Seattle Public Utilities

2014 Residential Waste Stream Composition Study FINAL Report

prepared by

Cascadia Consulting Group

Previous reports on Seattle's Residential Recycling and Waste Streams are available on the Seattle Public Utilities website.

Waste Composition Reports[1]

2010 Residential Waste Stream Composition Study

2006 Residential Waste Stream Composition Study

2002 Residential Waste Stream Composition Study

1998-1999 Residential Waste Stream Composition Study

1994-1995 Residential Waste Stream Composition Study

Recycling Composition Reports[2]

2010 Residential Recycling Composition Study

2005 Residential Recycling Composition Study

2000-01 Residential Recycling Composition Study

1998/1999 Residential Recycling Composition Study[3]

1993 Residential Recycling Composition Study[4]

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1 http://www.seattle.gov/util/About_SPU/Garbage_System/Reports/Waste_Composition_Reports/index.asp

2 http://www.seattle.gov/util/About_SPU/Recycling_System/Reports/Recycling_Composition_Study/index.asp

3 This report is not available online.

4 This report is not available online.

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1 Overview

1.1 Introduction and Background

Seattle Public Utilities (SPU) provides for the collection, transfer, and disposal of municipal solid waste (MSW) from within the City of Seattle. As part of this responsibility, SPU designs and implements programs intended to achieve a 70% recycling goal by 2025. SPU has conducted waste composition studies since 1988 to better understand the types and quantities of MSW disposed, to assess the city's recycling potential, and to aid the evaluation of existing programs. These studies have analyzed the residential, commercial, and self-haul waste streams at intervals of about four years. Table 1-1 shows the number of waste samples sorted by these three waste streams from 1988 through the current study in 2014.

Table 1-1: Samples per Study Period, by Substream

Year	Commercial	Residential	Self-Haul	Total
1988-89	121	212	217	550
1990	0	114	203	317
1992	251	0	197	448
1994-95	0	368	0	368
1996	348	0	199	547
1998-99	0	360	0	360
2000	347	0	200	547
2002	0	309	0	309
2004	270	0	216	486
2006	0	356	0	356
2008	271	0	216	487
2010	0	361	0	361
2012	259	0	216	476
2014	0	362	0	362

All of these studies share three common objectives:

- Obtain information about the city's residential, commercial, and self-haul waste streams to estimate the recycling potential for each.
- Understand differences among these three streams to help design, implement, and monitor targeted recycling programs for each stream.
- Establish a baseline for continued long-term measurement of system performance.

This report presents the results of the 2014 residential waste study in four sections. Section 1 briefly introduces the project and the methodology, and Section 2 summarizes the findings. In Section 3, the 2014 findings are compared to those from the 1988/89, 1994/95, 1998/99, 2002, 2006, and 2010 residential studies. Detailed results of the 2014 residential waste composition study are presented in Section 4. Appendices follow the main body of the report and provide material definitions, study methodology, comments on sampling events, waste composition calculations, year-to-year comparison calculations, and copies of field forms.

1.2 Seattle's Residential Waste Stream

This study examined waste disposed by two types of residences: single-family and multifamily.[5] In Seattle, the single-family and multifamily waste streams are defined as follows:

- **Single-family:** Primarily detached single-family, duplex, triplex, and four-plex homes. Waste is collected from garbage cans.
- **Multifamily:** Primarily apartments and condominiums with five or more units. Waste is collected from dumpsters.[6]

The contract haulers collect and deliver both single-family and multifamily residential waste to Seattle's two transfer stations. Self-hauled residential waste was not addressed by this study. Self-hauled waste is delivered to a transfer station by the individual homeowner or renter as opposed to a city-contracted hauler.[7]

Contract haulers collect Seattle's residential waste from four collection zones (Zones 1, 2, 3, and 4) shown in Figure 1-1 below.

Figure 1-1: Seattle's Collection Zones

Using these two characteristics—residence type and zone—eight sampling groups were established to provide a more detailed and precise analysis. Figure 1-2 depicts these eight residential waste stream sampling groups.

[5] This study measured waste *disposal*, not generation. Waste generation equals the sum of disposed, recycled, and composted amounts.

[6] Through the Clear Alleys Program, multifamily waste from approximately 24 downtown buildings is collected in bags. This waste was excluded from the study due to the difficulty of segregating and obtaining representative samples of this material.

[7] The most recent study on Seattle's self-haul waste was conducted in 2012.

Figure 1-2: Sampling Groups, by Residence Type and Collection Zone

		Generator Type	
		Single-family	*Multifamily*
Waste Collection Zones	*One*	Single-family Zone One	Multifamily Zone One
	Two	Single-family Zone Two	Multifamily Zone Two
	Three	Single-family Zone Three	Multifamily Zone Three
	Four	Single-family Zone Four	Multifamily Zone Four

1.3 Study Methodology

The following section provides an overview of the 2014 study methodology. As shown, this waste composition study was conducted in four major steps, presented according to the order in which they occurred during the course of the study. Appendix B contains a detailed description of the methodology.

Step 1: Develop Sampling Plan

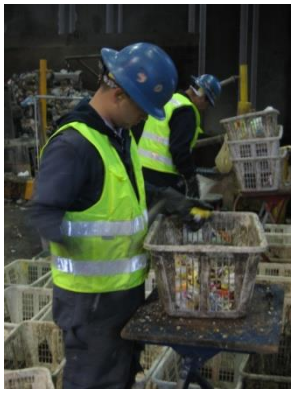
- Samples were allocated among the eight residential sampling groups: about half to single-family residential waste and half to multifamily residential waste. Both single-family and multifamily samples were evenly split among the four service zones.
- A sampling schedule was constructed for the 2014 calendar year, consisting of five consecutive sampling days (Monday-Friday) every other month. Sampling days were randomly selected and then adjusted to assure a representative distribution across the days of the week and weeks of the month.
- A complete list of Seattle's residential routes was assembled in conjunction with the City's contracted waste haulers.

Step 2: Schedule and Collect Waste Samples

- Prior to each month's sampling, vehicle routes were randomly selected from each of the eight sampling groups.
- The contract haulers were sent a list of the routes chosen for each day of sampling.
- Waste was collected from the designated routes and delivered to the appropriate transfer station for sampling.

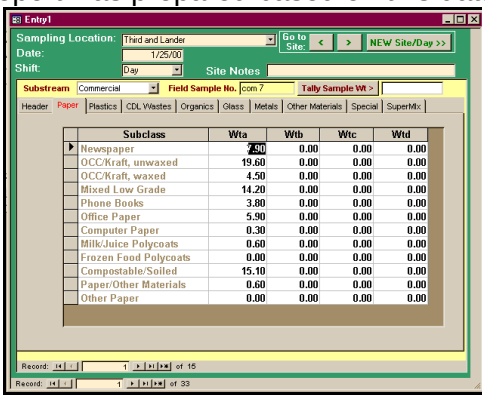
Step 3: Capture and Sort Samples

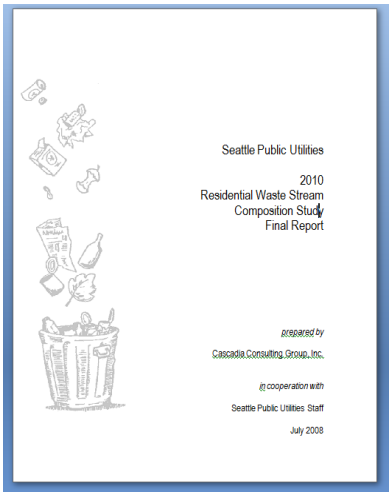
- As each vehicle entered the facility, the sampling crew supervisor verified information with the driver about the waste collected and then directed the front loader operator to scoop a portion of the waste being tipped out of the vehicle. About 250 pounds of this waste was placed on a tarpaulin for sorting.
- For this study, a total of 362 samples were sorted into 115 distinct component categories, such as newspaper or PET plastic bottles. Refer to Appendix A for component definitions and a detailed description of the changes made to the component categories from the 2010 study.



