SCS ENGINEERS






Waste Characterization Study

Presented to:

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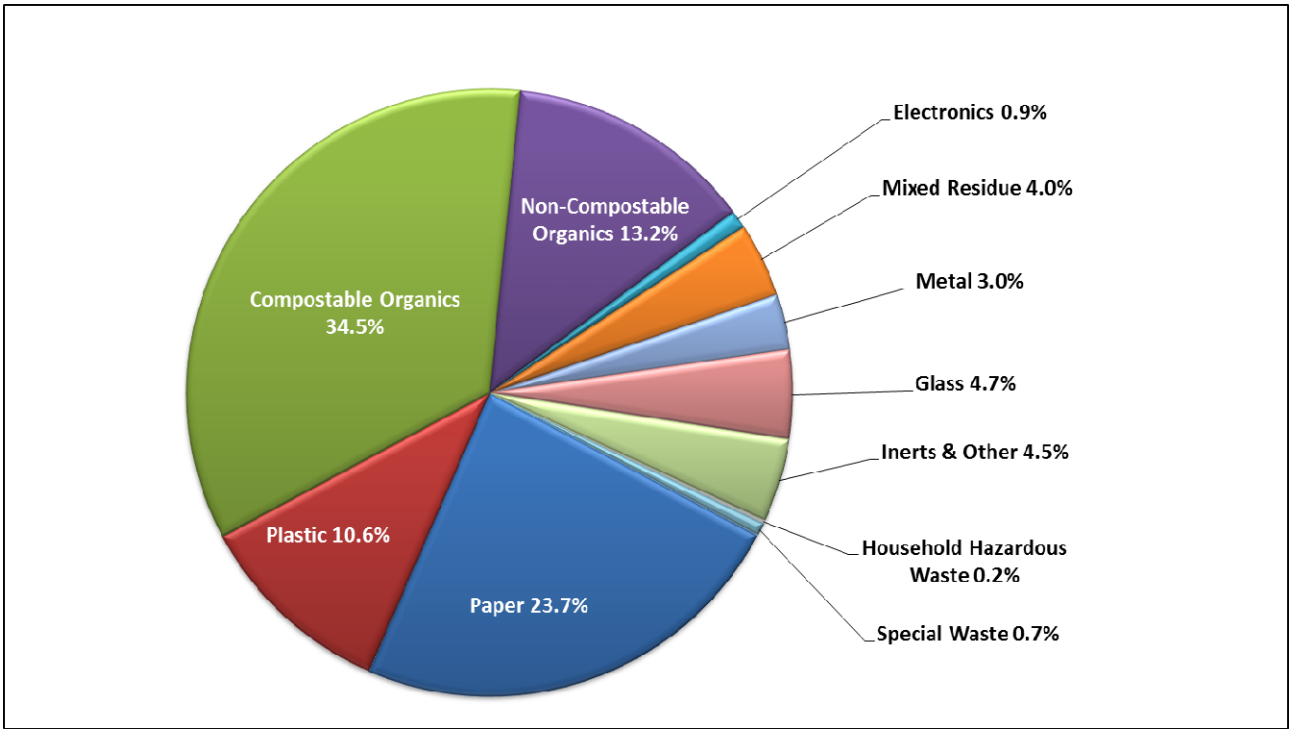
1 EXECUTIVE SUMMARY

SCS Engineers conducted a waste characterization study for the City of Sausalito in the Spring of 2013. The purpose of the project was to help the City collect baseline data for measuring the effectiveness of existing waste minimization strategies and diversion programs. Waste sampling was conducted at the Golden Bear Transfer Station during the week of March 18-22, 2013. The waste sampling program consisted of hand-sorting 41 waste samples from five waste generating sectors into 62 different waste categories. The five waste generators included: 1) Single-family residential; 2) Multi-family residential; 3) Commercial businesses; 4) Mollie Stones grocery store; and, 5) Public trash receptacles. In addition, five samples of waste contained in roll-off dumpsters were visually characterized into 19 different waste categories. Waste contained in these dumpsters originated from the City's yacht harbors and various home remodeling projects.

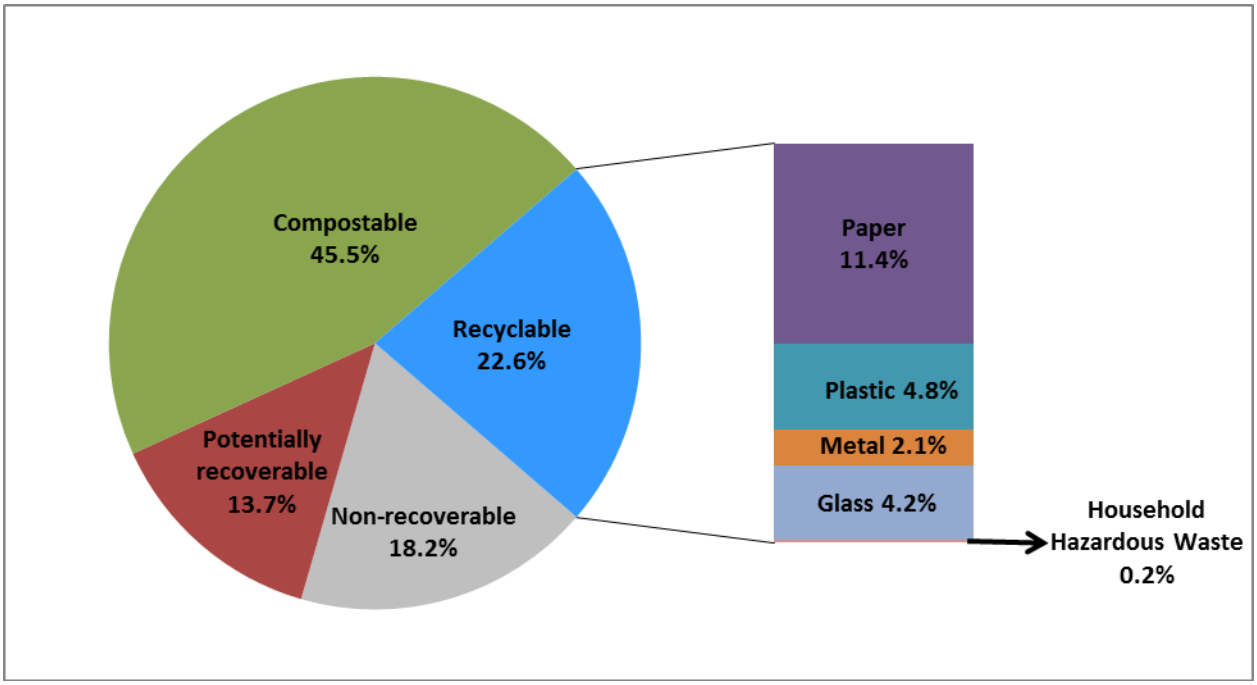
Using the data collected during the field study, SCS calculated the waste composition for each of the waste generating sectors. The data from each of the waste generating sectors was weighted based on the overall waste tonnages generated in the city so that an overall waste composition could be calculated. The overall waste composition is presented in **Exhibit 1**.

Exhibit 1. Overall Sausalito Waste Composition



In addition, SCS calculated the portion of the waste stream that is recoverable using the City's existing waste division programs. This analysis is included in **Exhibit 2**. Overall, about 68 percent of the City's waste stream is recoverable using existing composting and recycling programs.

Exhibit 2. Recoverability Analysis for Overall Sausalito Waste Stream



2 INTRODUCTION

The City of Sausalito, California (City) contracted with SCS Engineers (SCS) to conduct a waste characterization analysis of waste generated within the City. The primary objectives of the study are as follows:

- Collect baseline data for measuring the effectiveness of waste minimization strategies.
- Measure the effectiveness of existing diversion programs.
- Determine what materials continue to be landfilled.
- Measure the amount of recoverable materials not diverted from the waste stream.
- Make specific recommendations to assist the City of Sausalito to recover these materials with the intent of meeting the Marin County Hazardous and Solid Waste Management JPA's 2025 Zero Waste Goal.

This waste characterization study is based on the results of field sampling which was conducted during the week of March 18-22, 2013 at Republic Services' Golden Bear Transfer Station in Richmond, CA. The data generated by the field activities may be used by the City to develop additional programs to facilitate greater recycling activities and increase the effectiveness of current recycling programs. This report presents the data collected during the March 2013 field activities.

SCS would like to thank Mr. Greg Christie with Bay Cities Refuse Service for his assistance in helping identify waste generating sectors, determining the sampling plan, and for coordinating the delivery of the waste materials to the Golden Bear Transfer Station. His attentiveness and assistance facilitated the smooth execution of the field activities in March 2013. In addition, SCS would like to thank the City of Sausalito Sustainability Commission for their interest and dedication to improving waste management activities in the City as they seek to implement their zero waste plan. This study conducted by SCS Engineers was funded by a Marin County Hazardous and Solid Waste Management Joint Powers Authority Zero Waste Grant.

Appendix A presents the Health and Safety Plan that was in effect during field activities.

3 WASTE GENERATING SECTORS

SCS recognized there are different waste generating sectors represented in the City and worked with staff to identify these sectors. SCS believes evaluating the waste streams from these different generating sectors can provide valuable information that can be used to tailor new programs and refine existing programs specific to residential, commercial and/or multi-family properties. For purposes of this study, the following six generating sectors were identified:

RESIDENTAL:

- Single-Family Residential – this sector consists of waste generated by single-family homes throughout the City, and includes properties with up to four units.

- Multi-Family Residential – this sector consists of waste generated at apartment buildings and other multi-tenant properties located in the City, and includes properties with five or more units.

COMMERCIAL:

- Commercial Businesses – this sector consists of waste generated at commercial establishments located in the City, including restaurants, office buildings, retail stores/shops, etc.

- Mollie Stones Grocery Store – this sector is a large grocery store complex located in Sausalito. Due to the significant amount of waste generated by this facility and the relative ease with which the waste is segregated (collected in a compactor), waste materials from Mollie Stones was sampled separately.

- Public Trash Receptacles – this sector consists of waste disposed in the trash receptacles located in public areas of the City.

- Roll-Off Dumpster – this sector consists of waste collected in temporary and permanent roll-off dumpsters located in the City. Roll-off dumpsters are large waste containers typically used at construction sites and at yacht harbors. These dumpsters are transported on trucks and completely "roll-off" the back end.

Roll-off dumpster

4 NUMBER OF SAMPLES

SCS developed a sampling plan based on the information received from the City's solid waste hauler Bay Cities Refuse regarding the tons of materials received at the transfer station from the commercial and residential waste streams. SCS estimated that about 60 percent of the waste materials received from Sausalito was commercial (businesses, Mollie Stones grocery store, public trash receptacles) while the remaining waste was residential (single-family and multi-family). Based on the number of trucks Bay Cities Refuse sent to the transfer station each day of the sorting process, the following sampling schedule was developed:

Residential:

- 12 samples from single-family residential homes (29%).
- 4 samples from multi-family properties (10%).

Commercial:

- 20 samples from commercial businesses (49%).
- 3 samples from Mollie Stones grocery store (7%).
- 2 samples from public trash receptacles (5%).

In addition, five roll-off dumpsters were visually characterized. SCS understands that most construction and demolition waste materials generated in Sausalito are transferred to a separate facility for sorting and recycling.

5 WASTE SAMPLING

The waste characterization activities were conducted during the week of March 18-22, 2013, during the facility operating hours. Waste sampling activities were performed by manually sorting 41 total samples of municipal solid waste (MSW) into 62 distinct waste categories. Waste samples from the single-family residential, multi-family residential, commercial businesses, Mollie Stones grocery store, and public trash receptacles generating sectors were manually sorted. In addition, visual characterization of waste from five roll-off dumpsters was conducted, which included estimating the percent waste composition of 19 waste categories for each sample.

5.1 MANUAL SORTING

In order to obtain representative samples, SCS staff worked closely with Mr. Greg Christie of Bay Cities Refuse to select vehicles containing waste materials from the five designated generating sectors. Selected vehicles were directed to dump their waste loads near the sorting area. A representative of SCS manually gathered samples from a random portion of each target load (approximately two hundred and fifty pounds) for classification (sorting). Waste samples were placed in trash cans and weighed until about 250 pounds was obtained for sorting. Two important procedural factors were considered:

Bay Cities Refuse truck dropping off a waste sample

- The target vehicle selected for sampling contained MSW that was representative of the type of waste typically generated in that sector; and,
- The process of acquiring the waste sample did not, in itself, alter the apparent MSW composition.

The sorting and weighing of the samples was conducted by a sorting crew and an SCS Crew Supervisor. The basic procedures and objectives for sorting (as described below) were identical for each sample, each day. Sorting was performed as follows:

1. The sort crew transferred the refuse sample onto the sorting table until it was full and began sort activities. Large or heavy waste items, such as bags of yard waste, were torn open, examined and then placed directly into the appropriate waste container for subsequent weighing.
2. Plastic bags of refuse were opened and sort crew members manually segregated each item of waste, and placed it in the appropriate waste container. These steps were repeated until the entire sample was sorted. The list of waste types and component

categories is included in **Exhibit 3.** For the Organics waste type, the component categories are separated into compostable organics and non-compostable organics, to differentiate between waste that could potentially be used in a composting operation, and those that would not typically be composted.

3. At the completion of sorting, the waste containers were moved to the scale where SCS Crew Supervisor weighed each category and recorded the net weight on the Sort Data Sheet. Measurements were made to the nearest 0.2 pounds.

4. After the weight of each waste category had been recorded, the waste materials were dumped back onto the transfer station floor for further processing by the facility.

5. This four-step process was repeated until all of the samples taken at the site were characterized. Waste samples were maintained in as-disposed condition or as close to this as possible until the actual sorting began. Proper site layout and close supervision of sampling was maintained to avoid the need to repeatedly handle sampled wastes.

Members of the sorting crew were equipped with high visibility vests, safety gloves and glasses. The Health and Safety Plan is presented in **Appendix A**.

Waste sorting activities at the Golden Bear Transfer Station

Consistent with good practice in such sampling programs, efforts were made to minimize sampling bias or other impacts on the integrity of the data collected. To this end, field sampling was coordinated to avoid holidays and other out of ordinary events.

