bin recycling and Green Bin organics processing, and the benefits of both diversion programs.

Additionally, audits show that there is room for improvement in capturing additional Blue Bin recycling materials. In a report undertaken for CIF by Maria Kelleher entitled: *Diversion vs. Net Cost Analysis For The Ontario Blue Box System* (August 2014) it is recommended that maximizing the capture of printed paper (up to 80%) and maximizing capture of steel, glass and boxboard is the most cost efficient way to increase Blue Bin diversion, due to the heavier weight of these materials. It is recommended that a multi-residential "back to recycling basics" education campaign be considered to target these Blue Bin materials and improve their capture rate.

Workshops for Property Managers and Superintendents:

From high satisfaction rates received on the October 2014 workshop surveys, interaction and comments made to City staff at the workshop, the event was a success. Property Managers and building staff can have an impact on the success of a building's diversion program so it is crucial that these stakeholders have the information and support they need to have the successful waste diversion programs.

The City has been delivering multi-residential workshops since 2011. Several different workshop formats were tested to find the most appropriate format that would suit the needs of busy property managers and superintendents. Since 2011, the City delivered the workshop in a presentation/lecture format, facilitated table discussions with peer to peer learning, and informal drop-in sessions. It was found that the drop-in sessions were the least attended and the lecture format was the most attended. However, the facilitated workshop format was well received as attendees appreciated learning from their peers and having the opportunity to engage operations, policy, education, and communication staff at the same event. Despite the positive feedback of this format of workshops, achieving high attendance rates is challenging.

Therefore, it is recommended that the workshops be made mobile and marketed to property management groups. The workshop could be scaled down to a shorter length and possibly offered as a lunch and learn session, as part of their annual meetings or corporate training sessions. Offering customized and scaled-down workshops to larger property management groups will be incorporated in the City's multi-residential and customer service strategy to continue working towards improved diversion in the multi-residential sector.

Appendix A: "Please get with the Program" and "Feed our Gardens" campaign samples

Appendix B: Raw Audit Data

Appendix C: Purchase Call Document

Appendix D: Samples of Promotional and Educational Material Distributed at Multi-Residential Workshop (provided in hardcopy)