



## Appendix A

### Phase 1: Baseline Understanding

Draft Zero Waste Master Plan

*City of Cambridge, MA*  
January 25, 2019



## **Appendix A: Phase 1 Baseline Understanding**

### **Statement of Purpose**

This Baseline Understanding report was originally issued to the City of Cambridge in March 2017 for review, and was finalized in November 2017. The purpose of this document was to establish the baseline waste management system in the City upon which the recommendations for progressing towards Zero Waste were based. The baseline waste management system as documented in this report, represents the waste management system and system performance as of the end of 2016.

Subsequent adjustments to the waste management system over the two year period from 2017 to 2018 are regarded as early implementation activities associated with the Draft Zero Waste Master Plan, and are documented in the cover report for the Draft Zero Waste Master Plan as appropriate.

This document is a supporting background document for the draft ZWMP, documenting the outcome of one component of Phase 1 of the ZWMP process. No further amendments will be made to this document based on review of the draft ZWMP.

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# 1 Introduction

The City of Cambridge (City) is undertaking a Zero Waste Master Plan to further its environmental goals of minimizing waste generation, maximizing reuse and repurposing, and delivering a broad range of recycling options. The City provides a comprehensive suite of waste management services to both the residential and some non-residential sectors. The purpose of this document is to establish the baseline waste management system in the City upon which the recommendations for progressing towards Zero Waste will be based.

## 2 Demographics

The City of Cambridge is the fifth largest city in the state of Massachusetts. The 2015 population is estimated to be 110,402<sup>1</sup> and by 2030 is expected to be 118,625<sup>2</sup>. The City has a population density of 16,469 persons per square mile and 7,406 housing units per square mile<sup>3</sup>. The City is contained within 6.39 square miles.<sup>4</sup> Cambridge is a city undergoing rapid growth; in 2010, it was reported that there were 44,032<sup>5</sup> households and by 2030, it is expected there will be 49,640 households.<sup>6</sup> The largest proportion of householders represents those under the age of 35, followed by those in the age bracket of 35 to 54. The under 35 demographic also represents a large proportion of those renting in multi-family units which is not unexpected given the number of higher learning institutions in the City.<sup>7</sup>

Table 2-1 presents a breakdown of the number of types of dwelling units and households (HH) receiving trash collection service by the City. Table 2-2 presents a breakdown of the number of types of dwelling units and households receiving recycling collection service by the City. The City services approximately 72% of households (31,741 households) with trash collection and approximately 95% of households (44,678 households) with recycling collection.

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<sup>1</sup> U. S. Census Bureau, QuickFacts, Cambridge City, Massachusetts

<sup>2</sup> Metro Boston 2030 Population and Housing Demand Projections, Municipal Report, Stronger Region Scenario: Population for Cambridge.

<sup>3</sup> Cambridge Development Department (Facts and Maps)

<sup>4</sup> U. S. Census Bureau, QuickFacts, Cambridge City, Massachusetts

<sup>5</sup> Cambridge Development Department (Facts and Maps) and U. S. Census Bureau, Census 2010

<sup>6</sup> Metro Boston 2030 Population and Housing Demand Projections, Municipal Report, Stronger Region Scenario: Housing for Cambridge.

<sup>7</sup> Metro Boston 2030 Population and Housing Demand Projections, Municipal Report, Stronger Region Scenario: Housing for Cambridge.



**Table 2-1: Number of Buildings and Households Receiving City Trash Collection Service**

# Units	Monday		Tuesday		Wednesday		Thursday		Friday		Total	
	Buildings	#HH	Buildings	#HH	Buildings	#HH	Buildings	#HH	Friday	#HH	Buildings	Households
1	996	996	1,186	1,186	552	552	591	591	451	451	3,776	3,776
2	881	1,762	982	1,964	495	990	529	1,058	592	1,184	3,479	6,958
3	448	1,344	256	768	376	1,128	472	1,416	517	1,551	2,069	6,207
4	64	256	37	148	78	312	139	556	128	512	446	1,784
5	26	130	21	105	31	155	47	235	41	205	166	830
6	41	246	15	90	66	396	149	894	107	642	378	2,268
7	13	91	4	28	15	105	13	91	19	133	64	448
8	19	152	3	24	20	160	20	160	26	208	88	704
9	5	45	2	18	13	117	19	171	7	63	46	414
10	3	30	4	40	16	160	7	70	5	50	35	350
11	0	0	1	11	5	55	3	33	7	77	16	176
12	6	72	4	48	15	180	9	108	12	144	46	552
<b>Total 1-12 Units</b>	<b>2,502</b>	<b>5,124</b>	<b>2,515</b>	<b>4,430</b>	<b>1,682</b>	<b>4,310</b>	<b>1,998</b>	<b>5,383</b>	<b>1,912</b>	<b>5,220</b>	<b>10,609</b>	<b>24,467</b>
13-20	25	417	9	153	33	542	22	346	24	377	113	1,835
21-50	10	324	9	283	42	1,341	5	157	10	309	76	2,414
51-100	9	560	3	191	14	916	2	113	2	138	30	1,918
101+	3	477	1	153	1	175	0	0	2	302	7	1,107
<b>Total 13+ Units</b>	<b>47</b>	<b>1,778</b>	<b>22</b>	<b>780</b>	<b>90</b>	<b>2,974</b>	<b>29</b>	<b>616</b>	<b>38</b>	<b>1,126</b>	<b>226</b>	<b>7,274</b>



# Units	Monday		Tuesday		Wednesday		Thursday		Friday		Total	
	Buildings	#HH	Buildings	#HH	Buildings	#HH	Buildings	#HH	Friday	#HH	Buildings	Households
<b>Total</b>	<b>2,549</b>	<b>6,902</b>	<b>2,537</b>	<b>5,210</b>	<b>1,772</b>	<b>7,284</b>	<b>2,027</b>	<b>5,999</b>	<b>1,950</b>	<b>6,346</b>	<b>10,835</b>	<b>31,741</b>

Source: City of Cambridge

**Table 2-2: Number of Buildings and Households Receiving City Recycling Collection Service**

# Units	Monday		Tuesday		Wednesday		Thursday		Friday		Total	
	Buildings	#HH	Buildings	#HH	Buildings	#HH	Buildings	#HH	Friday	#HH	Buildings	Households
1	997	997	1,186	1,186	552	552	591	591	451	451	3,777	3,777
2	881	1,762	982	1,964	495	990	529	1,058	593	1,186	3,480	6,960
3	448	1,344	256	768	376	1,128	473	1,419	517	1,551	2,070	6,210
4	64	256	37	148	78	312	139	556	128	512	446	1,784
5	26	130	21	105	31	155	47	235	41	205	166	830
6	42	252	15	90	68	408	150	900	112	672	387	2,322
7	13	91	4	28	15	105	13	91	21	147	66	462
8	21	168	3	24	21	168	23	184	29	232	97	776
9	7	63	2	18	15	135	19	171	8	72	51	459
10	4	40	4	40	18	180	7	70	6	60	39	390
11	1	11	1	11	5	55	3	33	8	88	18	198
12	11	132	4	48	16	192	9	108	14	168	54	648
<b>Total 1-12 Units</b>	<b>2,515</b>	<b>5,246</b>	<b>2,515</b>	<b>4,430</b>	<b>1,690</b>	<b>4,380</b>	<b>2,003</b>	<b>5,416</b>	<b>1,928</b>	<b>5,344</b>	<b>10,651</b>	<b>24,816</b>



# Units	Monday		Tuesday		Wednesday		Thursday		Friday		Total	
	Buildings	#HH	Buildings	#HH	Buildings	#HH	Buildings	#HH	Buildings	#HH	Buildings	Households
13-20	47	685	10	172	49	756	34	495	51	691	191	2,799
21-50	18	591	19	623	64	2,049	13	429	20	645	134	4,337
51-100	13	834	12	798	28	1,898	6	374	8	606	67	4,510
101+	9	2,139	4	661	6	919	19	3,569	5	928	43	8,216
<b>Total 13+ Units</b>	<b>87</b>	<b>4,249</b>	<b>45</b>	<b>2,254</b>	<b>147</b>	<b>5,622</b>	<b>72</b>	<b>4,867</b>	<b>84</b>	<b>2,870</b>	<b>435</b>	<b>19,862</b>
<b>Total</b>	<b>2,602</b>	<b>9,495</b>	<b>2,560</b>	<b>6,684</b>	<b>1,837</b>	<b>10,002</b>	<b>2,075</b>	<b>10,283</b>	<b>2,012</b>	<b>8,214</b>	<b>11,086</b>	<b>44,678</b>

Source: City of Cambridge

## 3 State and Municipal Ordinances

Both the City of Cambridge and the State of Massachusetts have adopted a goal to reduce municipal waste by 30% by 2020, and 80% by 2050 or before (using 2008 levels as the base) as part of the pathway to Zero Waste. This section provides an overview of state and municipal legislation and ordinances relevant to this project.

### 3.1 State Legislation

The State of Massachusetts has developed a number of guidance documents, policies and pieces of legislation regarding waste management including: hazardous waste, solid waste, construction and demolition material, disaster debris, and solid waste management facilities. Over time, the State has enacted a number of regulations to achieve greater diversion. Those most applicable to this study are described below.