Exhibit 3. Description of Waste Categories for Manual Sorting

Major Waste Types	Waste Component Categories	Examples
Paper	Uncoated Corrugated Cardboard	Packing/shipping boxes
	Paper Bags	Shopping bags, department store bags
	Newspaper	Daily, weekly newspapers, including inserts
	White Ledger Paper	High grade white copy paper or letterhead
	Other Office Paper	Junk mail, notebook paper, envelops/folders
	Magazines and catalogs	Shiny/glossy magazines, catalogs, brochures
	Phone Books and Directories	Phone books, real-estate listings
	Other Miscellaneous paper	Tissues, paper towels, paperboard, cups/plates
	Remainder/Composite Paper	Waxed cardboard, aseptic containers
Plastic	PETE #1 Containers	Soda, water bottles, food containers
	HDPE #2 Containers	Milk cartons, detergent bottles, motor oil bottles
	Miscellaneous Plastic Containers	Containers with #3-7, usually for food products
	Film Plastic – Grocery and Other Merchandise Bags	Plastic one time use shopping bags
	Film Plastic – Trash Bags	Plastic garbage bags used to contain trash
	Film Plastic – Non-Bag Commercial and Industrial Packaging Film	Bubble wrap, shrink wrap, mattress bags
	Film Products	Agricultural films, drop cloths,
	Other Film	Chip bags, packaging materials
	Durable Plastic Items	Plastic toys, sporting goods, patio furniture
	Remainder/Composite Plastic	Straws, packing peanuts, foam plates/cups
Compostable Organics	Food Waste	Meat scraps, fruit/vegetable peels
	Leaves and Grass	Leaves, grass clippings, plants, seaweed
	Prunings and Trimmings	Woody plant material < 4 inches in diameter
	Branches and Stumps	Woody plant material > 4 inches in diameter
Non Compostable Organics	Manures	Farming/animal wastes and bedding
	Textiles	Fabric trimmings, draperies, clothes
	Carpet	Natural/synthetic fibers with backing material
	Remainder/Composite Organic	Leather, hair, cigarettes butts, diapers, cat litter
Electronics	Brown Goods	Microwaves, stereos, VCRs, DVD players
	Computer-Related Electronics	Laptops, keyboards, printers, modems
	Other Small Consumer Electronics	Cell phones, cameras, computer games, PDAs
	Video Display Devices	Computer monitors

Exhibit 3. Description of Waste Categories for Manual Sorting (continued)

Major Waste Types	Waste Component Categories	Examples
Metal	Tin/steel Cans	Food/beverage containers, paint cans
	Major Appliances	Washing machines, stoves, refrigerators
	Used Oil Filters	Metal oil filters for vehicles and other engines
	Other Ferrous	Iron, steel, stainless steel items
	Aluminum Cans	Aluminum food and beverage cans
	Other Non-Ferrous	Copper, brass, bronze, lead, or zinc items
	Remainder/Composite Metal	Hair dryers, insulated wire, toasters
Glass	Clear Bottles/Containers	Food containers, beverage bottles
	Brown Bottles/Containers	Soda, beer and wine bottles whole or broken
	Green Bottles/Containers	Beverage bottles
	Other Colored Bottles/Containers	Bottles/containers that are not clear/green/brown
	Flat Glass	Window panes, flat automotive glass
	Remainder/Composite Glass	Pyrex, mirrors, light bulbs, tableware
Inerts & Other	Concrete	Building foundations, concrete paving/blocks
	Asphalt Paving	Black/brown tar-like material used for paving
	Asphalt Roofing	Asphalt shingles, roofing tar, tar paper
	Lumber	Lumber, plywood, particle board, pallets
	Gypsum Board	Gypsum sandwiched between paper layers
	Rock/Soil/Fines	Rocks, soil, sand, stones
	Remainder/Composite Inerts & Others	Bricks, tiles, toilets, sinks
Household Hazardous Waste	Paint	Latex and oil-based paint, fine art paint
	Vehicle and Equipment Fluids	Antifreeze, brake fluid
	Used Oil	Hydraulic oil, gear oil, transmission oil
	Batteries	Car, flashlight, small appliance, watch batteries
	Remainder/Composite HHW	Pesticides, caustic cleaners, fluorescent bulbs
Special Waste	Ash	Ash from fireplaces and barbeques
	Treated Medical Wastes	Medical wastes, syringes, blood contaminated
	Bulky Items	Furniture, mattresses, box springs
	Tires	Automobile, bike and equipment tires
	Remainder/Composite Special Waste	Auto fluff, pipe insulation
Mixed Residue	Mixed Residue	Miscellaneous materials that don't fit any designated categories

5.2 VISUAL CHARACTERIZATION

As part of this study, SCS visually characterized (this material was not hand sorted) waste materials generated in Sausalito from roll-off dumpsters. A total of five roll-off dumpsters were visually characterized. Once a truck arrived at the transfer station with the roll-off dumpster, SCS would conduct a brief interview with the driver in order to estimate the weight of the sample and determine where the roll-off dumpster was located while being filled. Of the five roll-off dumpsters that were visually characterized, three were from various yacht harbors, and two were located at home remodeling projects.

Once the waste materials were dumped on the transfer station floor, SCS carefully studied the waste materials by walking around the pile and when possible moved materials to ensure all material types in the waste stream could be identified. Estimates were made as to the percentage make-up of waste materials for designated material categories. These categories included the following:

- Pallets/lumber
- Concrete/brick/rock
- Flat glass
- Shingles
- Bagged waste
- Furniture
- Dirt
- Carpet/carpet padding
- Mattresses
- Old corrugated cardboard (OCC)
- Other wood
- Sheet rock
- Scrap metal
- Yard waste
- Other bulky materials
- Asphalt paving
- Asphalt roofing
- Appliances
- Electronics

6 DATA ANALYSIS

The waste samples were acquired to estimate the material composition of various waste streams generated in Sausalito (i.e., the proportion of each waste component present in six different waste generators: single-family residential; multi-family residential; commercial; public trash receptacles, Mollie Stones; roll-off boxes). Data presented include mean percentages by weight, standard deviations, and statistical confidence intervals (95 percent confidence interval) for each group of data. Derivation of this data is as follows:

$$Mean\left(\overline{X}\right) = \sum_{i=1}^{n} x_i * \frac{1}{n};$$

$$Standard\ Deviation\ (s) = \sqrt{\frac{\left(n\sum x^2\right) - \left(\sum x\right)^2}{n(n-1)}}\ ;\ \text{and}$$

$$Upper/Lower\ Confidence\ Interval\ Limits = \overline{X} \pm \left[1.96 * \left(\frac{s}{\sqrt{n}}\right)\right]$$

Where: n = number of samples; and
x = sample percentage.

The mean is the arithmetic average of all data and the standard deviation is a measure of the dispersion in the data. Together, the mean and standard deviation determine the confidence interval. A 95 percent confidence interval contains the true proportion of a waste component with 95 percent confidence (i.e., similar studies will produce the same results 95 percent of the time).

7 SUMMARY OF RESULTS

7.1 MSW COMPOSITION

7.1.1 Overall Sausalito

Exhibit 4 summarizes the overall waste composition for Sausalito. The composition includes confidence intervals based on the number of samples and variability between the samples. In order to determine the overall waste composition, the percent composition of each waste material for each generating sector was weighted to the overall composition of the samples selected. Based on the samples collected, the three largest subcomponents, by weight, include food waste (32.5 percent), other miscellaneous paper (11 percent), and remainder/composite organic (9.1 percent).

Using tonnage data provided by Bay Cities Refuse Service, SCS extrapolated the tonnage data collected during the field sort activities in March 2013and calculated the annual weight of specific materials disposed of from Sausalito. Along with the percent composition, the pie chart in **Exhibit 4** provides a estimate of the tonnage of materials Sausalito disposes annually.

Exhibit 4: Overall Sausalito Waste Composition

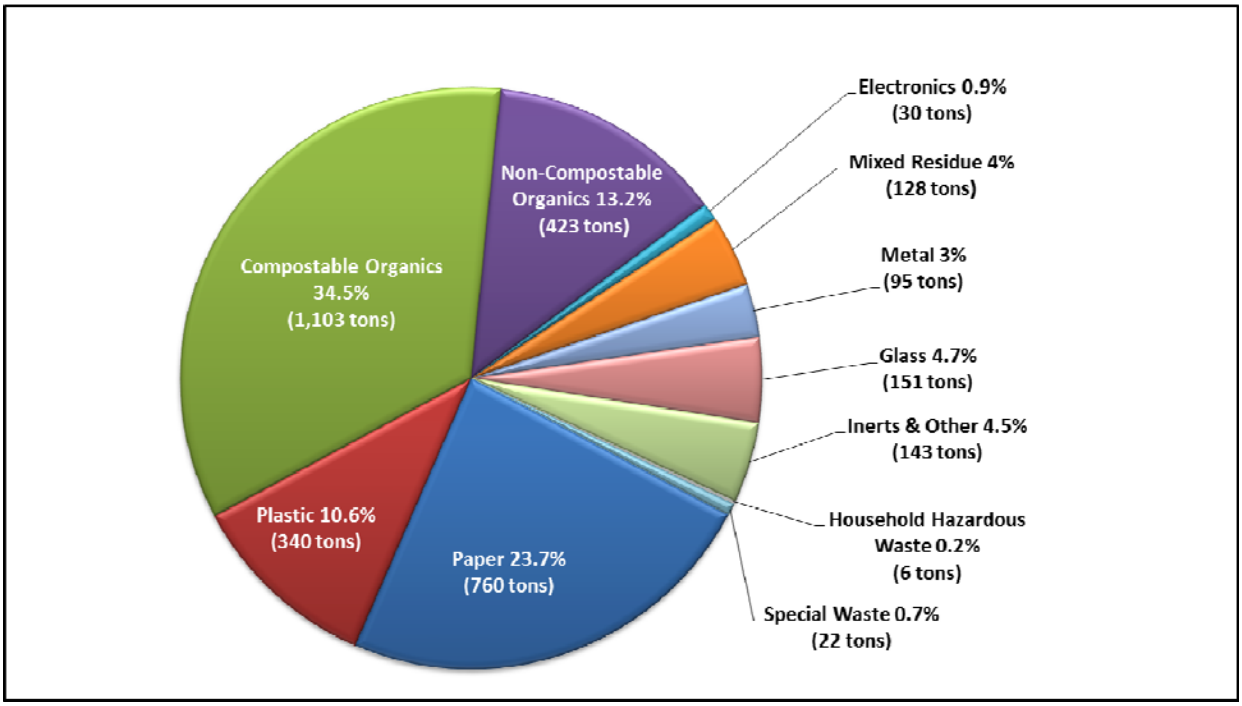


Exhibit 4. Overall Sausalito Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	Upper
PAPER				
1 Uncoated corrugated cardboard	2.5	2.8	1.7	3.4
2 Paper bags	0.9	0.8	0.7	1.2
3 Newspaper	1.5	1.7	1.0	2.0
4 White ledger paper	0.6	1.0	0.3	0.9
5 Other office paper	3.2	3.8	2.0	4.3
6 Magazines and catalogs	2.4	2.1	1.8	3.1
7 Phone books and directories	0.3	0.8	0.0	0.5
8 Other misc. paper	11.0	3.6	9.9	12.1
9 Remainder/composite paper	1.4	1.2	1.0	1.7
Total Paper	**23.7**			
PLASTIC				
10 PETE (#1) containers	0.7	0.5	0.6	0.9
11 HDPE (#2) containers	0.8	0.6	0.6	1.0
12 Misc. plastic containers	2.1	0.6	1.9	2.3
13 Film plastic-grocery/merchandise bag	0.3	0.3	0.1	0.4
14 Film plastic-trash bags	1.7	0.6	1.5	1.9
15 Film-comm. and industrial packaging	0.2	0.5	0.0	0.3
16 Film products	0.4	0.7	0.2	0.6
17 Other film	2.4	1.2	2.0	2.8
18 Durable plastic items	1.2	1.5	0.8	1.7
19 Remainder/composite plastic	0.9	2.4	0.1	1.6
Total Plastic	**10.6**			
ORGANIC				
20 Food Waste	32.5	9.9	29.5	35.6
21 Leaves and grass	1.4	1.9	0.8	2.0
22 Prunnings and trimmings	0.2	1.1	<0.1%	0.5
23 Branches and stumps	<0.1%	<0.1%	<0.1%	<0.1%
24 Manures	0.3	2.0	<0.1%	0.9
25 Textiles	3.7	3.3	2.7	4.8
26 Carpet	0.4	1.2	0.0	0.7
27 Remainder/composite organic	9.1	5.6	7.4	10.8
Total Organics	**47.7**			
ELECTRONICS				
28 Brown goods	0.3	2.0	<0.1%	0.9
29 Computer-related electronics	0.2	0.6	0.1	0.4
30 Other small consumer electronics	0.4	0.5	0.2	0.6
31 Video display devices	<0.1%	<0.1%	<0.1%	<0.1%
Total Electronics	**0.9**			
METAL				
33 Tin/steel cans	1.0	0.7	0.8	1.2
34 Major appliances	<0.1%	<0.1%	<0.1%	<0.1%
35 Used oil filters	0.0	0.1	<0.1%	0.0
36 Other ferrous	0.5	0.8	0.2	0.7
37 Aluminum cans	0.2	0.2	0.1	0.2
38 Other non-ferrous	0.4	0.6	0.2	0.6
39 Remainder/composite metal	0.9	1.1	0.5	1.2
Metal	**3.0**			

Exhibit 4: Overall Sausalito Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
GLASS				
40 Clear bottles/containers	1.8	1.2	1.5	2.2
41 Brown bottles/containers	0.9	1.2	0.6	1.3
42 Green bottles/containers	1.4	1.2	1.0	1.8
43 Other colored bottles/containers	0.0	0.1	<0.1%	0.1
44 Flat glass	0.0	0.1	<0.1%	0.1
45 Remainder/composite glass	0.5	1.3	0.1	0.9
Total Glass	**4.7**			
INERTS & OTHERS				
46 Concrete	0.1	0.5	<0.1%	0.3
47 Asphalt paving	<0.1%	<0.1%	<0.1%	<0.1%
48 Asphalt roofing	<0.1%	<0.1%	<0.1%	<0.1%
49 Lumber	3.2	5.5	1.5	4.8
50 Gypsum board	0.2	1.0	<0.1%	0.5
51 Rock/soil/fines	0.6	2.0	<0.1%	1.2
52 Remainder/composite inerts & other	0.4	1.9	<0.1%	0.9
Total Inerts & Other	**4.5**			
HOUSEHOLD HAZARDOUS WASTE				
53 Paint	0.0	0.0	<0.1%	0.0
54 Vehicle and equipment fluids	0.0	0.2	<0.1%	0.1
55 Used oil	<0.1%	<0.1%	<0.1%	<0.1%
56 Batteries	0.1	0.3	0.0	0.2
57 Remainder/composite HHW	0.0	0.1	<0.1%	0.0
Total Household Hazardous Waste	**0.2**			
SPECIAL WASTE				
58 Ash	0.1	0.2	<0.1%	0.1
59 Treated medical wastes	0.1	0.4	<0.1%	0.2
60 Bulky items	0.5	2.2	<0.1%	1.2
61 Tires	<0.1%	<0.1%	<0.1%	<0.1%
62 Remainder/composite special waste	<0.1%	<0.1%	<0.1%	<0.1%
Total Special Waste	**0.7**			
MIXED RESIDUE				
32 Mixed residue	4.0	2.2	3.3	4.7
Total Mixed Residue	**4.0**			
TOTALS	**100.0**			

Note: Composition based on 41 samples

SCS compared the top 10 most prevalent material types observed in Sausalito's waste stream to that observed in the California 2008 Statewide Waste Characterization Study, Bay Area Region,[1] and the Marin County Zero Waste Feasibility Study[2]. Comparisons of the results are summarized in **Exhibit 5**.