Step 4: Analyze Data and Prepare Report

- Each month all sort data were double-entered into a customized database to eliminate data entry errors. At the conclusion of the study, waste composition estimates were calculated by aggregating sampling data using a weighted average procedure. SPU provided annual waste tonnages to perform these calculations. Refer to Appendix D for a description of the calculation methodology.
- This report was prepared based on this data analysis.





2 Summary of 2014 Sampling Results

This report presents composition results in the following order. First, a pie chart reflects the composition percentages of the nine broad material categories. Following that, a table lists the top ten components, by weight.[8] Lastly, a detailed table presents the full composition results of all 115 components. Percentages may not add up to 100% in tables throughout the report due to rounding.

Material Designations

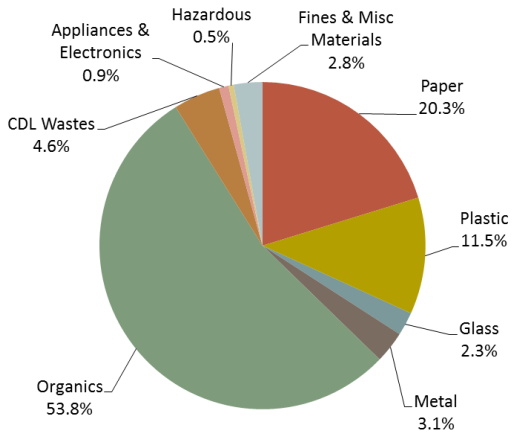
For the sake of clarity, broad categories such as **paper**, **glass**, and **metal** are bolded while material components such as *newspaper*, *clear glass bottles*, and *steel food cans* are italicized.

2.1 Overall Residential Composition

A total of 362 residential waste loads were sampled between January and December 2014. Seattle residents disposed a total of 112,238 tons of waste during this time. The composition estimates were applied to these tons to estimate the amount of waste disposed in 2014 for each component category.

As shown in Figure 2-1, **organics** accounted for more than half of the residential tonnage, while **paper** composed approximately 20% of the residential waste.

Figure 2-1: Composition Summary – Overall Residential[9]
(January – December 2014)



[8] Since the 1998/99 report, tables listing the largest components (greater than 5% by weight) have been replaced with tables listing the top ten components by weight.
[9] **CDL wastes** includes construction debris components, such as *clean dimensional lumber*, *demo gypsum scrap*, and *asphalt shingles*. **Fines and miscellaneous materials** includes four material components: *sand/soil/dirt*, *nondistinct fines*, *miscellaneous fines*, and *miscellaneous inorganics*.

The top ten components of Seattle's overall residential waste are listed in Table 2-1. When summed, they account for over 73% of the overall residential tonnage. Making up nearly 30%, *food* was the largest single component of this waste. In addition, *animal by-products, disposable diapers, compostable/soiled paper,* and *other film* each account for at least 5% of the overall residential waste stream. Table 2-2 lists the composition percentages, by weight, of each component in Seattle's residential substream.[10]

Table 2-1: Top Ten Components – Overall Residential
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	29.5%	29.5%	33,113
Animal By-products	10.7%	40.2%	12,054
Disposable Diapers	7.4%	47.6%	8,313
Compostable/Soiled Paper	6.4%	54.0%	7,169
Other Film	5.7%	59.7%	6,383
Mixed Low-grade Paper	4.3%	64.0%	4,806
Textiles/Clothing	2.9%	66.9%	3,207
Mixed/Other Paper	2.4%	69.3%	2,727
Newspaper	2.2%	71.5%	2,478
Miscellaneous Organics	1.7%	73.2%	1,899
Total	**73.2%**		**82,147**

[10] All waste composition results were derived using a 90% confidence level. This means that there is a 90% certainty that the actual composition is within the calculated range. In charts throughout this report, the values graphed represent the mean component percentage, not the range.

Table 2-2: Composition by Weight – Overall Residential
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**20.3%**		**22,728**
Newspaper	2.2%	0.2%	2,478
Plain OCC/Kraft	1.2%	0.1%	1,372
Waxed OCC	0.2%	0.1%	176
Grocery/Shopping Bags	0.7%	0.1%	814
High-grade Paper	1.4%	0.2%	1,568
Mixed Low-grade Paper	4.3%	0.2%	4,806
Polycoated Containers	0.5%	0.2%	534
Compostable/Soiled	6.4%	0.3%	7,169
Pot. Comp. Single-use Food Service	0.6%	0.1%	697
Non-Comp. Single-use Food Service	0.3%	0.1%	389
Mixed/Other Paper	2.4%	0.2%	2,727
Plastic	**11.5%**		**12,945**
#1 PET Bottles	0.6%	0.0%	690
#2 HDPE Natural Bottles	0.2%	0.0%	216
#2 HDPE Colored Bottles	0.3%	0.0%	288
Other Bottles	0.1%	0.0%	146
Tubs	0.4%	0.0%	443
Expanded Poly. Non-food	0.2%	0.0%	171
Expanded Poly. Food-grade	0.2%	0.0%	223
Rigid Poly. Foam Insulation	0.1%	0.0%	80
Pot. Comp. Single-use Food Service	0.2%	0.0%	192
Non-Comp. Single-use Food Service	0.3%	0.0%	291
Other Rigid Packaging	1.1%	0.1%	1,195
Shopping/Dry Cleaning Bags	0.2%	0.0%	248
Stretch Wrap	0.0%	0.0%	52
Clean Polyethylene Film	0.2%	0.1%	223
Other Film	5.7%	0.2%	6,383
Plastic Pipe	0.0%	0.0%	33
Foam Carpet Padding	0.2%	0.1%	184
Durable Plastic Products	1.0%	0.1%	1,069
Plastic/Other Materials	0.7%	0.1%	818
Glass	**2.3%**		**2,598**
Clear Bottles	0.6%	0.1%	723
Green Bottles	0.4%	0.1%	470
Brown Bottles	0.5%	0.1%	591
Container Glass	0.3%	0.0%	360
Fluorescent Tubes	0.0%	0.0%	24
CFLs	0.0%	0.0%	8
Flat Glass	0.1%	0.0%	67
Automotive Glass	0.0%	0.0%	14
Other Glass	0.3%	0.1%	341
Metal	**3.1%**		**3,522**
Aluminum Beverage Cans	0.4%	0.0%	412
Aluminum Foil/Containers	0.3%	0.0%	281
Other Aluminum	0.1%	0.0%	117
Other Nonferrous	0.3%	0.1%	307
Steel Food Cans	0.6%	0.1%	672
Empty Aerosol Cans	0.1%	0.0%	125
Other Ferrous	0.5%	0.1%	518
Oil filters	0.0%	0.0%	5
Mixed Metals/Material	1.0%	0.1%	1,084
Organics	**53.8%**		**60,416**
Leaves and Grass	1.2%	0.3%	1,375
Prunings	0.3%	0.1%	379
Food	29.5%	0.6%	33,113
Fats, Oils, Grease	0.1%	0.0%	73
Textiles/Clothing	2.9%	0.2%	3,207
Mixed Textiles	1.2%	0.1%	1,326
Disposable Diapers	7.4%	0.4%	8,313
Animal By-products	10.7%	0.6%	12,054
Rubber Products	0.5%	0.1%	541
Tires	0.0%	0.0%	37