#### 3.1.1 Waste Disposal Bans

The Massachusetts Department of Environmental Protection (MassDEP) has enacted a number of bans since the early '90s on landfilling and combustion of materials that are either toxic and/or easy to recycle. Materials that are banned from disposal and/or transfer for disposal in Massachusetts include<sup>8</sup>:

- Asphalt Pavement, Brick & Concrete
- Cathode Ray Tubes
- Clean Gypsum Wallboard
- Commercial Food Waste
- Ferrous & Non-Ferrous Metals
- Glass & Metal Containers
- Lead Acid Batteries
- Leaves & Yard Waste
- Recyclable Paper, Cardboard & Paperboard
- Single Resin Narrow-Necked Plastics
- Treated & Untreated Wood & Wood Waste (Banned from Landfills Only)
- White Goods (Large Appliances)
- Whole Tires (Banned from Landfills Only; Shredded Tires Acceptable)

#### 3.1.2 Commercial Organics Ban

In October 2014, a ban on the disposal of commercial organic wastes by businesses and institutions that dispose of one ton or more of these materials per week took effect. Generators of organic waste are prohibited from disposing, transferring for disposal, contracting for the disposal, or transporting commercial organics. Landfills, transfer facilities, and combustion facilities are prohibited from accepting organics from commercial generators except to handle,

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<sup>8</sup> The Official Website of the Executive Office of Energy and Environmental Affairs, Massachusetts Waste Disposal Bans

recycle or compost this material in accordance with their individual MassDEP-approved Waste Ban Plan. In general, this ban affects the following groups<sup>9</sup>:

- Residential Colleges or Universities with  $\geq 730$  students
- Non-residential Colleges or Universities with  $\geq 2,750$  students
- Secondary Schools with  $\geq 4,000$  students
- Hospitals with  $\geq 80$  beds
- Nursing Homes with  $\geq 160$  beds
- Restaurants with  $\geq 70$  or more full time employees
- Resort/Conference Properties with  $\geq 475$  seats
- Supermarkets with  $\geq 35$  full time employees.

### 3.1.3 Bottle Bill

Massachusetts has a Bottle Deposit Law; the “Bottle Bill”, enacted in 1983 which requires a \$0.05 deposit on all carbonated soft drink, beer, malt beverage and sparkling water containers sold in the state. This legislation reduces the quantities of these materials requiring management by municipalities.

## 3.2 Municipal Ordinances

The following provides brief descriptions of ordinances enacted by the City which are relevant to this project.

### 3.2.1 Refuse and Litter Ordinance

Cambridge Municipal Code Chapter 8.24, Refuse and Litter Ordinance<sup>10</sup>, sets out the conditions for the handling, collection and disposal of waste as well as maintenance of public and private properties.

This ordinance was amended in 1991 when City Council mandated recycling throughout the City for all sectors.

Section 8.24.070 (Mandatory Recycling) of the Cambridge Municipal Code requires all owner/occupants in Cambridge to separate all designated recyclable materials regardless of service provider. The ordinance requires commercial establishments to recycle materials that comprise at least 5% of their waste stream.

Section 8.24.110 specifies that the Commissioner of Public Works has the right to specify the times and methods of storage, collection and disposal of refuse by any private collector.

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<sup>9</sup> MassDEP – Guidance for Businesses, Institutions and Haulers

<sup>10</sup> [Chapter 8.24 - Refuse and Litter](#)

### 3.2.2 Bring Your Own Bag Ordinance

In March 2015, City Council passed the Bring Your Own Bag (BYOB) Ordinance<sup>11</sup> which prohibits the use of plastic bags with handles, and requires retail establishments to charge customers a minimum of \$0.10/bag for all reusable, paper or compostable bags with handles provided at the point of sale. The intent of this ordinance is to reduce the number of single use plastic bags, and encourage the use of reusable or other bags.

### 3.2.3 Polystyrene Ordinance

Cambridge recently adopted a Polystyrene Ordinance<sup>12</sup> which took effect on October 20, 2016. The ordinance prohibits retail establishments from using single-use, disposable, polystyrene containers for prepared take-out food or beverages. The ordinance affects all food and drink establishments that serve food or drink in single-use disposable service-ware.

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<sup>11</sup> [Ordinance Number 1366](#)

<sup>12</sup> [Ordinance Number 1374](#)

## 4 Waste Materials Management Programs

The Department of Public Works (DPW) administers all waste materials management programs in the City. The Solid Waste Division is comprised of the following three divisions: Recycling, Rubbish and Street Cleaning.

The Recycling Division is responsible for the weekly curbside collection of materials that must be diverted under State law, including paper, cardboard, bottles, cans and yard waste. These materials are collected from Cambridge residents, City buildings, schools and non-profit organizations. Materials are also collected from various drop-off locations. The Division also maintains a Recycling Center accessible to Cambridge residents, as well as businesses and non-profit agencies with 50 or fewer employees. The Recycling Division has five full-time employees (a director, two program managers, and two inspectors), two part-time employees, and currently two interns.

The Rubbish Division provides weekly curbside collection of trash from residences, public buildings, schools and some non-profit organizations. Collection of large, bulky items from residents is also provided by this division in addition to provision of four household hazardous waste collection events held annually. This division also is responsible for oversight and enforcement of the City's Refuse and Litter Ordinance.

The Street Cleaning Division is responsible for maintaining streets and sidewalks, as well as cleaning public area trash and recycling receptacles and removing graffiti.

### 4.1 Trash Collection

The City provides weekly collection of trash to residential areas, public buildings, schools and non-profit organizations. The City provides weekly trash collection service with municipal crews (Department of Public Works) to approximately 72% of the households in the City; all single family homes and approximately two thirds of all multi-family buildings, an estimated 31,750 households. The City also collects trash from all schools and City buildings, as well as from some Cambridge Housing Authority (CHA) buildings and the Cambridge Rindge and Latin School (CRLS).

The City has traditionally collected trash and litter using its own workforce using the following resources:

- Seven (7) three (3) person rubbish trucks (rear packers) collecting household trash from Monday to Friday
- Two (2) two (2) person trucks (rear packers) managing litter in various squares and parks from Monday to Friday
- Evening and overnight crews assist with litter collection during "off-hours" times as required.

The City does not provide trash collection to the commercial sector who must contract directly with private service providers. All haulers licensed to operate in Cambridge are required to offer recycling collection.

The Refuse and Litter Ordinance limits household trash to 150 pounds per week, 150 gallons per household in no more than three barrels, up to 50 gallons each. For example, a multi-family building with 6 units can have up to eighteen 50-gallon barrels and up to 900 pounds of trash per week set out for collection. The City does provide some collection of trash from dumpsters from select locations with regular collection vehicles.

## 4.2 Large Item Collection

The City provides large item collection to residents receiving City service. Some large items are collected at the curb; others are collected on a scheduled basis and require an Appliance/Large Item disposal permit for each item being collected. The cost of each disposal permit is \$25 or \$20 for senior citizens (ages 62+). Items of a commercial or industrial nature are not eligible for collection by the City. Residents are allowed to put one piece of furniture out per week on trash day. Collection staff on-route call in items that have been set out and that do not require a permit (and therefore not scheduled) for collection by a supervisor.

The City has a partnership with the MA Coalition for the Homeless who collect furniture items in good condition at no charge two times per month (on the last Friday and the first Monday of every month, except holidays) with additional collections provided during peak move-in/out times around June 1 and September 1. Residents must contact this organization directly to have furniture collected.

One City pickup truck is dedicated to the daily collection of small TVs/monitors, microwaves, stereos and box fans. There is a dedicated City crew for the weekly scheduled collection of white goods and other metals on Wednesdays and large TVs/monitors on Thursdays.

Items such as appliances or metal are brought to the DPW yard. Following extraction of Freon by a contractor, appliances are placed into a dumpster along with scrap metal for removal by a contractor. Furniture and other items not requiring a permit are collected by regular packer trucks and hauled to the transfer station for disposal.

An Appliance/ Large item Permit is required for:

- Air Conditioners\*<sup>13</sup>
- Clothes Washers & Dryers
- Copiers & Printers (More than 40 lbs)
- Dehumidifiers\*
- Dishwashers
- Exercise Equipment (small) & Bicycles (free, no permit required, call ahead to schedule pick-up)
- Larger Exercise Equipment (motorized)
- Lawnmowers (free, call ahead to schedule pick-up, must remove gas)
- Metal Filing Cabinets & Desks (free, no permit required, call ahead to schedule pick-up)
- Radiators (free, no permit required, call ahead to schedule pick-up)

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<sup>13</sup> Freon (chlorofluorocarbons) is removed from air conditioners, dehumidifiers, freezers, and refrigerators in order to meet the Clean Air Act. All appliances are then sent to a local scrap metal recycling facility.

- Refrigerators\* & Freezers\* (must remove doors, non-commercial)
- Snow Blowers (free, no permit required, call ahead to schedule pick-up, must remove gas)
- Stoves
- TVs & Computer Monitors (Over 20" diagonal screen length)
- Trash Compactors
- Water Coolers & Heaters.