Exhibit 5. Comparison of the 10 Most Prevalent Disposed Material Types: Sausalito, Bay Area Region, Marin County JPA

	Overall Sausalito		Bay Area Region		Marin County JPA	
	Material	% Composition	Material	% Composition	Material	% Composition
1	Food	32.5	Food	20.9	Food	23
2	Other Miscellaneous Paper	11.0	Lumber	11.1	Paper	23
3	Remainder/Composite Organic	9.1	Remainder/ Composite Paper	5.9	Other Organics	10
4	Mixed Residue	4.0	Remainder/ Composite Organic	5.5	Plastic	4
5	Textiles	3.7	Leaves and Grass	4.7	Yard Debris	8
6	Other Office Paper	3.2	Remainder/ Composite Inerts	4.3	Mixed C&D	8
7	Lumber	3.2	Remainder/ Composite Plastic	3.5	Inerts	8
8	Uncoated Corrugated Cardboard	2.5	Other Miscellaneous Paper	3.3	Other Inorganics	4
9	Magazines and Catalogs	2.4	Asphalt Roofing	3.1	Metal	4
10	Other Film	2.4	Textiles	3.0	Glass	2
	Total	**74.0**	**Total**	**65.3**		**94.0**

[1] California 2008 Statewide Waste Characterization Study, Bay Area Region, California Integrated Waste Management Board, August 2009.
[2] Final Draft Zero Waste Feasibility Study, Marin County Hazardous and Solid Waste Management JPA, December 2009.

7.1.2 Single-Family Residential

A compilation of the 12 single-family residential waste samples collected and sorted in March 2013 is presented in **Exhibit 6**. The composition includes confidence intervals based on the number of samples and variability between the samples. Based on the samples collected, the three largest subcomponents, by weight, of the single-family residential waste stream include food waste (30.7 percent), remainder/composite organic (13.6 percent), and other miscellaneous paper (10.6 percent).

Exhibit 6. Single-Family Residential Waste Composition

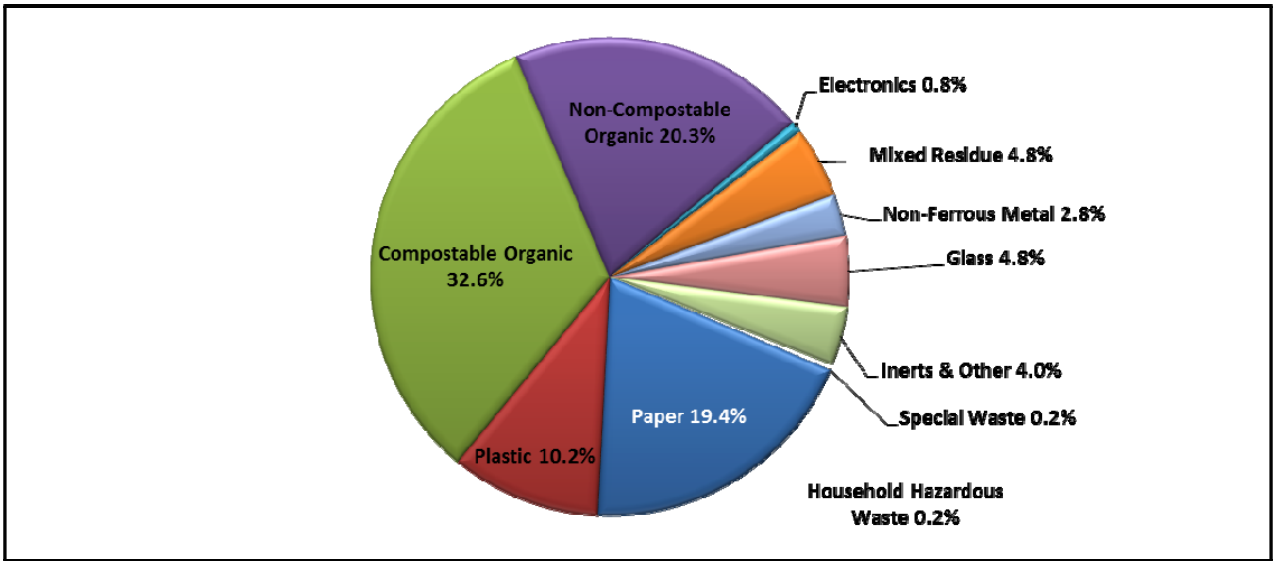


Exhibit 6. Single-Family Residential Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Uncoated corrugated cardboard	0.6	0.5	0.3	0.9
2 Paper bags	1.5	1.2	0.8	2.1
3 Newspaper	0.6	0.8	0.2	1.0
4 White ledger paper	0.6	1.1	0.0	1.3
5 Other office paper	1.9	1.2	1.2	2.6
6 Magazines and catalogs	2.3	2.0	1.2	3.5
7 Phone books and directories	0.3	0.6	<0.1%	0.6
8 Other misc. paper	10.6	2.1	9.4	11.8
9 Remainder/composite paper	1.1	0.4	0.8	1.3
Total Paper	**19.4**			
PLASTIC				
10 PETE (#1) containers	0.6	0.4	0.4	0.8
11 HDPE (#2) containers	0.4	0.2	0.2	0.5
12 Misc. plastic containers	2.2	0.5	1.9	2.4
13 Film plastic-grocery/merchandise bag	0.3	0.3	0.1	0.5
14 Film plastic-trash bags	1.2	0.3	1.1	1.4
15 Film-comm. and industrial packaging	0.0	0.1	<0.1%	0.1
16 Film products	0.4	0.5	0.1	0.7
17 Other film	2.6	0.6	2.2	2.9
18 Durable plastic items	0.9	0.8	0.4	1.4
19 Remainder/composite plastic	1.6	4.1	<0.1%	3.9
Total Plastic	**10.2**			
ORGANIC				
20 Food Waste	30.7	4.5	28.2	33.2
21 Leaves and grass	1.8	2.0	0.7	3.0
22 Prunnings and trimmings	0.1	0.2	<0.1%	0.2
23 Branches and stumps	<0.1%	<0.1%	<0.1%	<0.1%
24 Manures	<0.1%	0.0	<0.1%	0.0
25 Textiles	5.5	3.8	3.4	7.7
26 Carpet	1.1	2.2	<0.1%	2.4
27 Remainder/composite organic	13.6	7.0	9.6	17.6
Total Organics	**52.9**			
ELECTRONICS				
28 Brown goods	<0.1%	<0.1%	<0.1%	<0.1%
29 Computer-related electronics	0.0	0.1	<0.1%	0.1
30 Other small consumer electronics	0.7	0.7	0.3	1.1
31 Video display devices	<0.1%	<0.1%	<0.1%	<0.1%
Total Electronics	**0.8**			
METAL				
33 Tin/steel cans	0.8	0.3	0.6	1.0
34 Major appliances	<0.1%	<0.1%	<0.1%	<0.1%
35 Used oil filters	0.0	0.0	<0.1%	0.0
36 Other ferrous	0.7	1.0	0.1	1.2
37 Aluminum cans	0.1	0.2	<0.1%	0.2
38 Other non-ferrous	0.6	1.0	0.1	1.2
39 Remainder/composite metal	0.6	0.4	0.4	0.8
Metal	**2.8**			

Exhibit 6. Single-Family Residential Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
GLASS				
40 Clear bottles/containers	1.6	1.1	0.9	2.2
41 Brown bottles/containers	0.9	1.5	0.0	1.8
42 Green bottles/containers	1.2	1.0	0.7	1.8
43 Other colored bottles/containers	0.1	0.2	<0.1%	0.1
44 Flat glass	0.1	0.2	<0.1%	0.2
45 Remainder/composite glass	0.9	1.6	0.0	1.8
Total Glass	**4.8**			
INERTS & OTHERS				
46 Concrete	0.2	0.6	<0.1%	0.5
47 Asphalt paving	<0.1%	<0.1%	<0.1%	<0.1%
48 Asphalt roofing	<0.1%	<0.1%	<0.1%	<0.1%
49 Lumber	1.8	3.1	0.1	3.6
50 Gypsum board	<0.1%	<0.1%	<0.1%	<0.1%
51 Rock/soil/fines	1.9	3.8	<0.1%	4.0
52 Remainder/composite inerts & other	0.1	0.2	<0.1%	0.2
Total Inerts & Other	**4.0**			
HOUSEHOLD HAZARDOUS WASTE				
53 Paint	<0.1%	<0.1%	<0.1%	<0.1%
54 Vehicle and equipment fluids	0.0	0.2	<0.1%	0.1
55 Used oil	<0.1%	<0.1%	<0.1%	<0.1%
56 Batteries	0.1	0.2	0.0	0.3
57 Remainder/composite HHW	0.0	0.1	<0.1%	0.1
Total Household Hazardous Waste	**0.2**			
SPECIAL WASTE				
58 Ash	<0.1%	<0.1%	<0.1%	<0.1%
59 Treated medical wastes	0.0	0.1	<0.1%	0.1
60 Bulky items	0.1	0.5	<0.1%	0.4
61 Tires	<0.1%	<0.1%	<0.1%	<0.1%
62 Remainder/composite special waste	<0.1%	<0.1%	<0.1%	<0.1%
Total Special Waste	**0.2**			
MIXED RESIDUE				
32 Mixed residue	4.8	0.8	4.4	5.3
Total Mixed Residue	**4.8**			
TOTALS	**100.0**			

Note: Composition based on 12 samples

7.1.3 Multi-Family Residential

Exhibit 7 presents a compilation of the four multi-family residential waste samples collected and sorted in March 2013. The composition includes confidence intervals based on the number of samples and variability between the samples. Based on the samples collected, the three largest subcomponents, by weight, of the multi-family residential waste stream include food waste (37.9 percent), remainder/composite organic (11.0 percent), and other miscellaneous paper (10.5 percent).