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**0.9%**		**1,052**
Furniture	0.3%	0.2%	338
Mattresses	0.1%	0.1%	120
Small Appliances	0.3%	0.1%	333
Cell Phones	0.0%	0.0%	4
Audio/Visual Equipment	0.1%	0.0%	62
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	24
Other Electronics	0.2%	0.1%	171
CDL Wastes	**4.6%**		**5,213**
Clean Dimension Lumber	0.2%	0.1%	268
Clean Engineered Wood	0.2%	0.1%	203
Pallets	0.0%	0.0%	9
Crates	0.0%	0.0%	2
Other Untreated Wood	0.3%	0.1%	331
New Painted Wood	0.3%	0.1%	363
Old Painted Wood	0.4%	0.2%	446
Creosote-treated Wood	0.0%	0.0%	42
Other Treated Wood	0.2%	0.1%	180
Contaminated Wood	0.5%	0.2%	599
New Gypsum Scrap	0.1%	0.1%	75
Demo Gypsum Scrap	0.3%	0.1%	381
Carpet	1.0%	0.3%	1,167
Felt Carpet Pad	0.0%	0.0%	23
Fiberglass Insulation	0.1%	0.1%	70
Concrete	0.2%	0.1%	171
Asphalt Paving	0.0%	0.0%	21
Other Aggregates	0.0%	0.0%	6
Rock	0.0%	0.0%	54
Asphalt Shingles	0.0%	0.0%	42
Other Asphaltic Roofing	0.0%	0.0%	14
Ceramics	0.3%	0.1%	317
Cement Fiber Board	0.0%	0.0%	15
Single-ply Roofing Membranes	0.0%	0.0%	13
Ceiling Tiles	0.0%	0.0%	23
Other Construction	0.3%	0.1%	373
Hazardous	**0.5%**		**594**
Dried Latex Paint	0.1%	0.0%	80
Liquid Latex Paint	0.1%	0.0%	110
Solvent-based Adhesives	0.0%	0.0%	6
Water-based Adhesives	0.0%	0.0%	16
Oil-based Paint/Thinners	0.0%	0.0%	20
Caustic Cleaners	0.0%	0.0%	21
Pesticides/Herbicides	0.0%	0.0%	22
Rechargeable Batteries	0.0%	0.0%	3
Other Dry-cell Batteries	0.0%	0.0%	30
Wet-cell Batteries	0.0%	0.0%	3
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	5
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	55
Other Cleaners/Chemicals	0.0%	0.0%	29
Pharmaceuticals/Vitamins	0.0%	0.0%	30
Cosmetics	0.1%	0.0%	113
Other Potentially Harmful Waste	0.0%	0.0%	49
Fines and Misc Materials	**2.8%**		**3,170**
Sand/Soil/Dirt	0.7%	0.2%	777
Non-distinct Fines	0.3%	0.1%	286
Miscellaneous Organics	1.7%	0.2%	1,899
Miscellaneous Inorganics	0.2%	0.1%	208
Totals	**100%**		**112,238**
Sample Count	362		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

2.2 Residential Waste by Subpopulation

In addition to the overall residential substream, waste composition estimates were calculated for the following subpopulations:

- **Residence type**: single-family and multifamily
- **Collection zone**: Zones 1, 2, 3, and 4
- **Residence type and collection zone**: single-family Zone 1, single-family Zone 2, single-family Zone 3, single family Zone 4, multifamily Zone 1, multifamily Zone 2, multifamily Zone 3, and multifamily Zone 4
- **Season**: spring, summer, autumn, and winter
- **Household income**: low and high
- **Household size**: small and large

As with the overall estimates, a weighted average procedure was employed to calculate composition estimates by residence type and service area; see Appendix D for more detail on weighted averages. Several additional steps were needed to calculate composition by household income and household size; see the Demographic Calculations section in Appendix D for more detail.

The largest components for each subpopulation are shown in Table 2-3 (each accounting for more than 5%).

Table 2-3: Largest Waste Components, by Subpopulation[11]
(January – December 2014)

Subpopulation	Paper		Organics			Plastic
	Compostable/ Soiled	Mixed Low-grade	Food	Animal By-products	Disposable Diapers	Other Film
Residence Type						
Single-family	6.7%		28.4%	12.5%	9.0%	6.2%
Multifamily	6.1%		30.7%	8.7%	5.5%	5.1%
Collection Zone						
Zone 1	6.3%		27.5%	11.3%	7.3%	5.9%
Zone 2	6.1%		28.8%	10.2%	7.8%	6.3%
Zone 3	6.4%		30.3%	10.6%	6.6%	5.3%
Zone 4	6.6%		30.6%	10.8%	8.2%	5.6%
Residence Type and Zone						
Single-family Zone 1	6.5%		27.2%	12.2%	8.5%	6.1%
Single-family Zone 2	6.3%		27.8%	12.1%	9.0%	6.5%
Single-family Zone 3	6.5%		29.3%	13.2%	8.8%	6.1%
Single-family Zone 4	7.2%		29.1%	12.4%	9.6%	6.3%
Multifamily Zone 1	6.2%		27.9%	9.8%	5.1%	5.4%
Multifamily Zone 2	5.9%	5.2%	29.9%	7.8%	6.3%	6.0%
Multifamily Zone 3	6.3%		30.8%	9.0%	5.3%	
Multifamily Zone 4	5.6%	5.1%	33.4%	8.1%	5.7%	
Season						
Spring	6.0%		32.2%	11.7%	7.9%	5.5%
Summer	6.4%		26.7%	10.9%	7.2%	5.8%
Fall	7.0%		23.2%	10.9%	8.9%	
Winter	6.2%	5.4%	36.1%	9.5%	5.6%	7.1%
Demographics						
Low Income	6.9%		28.9%	12.2%	7.9%	6.6%
High Income	6.3%		28.8%	13.0%	9.6%	6.3%
Small Households	6.6%		28.2%	14.6%	8.6%	6.3%
Large Households	6.9%		30.7%	11.4%	9.1%	6.7%
Overall Residential	**6.4%**		**29.5%**	**10.7%**	**7.4%**	**5.7%**

The following conclusions can be drawn from the waste composition estimates of the overall residential substream and for each subpopulation.