No Permit is required for:

- Carpet or lumber (residential only, up to 3 tied bundles, 3' x 3' x 1')
- Electronics (microwaves, stereos, box fans, small printer or fax machine)
- Furniture (couches, mattresses, box springs, tables)
- Toilet or Sink (one per household on collection day)
- Small TVs & computer monitors (20" or less diagonal screen length), including hard drive, keyboard, mouse and small printer or fax machine.

### 4.3 Recycling Collection

The City manages a single stream residential recycling collection program that has been in effect for more than twenty years. Recycling is mandatory for all sectors in the City. Recycling is provided to approximately 95% of the households in the City or 44,000 households.

The City has a 5-year contract with a private service provider (Russell Disposal) for curbside recycling collection and delivery of recyclables to another private service provider (Casella Recycling) for processing. Recyclables are delivered to a Material Recycling Facility (MRF) located at 24 Bunker Hill Industrial Park in Cambridge.

Recycling is collected using the same schedule and routes as the City's trash program and typically require five (5) recycling packer trucks (rear load packers) operating throughout the City on a daily basis. One additional Supervisor rear load packer is used to service narrow streets, collect missed material and/or deliver new or replacement totes (carts).

#### 4.3.1 Residential Recycling

The City provides most residences with 65 or 95 gallon recycling totes (carts) on wheels for weekly collection of single stream recycling. Residents may also convert any 32-gallon trash barrel for recycling, labeled with City stickers, or continue using blue bins. There are no limits on the amount of recycling placed out for collection.

##### **Accepted Items**

###### *Containers*

- Aerosol Cans
- Aluminum Cans, Trays & Foil
- Glass Bottles & Jars
- Metal Cans
- Milk Cartons & Juice Boxes

##### **Items NOT Accepted**

- Trash
- Plastic bags
- Styrofoam
- Food waste
- Ceramics, dishes or glassware
- Clothes hangers



- Large Plastics
- Stiff Plastic Containers
- Spiral Cans

*Papers*

- Books Cardboard Boxes
- Coffee Cups
- Frozen Food Boxes
- Paperboard
- Phone Books & Junk Mail
- Pizza Boxes
- Newspapers & Inserts
- Magazines & Catalogs
- Paper Bags
- Shredded Paper
- White & Colored Paper
- Wrapping Paper

- Electronics or appliances
- Household Hazardous Waste
- Light bulbs
- Paint containers
- Paper towels or napkins
- Photographs or blueprints
- Pots, pans or scrap metal
- Plastic utensils
- VCR or cassette tapes
- Windows, plate glass or mirrors
- Yard waste

### 4.3.2 Commercial Recycling

Since 1991, the City's Mandatory Recycling Ordinance has required all buildings recycle any recyclable material that comprises at least 5% of their waste stream. Businesses can arrange for curbside pickup with any hauler licensed in Cambridge. All haulers licensed to operate in Cambridge are required to offer recycling collection. Small businesses with 50 employees or less may use the City's Recycling Center during regular operating hours.

All materials subject to Massachusetts Waste Bans are considered designated recyclables in addition to the list below. The City reserves the right to add or remove recyclable materials as defined in the rules and regulations of the Cambridge Municipal Code at any time.

The following materials are designated as recyclable materials:

- Batteries (lead-acid)
- Cardboard
- Cathode ray tubes (TVs and computer monitors)
- Construction waste (asphalt, brick & concrete)
- Paper
- Glass, plastic & metal containers
- Leaf & yard waste
- Scrap metal
- Tires (whole)
- White goods
- Wood

### 4.3.3 Multi-family Recycling

The City's Mandatory Recycling Ordinance includes multi-family buildings. The City provides free recycling 95 Gallon totes and weekly curbside collection service of recycling to all multi-family buildings. Toters are allocated to multi-family buildings based on one recycling toter for every four units. Toters must be placed at the curb for collection; there are a few instances where toters may be placed out in an alley for collection. The City is not able to service recycling dumpsters.

New large multi-family residential developments with 75+ units that request City service are required to pay a set-up charge for toters to collect recyclable materials. In the event that the City service with toters is not suitable for a large multi-family development, these buildings can apply for a dumpster license and contract to use a private collection service.

### 4.3.4 Public Area Bin Recycling

The City has a contract with a private operator who collects recycling materials from City squares and parks using bicycles throughout the year. Material is brought to the MRF by the private operator.

## 4.4 Recycling Center

The City operates a recycling center located at 147 Hampshire Street, Cambridge in the rear of the DPW yard. It is open to Cambridge residents, small businesses and non-profit organizations in Cambridge with 50 employees or less on Tuesdays and Thursdays from 4 pm to 7:30 pm and Saturdays from 9 am to 4 pm. Use of the Center is free of charge.

The recycling center is run by City staff. Material dropped off at the recycling center by residents and small businesses is transferred to small dumpsters in the yard and, depending on the material, hauled from the center by different vendors.

The following list provides an overview of the materials accepted at the recycling center. While residents can bring any material in the accepted items list, those items marked with an asterisk are the only materials accepted from small businesses/non-profits.

#### Accepted Items

- Batteries (non-alkaline only)
- Binders (good condition, for reuse)
- Books (residents are welcome to take up to 10 books per visit)
- Bottles & Cans\*
- Cardboard Boxes\*
- CDs, DVDs, Video Games (in original packaging)
- Cell Phones
- Electronics and Cords (no computer monitors or TVs)
- Flags
- Fluorescent Bulbs\*
- Food Scraps (residents only)
- Metal Items\* (no sealed containers or large appliances)
- Paper\*
- Plastic Bags\*
- Plastics, Large Items\* (laundry baskets, crates, toys, etc.)

- Small Appliances (any small appliance with a cord or battery-operated device that one person can lift)
- String Lights
- Styrofoam Packing Peanuts (no block Styrofoam, no cellulose peanuts)
- Thermometers
- Thermostats
- Toner & Ink Cartridges

### Items NOT Accepted

- Air Conditioners, Dehumidifiers or Water Coolers (Large Items/Appliance permit needed)
- Car Batteries (bring to junk yard, auto shops, Household Hazardous Waste Day)
- Chemicals
- Computer Monitors or TVs
- Construction Debris
- Floppy Disks, VHS or Cassette Tapes
- Furniture
- Hazardous Waste
- Paint
- Smoke Detectors
- Trash
- Yard Waste or Wood
- Water Filters
- Window Glass

## 4.5 Yard Waste Collection

The City offers a yard waste collection program from the first week in April through to mid-December. In 2016, yard waste was collected from April 1st to December 16th. Yard waste is mainly collected from single family homes and small multi-family dwellings, as larger multi-family dwellings and commercial entities typically have a landscaping service to manage their yard waste.

The program is managed by the recycling contractor and typically involves one rear load packer operating throughout the City using the same routes and schedules as the solid waste operation. Yard waste is delivered to an outdoor composting facility located in Woburn.

### Accepted Materials

- Leaves
- Grass
- Plants
- Shrub Prunings & Twigs (no more than 1 inch in diameter and 3 feet in length)
- Pumpkins
- Thick Limbs (3 tied bundles per week, no more than 3 feet in length and diameter)

### Unaccepted Materials

- Trash
- Food
- Soil, Dirt, Sand Rocks or Tree Stumps (call a private hauler)

## 4.6 Organics Collection

The City has been providing organics collection since 2014 on a pilot basis which was expanded in 2015 to provide service to all residential households that are currently provided with trash/recycling service on Monday collection routes. The following provides details on collection, transfer and processing of organics.

### 4.6.1 Residential Organics Collection

The City completed a feasibility study for a pilot curbside food scraps collection program for residents in 2012; and in 2015, completed the first year of the pilot collection program. Starting in 2014 with 554 households, the program expanded in the Fall of 2015 to include all eligible residences on the Monday collection routes in North Cambridge. The expanded program services approximately 5,100 households, including residents in about 2,500 small (1-12 units) multi-family buildings with City trash/recycling pickup. The City is presently considering whether to expand this program throughout the entire City in the near future to all units with 12 or fewer units, and potentially to buildings with 13+ units thereafter for which the City currently provides recycling collection service.

The City provides a kitchen container and a collection container (12 or 21 gallon lockable totes) to residents, and weekly collection of material at the curb. The City contracts with a private service provider for collection, transfer and processing of organics. The private service provider is responsible for contracting out processing of organics. One rear load packer is utilized to collect organics as well as one 1-ton satellite dump truck which is used to provide extra collection capacity as required.

### 4.6.2 Organics Collection from Schools and Other Locations

The City provides 65 or 68 gallon totes for organics collection at participating schools, drop-off centers (Community Centers), the Recycling Center, and participating non-profit organizations. Generally, collection is weekly or on-call as needed; however, some locations require twice weekly collection due to higher volumes collected. The City has contracted with a private service provider for collection, transfer and processing of organics from these locations. However, the City will be taking over the collection and transfer of compostable material (food scraps and compostable trays) from schools by City collection staff. Material from schools will be composted at Rocky Hill.