Exhibit 7. Multi-Family Residential Waste Composition

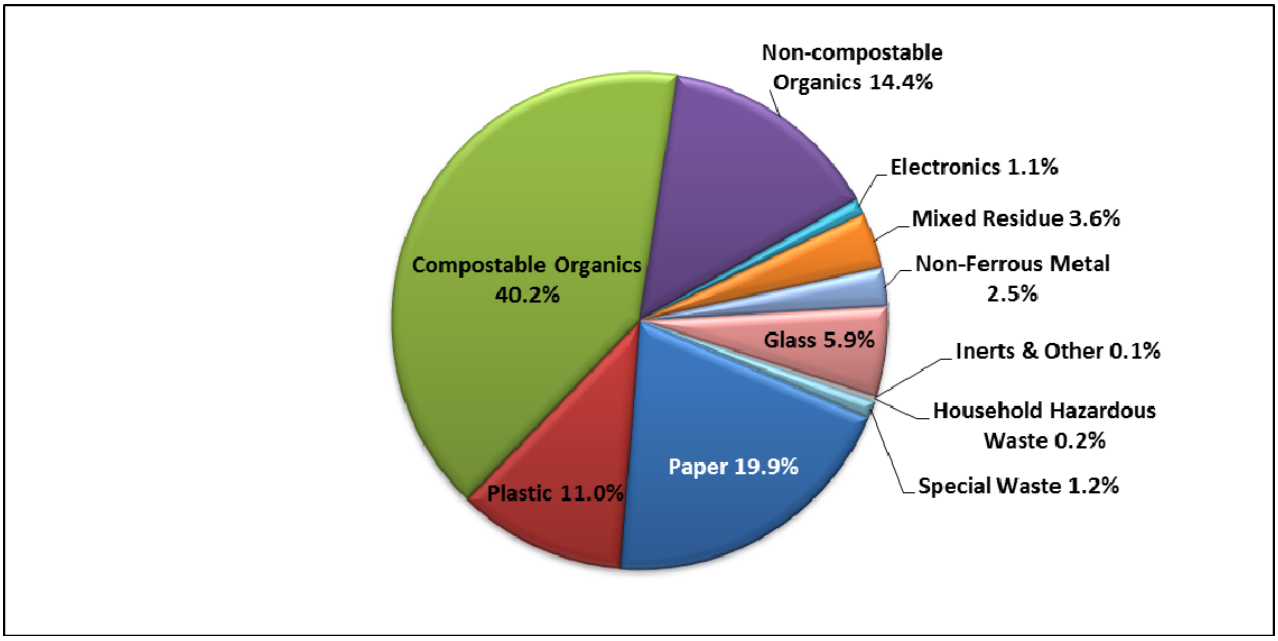


Exhibit 7. Multi-Family Residential Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Uncoated corrugated cardboard	0.2	0.2	<0.1%	0.4
2 Paper bags	1.0	0.3	0.7	1.2
3 Newspaper	0.5	0.6	<0.1%	1.1
4 White ledger paper	0.4	0.6	<0.1%	1.0
5 Other office paper	3.3	1.8	1.6	5.1
6 Magazines and catalogs	2.9	1.7	1.3	4.5
7 Phone books and directories	<0.1%	<0.1%	<0.1%	<0.1%
8 Other misc. paper	10.5	2.4	8.1	12.8
9 Remainder/composite paper	1.0	0.5	0.5	1.5
Total Paper	**19.9**			
PLASTIC				
10 PETE (#1) containers	0.7	0.5	0.3	1.2
11 HDPE (#2) containers	0.6	0.3	0.3	0.9
12 Misc. plastic containers	2.9	0.8	2.1	3.6
13 Film plastic-grocery/merchandise bag	0.4	0.4	<0.1%	0.8
14 Film plastic-trash bags	1.2	0.4	0.8	1.6
15 Film-comm. and industrial packaging	0.1	0.1	<0.1%	0.2
16 Film products	0.3	0.4	<0.1%	0.7
17 Other film	3.0	1.3	1.7	4.2
18 Durable plastic items	1.6	0.9	0.7	2.5
19 Remainder/composite plastic	0.3	0.3	0.0	0.6
Total Plastic	**11.0**			
ORGANIC				
20 Food Waste	37.9	6.1	31.9	43.9
21 Leaves and grass	2.3	1.6	0.8	3.9
22 Prunnings and trimmings	<0.1%	<0.1%	<0.1%	<0.1%
23 Branches and stumps	<0.1%	<0.1%	<0.1%	<0.1%
24 Manures	<0.1%	<0.1%	<0.1%	<0.1%
25 Textiles	3.0	1.3	1.7	4.3
26 Carpet	0.4	0.8	<0.1%	1.2
27 Remainder/composite organic	11.0	4.4	6.7	15.3
Total Organics	**54.6**			
ELECTRONICS				
28 Brown goods	<0.1%	<0.1%	<0.1%	<0.1%
29 Computer-related electronics	0.8	1.4	<0.1%	2.2
30 Other small consumer electronics	0.3	0.5	<0.1%	0.8
31 Video display devices	<0.1%	<0.1%	<0.1%	<0.1%
Total Electronics	**1.1**			
METAL				
33 Tin/steel cans	0.9	0.6	0.3	1.5
34 Major appliances	<0.1%	<0.1%	<0.1%	<0.1%
35 Used oil filters	<0.1%	<0.1%	<0.1%	<0.1%
36 Other ferrous	0.5	0.8	<0.1%	1.3
37 Aluminum cans	0.2	0.3	<0.1%	0.6
38 Other non-ferrous	0.4	0.3	0.1	0.7
39 Remainder/composite metal	0.5	0.6	<0.1%	1.1
Metal	**2.5**			

Exhibit 7. Multi-Family Residential Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
GLASS				
40 Clear bottles/containers	1.3	1.3	0.1	2.6
41 Brown bottles/containers	0.9	1.4	<0.1%	2.3
42 Green bottles/containers	1.8	0.7	1.1	2.5
43 Other colored bottles/containers	0.1	0.1	<0.1%	0.2
44 Flat glass	<0.1%	<0.1%	<0.1%	<0.1%
45 Remainder/composite glass	1.8	3.1	<0.1%	4.8
Total Glass	**5.9**			
INERTS & OTHERS				
46 Concrete	<0.1%	<0.1%	<0.1%	<0.1%
47 Asphalt paving	<0.1%	<0.1%	<0.1%	<0.1%
48 Asphalt roofing	<0.1%	<0.1%	<0.1%	<0.1%
49 Lumber	<0.1%	<0.1%	<0.1%	<0.1%
50 Gypsum board	<0.1%	<0.1%	<0.1%	<0.1%
51 Rock/soil/fines	0.1	0.1	<0.1%	0.2
52 Remainder/composite inerts & other	<0.1%	<0.1%	<0.1%	<0.1%
Total Inerts & Other	**0.1**			
HOUSEHOLD HAZARDOUS WASTE				
53 Paint	<0.1%	<0.1%	<0.1%	<0.1%
54 Vehicle and equipment fluids	<0.1%	<0.1%	<0.1%	<0.1%
55 Used oil	<0.1%	<0.1%	<0.1%	<0.1%
56 Batteries	0.2	0.4	<0.1%	0.6
57 Remainder/composite HHW	<0.1%	<0.1%	<0.1%	<0.1%
Total Household Hazardous Waste	**0.2**			
SPECIAL WASTE				
58 Ash	0.6	0.7	<0.1%	1.3
59 Treated medical wastes	0.6	1.0	<0.1%	1.5
60 Bulky items	<0.1%	<0.1%	<0.1%	<0.1%
61 Tires	<0.1%	<0.1%	<0.1%	<0.1%
62 Remainder/composite special waste	<0.1%	<0.1%	<0.1%	<0.1%
Total Special Waste	**1.2**			
MIXED RESIDUE				
32 Mixed residue	3.6	1.1	2.6	4.7
Total Mixed Residue	**3.6**			
TOTALS	**100.0**			

Note: Composition based on 4 samples

7.1.4 Commercial Businesses

Exhibit 8 presents a compilation of the 20 commercial waste samples collected and sorted in March 2013. The composition includes confidence intervals based on the number of samples and variability between the samples. Based on the samples collected, the three largest subcomponents, by weight, of the commercial businesses waste stream include food waste (29.3 percent), other miscellaneous paper (11.7 percent), and remainder/composite organic (6.9 percent).

Exhibit 8. Commercial Waste Composition

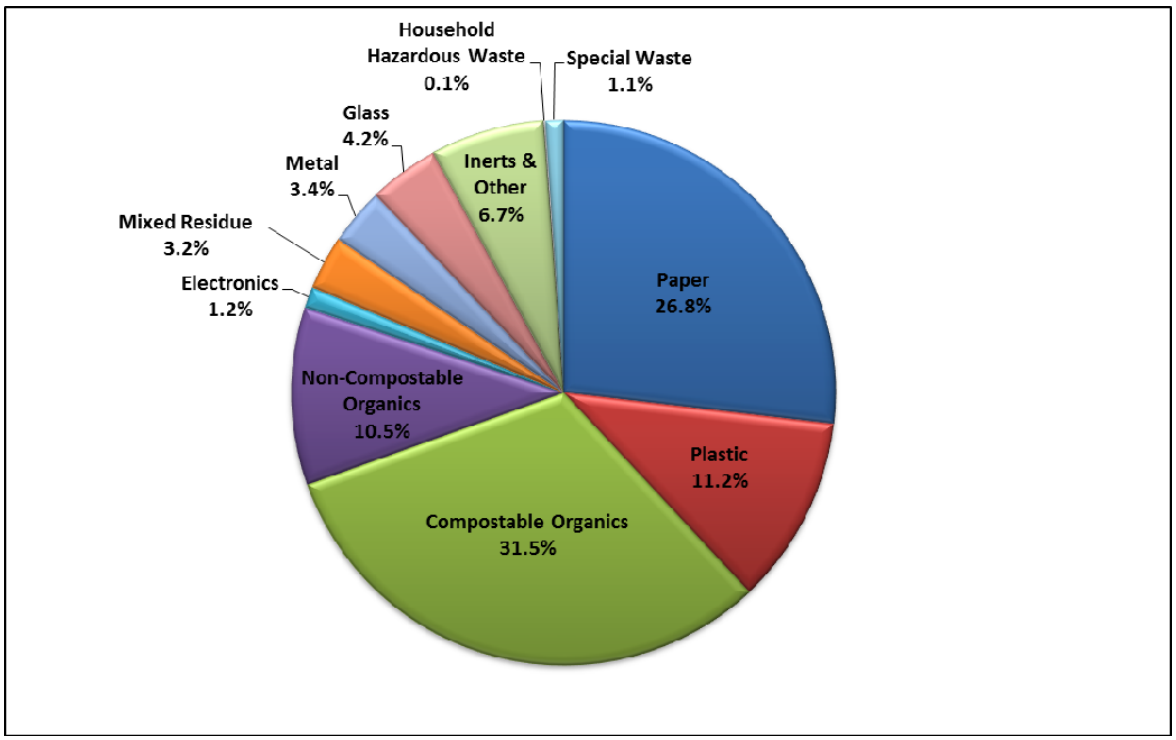


Exhibit 8. Commercial Businesses Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Uncoated corrugated cardboard	3.4	3.7	1.7	5.0
2 Paper bags	0.7	0.5	0.4	0.9
3 Newspaper	1.9	2.2	0.9	2.9
4 White ledger paper	0.6	1.1	0.2	1.1
5 Other office paper	4.5	5.2	2.2	6.8
6 Magazines and catalogs	2.6	2.4	1.5	3.7
7 Phone books and directories	0.2	0.5	<0.1%	0.4
8 Other misc. paper	11.7	4.4	9.8	13.6
9 Remainder/composite paper	1.2	0.7	0.9	1.5
Total Paper	**26.8**			
PLASTIC				
10 PETE (#1) containers	0.7	0.6	0.5	1.0
11 HDPE (#2) containers	1.0	0.8	0.7	1.3
12 Misc. plastic containers	1.8	0.7	1.5	2.2
13 Film plastic-grocery/merchandise bag	0.2	0.2	0.1	0.2
14 Film plastic-trash bags	2.3	0.8	2.0	2.7
15 Film-comm. and industrial packaging	0.3	0.7	<0.1%	0.5
16 Film products	0.5	0.8	0.1	0.8
17 Other film	2.4	1.5	1.8	3.1
18 Durable plastic items	1.6	1.9	0.8	2.5
19 Remainder/composite plastic	0.4	0.3	0.3	0.6
Total Plastic	**11.2**			
ORGANIC				
20 Food Waste	29.3	12.8	23.7	34.9
21 Leaves and grass	1.2	2.0	0.3	2.1
22 Prunnings and trimmings	0.4	1.6	<0.1%	1.0
23 Branches and stumps	<0.1%	<0.1%	<0.1%	<0.1%
24 Manures	0.6	2.8	<0.1%	1.9
25 Textiles	3.6	3.7	2.0	5.2
26 Carpet	<0.1%	<0.1%	<0.1%	<0.1%
27 Remainder/composite organic	6.9	4.0	5.2	8.7
Total Organics	**42.0**			
ELECTRONICS				
28 Brown goods	0.6	2.9	<0.1%	1.9
29 Computer-related electronics	0.3	0.5	0.1	0.5
30 Other small consumer electronics	0.3	0.5	0.1	0.5
31 Video display devices	<0.1%	<0.1%	<0.1%	<0.1%
Total Electronics	**1.2**			
METAL				
33 Tin/steel cans	1.2	0.8	0.8	1.5
34 Major appliances	<0.1%	<0.1%	<0.1%	<0.1%
35 Used oil filters	<0.1%	<0.1%	<0.1%	<0.1%
36 Other ferrous	0.4	0.7	0.1	0.7
37 Aluminum cans	0.2	0.1	0.1	0.2
38 Other non-ferrous	0.4	0.5	0.2	0.6
39 Remainder/composite metal	1.3	1.4	0.6	1.9
Total Metal	**3.4**			

Exhibit 8. Commercial Businesses Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
GLASS				
40 Clear bottles/containers	1.9	1.3	1.3	2.5
41 Brown bottles/containers	1.0	1.0	0.6	1.5
42 Green bottles/containers	1.1	1.2	0.6	1.6
43 Other colored bottles/containers	0.0	0.1	<0.1%	0.0
44 Flat glass	0.0	0.0	<0.1%	0.0
45 Remainder/composite glass	0.1	0.3	0.0	0.3
Total Glass	**4.2**			
INERTS & OTHERS				
46 Concrete	0.1	0.4	<0.1%	0.3
47 Asphalt paving	<0.1%	<0.1%	<0.1%	<0.1%
48 Asphalt roofing	<0.1%	<0.1%	<0.1%	<0.1%
49 Lumber	5.4	7.4	2.1	8.6
50 Gypsum board	0.5	1.4	<0.1%	1.1
51 Rock/soil/fines	0.1	0.3	<0.1%	0.2
52 Remainder/composite inerts & other	0.7	2.7	<0.1%	1.9
Total Inerts & Other	**6.7**			
HOUSEHOLD HAZARDOUS WASTE				
53 Paint	0.0	0.0	<0.1%	0.0
54 Vehicle and equipment fluids	<0.1%	<0.1%	<0.1%	<0.1%
55 Used oil	<0.1%	<0.1%	<0.1%	<0.1%
56 Batteries	0.1	0.3	<0.1%	0.2
57 Remainder/composite HHW	<0.1%	<0.1%	<0.1%	<0.1%
Total Household Hazardous Waste	**0.1**			
SPECIAL WASTE				
58 Ash	<0.1%	<0.1%	<0.1%	<0.1%
59 Treated medical wastes	0.1	0.2	<0.1%	0.2
60 Bulky items	1.0	3.1	<0.1%	2.3
61 Tires	<0.1%	<0.1%	<0.1%	<0.1%
62 Remainder/composite special waste	<0.1%	<0.1%	<0.1%	<0.1%
Total Special Waste	**1.1**			
MIXED RESIDUE				
32 Mixed residue	3.2	1.5	2.5	3.8
Total Mixed Residue	**3.2**			
TOTALS	**100.0**			

Note: Composition based on 20 samples

7.1.5 Mollie Stones Grocery Store

Exhibit 9 presents a compilation of the three waste samples collected from the Mollie Stones grocery store. The composition includes confidence intervals based on the number of samples and variability between the samples. Based on the samples collected, the three largest subcomponents, by weight, of the Mollie Stones grocery store waste stream include food waste (65.4 percent), uncoated corrugated cardboard (8.7 percent), and other miscellaneous paper (6.8 percent).