- *Food* typically accounted for about a third of each subpopulation's waste, by weight.
- *Animal by-products* and *food* were among the largest components for all subpopulations.
- Subpopulations share many of the same largest material components, particularly *food* as the most commonly disposed material in all subpopulations; however, the main differences appear to include:[12]

[11] A map showing Seattle's residential waste collection zones can be found in Figure 1-1 on page 2.
[12] No statistical tests were performed to identify differences among subpopulations. Therefore, the comparisons may not be statistically significant.

- Single-family residents discarded a greater percentage of *disposable diapers* and *animal by-products* than did multifamily residents. Conversely, multifamily residents disposed of a greater portion of *food*.
- The percentage of *food* disposed was highest in winter (36.1%) and lowest in fall (23.2%).
- Low-income households discarded relatively fewer *disposable diapers* than high-income households. Other large components contributed similar portions to both low and high-income households.
- Large households disposed of a lower percentage of *animal by-products* and a higher percentage of *compostable/soiled paper*, *food*, and *disposable diapers* than small households.

3 Trends in Residential Disposal: 1988/89 – 2014

The overall residential results for the 2014 study were compared to previous studies of the residential waste stream to identify trends over time.[13] Seattle's curbside recycling program began in 1988, and the yard waste program followed in 1989. In 2000, the commingled recycling program began.[14] Seattle enacted mandatory recycling in January 2005, and enforcement began in January 2006. Soon after, in mid-2006, the yard waste program expanded to accept vegetative food waste and compostable paper. In April 2009, organics collection frequency increased to weekly citywide and the program was expanded to allow all food waste and compostable paper. In addition, universal organics service was implemented, requiring residents to subscribe to organics collection unless they received an exemption for back yard composting. All six of the previous residential studies followed the same basic methodology as the present 2014 study.[15]

Results were compared year-to-year by examining the changes in the total amount of waste disposed and in composition percentages for each of the eight broad material categories.[16] Statistical t-tests were used to analyze differences in the composition percentages. Section 3.1 provides an overview of the changes in disposed tons over the last 26 years. Section 3.2 compares 2014 composition percentages with earlier studies. See Appendix E for details about year-to-year comparison calculations.

3.1 Trends in Tons Disposed Over the Past 26 Years

Figure 3-1 illustrates the changes in disposed tons since the 1988/89 study for each of the eight broad material categories: **paper**, **plastic**, **glass**, **metals**, **organics**, **other materials**, **CDL wastes**, and **hazardous**. The total amount of waste disposed decreased dramatically from 179,968 tons in 1988/89 to 145,591 tons in 1994/95. Residential waste tonnage remained relatively consistent until 2002, then decreased from 142,910 tons to 133,774 tons in 2006 and dropped again in 2010 to 114,134 tons. This decrease is likely due to the economic recession and the new organics program described above. Residential waste tonnage declined slightly in 2014 to 112,238 tons. Between 2010 and 2014, the broad material categories of **paper**, **organics**, and **other materials** (which includes *animal by-products*, *disposable diapers*, *furniture*, and *carpet*) showed the greatest changes.

[13] The composition and tonnage figures presented in this section were calculated using an unweighted analytical process. Thus, they may not be equal to the composition percentages (and associated tonnages) presented in Section 4 as these are derived using a weighted process. Appendix D provides more detail on weighted averages, while Appendix E outlines year-to-year comparison calculations.

[14] The commingled recycling program started in 2000 allowed residents to combine plastic and paper recyclable materials. Glass was still collected in a separate bin. Materials added to the recycling program in 2000 included polycoated paper, aseptic packaging, plastic jars, tubs, and bottles, and clean plastic film bags.

[15] See Appendix B for more detail regarding the methodology.

[16] The material components for each season have been adjusted to match a uniform material list for two reasons: (1) the materials list has changed from 52 material components in 1988/89 to 115 materials in 2014 and (2) several components have been moved to different broad material categories to better reflect new policies in recycling and composting. Therefore, the percentages of broad material categories in Section 3 will not necessarily match the percentages of broad material categories presented in Section 4. This is explained in greater depth in Appendix E.

Figure 3-1: Trends in Disposed Tons – 1988/89 to 2014

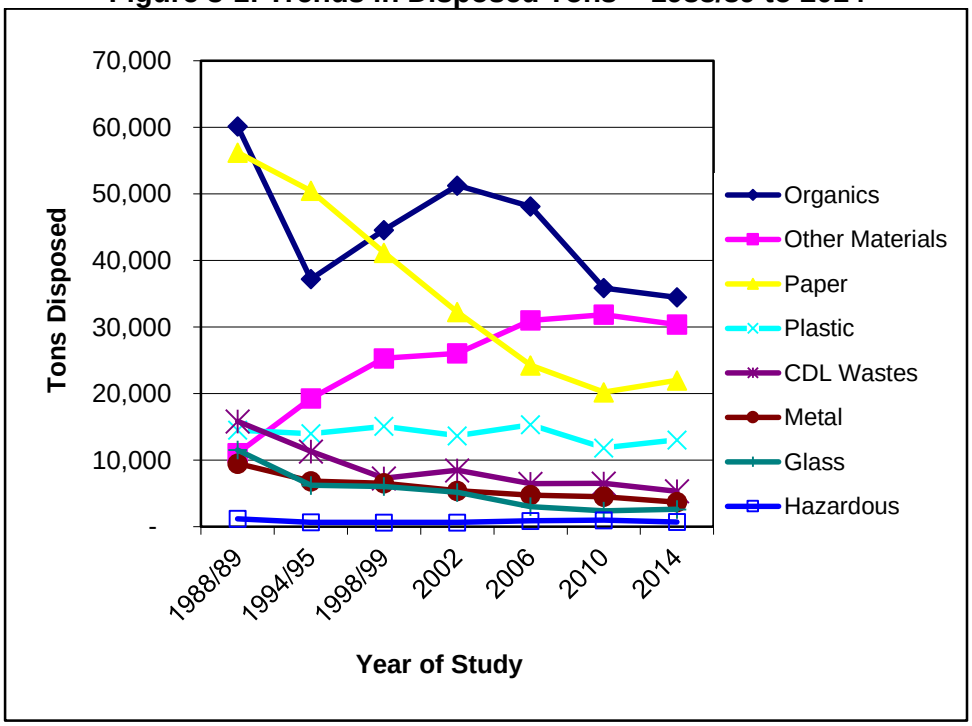


Figure 3-1 graphically shows the following changes in tonnage for each material category over the study years since 1988/89:

- **Paper**. The tonnage of **paper** increased slightly in 2014 for the first time since 1988/89, but overall has dropped by over 60% since 1988/89 to 21,981 tons. The overall decrease is due to noticeable decreases in *newsprint, unwaxed OCC/Kraft, mixed low-grade paper*, and *mixed/other paper* between the two study periods.
- **Plastic**. The tonnage of **plastic** increased between 2010 and 2014 by over 1,200 tons. Contributing to this increase, *other plastic film* rose from 4,428 tons to 6,383 tons, and *other rigid packaging* increased from 714 tons to 1,195 tons. When comparing across all study years prior to 2014, **plastic** tonnage was lowest in 2010.
- **Glass**. Between 1988/89 and 2010, **glass** tonnage decreased by 80%, from 11,537 tons to 2,368 tons. In the following four year period, from 2010 to 2014, **glass** tonnage increased slightly, reaching 2,627 tons last year.
- **Metal**. The tonnage of **metal** in the waste stream has declined steadily from 9,491 tons in 1988/89 to 3,701 tons in 2014.
- **Organics**. Between 2006 and 2010, **organics** decreased by about 12,000 tons. Organics decreased again between 2010 and 2014, though by a smaller amount - about 1,400 tons.
- **Other Materials**. The tonnage of **other materials** in the waste stream has increased every study year since 1988/89. This category decreased slightly for the first time between 2010 and 2014, falling from 31,866 tons to 30,380 tons.
- **CDL Wastes**. The tonnage of **CDL wastes** decreased by about half between 1988/89 and 1998/99 from 15,830 tons to 7,280 tons, followed by an increase in

2002 to 8,469 tons. Between 2006 and 2010, the amount of **CDL waste** remained relatively consistent, and then fell to 5,336 tons in 2014.

- **Hazardous**. The tonnage of **hazardous** materials has remained fairly steady since 1994/95. In 2014, tonnage decreased slightly from 979 tons to 707 tons.

3.2 Changes in Composition Percentages

This section first presents a comparison of composition percentages between the current study and the 1988/89 study, and then a comparison between the current study and the 2010 study.

3.2.1 Changes in Composition Percentages: 1988/89 vs. 2014

The bolded broad material categories in Table 3-1 showed statistically significant changes between 1988/89 and 2014. **Paper**, **glass**, **metal**, **organics**, and **CDL wastes** decreased significantly, while **plastic** and **other materials** increased significantly. The portion of **other materials** disposed in the waste stream showed the greatest change, increasing from 6.1% in 1988/89 to 27.1% in 2014, but some of this increase is due to changes in material categorization.[17]

Table 3-1: Changes in Composition Percentages – 1988/99 and 2014 Study Periods

	Percent		Change in	Disposed Tons	
	1988/89	2014	Composition %	1988/89	2014
Paper	**31.2%**	**19.6%**	**-11.7%** ⬇	**56,220**	**21,981**
Plastic	**8.1%**	**11.6%**	**3.6%** ⬆	**14,508**	**13,050**
Glass	**6.4%**	**2.3%**	**-4.1%** ⬇	**11,537**	**2,627**
Metal	**5.3%**	**3.3%**	**-2.0%** ⬇	**9,491**	**3,701**
Organics	**33.4%**	**30.7%**	**-2.7%** ⬇	**60,145**	**34,456**
Other Materials	**6.1%**	**27.1%**	**20.9%** ⬆	**11,046**	**30,380**
CDL Wastes	**8.8%**	**4.8%**	**-4.0%** ⬇	**15,830**	**5,336**
Hazardous	0.7%	0.6%	0.0%	1,192	707
Total	**100%**	**100%**		**179,968**	**112,238**

Note: Bold type indicates statistically significant changes.

[17] Part of this increase is due to adding several material types to the **other materials** category, such as *furniture*, *small appliances*, and *AV equipment*; in the 1988/89 study these were classified according to their dominant material type (such as **metal** or **plastic**). See Appendix A for a table outlining changes in material categories across study periods. The change in sorting categories may have also affected the estimated proportions of plastic, metal, and glass, causing them to be slightly higher in the 1988/89 study. The exact amount of this difference cannot be calculated.

3.2.2 Changes in Composition Percentages: 2010 vs. 2014

In Table 3-2, bolded broad material categories differed by a statistically significant amount between the 2010 and 2014 study periods. **Paper** and **plastic** increased significantly while the other broad material categories did not show significant differences between study years.

Table 3-2: Changes in Composition Percentages – 2010 and 2014 Study Periods

	Percent		Change in Composition %	Disposed Tons	
	2010	2014		2010	2014
Paper	**17.7%**	**19.6%**	**1.9%** ⬆	**20,197**	**21,981**
Plastic	**10.4%**	**11.6%**	**1.3%** ⬆	**11,835**	**13,050**
Glass	2.1%	2.3%	0.3% ⬆	2,368	2,627
Metal	4.0%	3.3%	-0.7% ⬇	4,522	3,701
Organics	31.4%	30.7%	-0.7% ⬇	35,863	34,456
Other Materials	27.9%	27.1%	-0.9% ⬇	31,866	30,380
CDL Wastes	5.7%	4.8%	-0.9% ⬇	6,505	5,336
Hazardous	0.9%	0.6%	-0.2% ⬇	979	707
Total	**100%**	**100%**		**114,135**	**112,238**

Note: Bold type indicates statistically significant changes.

4 Composition Results: By Subpopulation

4.1 Overview

A total of 362 loads from the residential waste stream were sampled from January to December 2014. Table 4-1 summarizes the sample information for each residential subpopulation as well as the associated tons disposed. The average sample weight for the 362 residential samples was approximately 318 pounds. Seattle Public Utilities and the City's authorized waste haulers provided the total 2014 disposal tonnages presented in this section of the report.

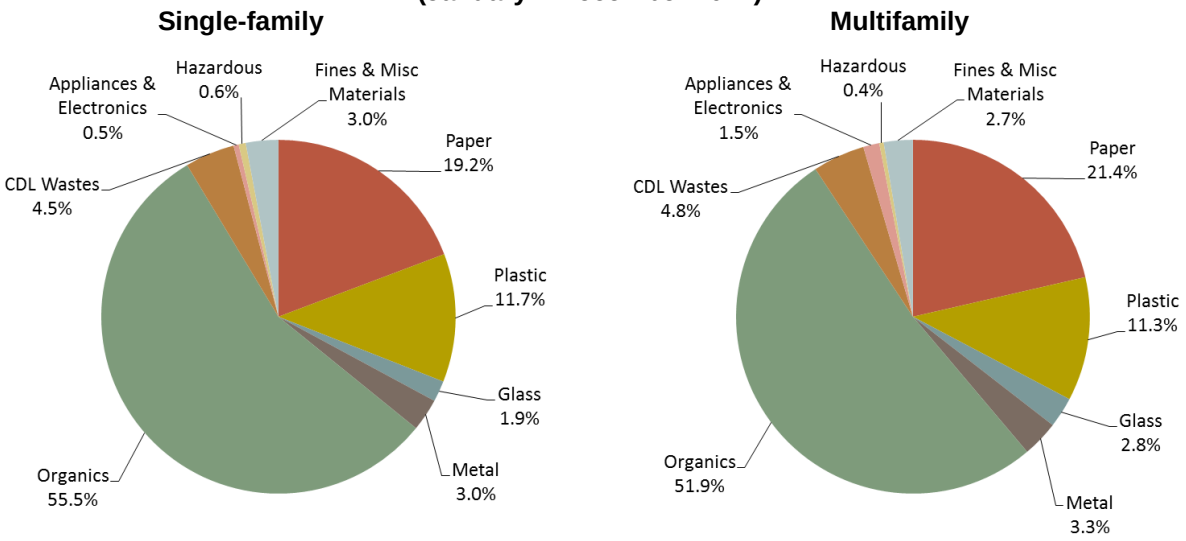
Table 4-1: Sampling Information, by Subpopulation
(January – December 2014)