## 4.7 HHW Collection

The City contracts with a private service provider to operate four Household Hazardous Waste (HHW) events annually, which are open to Cambridge residents. In 2016, four events were held on Saturdays from 9 am to 1 pm in April, June, September and October. Events are held at locations throughout the City (typically City-owned parking lots). One City staff person attends the events to support the contractor's staff. Residents can also dispose of HHW at privately run facilities for a small fee at other times during the year. The following is a list of acceptable and non-acceptable items collected at the City-run events.

### **Accepted Items**

- Batteries: Vehicle & Non-Alkaline
- Car Fluids: Antifreeze, Brake, Engine Degreaser, & Transmission
- Car Tires (maximum four per household)
- Chemicals: Cleaners, Glues, Removers, Photography & Swimming Pool
- Fluorescent Light Bulbs
- Mercury Items: Thermometers & Thermostats
- Paints: Oil-Based & Latex
- Poisons: Insecticides, Pesticides & Weed Killers
- Prescription Medicines (also accepted year-round at Police Dept. 125 Sixth St)
- Propane Cylinders (20 lbs. or less only)
- Waste Fuels: Antifreeze, Gasoline, Kerosene, Sterno & Motor Oil (motor oil also accepted year-round at DPW)

### **Items NOT Accepted**

- Alkaline Batteries
- Ammunition, Fireworks & Explosives
- Asbestos (requires proper disposal)
- Bleach or Ammonia
- Commercial/Industrial Waste
- Construction Debris
- Empty Aerosol Cans
- Fire Extinguishers
- Compressed Gas Cylinders
- Infectious or Biological Waste
- Radioactive Waste
- Smoke Detectors
- Syringes

## 5 Waste Management Contracts

The following sections provide an overview of the various contracts the City holds with private service providers for waste management.

### 5.1.1 Recycling Collection and Processing

The City has a contract with FW Russell and Sons Disposal Inc. and Langton & Douglas Contracting, Inc. for weekly single stream recycling collection. The City has a 5-year contract which commenced on November 1, 2015 and ends on October 31, 2020. The contract requires the service provider to collect single stream recycling on a weekly basis from all eligible households and deliver the material to a Material Recovery Facility (MRF) located in Charlestown. This contract also covers yard waste collection.

The City has a contract with Casella Recycling LLC for processing and marketing of recyclables delivered to their Material Recycling Facility (MRF) located at 24 Bunker Hill Industrial Park, Charlestown, MA. The contract period runs from October 25, 2015 through October 25, 2020. The City's agreement includes provisions for a monthly calculation of revenue or charges to Casella determined by the average commodity revenue (ACR). The ACR is calculated by dividing the prior month's net revenue for Casella for each commodity (including residue tons at current market rates) divided by the total tons of commodities shipped (including residue and unaccounted for tons) over the same month. The ACR threshold of \$78.50 per ton is subtracted from the excess ACR to determine who gets paid. The City gets paid for 50% of the revenue share of the excess ACR. In times of unfavorable markets, the City must pay Casella dollar for dollar below the ACR threshold. This arrangement excludes pre-sorted recyclables such as cardboard and mixed paper for which the City has an alternative revenue sharing agreement. Residue is not to exceed 7% by weight. The agreement allows for twice yearly audits of Cambridge loads by Casella to identify more significant contaminants which could be targeted through public education campaigns and driver training.

Casella also processes cardboard, commingled material, paper and plastic film collected at the Recycling Center.

### 5.1.2 Yard Waste Collection, Hauling and Processing

The contract for yard waste collection is part of the recycling collection contract. The City has a contract with FW Russell and Sons Disposal Inc. and Langton & Douglas Contracting, Inc. for collection, marketing and composting of yard waste on a seasonal basis. The City has a 5-year contract which commenced on November 1, 2015 and ends on October 31, 2020. The service provider is required to collect yard waste on a seasonal basis, deliver material to a composting facility (Landscape Express) located at 218 New Boston Street in Woburn and market the final compost. The City's contractor has an agreement with Landscape Express to process yard waste and market the final compost.

### 5.1.3 Organics Collection, Hauling and Processing

The City entered into a contract with Save that Stuff Inc. for a one year period from August 25, 2014 to August 26, 2015 with two 1-year options to renew for weekly organics collection, hauling and processing. The City renewed the contract for a one-year period from August 27, 2015 to August 28, 2016 and then again to April 27, 2017.

Save that Stuff is responsible for weekly collection of residential curbside organics (food scraps from the pilot area), hauling and processing. Up until the end of January 2017, material was processed at Rocky Hill Farm located at 34 Butterfield Road, Saugus, MA. From February 2017 onwards, material will be processed at a processing facility owned by Waste Management Inc. situated at Save that Stuff's facility located at 200 Terminal Street in Boston. Organics are processed into a slurry which is transferred to the Greater Lawrence Sanitary District wastewater treatment plant located at 240 Charles Street in North Andover, MA where it is anaerobically digested. The methane produced will be converted to electricity to be used for the plant's power needs.

The City entered into a separate contract with Save that Stuff on August 25, 2014 for a one year period with options for two 1-year extensions for organics collection from City buildings, schools, the Recycling Center and other drop-off locations, and delivery to a registered composting facility. On February 15, 2017 the City brought the collection of food waste from the Recycling Center, schools, drop-off locations, and City Buildings in-house. This entire collection route will be collected and sent to Rocky Hill Farm for processing.

### 5.1.4 Christmas Tree Collection and Disposal

Christmas trees are collected by City forces and taken to C.J. Mabardy's facility. From there, they are transported to a wood chipping facility in Winchendon, MA.

### 5.1.5 HHW Collection and Processing

The City has a contract with Clean Harbors, Norwell, MA to operate four household HHW events annually. Material is transferred to their facility located at 42 Longwater Drive in Norwell, MA.

The City also has a contract with Environmental Integrity for hauling fluorescent bulbs and mercury-containing items collected by the City to a processing facility located in Holyoke, MA.

### 5.1.6 Large Items Collection and Disposal

The City has a partnership with the Coalition for the Homeless to collect furniture two times per month. This free service must be scheduled, and is offered on the last Friday and the first Monday of every month, except holidays.

Other large items are collected by City forces and either processed at the DPW yard (e.g. appliances) or taken to the transfer station owned by Republic Services for disposal (e.g. furniture). Scrap metal is hauled from the DPW yard by ScrapIt and taken to their facility located at 2 Dexter Street, Everett, MA.

### 5.1.7 Electronics Collection and Disposal

Small electronics (e.g. small TVs/monitors, microwaves, stereos) are collected by City forces from the curb using a pickup truck. Larger electronics (e.g. large TVs/monitors, copiers, printers) are collected by a dedicated City crew on a scheduled collection basis. Some electronics are accepted at the Recycling Center. Electronics are placed in containers, collected by Universal Recycling Technologies and hauled to their facility at 61 Industrial Park Drive in Dover, NH.

### 5.1.8 Trash Collection and Disposal

Trash collection is provided by City forces. Trash is hauled to a transfer station located at 68 Norfolk Ave, Roxbury, MA owned and operated by Republic Services (formerly Allied Waste Systems Inc.).

Currently, the City has a contract with Republic Services transfer station in Roxbury, MA which started in July 2013 and expires on June 30, 2018 for trash disposal. Trash is either sent to a landfill (e.g. Turnkey Landfill in Rochester, New Hampshire) or to a waste-to-energy facility (WTE) (e.g. Wheelabrator in Saugus MA, Covanta SEMASS in West Wareham MA or Covanta in Haverhill MA) depending on market conditions. Typically, approximately 60% of trash is disposed of at a waste-to-energy facility and 40% is landfilled; however, this can vary from year to year.

Previously, the City had a contract with Waste Management Inc., for trash disposal. From FY08 to FY13, trash was disposed of at WTE facilities (Wheelabrator in Saugus, North Andover, and Milbury MA) or landfill (Turnkey in Rochester, NH and Fitchburg, MA). Both of these landfill sites have active methane to energy facilities.

Table 5-1 presents the destination of trash from FY08 to FY16, and reflects the two contracts with different service providers. Note that FY14 to FY16 represents estimated tonnages based on a 60/40 split between WTE and landfill.

**Table 5-1: Destination of Trash (FY08-FY13)**

Period	Total Tonnage	% WTE	Tonnage to WTE	% Landfill	Tonnage to Landfill
FY16	16,097	60%	9,736	40%	6,491
FY15	16,089	60%	9,653	40%	6,434
FY14	16,226	60%	9,658	40%	6,438
FY13	16,725	86.4%	14,450	13.6%	2,275
FY12	17,030	84.2%	14,339	15.8%	2,691
FY11	17,407	88.8%	15,457	11.2%	1,950
FY10	18,515	65.4%	12,109	34.6%	6,406
FY09	19,772	80.7%	15,956	19.3%	3,816
FY08	20,425	24.6%	5,025	75.4%	15,400

Source: City of Cambridge -Tonnage Destination Report – FY08-FY13 (E. Katz), Outbound Breakdown Analysis (M. Orr), Trash Tonnage (M. Orr)



### 5.1.9 Miscellaneous Debris Collection and Disposal

The City has a contract with W.L. French Excavating Corporation for the collection of miscellaneous debris, including playground structures, regular street sweeping debris, leaf season street sweeping debris and staging area cleanup. The contract was recently extended for a two year period ending on October 21, 2017.