Exhibit 9. Mollie Stones Grocery Store Waste Composition

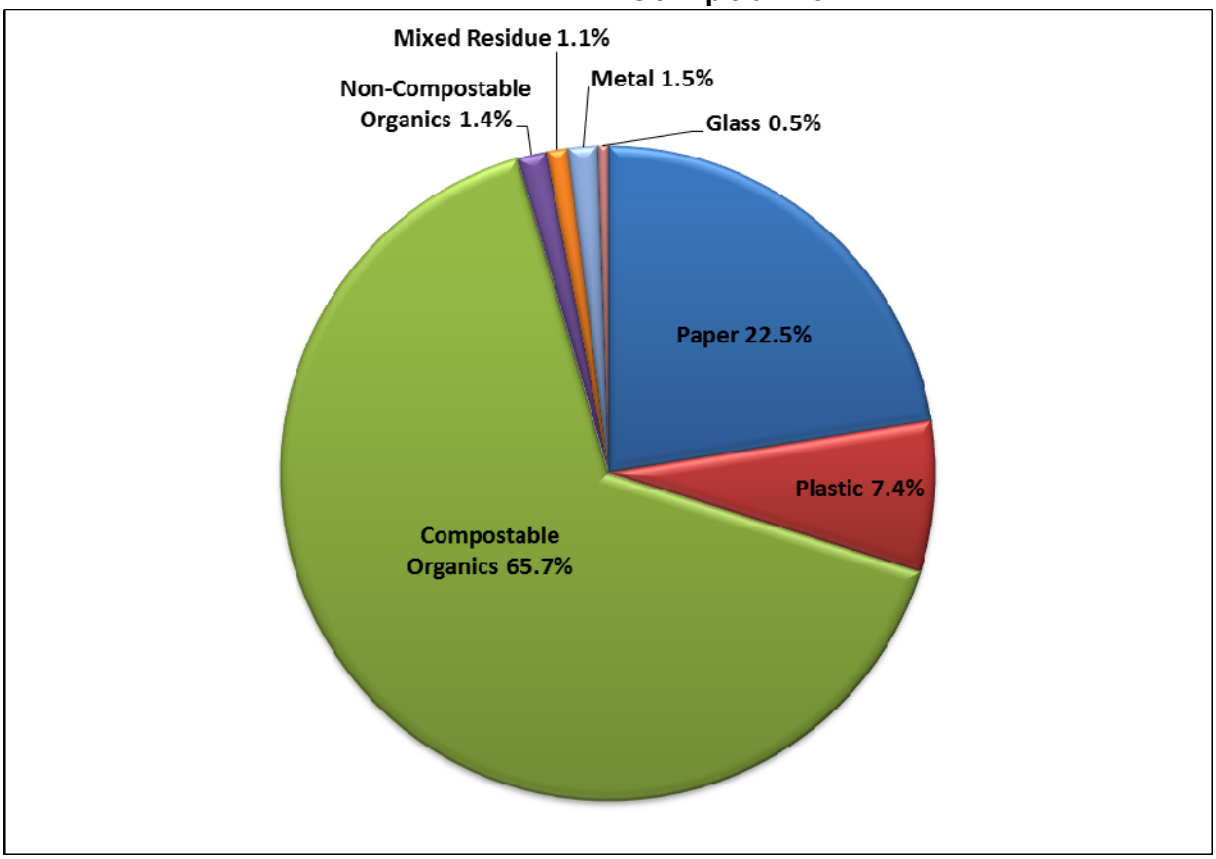


Exhibit 9. Mollie Stones Grocery Store Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Uncoated corrugated cardboard	8.7	3.4	4.8	12.5
2 Paper bags	0.5	0.2	0.2	0.7
3 Newspaper	1.1	1.8	<0.1%	3.1
4 White ledger paper	0.0	0.0	<0.1%	0.1
5 Other office paper	0.1	0.2	<0.1%	0.4
6 Magazines and catalogs	0.3	0.4	<0.1%	0.7
7 Phone books and directories	1.3	2.2	<0.1%	3.8
8 Other misc. paper	6.8	2.7	3.7	9.9
9 Remainder/composite paper	3.7	4.0	<0.1%	8.2
Total Paper	**22.5**			
PLASTIC				
10 PETE (#1) containers	0.2	0.1	0.1	0.2
11 HDPE (#2) containers	1.3	1.3	<0.1%	2.7
12 Misc. plastic containers	2.2	0.7	1.3	3.0
13 Film plastic-grocery/merchandise bag	0.1	0.1	<0.1%	0.2
14 Film plastic-trash bags	0.9	0.5	0.3	1.5
15 Film-comm. and industrial packaging	0.3	0.5	<0.1%	0.9
16 Film products	0.1	0.1	<0.1%	0.3
17 Other film	2.0	1.2	0.7	3.3
18 Durable plastic items	0.1	0.1	<0.1%	0.2
19 Remainder/composite plastic	0.3	0.2	<0.1%	0.5
Total Plastic	**7.4**			
ORGANIC				
20 Food Waste	65.4	10.8	53.2	77.6
21 Leaves and grass	0.3	0.5	<0.1%	0.8
22 Prunnings and trimmings	<0.1%	<0.1%	<0.1%	<0.1%
23 Branches and stumps	<0.1%	<0.1%	<0.1%	<0.1%
24 Manures	<0.1%	<0.1%	<0.1%	<0.1%
25 Textiles	<0.1%	<0.1%	<0.1%	<0.1%
26 Carpet	<0.1%	<0.1%	<0.1%	<0.1%
27 Remainder/composite organic	1.4	1.3	<0.1%	2.9
Total Organics	**67.1**			
ELECTRONICS				
28 Brown goods	<0.1%	<0.1%	<0.1%	<0.1%
29 Computer-related electronics	<0.1%	<0.1%	<0.1%	<0.1%
30 Other small consumer electronics	0.0	0.0	<0.1%	0.1
31 Video display devices	<0.1%	<0.1%	<0.1%	<0.1%
Total Electronics	**0.0**			
METAL				
33 Tin/steel cans	0.6	0.5	0.0	1.1
34 Major appliances	<0.1%	<0.1%	<0.1%	<0.1%
35 Used oil filters	<0.1%	<0.1%	<0.1%	<0.1%
36 Other ferrous	0.5	0.9	<0.1%	1.6
37 Aluminum cans	<0.1%	<0.1%	<0.1%	<0.1%
38 Other non-ferrous	0.1	0.1	<0.1%	0.3
39 Remainder/composite metal	0.2	0.3	<0.1%	0.6
Metal	**1.5**			

Exhibit 9. Mollie Stones Grocery Store Waste Composition (continued)

Material Components	Mean Composition %	Standard Deviation %	95% Confidence Limits Lower	95% Confidence Limits Upper
GLASS				
40 Clear bottles/containers	0.4	0.4	<0.1%	0.9
41 Brown bottles/containers	<0.1%	<0.1%	<0.1%	<0.1%
42 Green bottles/containers	<0.1%	<0.1%	<0.1%	<0.1%
43 Other colored bottles/containers	<0.1%	<0.1%	<0.1%	<0.1%
44 Flat glass	<0.1%	<0.1%	<0.1%	<0.1%
45 Remainder/composite glass	0.1	0.1	<0.1%	0.3
Total Glass	**0.5**			
INERTS & OTHERS				
46 Concrete	<0.1%	<0.1%	<0.1%	<0.1%
47 Asphalt paving	<0.1%	<0.1%	<0.1%	<0.1%
48 Asphalt roofing	<0.1%	<0.1%	<0.1%	<0.1%
49 Lumber	<0.1%	<0.1%	<0.1%	<0.1%
50 Gypsum board	<0.1%	<0.1%	<0.1%	<0.1%
51 Rock/soil/fines	<0.1%	<0.1%	<0.1%	<0.1%
52 Remainder/composite inerts & other	<0.1%	<0.1%	<0.1%	<0.1%
Total Inerts & Other	**0.0**			
HOUSEHOLD HAZARDOUS WASTE				
53 Paint	<0.1%	<0.1%	<0.1%	<0.1%
54 Vehicle and equipment fluids	<0.1%	<0.1%	<0.1%	<0.1%
55 Used oil	<0.1%	<0.1%	<0.1%	<0.1%
56 Batteries	<0.1%	<0.1%	<0.1%	<0.1%
57 Remainder/composite HHW	<0.1%	<0.1%	<0.1%	<0.1%
Total Household Hazardous Waste	**0.0**			
SPECIAL WASTE				
58 Ash	<0.1%	<0.1%	<0.1%	<0.1%
59 Treated medical wastes	<0.1%	<0.1%	<0.1%	<0.1%
60 Bulky items	<0.1%	<0.1%	<0.1%	<0.1%
61 Tires	<0.1%	<0.1%	<0.1%	<0.1%
62 Remainder/composite special waste	<0.1%	<0.1%	<0.1%	<0.1%
Total Special Waste	**<0.1%**			
MIXED RESIDUE				
32 Mixed residue	1.1	1.0	<0.1%	2.2
Total Mixed Residue	**1.1**			
TOTALS	**100.0**			

Note: Composition based on 3 samples

7.1.6 Public Trash Receptacles

A compilation of the two public trash receptacle waste samples collected and sorted in March 2013 is contained in **Exhibit 10**. The composition includes confidence intervals based on the number of samples and variability between the samples. Based on the samples collected, the three largest subcomponents, by weight, of the public trash receptacles waste stream considered trash (not including mixed residue, which is the small miscellaneous material that could not be easily categorized) includes food waste (18.1 percent), other miscellaneous paper (14.2 percent), and remainder/composite organic (11.1 percent).

Waste sampled from public trash receptacles

Exhibit 10. Public Trash Receptacles Waste Composition

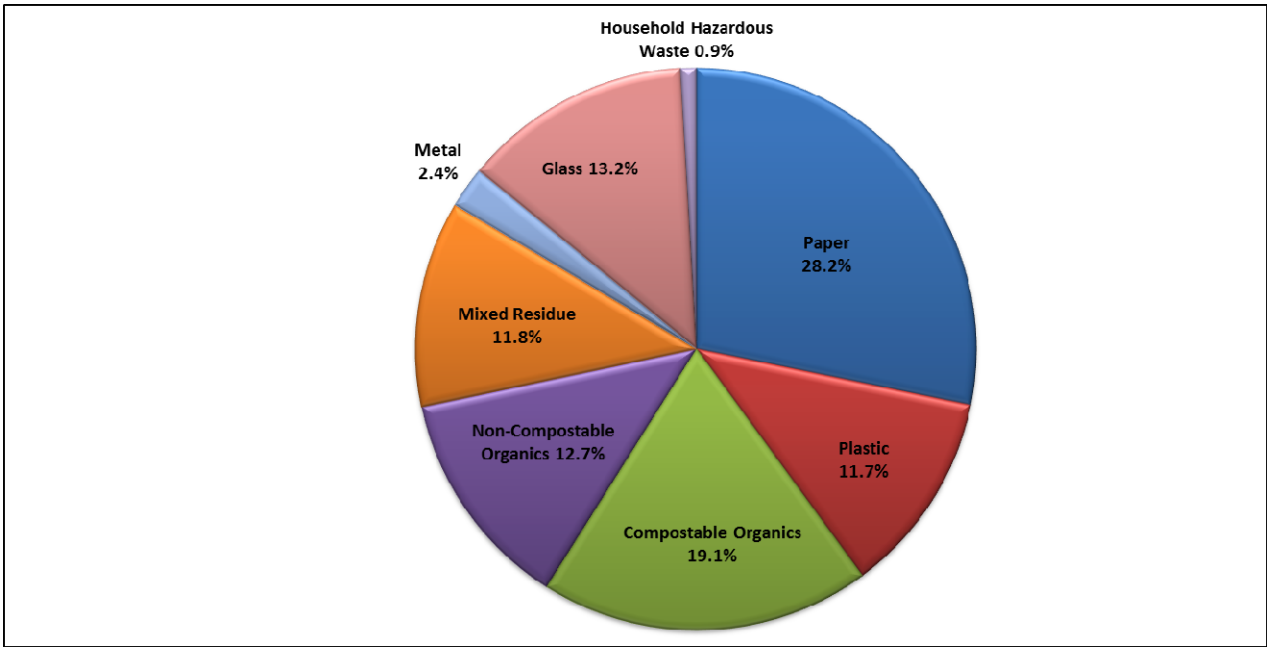


Exhibit 10. Public Trash Receptacles Waste Composition (continued)

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
PAPER				
1 Uncoated corrugated cardboard	1.5	1.5	<0.1%	3.5
2 Paper bags	0.8	1.1	<0.1%	2.3
3 Newspaper	5.7	1.1	4.1	7.2
4 White ledger paper	0.3	0.4	<0.1%	0.9
5 Other office paper	1.1	0.4	0.6	1.7
6 Magazines and catalogs	2.8	0.8	1.7	3.9
7 Phone books and directories	<0.1%	<0.1%	<0.1%	<0.1%
8 Other misc. paper	14.2	4.2	8.4	20.0
9 Remainder/composite paper	1.8	1.5	<0.1%	3.9
Total Paper	**28.2**			
PLASTIC				
10 PETE (#1) containers	2.4	0.3	1.9	2.8
11 HDPE (#2) containers	0.3	0.1	0.2	0.4
12 Misc. plastic containers	2.8	0.2	2.5	3.1
13 Film plastic-grocery/merchandise bag	1.0	1.2	<0.1%	2.6
14 Film plastic-trash bags	0.2	0.1	<0.1%	0.4
15 Film-comm. and industrial packaging	<0.1%	<0.1%	<0.1%	<0.1%
16 Film products	0.4	0.5	<0.1%	1.1
17 Other film	0.7	0.7	<0.1%	1.7
18 Durable plastic items	0.6	0.8	<0.1%	1.7
19 Remainder/composite plastic	3.3	4.0	<0.1%	8.8
Total Plastic	**11.7**			
ORGANIC				
20 Food Waste	18.1	4.6	11.8	24.5
21 Leaves and grass	0.9	0.4	0.3	1.5
22 Prunnings and trimmings	<0.1%	<0.1%	<0.1%	<0.1%
23 Branches and stumps	<0.1%	<0.1%	<0.1%	<0.1%
24 Manures	<0.1%	<0.1%	<0.1%	<0.1%
25 Textiles	1.6	0.5	0.9	2.2
26 Carpet	<0.1%	<0.1%	<0.1%	<0.1%
27 Remainder/composite organic	11.1	12.4	<0.1%	28.3
Total Organics	**31.8**			
ELECTRONICS				
28 Brown goods	<0.1%	<0.1%	<0.1%	<0.1%
29 Computer-related electronics	<0.1%	<0.1%	<0.1%	<0.1%
30 Other small consumer electronics	<0.1%	<0.1%	<0.1%	<0.1%
31 Video display devices	<0.1%	<0.1%	<0.1%	<0.1%
Total Electronics	**0.0**			
METAL				
33 Tin/steel cans	0.8	0.1	0.6	0.9
34 Major appliances	<0.1%	<0.1%	<0.1%	<0.1%
35 Used oil filters	0.2	0.3	<0.1%	0.7
36 Other ferrous	0.1	0.1	<0.1%	0.3
37 Aluminum cans	0.8	0.2	0.6	1.1
38 Other non-ferrous	0.1	0.1	0.0	0.2
39 Remainder/composite metal	0.3	0.4	<0.1%	0.8
Metal	**2.4**			