Subpopulation	Code	Total Sample (lbs)	Sample Count	Total Disposal (Tons)	Number of Households
Residence Type					
Single-family	SF	56,592.1	182	60,106.21	163,971
Multifamily	MF	58,566.8	180	52,131.31	142,235
Collection Zone					
Zone 1	1	29,757.6	92	23,898.73	70,749
Zone 2	2	28,421.8	90	20,110.87	51,647
Zone 3	3	28,909.0	91	36,512.92	109,872
Zone 4	4	28,070.6	89	31,714.99	73,938
Residence Type and Zone					
Single-family Zone 1	SF1	14,553.6	47	15,114.61	45,958
Single-family Zone 2	SF2	14,277.9	45	11,160.45	30,665
Single-family Zone 3	SF3	14,119.5	45	13,468.03	34,401
Single-family Zone 4	SF4	13,641.2	45	20,363.12	52,947
Mulifamily Zone 1	MF1	15,204.0	45	8,784.12	24,791
Mulifamily Zone 2	MF2	14,143.9	45	8,950.42	20,982
Mulifamily Zone 3	MF3	14,789.5	46	23,044.89	75,471
Mulifamily Zone 4	MF4	14,429.4	44	11,351.87	20,991
Overall Residential		***115,159.0***	***362***	***112,237.51***	***306,206***

4.2 By Residence Type

As shown in Figure 4-1, **organics** and **paper** composed the bulk of waste from both single and multifamily residences. **Organics** made up a larger portion of single-family waste (55.5%) than multifamily waste (51.9%). In contrast, **paper** was slightly higher for multifamily compared to single-family residences: over 21% compared to slightly above 19%. **Plastic**, the third largest material category, made up around 11% of the waste for both single and multifamily residences.

Figure 4-1: Composition Summary, by Residence Type
(January – December 2014)



4.2.1 Single-family Residences

A total of 182 samples were sorted from single-family loads during the 2014 study period. Single-family residences disposed of approximately 60,106 tons of waste. As shown in Table 4-2, *food* was the largest component, accounting for over 28% of the total tons disposed by single-family residences in 2014. When added together, all of the top ten components summed to about 76% of the total, by weight. The full single-family composition results are presented in Table 4-4.

Table 4-2: Top Ten Components – Single-family
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	28.4%	28.4%	17,091
Animal By-products	12.5%	40.9%	7,501
Disposable Diapers	9.0%	50.0%	5,439
Compostable/Soiled Paper	6.7%	56.6%	4,014
Other Film	6.2%	62.9%	3,742
Mixed Low-grade Paper	3.9%	66.7%	2,333
Textiles/Clothing	2.9%	69.7%	1,767
Mixed/Other Paper	2.4%	72.1%	1,462
Newspaper	2.1%	74.2%	1,256
Miscellaneous Organics	1.9%	76.1%	1,121
Total	**76.1%**		**45,726**

4.2.2 Multifamily Residences

From loads of multifamily waste, 180 samples were captured and sorted between January and December 2014. In 2014, Seattle's multifamily residents disposed of 52,131 tons of waste. Table 4-3 lists the top ten components disposed by multifamily residences. *Food* alone accounted for almost 31%, by weight. *Animal by-products* and *compostable/soiled paper* were also large components. The top ten components, listed in Table 4-3, summed to about 70% of the total waste disposed by multifamily residences. The full multifamily composition results are listed in Table 4-5.

Table 4-3: Top Ten Components – Multifamily
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	30.7%	30.7%	16,022
Animal By-products	8.7%	39.5%	4,553
Compostable/Soiled Paper	6.1%	45.5%	3,154
Disposable Diapers	5.5%	51.0%	2,874
Other Film	5.1%	56.1%	2,640
Mixed Low-grade Paper	4.7%	60.8%	2,473
Textiles/Clothing	2.8%	63.6%	1,440
Mixed/Other Paper	2.4%	66.0%	1,264
Newspaper	2.3%	68.4%	1,222
Plain OCC/Kraft	1.7%	70.1%	893
Total	**70.1%**		**36,536**

4.2.3 Detailed Composition Comparisons between Single-family and Multifamily Residences

As the largest component of both single-family and multifamily waste, *food* made up almost 30% of waste for each. *Compostable/soiled paper*, *animal by-products*, *disposable diapers*, *mixed low-grade paper*, *other plastic film*, and *textiles/clothing* were top ten components of waste from both residence types.

Single-family and multifamily waste streams were substantially similar with a few notable differences. *Disposable diapers* accounted for considerably more waste from single-family residences (9.0%) than from multifamily residences (5.5%). In addition, *miscellaneous organics* were a top ten component only for single-family waste. *Plain OCC/Kraft* was a top ten component for multifamily waste only.

Table 4-4: Composition by Weight – Single-family
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**19.2%**		**11,569**
Newspaper	2.1%	0.2%	1,256
Plain OCC/Kraft	0.8%	0.1%	479
Waxed OCC	0.1%	0.1%	51
Grocery/Shopping Bags	0.6%	0.1%	347
High-grade Paper	1.2%	0.2%	711
Mixed Low-grade Paper	3.9%	0.3%	2,333
Polycoated Containers	0.6%	0.4%	350
Compostable/Soiled	6.7%	0.3%	4,014
Pot. Comp. Single-use Food Service	0.6%	0.1%	368
Non-Comp. Single-use Food Service	0.3%	0.1%	198
Mixed/Other Paper	2.4%	0.3%	1,462
Plastic	**11.7%**		**7,049**
#1 PET Bottles	0.5%	0.0%	286
#2 HDPE Natural Bottles	0.2%	0.0%	92
#2 HDPE Colored Bottles	0.2%	0.0%	142
Other Bottles	0.1%	0.0%	84
Tubs	0.4%	0.1%	225
Expanded Poly. Non-food	0.2%	0.0%	102
Expanded Poly. Food-grade	0.3%	0.0%	155
Rigid Poly. Foam Insulation	0.1%	0.0%	51
Pot. Comp. Single-use Food Service	0.2%	0.1%	108
Non-Comp. Single-use Food Service	0.2%	0.0%	142
Other Rigid Packaging	1.1%	0.1%	654
Shopping/Dry Cleaning Bags	0.2%	0.0%	136
Stretch Wrap	0.0%	0.0%	14
Clean Polyethylene Film	0.1%	0.1%	51
Other Film	6.2%	0.3%	3,742
Plastic Pipe	0.0%	0.0%	6
Foam Carpet Padding	0.1%	0.1%	70
Durable Plastic Products	1.0%	0.2%	589
Plastic/Other Materials	0.7%	0.1%	400
Glass	**1.9%**		**1,147**
Clear Bottles	0.5%	0.1%	329
Green Bottles	0.3%	0.1%	177
Brown Bottles	0.4%	0.1%	236
Container Glass	0.3%	0.1%	195
Fluorescent Tubes	0.0%	0.0%	3
CFLs	0.0%	0.0%	6
Flat Glass	0.1%	0.0%	34
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	167
Metal	**3.0%**		**1,786**
Aluminum Beverage Cans	0.3%	0.0%	153
Aluminum Foil/Containers	0.2%	0.0%	144
Other Aluminum	0.1%	0.0%	81
Other Nonferrous	0.2%	0.2%	138
Steel Food Cans	0.6%	0.1%	333
Empty Aerosol Cans	0.1%	0.0%	77
Other Ferrous	0.5%	0.1%	285
Oil filters	0.0%	0.0%	1
Mixed Metals/Material	1.0%	0.2%	573
Organics	**55.5%**		**33,372**
Leaves and Grass	0.8%	0.3%	498
Prunings	0.2%	0.1%	96
Food	28.4%	0.8%	17,091
Fats, Oils, Grease	0.0%	0.0%	20
Textiles/Clothing	2.9%	0.3%	1,767
Mixed Textiles	1.1%	0.2%	662
Disposable Diapers	9.0%	0.6%	5,439
Animal By-products	12.5%	0.8%	7,501
Rubber Products	0.5%	0.1%	291
Tires	0.0%	0.0%	6