It is estimated, that on average, approximately 50% of the green debris managed by W.L. French Excavating is disposed of at Clear Summit Earth Materials in Lancaster, MA and 50% at a wood chipping facility in Winchendon, MA.

It is estimated that approximately 90% of the street sweepings managed by W.L. French Excavating are disposed of at the Turnkey Landfill located in Rochester, NH with the remaining 10% being managed at the Covanta facility located in Haverhill, MA.

The City contracts with C.J. Mabardy for the receipt of waste dropped off by DPW vehicles at the C.J. Mabardy Transfer Station, which may include miscellaneous debris and playground structures, wood stumps, street sweeping debris, dirt, materials generated by routine street work (e.g. rubble, gravel, asphalt). The most recent contract runs from December 1, 2016 to November 30, 2017. Street sweepings managed by C.J. Mabardy have been disposed of at a landfill located in Southbridge, MA, however, in the future; a landfill located in Hopedale, MA will be utilized instead.

### 5.1.10 Catch Basin Waste Collection and Disposal

The City has a contract with W.L. French Excavating Corporation for solid waste collection and disposal from catch basins. The contract was recently renewed for a one-year period ending on January 15, 2017. Catch basin waste is disposed of at Turnkey Landfill located in Rochester, NH.

## 6 Waste Materials Managed

The following sections present a breakdown of the tons of waste materials managed by the City by fiscal year and by calendar year.

### 6.1 Overall City-Managed Waste

Table 6-1 and Table 6-2 present the overall tons of waste materials managed by the City in the major categories of Organics, Recycling, and Trash<sup>14</sup> by fiscal and calendar year. Further breakdowns of each major category are provided in subsequent tables.

**Table 6-1: Overall City-Managed Waste (FY12-FY16) (tons)**

Waste Stream	FY12	FY13	FY14	FY15	FY16
Organics	2,044	2,237	2,074	2,150	2,487
Recycling	9,592	9,608	9,679	9,611	9,668
Trash	17,020	17,111	15,640	16,205	16,543
<b>Total</b>	<b>28,656</b>	<b>28,956</b>	<b>27,393</b>	<b>27,966</b>	<b>28,698</b>

Source: City of Cambridge, Organics, Recycling (FY12-FY16, Recycling Database), Trash (FY12, Tonnage file from M. Orr and FY13-FY16 Rubbish and Allied Files)

**Table 6-2: Overall City-Managed Waste (2012-2016) (tons)**

Waste Stream	2012	2013	2014	2015	2016
Organics	1,982	2,251	2,092	2,395	2,518
Recycling	9,594	9,707	9,678	9,581	9,546
Trash	16,895	16,491	16,137	14,853	14,419
<b>Total</b>	<b>28,471</b>	<b>28,449</b>	<b>27,907</b>	<b>26,829</b>	<b>26,483</b>

Source: City of Cambridge, Organics, Recycling (2012-2016 Recycling Database), Trash (2012-2013, Tonnage file from M. Orr, 2014-2016, Rubbish and Allied Files)

<sup>14</sup> Note that the trash tons reported includes other materials such as street sweepings as reported by Allied/Republic and is not solely curbside trash.

## 6.3 City-Managed Trash

Table 6-3 and Table 6-4 present the tons of trash managed by fiscal and calendar year. This represents trash collected from parks and litter bins, the Cambridge Housing Authority (CHA), Cambridge Rindge & Latin School (CRLS), curbside by City forces (DPW) (includes trash from dumpsters collected at parks, municipal buildings, schools, non-profits and some residential facilities).

**Table 6-3: City-Managed Trash (FY12-FY16) (tons)**

Source	FY12	FY13	FY14	FY15	FY16
Parks, Litter	891	925	804	752	811
CHA	456	370	357	392	740
CRLS	125	89	87	110	205
Curbside	15,548	15,727	14,392	14,951	14,787
<b>Total</b>	<b>17,020</b>	<b>17,111</b>	<b>15,640</b>	<b>16,205</b>	<b>16,543</b>

Source: City of Cambridge, FY12 Tonnage files from M. Orr (Parks, Litter, CHA, CRLS) FY13-FY16, 2012-2016 Rubbish Files (tons of trash for Parks and Litter), 2013-2016 Allied Trash (tons of trash from CHA, CRLS), Curbside tons from M.Orr (Tonnage files)

**Table 6-4: City-Managed Trash (2012-2016) (tons)**

Source	2012	2013	2014	2015	2016
Parks, Litter	961	841	774	812	703
CHA	574	472	354	391	366
CRLS	106	105	73	108	104
Curbside	15,254	15,073	14,936	14,853	14,419
<b>Total</b>	<b>16,895</b>	<b>16,491</b>	<b>16,137</b>	<b>16,164</b>	<b>15,592</b>

Source: City of Cambridge, 2012-2013 Tonnage file from M. Orr (Parks, Litter, CHA, CRLS and Curbside), 2014-2016 Rubbish Files (tons of trash for Parks and Litter), 2014-2016 Allied Trash (tons of trash from CHA, CRLS,), Curbside tons from M.Orr (Tonnage files)

The tons of trash presented in the previous two tables include the tons of trash collected from dumpsters at residential and non-residential locations (included in Curbside tons). These include City parks, municipal facilities/departments, schools, non-profits, and some residential buildings. Service is provided with varying frequency depending on the volume of material generated and can vary from once a week to five times a week. Some locations generate smaller amounts of trash and are considered a “hand stop”. It was assumed that one full container (i.e. a 50 lb bag or barrel) of garbage would be set out. For the remainder of the dumpsters, it was assumed that containers would be 65% full. Based on the number and size of dumpsters, an estimate of the annual tons collected was developed using density factors of compacted and uncompacted trash from the U.S. EPA.

**Table 6-5: City-Managed Trash Collected from Dumpsters (tons)**

Source	Tons Collected
Park	112
Municipal	588
School	833
Non-Profit	7
Residential	679
<b>Total</b>	<b>2,217</b>

Source: City of Cambridge – Trash Dumpster Schedule

## 6.4 City-Managed Organics

Table 6-6 and Table 6-7 present the tons of organics managed by the City by fiscal and calendar year. The category of food scraps represents the material dropped off at recycling/community centers and collected curbside from various schools and organizations as well from the curbside organics collection pilot areas.

**Table 6-6: City-Managed Organics (FY12-FY16) (tons)**

Material Category	FY12	FY13	FY14	FY15	FY16
Christmas Trees	44	40	27	45	45
Food Scraps	96	117	138	236	466
Yard Waste	1,904	2,081	1,909	1,870	2,021
<b>Total</b>	<b>2,044</b>	<b>2,237</b>	<b>2,074</b>	<b>2,150</b>	<b>2,532</b>

Source: City of Cambridge, Recycling Database

**Table 6-7: City-Managed Organics (2012-2016) (tons)**

Material Category	2012	2013	2014	2015	2016
Christmas Trees	44	40	27	45	45
Food Scraps	107	123	191	311	532
Yard Waste	1,831	2,089	1,873	2,039	1,986
<b>Total</b>	<b>1,982</b>	<b>2,251</b>	<b>2,092</b>	<b>2,395</b>	<b>2,563</b>

Source: City of Cambridge, Recycling Database

Table 6-8 presents a breakdown of the tons of City-managed food scraps by source collected at the curb and from various drop-off locations, including the Recycling Center by fiscal year. Table 6-9 presents the same by calendar year from 2012 to 2016.

**Table 6-8: Tons of City-Managed Food Scraps by Source (FY12-FY16)**

Source	FY12	FY13	FY14	FY15	FY16
<b>Curbside</b>					
CRLS	6	16	14	24	21
Schools & Senior Centers	26	38	34	47	76
Pilot Area			21	88	278
<b>Drop-off</b>					
Recycling Center	18	17	13	13	17
Other locations	47	46	55	45	48
<b>Total</b>	<b>96</b>	<b>117</b>	<b>138</b>	<b>236</b>	<b>466</b>

Source: City of Cambridge, Recycling Database

**Table 6-9: Tons of City-Managed Food Scraps by Source (2012-2016)**

Source	2012	2013	2014	2015	2016
<b>Curbside</b>					
CRLS	12	16	17	23	24
Schools & Senior Centers	32	40	38	61	80
Pilot Area			65	142	338
<b>Drop-off</b>					
Recycling Center	18	16	12	14	17
Other locations	45	51	59	70	73
<b>Total</b>	<b>107</b>	<b>123</b>	<b>191</b>	<b>311</b>	<b>532</b>

Source: City of Cambridge, Recycling Database

## 6.5 City-Managed Recyclables

Table 6-10 and Table 6-11 present the tons of recyclables managed by the City by fiscal and calendar year collected in various ways including:

- Curbside – includes materials collected at the curb such as, appliances, electronics, HHW, paper, scrap metal, single stream recycling, and, Styrofoam<sup>15</sup> from residential properties, non-profit organizations, City locations, other organizations such as senior centres and other locations.

<sup>15</sup> In previous years, City collected Styrofoam trays used in schools. Following the ban on Polystyrene, schools have switched to compostable trays.