Exhibit 10. Public Trash Receptacles Waste Composition (continued)

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
GLASS				
40 Clear bottles/containers	5.6	0.5	5.0	6.3
41 Brown bottles/containers	1.4	0.5	0.7	2.1
42 Green bottles/containers	6.2	3.1	1.9	10.4
43 Other colored bottles/containers	<0.1%	<0.1%	<0.1%	<0.1%
44 Flat glass	<0.1%	<0.1%	<0.1%	<0.1%
45 Remainder/composite glass	<0.1%	<0.1%	<0.1%	<0.1%
Total Glass	**13.2**			
INERTS & OTHERS				
46 Concrete	<0.1%	<0.1%	<0.1%	<0.1%
47 Asphalt paving	<0.1%	<0.1%	<0.1%	<0.1%
48 Asphalt roofing	<0.1%	<0.1%	<0.1%	<0.1%
49 Lumber	<0.1%	<0.1%	<0.1%	<0.1%
50 Gypsum board	<0.1%	<0.1%	<0.1%	<0.1%
51 Rock/soil/fines	<0.1%	<0.1%	<0.1%	<0.1%
52 Remainder/composite inerts & other	<0.1%	<0.1%	<0.1%	<0.1%
Total Inerts & Other	**0.0**			
HOUSEHOLD HAZARDOUS WASTE				
53 Paint	<0.1%	<0.1%	<0.1%	<0.1%
54 Vehicle and equipment fluids	0.7	1.0	<0.1%	2.0
55 Used oil	<0.1%	<0.1%	<0.1%	<0.1%
56 Batteries	0.2	0.3	<0.1%	0.7
57 Remainder/composite HHW	<0.1%	<0.1%	<0.1%	<0.1%
Total Household Hazardous Waste	**0.9**			
SPECIAL WASTE				
58 Ash	<0.1%	<0.1%	<0.1%	<0.1%
59 Treated medical wastes	<0.1%	<0.1%	<0.1%	<0.1%
60 Bulky items	<0.1%	<0.1%	<0.1%	<0.1%
61 Tires	<0.1%	<0.1%	<0.1%	<0.1%
62 Remainder/composite special waste	<0.1%	<0.1%	<0.1%	<0.1%
Total Special Waste	**<0.1%**			
MIXED RESIDUE				
32 Mixed residue	11.8	8.4	0.3	23.4
Total Mixed Residue	**11.8**			
TOTALS	**100.0**			

Note: Composition based on 2 samples

7.2 ROLL-OFF DUMPSTER WASTE

As part of this study, SCS visually characterized waste materials generated in Sausalito from roll-off dumpsters. A total of five roll-off dumpsters were visually characterized. **Exhibit 11** presents the composition of the two roll-off dumpsters located at home remodeling projects. **Exhibit 12** presents the composition of the three roll-off dumpsters located at various yacht harbors around the City. Based on the estimated weight of each load, SCS calculated the mean composition and confidence intervals based on the number of samples and variability between the samples.

Exhibit 11. Home Remodel Roll-off Dumpster Waste Composition

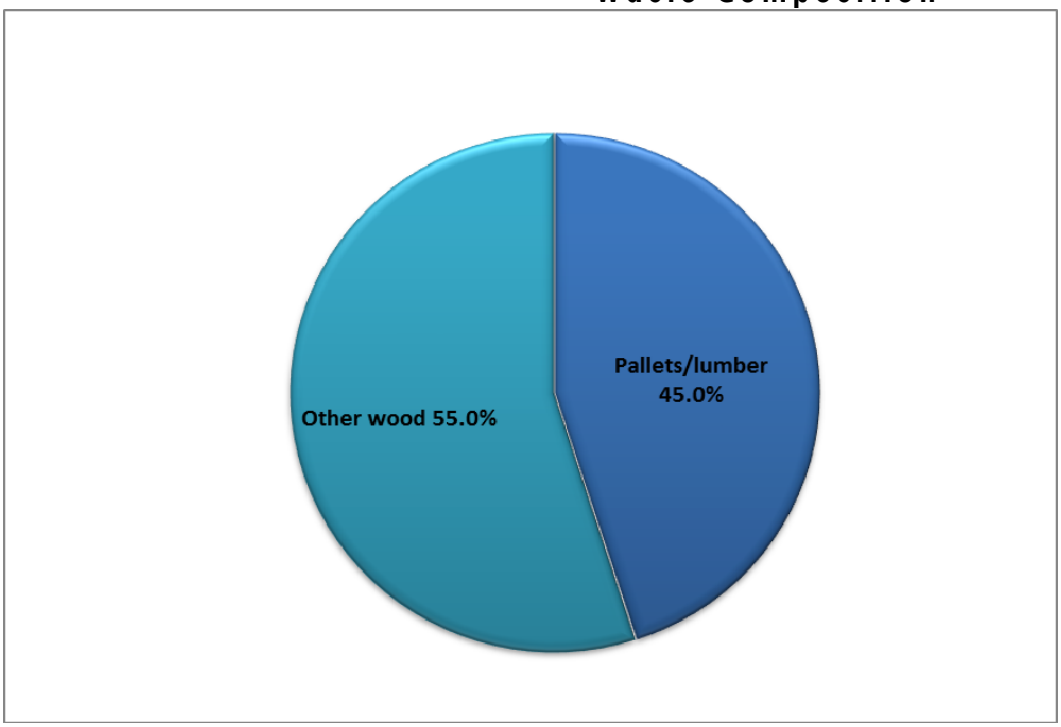
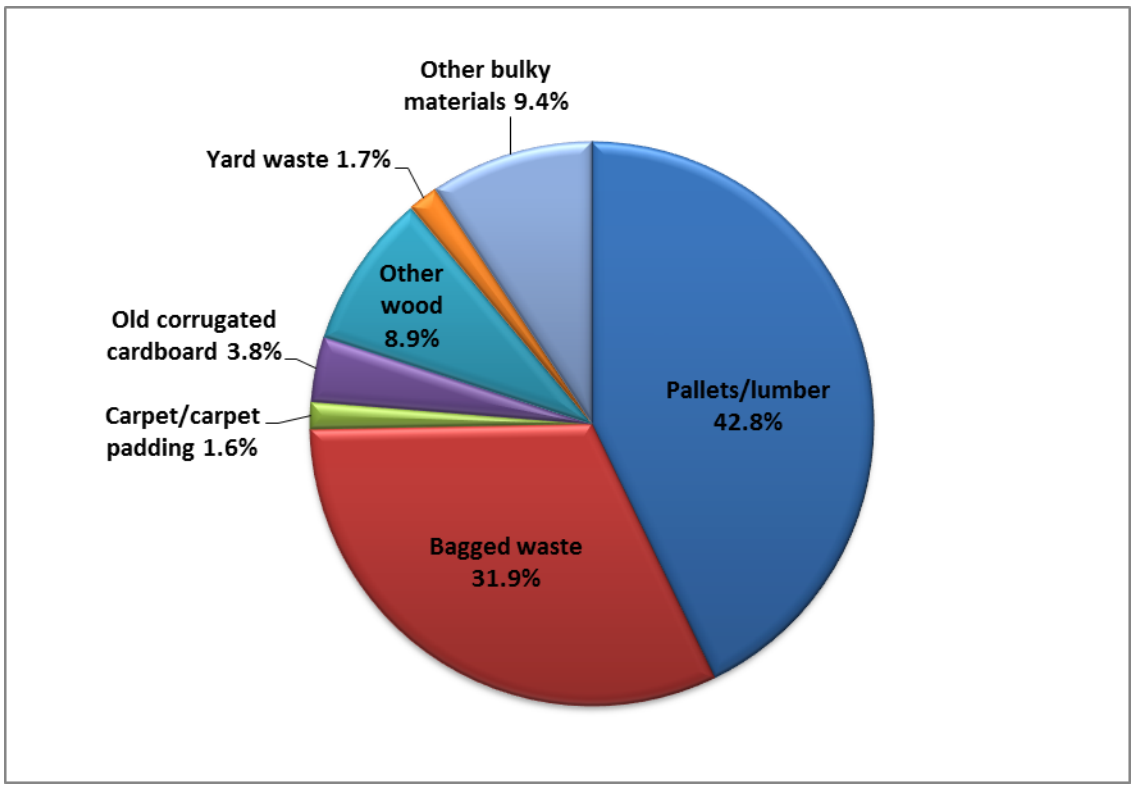


Exhibit 11. Home Remodel Roll-off Dumpster Waste Composition (continued)

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
1 Pallets/lumber	45.0	1.5	43.7	46.3
2 Concrete/bricks/rock	<0.1%	<0.1%	<0.1%	<0.1%
3 Flat glass	<0.1%	<0.1%	<0.1%	<0.1%
4 Shingles	<0.1%	<0.1%	<0.1%	<0.1%
5 Bagged waste	<0.1%	0.3	<0.1%	0.3
6 Furniture	<0.1%	<0.1%	<0.1%	<0.1%
7 Dirt	<0.1%	<0.1%	<0.1%	<0.1%
8 Carpet/carpet padding	<0.1%	<0.1%	<0.1%	<0.1%
9 Mattresses	<0.1%	<0.1%	<0.1%	<0.1%
10 Old corrugated cardboard	<0.1%	0.0	<0.1%	0.0
11 Other wood	55.0	1.2	54.0	56.0
12 Sheet rock	<0.1%	<0.1%	<0.1%	<0.1%
13 Scrap metal	<0.1%	<0.1%	<0.1%	<0.1%
14 Yard waste	<0.1%	0.0	<0.1%	0.0
15 Other bulky materials	<0.1%	<0.1%	<0.1%	<0.1%
16 Asphalt paving	<0.1%	<0.1%	<0.1%	<0.1%
17 Asphalt roofing	<0.1%	<0.1%	<0.1%	<0.1%
18 Applicances	<0.1%	<0.1%	<0.1%	<0.1%
19 Electronics	<0.1%	<0.1%	<0.1%	<0.1%
	100.0			

Note: Composition based on 2 samples

Exhibit 12. Yacht Harbor Roll-off Dumpster Waste Composition



Material Components	Mean Composition	Standard Deviation	95% Confidence Limits Lower	95% Confidence Limits Upper
1 Pallets/lumber	42.8	1.5	41.5	44.1
2 Concrete/bricks/rock	<0.1%	<0.1%	<0.1%	<0.1%
3 Flat glass	<0.1%	<0.1%	<0.1%	<0.1%
4 Shingles	<0.1%	<0.1%	<0.1%	<0.1%
5 Bagged waste	31.9	0.3	31.6	32.2
6 Furniture	<0.1%	<0.1%	<0.1%	<0.1%
7 Dirt	<0.1%	<0.1%	<0.1%	<0.1%
8 Carpet/carpet padding	1.6	<0.1%	<0.1%	<0.1%
9 Mattresses	<0.1%	<0.1%	<0.1%	<0.1%
10 Old corrugated cardboard	3.8	0.0	3.7	3.8
11 Other wood	8.9	1.2	7.9	9.9
12 Sheet rock	<0.1%	<0.1%	<0.1%	<0.1%
13 Scrap metal	<0.1%	<0.1%	<0.1%	<0.1%
14 Yard waste	1.7	0.0	1.7	1.8
15 Other bulky materials	9.4	<0.1%	<0.1%	<0.1%
16 Asphalt paving	<0.1%	<0.1%	<0.1%	<0.1%
17 Asphalt roofing	<0.1%	<0.1%	<0.1%	<0.1%
18 Applicances	<0.1%	<0.1%	<0.1%	<0.1%
19 Electronics	<0.1%	<0.1%	<0.1%	<0.1%
	100.0			

Note: Composition based on 3 samples

8 RECOVERABILITY ANALYSIS

8.1 INTRODUCTION

SCS Engineers obtained from Bay Cities Refuse a list of the materials that are currently accepted as part of Sausalito's recycling and composting programs. For purposes of this recoverability analysis, recyclable materials refer to components of the waste stream that are currently accepted as part of the City's existing recycling program. Compostable materials are materials that are currently accepted as part of the City's existing composting program. The category referred to as potentially recoverable refers to materials that may be recycled if new markets develop or changes in existing recycling contracts allow for acceptance of these materials. Non-recoverable materials refer to those materials for which no markets or technologies currently exist to recover the materials.

Exhibit 13 details the materials included in the compostable, recyclable, potentially recoverable, and non-recoverable classifications used for this analysis.