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**0.5%**		**284**
Furniture	0.1%	0.1%	89
Mattresses	0.0%	0.1%	24
Small Appliances	0.2%	0.1%	120
Cell Phones	0.0%	0.0%	3
Audio/Visual Equipment	0.0%	0.0%	10
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.1%	0.0%	38
CDL Wastes	**4.5%**		**2,729**
Clean Dimension Lumber	0.2%	0.1%	127
Clean Engineered Wood	0.1%	0.1%	86
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.2%	0.1%	126
New Painted Wood	0.3%	0.2%	206
Old Painted Wood	0.5%	0.3%	296
Creosote-treated Wood	0.0%	0.0%	18
Other Treated Wood	0.2%	0.1%	93
Contaminated Wood	0.4%	0.2%	238
New Gypsum Scrap	0.1%	0.1%	54
Demo Gypsum Scrap	0.4%	0.2%	216
Carpet	1.0%	0.3%	595
Felt Carpet Pad	0.0%	0.0%	12
Fiberglass Insulation	0.0%	0.0%	20
Concrete	0.1%	0.1%	66
Asphalt Paving	0.0%	0.1%	21
Other Aggregates	0.0%	0.0%	2
Rock	0.0%	0.0%	13
Asphalt Shingles	0.1%	0.1%	42
Other Asphaltic Roofing	0.0%	0.0%	14
Ceramics	0.3%	0.1%	172
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	13
Ceiling Tiles	0.0%	0.0%	22
Other Construction	0.5%	0.2%	274
Hazardous	**0.6%**		**386**
Dried Latex Paint	0.1%	0.1%	60
Liquid Latex Paint	0.1%	0.1%	80
Solvent-based Adhesives	0.0%	0.0%	2
Water-based Adhesives	0.0%	0.0%	12
Oil-based Paint/Thinners	0.0%	0.0%	10
Caustic Cleaners	0.0%	0.0%	16
Pesticides/Herbicides	0.0%	0.0%	21
Rechargeable Batteries	0.0%	0.0%	1
Other Dry-cell Batteries	0.0%	0.0%	21
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	2
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	22
Other Cleaners/Chemicals	0.0%	0.0%	10
Pharmaceuticals/Vitamins	0.0%	0.0%	17
Cosmetics	0.1%	0.0%	79
Other Potentially Harmful Waste	0.1%	0.0%	32
Fines and Misc Materials	**3.0%**		**1,785**
Sand/Soil/Dirt	0.7%	0.3%	443
Non-distinct Fines	0.2%	0.1%	124
Miscellaneous Organics	1.9%	0.3%	1,121
Miscellaneous Inorganics	0.2%	0.1%	97
Totals	**100%**		**60,106**
Sample Count	182		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-5: Composition by Weight – Multifamily
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**21.4%**		**11,159**
Newspaper	2.3%	0.2%	1,222
Plain OCC/Kraft	1.7%	0.3%	893
Waxed OCC	0.2%	0.1%	126
Grocery/Shopping Bags	0.9%	0.1%	467
High-grade Paper	1.6%	0.3%	857
Mixed Low-grade Paper	4.7%	0.3%	2,473
Polycoated Containers	0.4%	0.1%	183
Compostable/Soiled	6.1%	0.4%	3,154
Pot. Comp. Single-use Food Service	0.6%	0.1%	329
Non-Comp. Single-use Food Service	0.4%	0.1%	191
Mixed/Other Paper	2.4%	0.3%	1,264
Plastic	**11.3%**		**5,897**
#1 PET Bottles	0.8%	0.1%	404
#2 HDPE Natural Bottles	0.2%	0.0%	124
#2 HDPE Colored Bottles	0.3%	0.0%	146
Other Bottles	0.1%	0.0%	62
Tubs	0.4%	0.1%	218
Expanded Poly. Non-food	0.1%	0.0%	69
Expanded Poly. Food-grade	0.1%	0.0%	68
Rigid Poly. Foam Insulation	0.1%	0.0%	29
Pot. Comp. Single-use Food Service	0.2%	0.0%	84
Non-Comp. Single-use Food Service	0.3%	0.1%	149
Other Rigid Packaging	1.0%	0.2%	542
Shopping/Dry Cleaning Bags	0.2%	0.0%	112
Stretch Wrap	0.1%	0.1%	39
Clean Polyethylene Film	0.3%	0.3%	172
Other Film	5.1%	0.3%	2,640
Plastic Pipe	0.1%	0.1%	27
Foam Carpet Padding	0.2%	0.2%	114
Durable Plastic Products	0.9%	0.1%	480
Plastic/Other Materials	0.8%	0.2%	417
Glass	**2.8%**		**1,450**
Clear Bottles	0.8%	0.1%	394
Green Bottles	0.6%	0.1%	292
Brown Bottles	0.7%	0.2%	355
Container Glass	0.3%	0.1%	165
Fluorescent Tubes	0.0%	0.1%	21
CFLs	0.0%	0.0%	2
Flat Glass	0.1%	0.0%	32
Automotive Glass	0.0%	0.0%	14
Other Glass	0.3%	0.2%	174
Metal	**3.3%**		**1,736**
Aluminum Beverage Cans	0.5%	0.0%	259
Aluminum Foil/Containers	0.3%	0.0%	138
Other Aluminum	0.1%	0.0%	36
Other Nonferrous	0.3%	0.2%	169
Steel Food Cans	0.7%	0.1%	339
Empty Aerosol Cans	0.1%	0.0%	47
Other Ferrous	0.4%	0.1%	234
Oil filters	0.0%	0.0%	3
Mixed Metals/Material	1.0%	0.2%	511
Organics	**51.9%**		**27,045**
Leaves and Grass	1.7%	0.7%	877
Prunings	0.5%	0.2%	282
Food	30.7%	1.0%	16,022
Fats, Oils, Grease	0.1%	0.1%	52
Textiles/Clothing	2.8%	0.3%	1,440
Mixed Textiles	1.3%	0.2%	664
Disposable Diapers	5.5%	0.5%	2,874
Animal By-products	8.7%	0.8%	4,553
Rubber Products	0.5%	0.1%	250
Tires	0.1%	0.1%	31