- Drop-off – includes materials such as cardboard, clothing, commingled recycling, electronics, HHW, paper, plastic film and scrap metal dropped off at the Recycling Centre, or collected at shred events, Hazardous Waste Days, Special Collection Event from the Electrical Department (fluorescent tubes), and some materials collected at the curb (electronics, TVs, monitors, miscellaneous HHW) and brought to the DPW yard.
- Public Area Bins includes single stream materials collected in bins from public areas such as City squares and parks.

**Table 6-10: City-Managed Recycling (FY12-FY16) (tons)**

Source	FY12	FY13	FY14	FY15	FY16
Curbside	9,362	9,368	9,415	9,357	9,413
Drop-Off	229	203	222	201	197
Public Area Bins	25	38	42	53	57
<b>Total</b>	<b>9,617</b>	<b>9,608</b>	<b>9,679</b>	<b>9,611</b>	<b>9,668</b>

Source: City of Cambridge, Recycling Database

**Table 6-11: City-Managed Recycling (2012-2016) (tons)**

Source	2012	2013	2014	2015	2016
Curbside	9,360	9,439	9,416	9,317	9,314
Drop-Off	198	229	214	210	171
Public Area Bins	36	39	48	54	62
<b>Total</b>	<b>9,594</b>	<b>9,707</b>	<b>9,678</b>	<b>9,581</b>	<b>9,546</b>

Source: City of Cambridge, Recycling Database

Table 6-12 and Table 6-13 present a breakdown of the materials managed by the City from various sources.

**Table 6-12: Breakdown of City-Managed Recycling (FY12-FY16) (tons)**

Material Category	FY12	FY13	FY14	FY15	FY16
<b>Curbside</b>	<b>9,362</b>	<b>9,368</b>	<b>9,415</b>	<b>9,357</b>	<b>9,413</b>
Appliances & Scrap Metal	79	51	41	22	30
Electronics	107	60	77	65	63
HHW	4	14	0	1	1
Single Stream	9,166	9,237	9,290	9,264	9,313
Styrofoam	6	7	6	6	6
<b>Drop-Off</b>	<b>229</b>	<b>203</b>	<b>222</b>	<b>201</b>	<b>197</b>

Material Category	FY12	FY13	FY14	FY15	FY16
Cardboard	62	54	58	57	59
Single Stream	12	16	11	12	12
Electronics	24	21	35	36	29
HHW	29	32	43	16	14
Paper	52	38	31	28	32
Plastic Film	5	3	5	5	3
Scrap Metal	45	39	39	48	49
<b>Public Area Bins</b>	<b>25</b>	<b>38</b>	<b>42</b>	<b>53</b>	<b>57</b>
Single Stream	25	38	42	53	57
<b>Grand Total</b>	<b>9,617</b>	<b>9,608</b>	<b>9,679</b>	<b>9,611</b>	<b>9,668</b>

Source: City of Cambridge, Recycling Database

**Table 6-13: Breakdown of City-Managed Recycling (2012-2016) (tons)**

Material Category	2012	2013	2014	2015	2016
<b>Curbside</b>	<b>9,360</b>	<b>9,439</b>	<b>9,416</b>	<b>9,317</b>	<b>9,314</b>
Appliances & Scrap Metal	53	43	27	17	42
Electronics	91	67	66	61	64
HHW	0	14	0	1	0
Single Stream	9,209	9,308	9,315	9,232	9,204
Styrofoam	6	6	6	6	4
<b>Drop-Off</b>	<b>198</b>	<b>229</b>	<b>214</b>	<b>210</b>	<b>171</b>
Cardboard	56	57	58	59	42
Single Stream	15	13	11	14	10
Electronics	21	29	37	32	25
HHW	22	51	25	21	4
Paper	43	33	33	27	20
Plastic Film	4	5	5	5	2
Scrap Metal	38	41	45	51	67
<b>Public Area Bins</b>	<b>36</b>	<b>39</b>	<b>48</b>	<b>54</b>	<b>62</b>
Single Stream	36	39	48	54	62
<b>Grand Total</b>	<b>9,594</b>	<b>9,707</b>	<b>9,678</b>	<b>9,581</b>	<b>9,546</b>

Source: City of Cambridge, Recycling Database

## 6.6 Miscellaneous Debris

The following tables present the tons of street sweepings, and green debris disposed of by C.J. Mabardy.

**Table 6-14: Tons of Miscellaneous Debris Managed (FY12-FY16)**

Material Category	FY12	FY13	FY14	FY15	FY16
Street Sweepings	969	1,415	1,431	861	1,313
Green Debris	354	562	107	280	285

Source: C.J. Mabardy, Tonnage and Cost of Debris Drop-off

**Table 6-15: Tons of Miscellaneous Debris Managed (2012-2016)**

Material Category	2012	2013	2014	2015	2016
Street Sweepings	1,066	1,477	1,290	791	1,399
Green Debris	346	456	187	307	332

Source: C.J. Mabardy, Tonnage and Cost of Debris Drop-off

## 6.7 Catch Basin Waste

The following tables present the tons of catch basin waste disposed of by W.L. French Excavating.

**Table 6-16: Tons of Catch Basin Waste Managed (FY12 – FY16)**

Material Category	FY12	FY13	FY14	FY15	FY16
Catch Basin Waste	434	510	475	561	345

Source: City of Cambridge – WL French CB Disposal and Tonnage

**Table 6-17: Tons of Catch Basin Waste Managed (2012 – 2016)**

Material Category	2012	2013	2014	2015	2016
Catch Basin Waste	614	412	491	705	278

Source: City of Cambridge – WL French CB Disposal and Tonnage



## 7 Waste Composition

The following sections present the results of a recent waste audit and a comparison of the results between those households participating in the curbside organics program (i.e. those households located within the pilot area on the Monday route) and those non-participating households that are not participating in the curbside organics program (i.e. those households located in other areas of the City that are not currently eligible to participate).

### 7.1 Waste Audit

In December 2016, the City conducted a waste audit of trash and recycling from 111 households that participate in the organics program and from 116 households that do not participate in the organics program. It should be noted that this audit was relatively high level for the purposes of estimating waste composition and generation. Detailed sorts of trash and recycling were not conducted and curbside organics bins were not audited, as it was assumed that the majority of material in the green bins would consist of food scraps.

The following Table 7-1 presents the results of the waste audit for participating and non-participating households. This table presents the percent composition and estimated pounds generated per household weekly for trash and recycling based on the waste audit data. Composition and generation rates for curbside organics have been estimated based on tons collected, and assuming curbside organics are comprised primarily of food scraps.

**Table 7-1: Waste Audit Results**

Material	Participating Households						Non-Participating Households					
	Trash		Recycling			Curbside Organics		Trash		Recycling		
	% Composition	lbs/ hhld/ wk	% Composition	lbs/ hhld/ wk	% Capture Rate	% Composition *	lbs/ hhld/ wk	% Composition	lbs/ hhld/ wk	% Composition	lbs/ hhld/ wk	% Capture Rate
Paper/ Cardboard	10	1.25	63	8.11	87			11	2.23	50	6.168	73
Containers/ Plastics	6	0.73	31	3.95	84			7	1.54	37	4.55	75
Food Scraps	29	3.80				100	2.52	33	6.90			
Organics (non-food paper)	12	1.59						8	1.72			
Diapers/Pet Waste	9	1.13						11	2.29			
Textiles	4	0.50	0.1	0.01				4	0.92			
Electronics	3	0.44						2	0.46			
Other Materials	21	2.78	5	0.68				19	3.89	11	1.38	
Scrap Metal	2	0.26	0.4	0.05				1	0.27			
Liquids	4	0.49						3	0.64	1	0.15	
Total	100	12.97	100	12.79		100	2.52	100	20.86	100	12.24	

\*Note that curbside organics were not audited, it was assumed that they consisted primarily of food scraps.

An estimate of the waste generation rates for participating and non-participating households was developed based on the information obtained through the waste audit. In general, it appears that participating households generate less waste overall. Caution should be used when interpreting these results as the difference may be attributed to those households who initially self-selected to participate in the organics pilot program and who may be more proactive about waste reduction compared to the average resident.

**Table 7-2: Waste Generation – Participating and Non-participating Households (lbs/hhld/week)**

Waste Generation lbs/hhld/week	Participating Households (lbs/hhld/week)	Non- participating Households (lbs/hhld/week)
Trash	12.97	20.86
Recycling	12.79	12.24
Curbside Organics	2.52	
<b>Total</b>	<b>28.29</b>	<b>33.10</b>

## 7.2 Comparison of Participating and Non-participating Households

The following figures present a comparison between the participating and non-participating households for trash and recyclables set out for collection.

Figure 7-1 presents the composition of the trash set out for collection by participating households audited. It is interesting to note that almost one-third of the trash set out by participating households still consists of food scraps. This reflects that based on the audit results, it appears that the curbside organics program is capturing in the order of 40% of the food scraps generated, with 60% remaining in the trash.