Exhibit 13. Compostable, Recyclable, Potentially Recoverable, and Non-Recoverable Classifications

Compostable	Recyclable	Potentially Recoverable	Non-Recoverable
Other misc. paper Food waste Leaves and grass Prunings/trimmings Branches/stumps Manures	Uncoated Corrugated Cardboard Paper bags Newspaper White ledger paper Other office paper Magazines/catalogs Phone books/directories PETE #1 containers HDPE #2 containers Misc. plastic containers Durable plastic items Metals Clear/brown/green/colored bottles/containers Household hazardous waste	Remainder/composite paper Film plastic – - grocery and merchandise bags -Commercial packaging -Products -Other film Remainder/composite plastic Textiles Carpet Electronics Used oil filters Lumber Tires	Plastic Trash bags Remainder/composite Organic Remainder/composite metal Flat glass Remainder/composite glass Inert material Special Waste (not including tires) Mixed residue

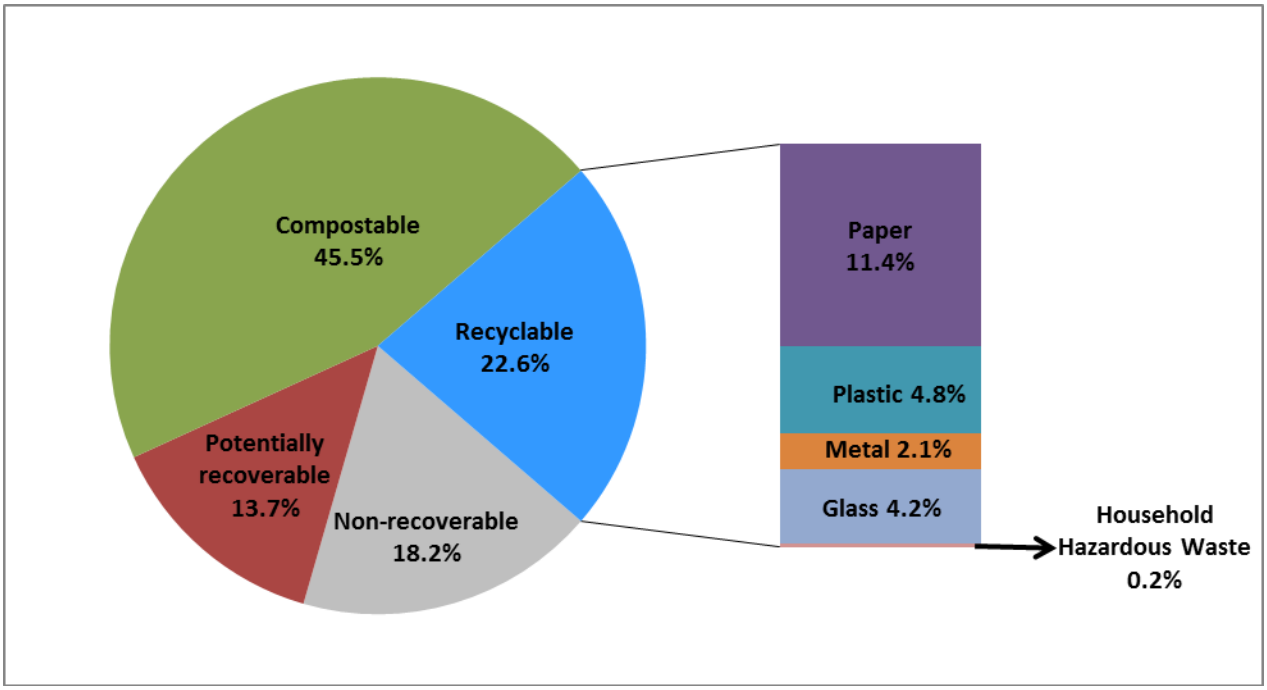
A significant portion of the Sausalito waste stream is either compostable or recyclable. The greatest diversion opportunities in Sausalito are capturing more recyclable paper, and composting miscellaneous paper and food waste. **Exhibits 14-20** delineate the recoverability of the disposed waste stream for each generating sector, by material categories. This analysis is based on the materials currently accepted in Sausalito's recycling and composting programs.

The exhibits provide additional detail on the make-up of the recyclable portion of the disposed waste stream, including paper, plastic, metal, glass and household hazardous waste. The compostable portion of the disposed waste stream is comprised of food waste, leaves and grass, prunings/trimmings, branches/stumps, manures, and other miscellaneous paper.

8.2 OVERALL SAUSALITO

For the overall waste stream, about 68 percent of the materials could potentially be recovered for recycling and composting, using the existing City programs (**Exhibit 14)**. A significant portion the materials that could be captured for recycling from the overall waste stream is paper.

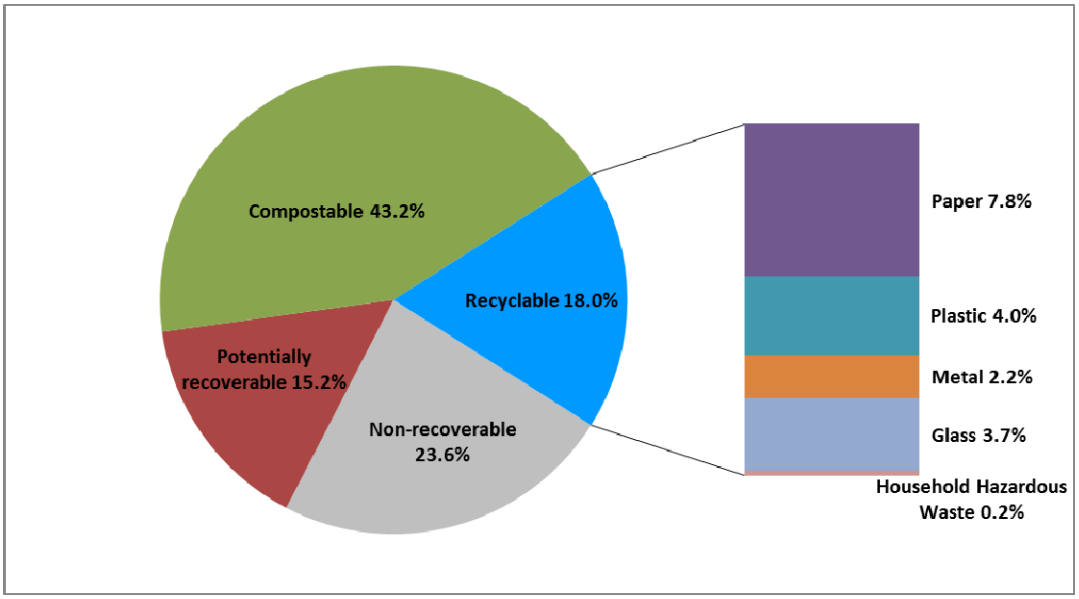
Exhibit 14. Recoverability Analysis for Overall Sausalito Waste Stream



8.3 SINGLE-FAMILY RESIDENTIAL

Approximately 61 percent of the single-family residential waste stream is either recyclable or compostable (**Exhibit 15**). Over 40 percent of the single-family residential waste stream could be diverted through composting alone. Additional opportunities for waste diversion for the single-family residential waste stream include paper (7.8 percent), plastic (4 percent), and glass containers, particularly wine bottles, which made up nearly four percent of the waste stream.

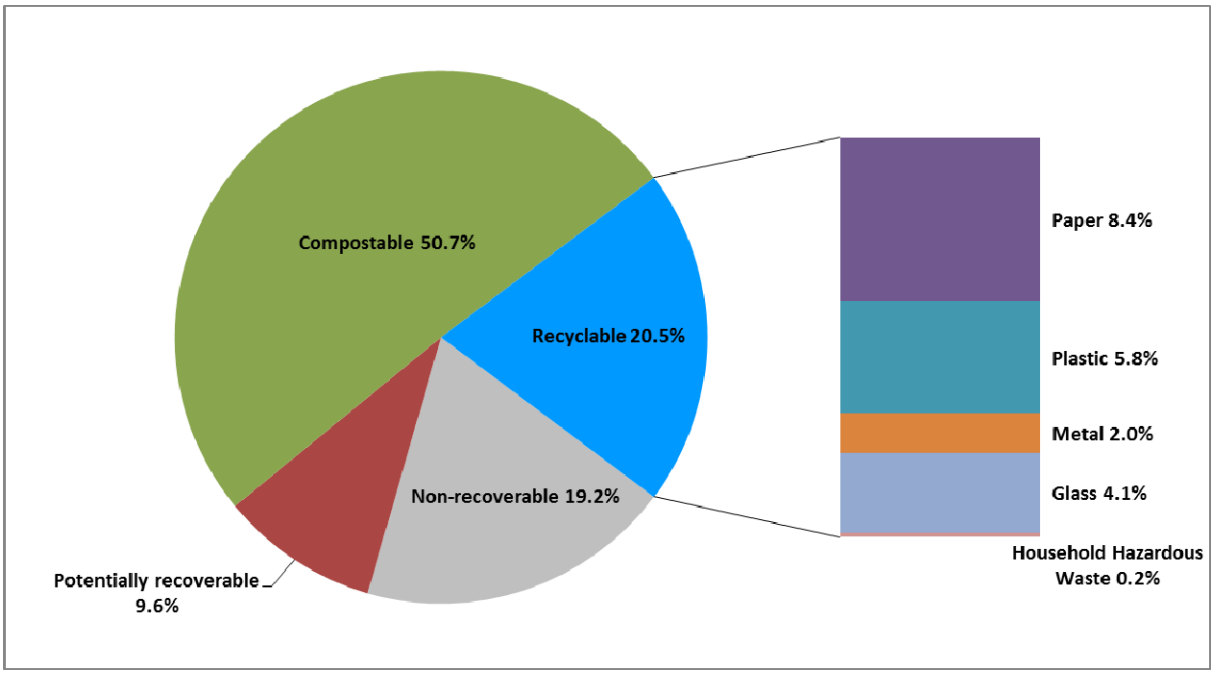
Exhibit 15. Recoverability Analysis for Single-Family Residential Waste Stream



8.4 MULTI-FAMILY RESIDENTIAL

Approximately 71 percent of the multi-family waste stream is recyclable or compostable. Fifty percent of the waste stream could be diverted through composting alone, which provides the greatest opportunity for waste diversion from multi-family properties (**Exhibit 16**). Of particular note is that the composition of the waste stream for multi-family residences that is recyclable is similar to that of single-family residences. In conducting similar studies, SCS typically observes more recyclable materials in the multi-family waste stream than for single-family residences; however, that is not necessarily the case with the multi-family sector in Sausalito.

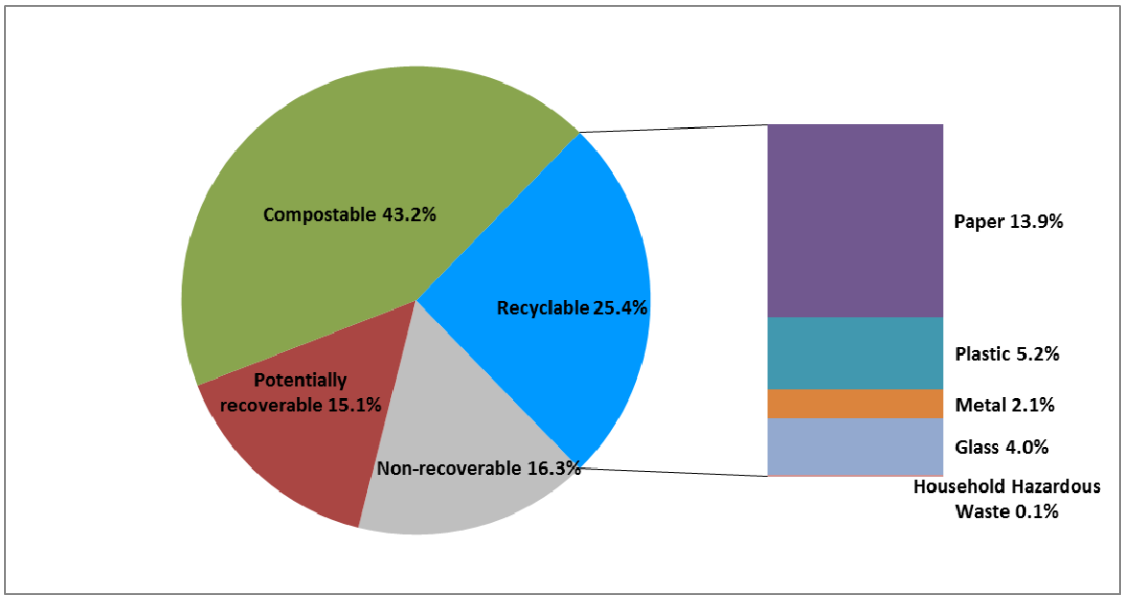
Exhibit 16. Recoverability Analysis for Multi-Family Waste Stream



8.5 COMMERCIAL BUSINESSES

Overall 68 percent of the commercial waste stream is either recyclable or compostable (**Exhibit 17**). Food waste is the largest portion of the commercial waste stream in Sausalito (about 30 percent); however, overall food waste is a significantly smaller portion of the waste stream when compared to Mollie Stones, single-family residential and multi-family residential sectors. Paper makes up a higher portion of the waste stream for commercial entities when compared to the multi-family and single-family generating sectors. In particular, corrugated cardboard, other office paper, and magazines and catalogs present an opportunity for diverting an additional ten percent of the commercial waste stream.

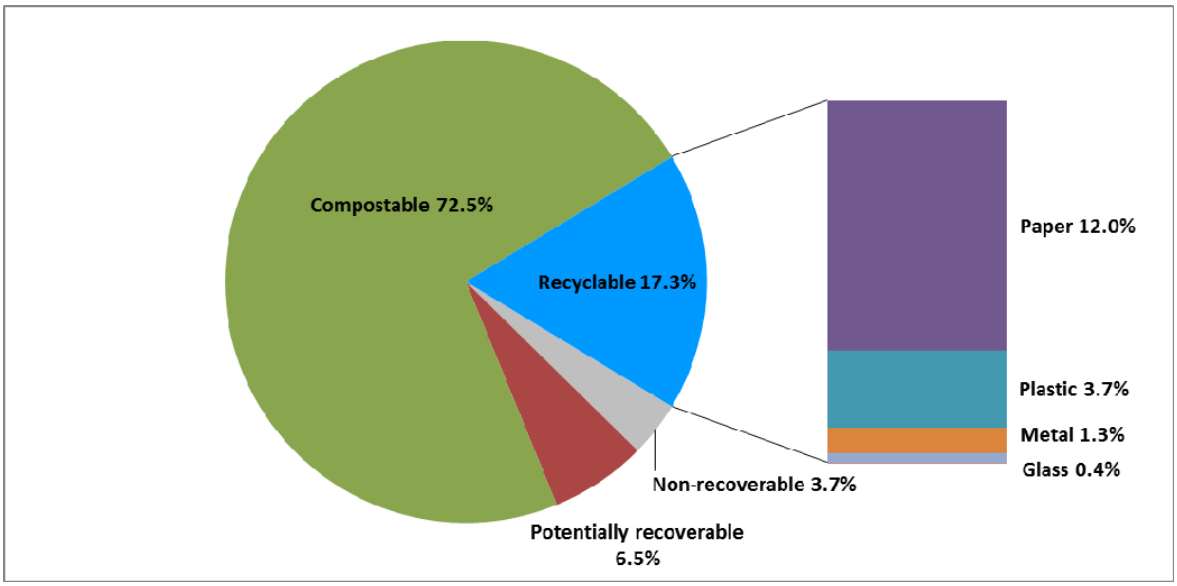
Exhibit 17. Recoverability Analysis for Commercial Waste Stream



8.6 MOLLIE STONES GROCERY STORE

Nearly 90 percent of the Mollie Stones waste stream is recyclable or compostable (**Exhibit 18**). The greatest opportunity for waste diversion for Mollie Stones is food waste, which represented 65.4 percent of the waste stream. Additionally, 6.8 percent of the waste stream consisted of other miscellaneous paper that could also be targeted for composting along with food waste. Based on the results of this study, nearly ¾ of the Mollie Stones waste stream could be diverted with the implementation of an effective composting program. There may also be opportunity for the diversion of corrugated cardboard and miscellaneous plastic containers. Much of the corrugated cardboard and miscellaneous plastic containers observed in the waste steam contained food materials. Thus, if food waste could be diverted for composting, it may help facilitate the recovery of these other materials as well. It should be noted that Bay Cities Refuse is presently working with Mollie Stones to enhance food waste recovery and overall recycling.

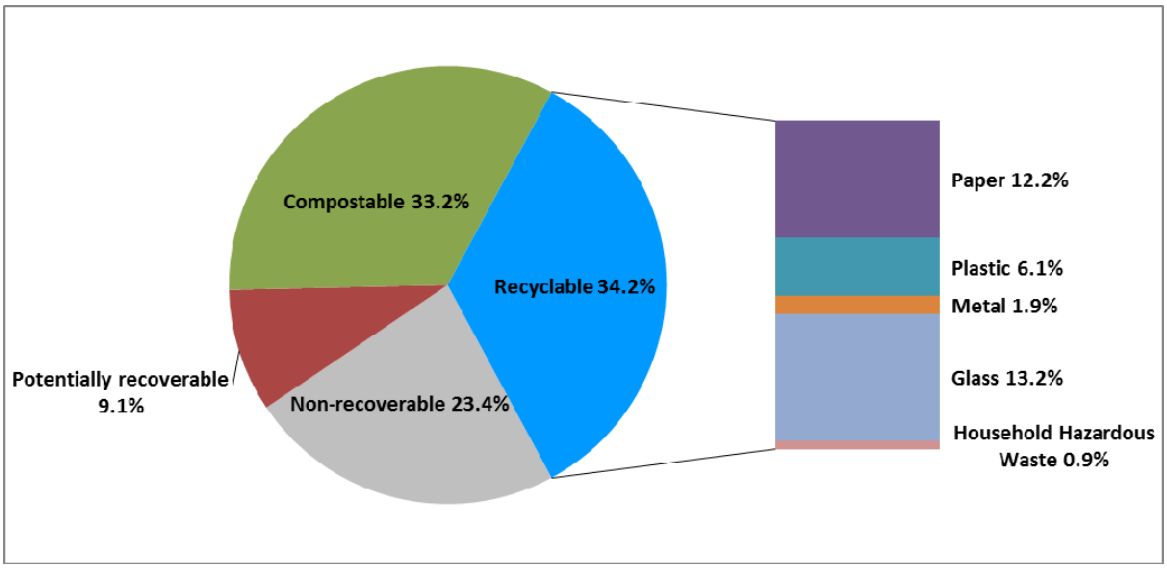
Exhibit 18. Recoverability Analysis for Mollie Stones Waste Stream



8.7 PUBLIC TRASH RECEPTACLES

Approximately 67 percent of the public trash receptacles waste stream is recyclable or compostable (**Exhibit 19**). Paper materials and glass containers make up a major portion of the public trash receptacles waste stream. It was observed that a significant amount of recyclable containers (glass and plastic bottles, aluminum cans, etc.) still end up in the waste stream in this generating sector, and could present further opportunities for waste division. Like all other waste generating sectors, food waste makes up the largest portion of the compostable fraction of the waste stream (18.1 percent).

Exhibit 19. Recoverability Analysis for Public Trash Receptacles Waste Stream

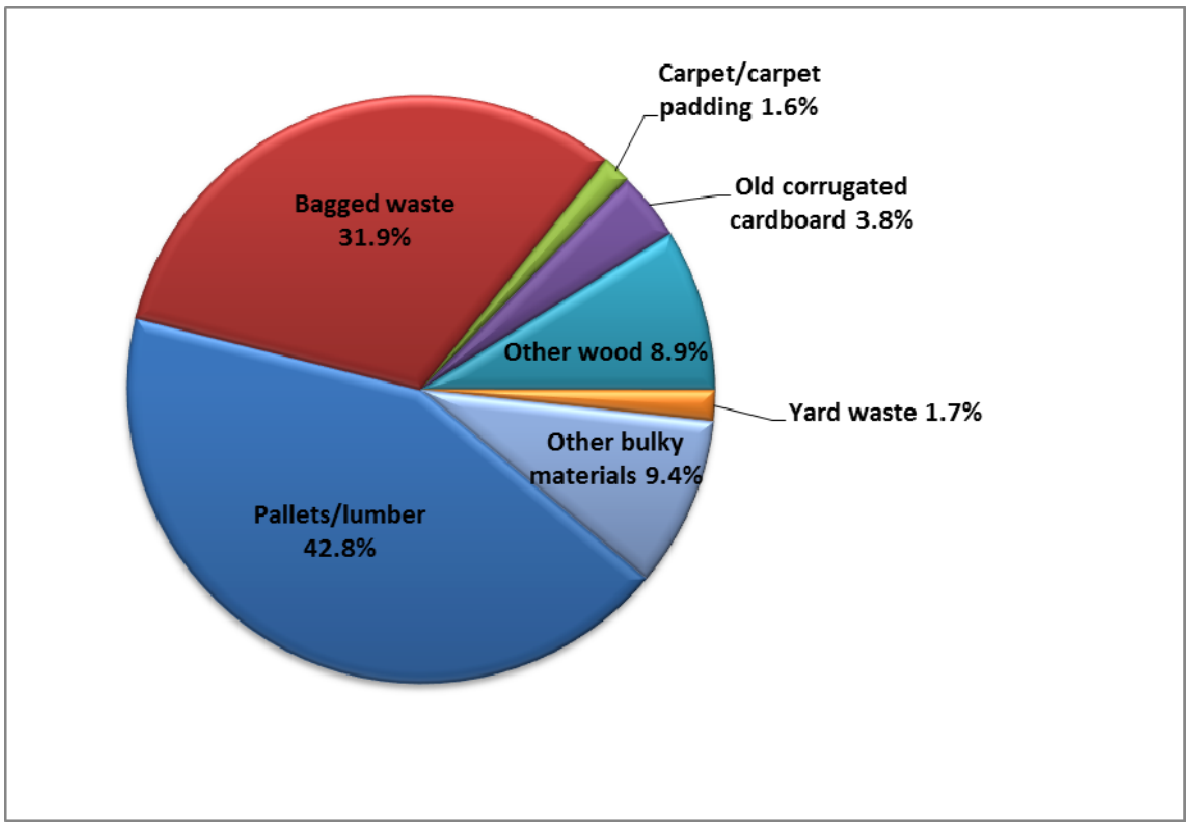


8.8 ROLL-OFF DUMPSTERS

It was observed that all waste being disposed of in roll-off dumpsters from home remodeling projects were either other wood or pallets/lumber, which are not materials that can be recycled or composted as part of Sausalito's existing programs. It is important to note that typically the roll-off dumpsters from home remodeling projects are taken to specialized facilities that recover construction and demolition debris.

A small percentage of materials observed to be present in the roll-off dumpsters located at yacht harbors could potentially be recoverable. The materials that could be recovered include corrugated cardboard (3.8 percent) and yard waste (1.7 percent). **Exhibit 20** provides an overview of the materials observed in the roll-off dumpsters from the yacht harbors.

Exhibit 20. Recoverability Analysis for Yacht Harbor Roll-Off Dumpsters Waste Stream



9 RECOMMENDATIONS

This section summarizes SCS's recommendations for diverting additional materials from the waste stream, based on the results of the waste characterization analysis. The recommendations will help the City to prioritize initiatives to maximize diversion and attain its zero waste goals.

9.1 OVERALL SAUSALITO

- Promote the City's zero waste goals to residents. Take the opportunity to educate residents and visitors that obtaining zero waste status is important for the City and community because it reduces landfill costs, protects the environment, and provides for a more sustainable and livable community. Let the community – residents and visitors – know that they are an essential part in achieving this goal and without their participation and support it will not be possible.

- Across all generating sectors there remains substantial opportunity to divert more waste for composting, particular food waste and miscellaneous paper (napkins, paper towels, tissues, etc.). Development of a targeted educational program and initiative that specifically focuses on the recovery of materials for composting should be considered to increase the collection and recovery of compostable materials.

- Utilize media (print and electronic) and social marketing campaigns to help spread the word about the City's programs and goals. Working with the media will greatly enhance public awareness of their role to participate in the City's recycling and composting programs and what household materials can be diverted to achieve zero waste. A community-based social marketing campaign can be implemented to help change the culture and waste-related behavior of the City, with different messages targeted to different demographics. For example, social media tools, including Facebook, Twitter, and others can be effective in reaching younger audiences. Other effective strategies for changing behaviors might include employing community leaders who visibly encourage and reward successful innovation, and focusing financial resources on innovation, including both public and private sources.

9.2 SINGLE-FAMILY RESIDENTIAL

- Paper bags – it was observed throughout the field study that many households use paper bags (especially from Mollie Stones) to contain their trash. Residents should be encouraged to include their paper bags in their recycling containers, and/or residents can be encouraged to use reusable grocery bags instead.

- Glass wine bottles were observed to be prevalent in the waste stream – approximately four percent of waste stream by weight. Glass bottles are recyclable, and can be placed in the City's recycling containers. Outreach and education targeting this material type can be effective in capturing more of these materials.

- Explore reuse and recycling opportunities for used clothing and carpet, as they make up nearly seven percent of the waste stream. This may include researching recycling markets or developing a community "swap shop."

- Significant opportunity exists for expanded composting of food waste (30.7 percent), leaves/grass (1.8 percent), and miscellaneous paper (10.6 percent). Over 40 percent of the waste stream could be recoverable through the City's existing organics recovery program. Additional outreach and education targeted at this portion of the waste stream can be effective in capturing more of these materials.

9.3 MULTI-FAMILY RESIDENTIAL

- Additional education should be provided regarding the composting of food waste (38 percent), leaves/grass (2.3 percent), and miscellaneous paper (10.5 percent). This could potentially divert half of the multi-family waste stream. More frequent education is important for this waste generating sector, due to the relatively high turn-over in some multi-family properties.

- Additional focus should be placed on the recycling of glass, metal, and plastic containers, which make up nearly 10 percent of the waste stream. These are commonly recyclable materials that could easily be recovered in the City's existing recycling program.

9.4 COMMERCIAL BUSINESSES

- Similar to all other waste generating sectors, there are significant opportunities for increased composting of food waste, leaves/grass and miscellaneous. paper (about 42 percent of waste stream). Outreach and education, as well as technical assistance for commercial businesses targeting these materials for composting should be provided.

- Recyclable paper makes up about 14 percent of the waste stream, particularly corrugated cardboard and other office paper. Business technical assistance and outreach and education should be provided to enhance recovery of these materials.

- Although there are opportunities to recover additional materials from the commercial waste stream, SCS notes that compared to other commercial waste generating studies we have conducted, Sausalito's businesses are doing a good job of recycling and composting.

9.5 MOLLIE STONES GROCERY STORE

- There is significant opportunity for Mollie Stones to increase food waste diversion – over 65 percent of their waste stream is food waste. In addition, the composting of miscellaneous paper (6.8 percent) provides an opportunity to divert over 2/3 of the Mollie Stones waste stream.

- Enhanced diversion of corrugated cardboard and miscellaneous plastic containers also presents an opportunity to reduce the Mollie Stones waste stream by an additional 11 percent. Many of these cardboard and plastic containers contain food, and thus if additional food waste composting could be done it might facilitate the recovery of these other materials as well.

- Presently, Bay Cities Refuse is working with Mollie Stones to enhance the recovery of food waste and recyclables. SCS suggests the City or members of the Sustainability Commission participate with Bay Cities and Mollie Stones in these efforts. The City might consider calculating the potential savings Mollie Stones may realize by diverting more materials from disposal. In addition, the City/Commission should discuss with Mollie Stones the City's zero waste goal, and highlight Mollie Stones key role in helping the City achieve the goal.

9.6 PUBLIC TRASH RECEPTACLES

- Installing more recycling containers in public/tourist areas might help the City recover more containers from the waste stream, which currently make up over 20 percent of the public trash receptacles waste stream.

- Recyclable paper also presents an opportunity for additional waste recovery (about 12 percent) and could be incorporated into a container recycling program if single stream recycling is acceptable.

9.7 ROLL-OFF DUMPSTERS

- A significant portion of the roll-off dumpster waste is pallets/lumber and other wood materials (over 70 percent). These materials mainly came from home remodeling projects and various yacht harbors around the City. SCS does not believe this material is readily recyclable, because the wood is treated and not suitable for mulching/composting (because it is varnished, painted, etc.). Some of this material could be recovered for reuse or repurposing. There are some opportunities for recovering yard waste (1 percent) and corrugated cardboard (2.1 percent) from roll-off dumpsters.

Appendix A
SCS Health and Safety Plan