**Figure 7-1: Trash - Participating Households - Percent Composition**

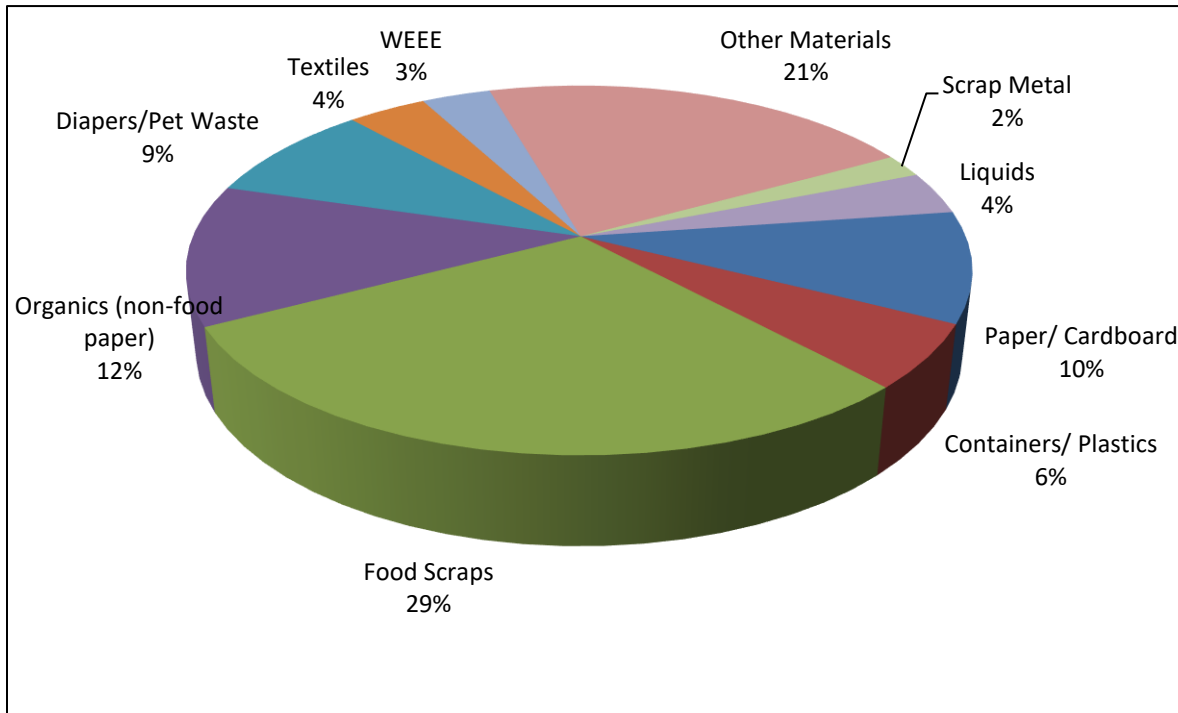


Table 7-2 presents the composition of the trash set out for collection by non-participating households audited.

**Figure 7-2: Trash – Non-Participating Households - Percent Composition**

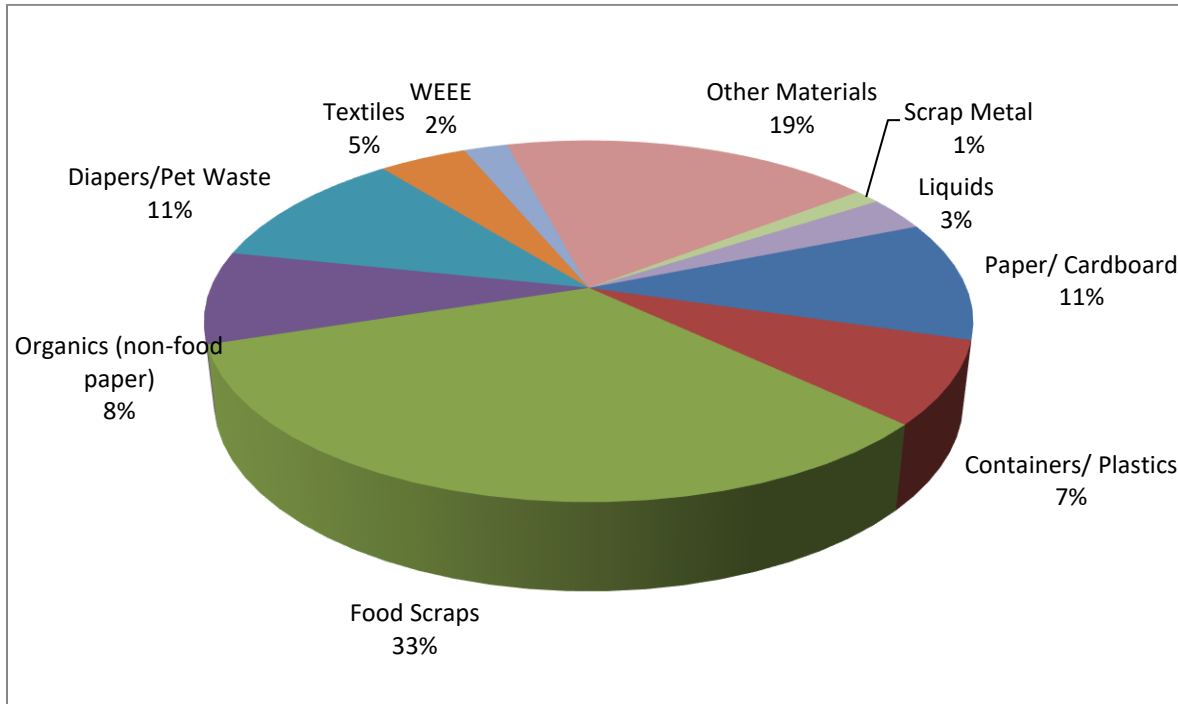


Figure 7-3 presents a comparison of the estimated generation rates of materials found in the trash stream. In general, non-participating households generate greater quantities of all material streams compared to participating households.

**Figure 7-3: Quantities of Materials Placed in the Trash**

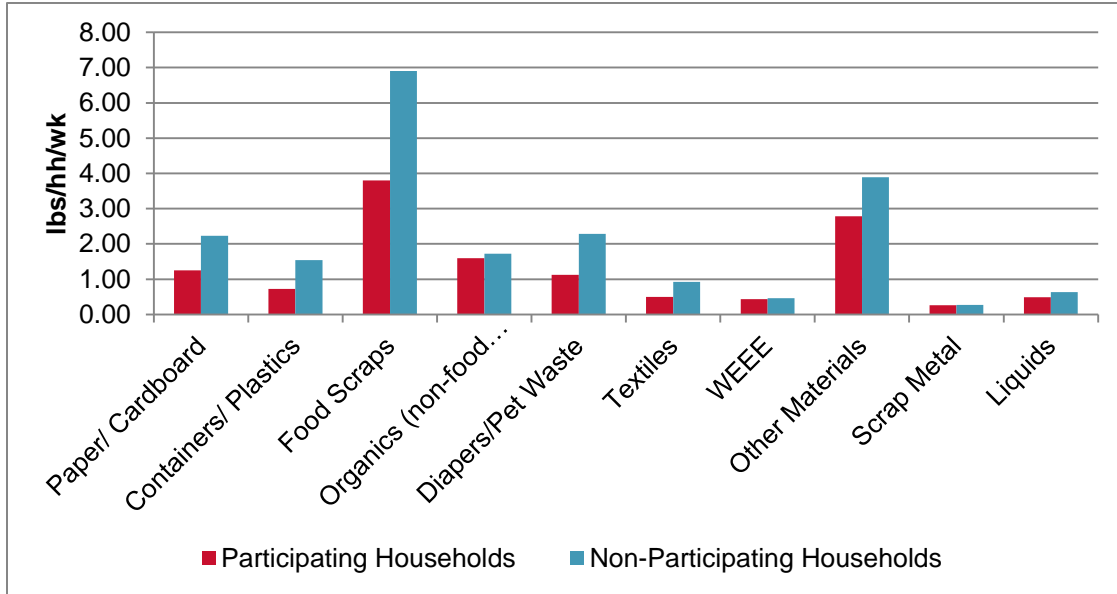
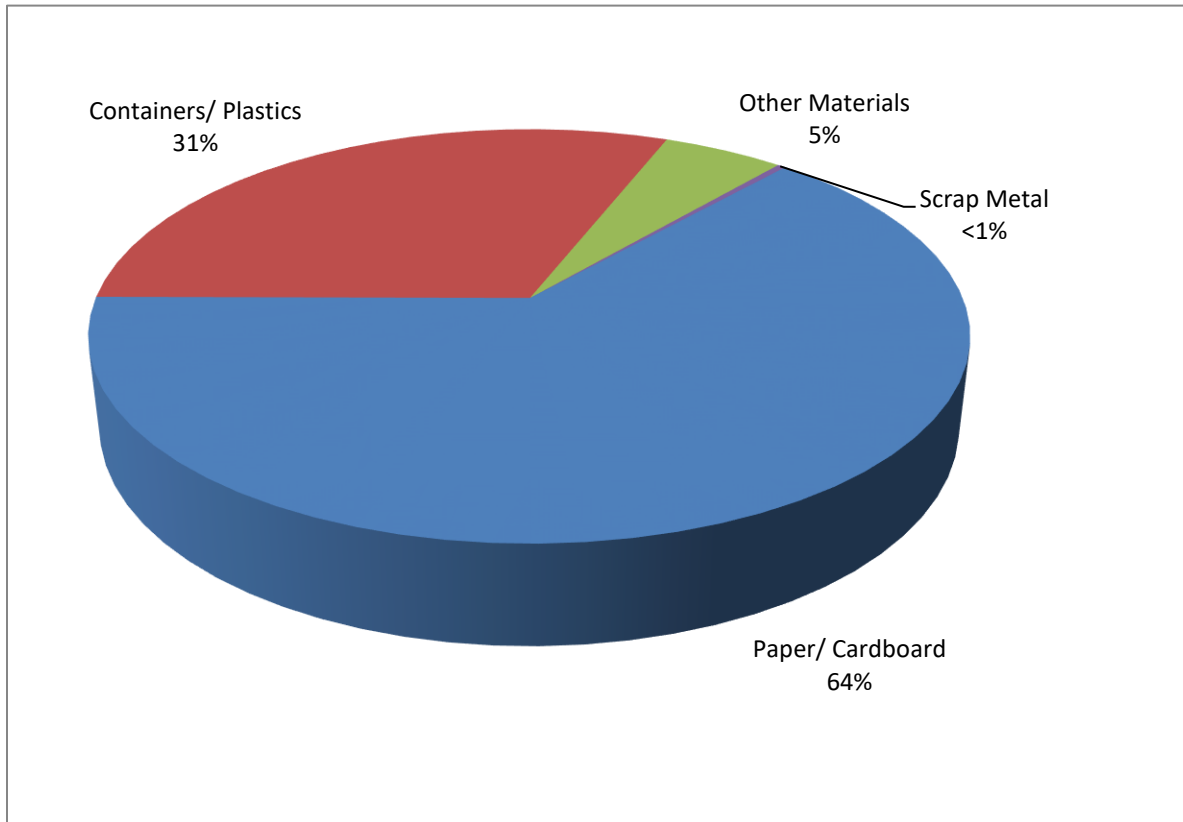


Figure 7-4 presents the composition of the recycling stream for participating households. Figure 7-5 presents the composition of recycling stream for non-participating households. In general, participating households recycle a greater percentage of paper/cardboard and containers/plastics compared to non-participating households, based on the material capture rates as indicated in Table 7-1.

**Figure 7-4: Recycling – Participating Households - Percent Composition**



**Figure 7-5: Recycling – Non-Participating Households - Percent Composition**

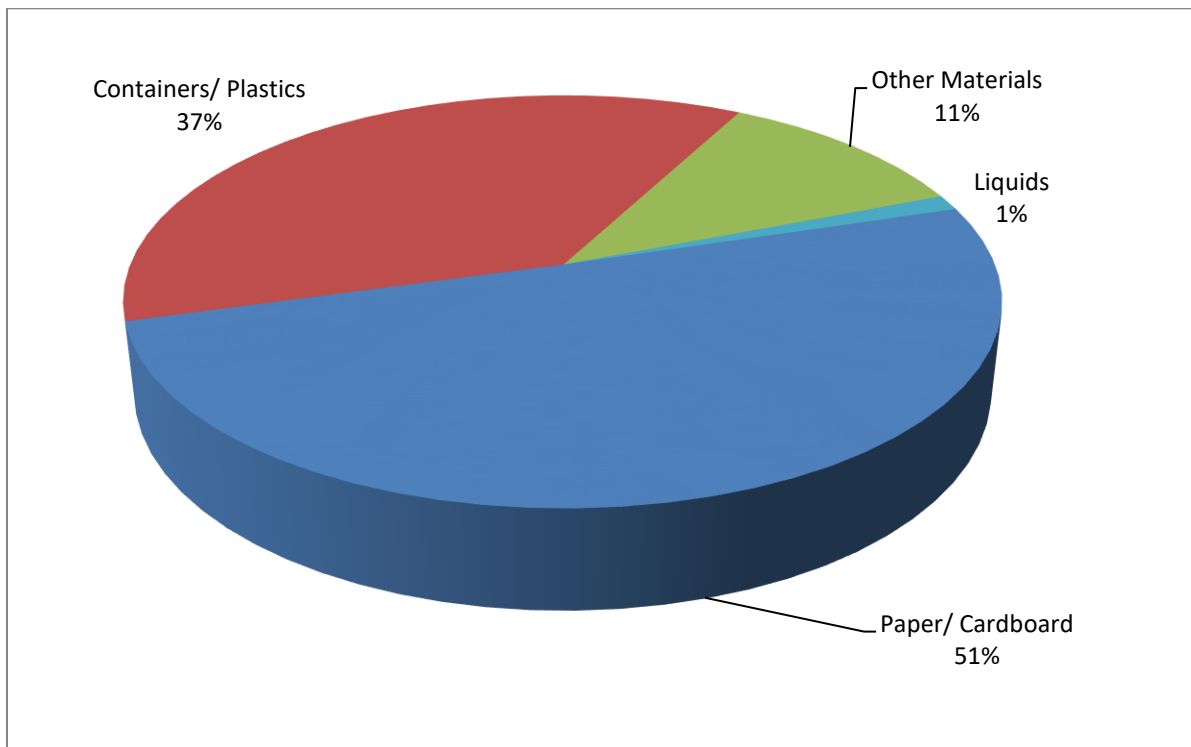
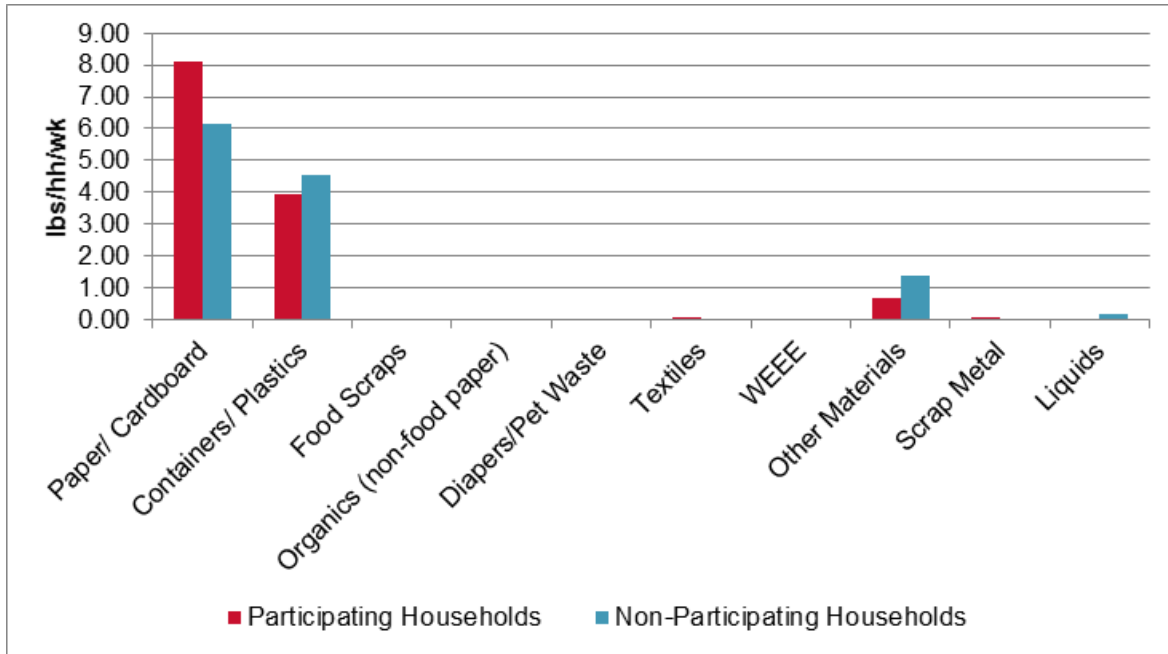


Figure 7-6 presents a comparison of the quantities of materials found in the recycling stream. In general, participating households set out greater quantities of paper/cardboard but less containers/plastics however they also generated less containers/plastics. Non-participating households place greater quantities of other materials out for recycling that are not accepted in the City’s recycling program such as durable plastic products, carpeting, wood, ceramics etc.

**Figure 7-6: Quantities of Materials Set Out for Recycling**



Although the waste audit did not include detailed material sort categories and did not delineate if materials included within the broader material categories were accepted in the City’s recycling program, a very rough estimate of capture rates can be made. Capture rates refer to the quantity of recyclable materials captured in the recycling bin as a percentage of total materials placed in the recycling bin and in the trash.

Assuming that all materials considered in the categories of paper/cardboard or containers/plastics are accepted in the City’s recycling program, the following capture rates were estimated:

- Participating households had a capture rate of 87% for paper/cardboard and 84% for containers/plastics.
- Non-participating households had a capture rate of 73% for paper/cardboard and 75% for containers/plastics.

It appears that there may be opportunities to educate non-participating households about placement of recyclable materials in the correct container.

## 8 Next Steps

The next steps in the project are to develop the baseline collection model using the information in this document and to develop alternative collection efficiency models for recycling, trash and curbside organics. The information contained in this document will also be used to estimate the baseline for Greenhouse Gas (GHG) emissions associated with the current system.