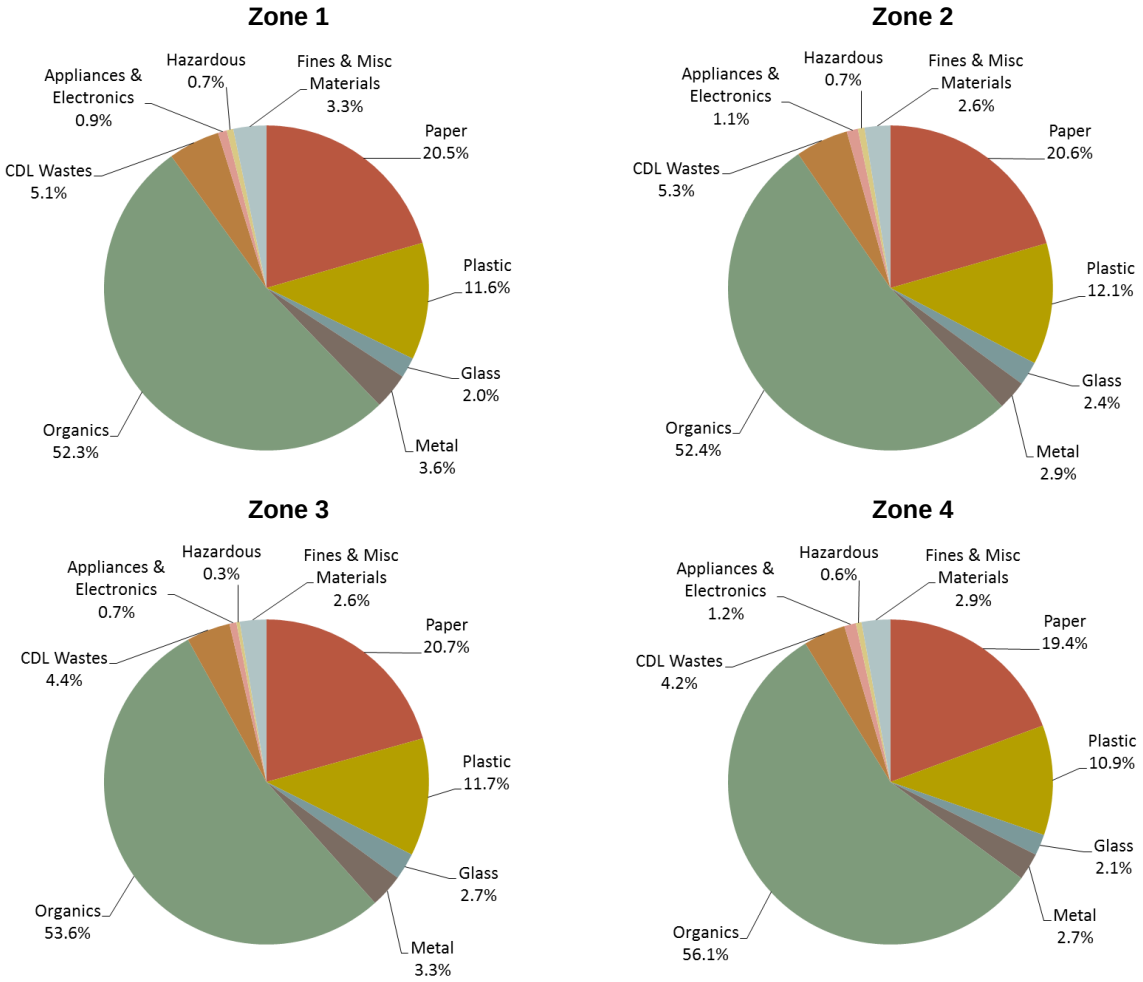
Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**1.5%**		**768**
Furniture	0.5%	0.3%	249
Mattresses	0.2%	0.3%	96
Small Appliances	0.4%	0.2%	213
Cell Phones	0.0%	0.0%	0
Audio/Visual Equipment	0.1%	0.1%	52
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.1%	24
Other Electronics	0.3%	0.2%	133
CDL Wastes	**4.8%**		**2,484**
Clean Dimension Lumber	0.3%	0.1%	141
Clean Engineered Wood	0.2%	0.1%	117
Pallets	0.0%	0.0%	9
Crates	0.0%	0.0%	2
Other Untreated Wood	0.4%	0.2%	205
New Painted Wood	0.3%	0.2%	157
Old Painted Wood	0.3%	0.1%	150
Creosote-treated Wood	0.0%	0.1%	25
Other Treated Wood	0.2%	0.1%	87
Contaminated Wood	0.7%	0.3%	361
New Gypsum Scrap	0.0%	0.0%	21
Demo Gypsum Scrap	0.3%	0.2%	165
Carpet	1.1%	0.4%	572
Felt Carpet Pad	0.0%	0.0%	11
Fiberglass Insulation	0.1%	0.2%	50
Concrete	0.2%	0.2%	106
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	4
Rock	0.1%	0.1%	40
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.3%	0.1%	145
Cement Fiber Board	0.0%	0.0%	15
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	1
Other Construction	0.2%	0.1%	99
Hazardous	**0.4%**		**208**
Dried Latex Paint	0.0%	0.0%	20
Liquid Latex Paint	0.1%	0.1%	29
Solvent-based Adhesives	0.0%	0.0%	4
Water-based Adhesives	0.0%	0.0%	4
Oil-based Paint/Thinners	0.0%	0.0%	10
Caustic Cleaners	0.0%	0.0%	5
Pesticides/Herbicides	0.0%	0.0%	1
Rechargeable Batteries	0.0%	0.0%	2
Other Dry-cell Batteries	0.0%	0.0%	9
Wet-cell Batteries	0.0%	0.0%	3
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	3
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.1%	0.0%	33
Other Cleaners/Chemicals	0.0%	0.0%	19
Pharmaceuticals/Vitamins	0.0%	0.0%	13
Cosmetics	0.1%	0.0%	35
Other Potentially Harmful Waste	0.0%	0.0%	16
Fines and Misc Materials	**2.7%**		**1,385**
Sand/Soil/Dirt	0.6%	0.3%	334
Non-distinct Fines	0.3%	0.1%	162
Miscellaneous Organics	1.5%	0.3%	778
Miscellaneous Inorganics	0.2%	0.1%	111
Totals	**100%**		**52,131**
Sample Count	180		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

4.3 By Collection Zone

For all four collection zones, the broad material categories **organics** and **paper** accounted for the highest percentages of waste. Combined, these two categories accounted for nearly three-quarters of the waste from each collection zone. **Plastic** made up around 11% or 12% in each zone. Other than **fines and miscellaneous materials**, which was slightly greater in Zone 1 than in Zones 2, 3, and 4, very few differences existed in other broad material categories.[18]

Figure 4-2: Composition Summary, by Zone
(January – December 2014)



[18] In April 2000, Seattle implemented a new citywide commingled recycling program. Prior to 2000, larger differences existed between areas of the city because recycling collection containers, separation requirements, and pick-up frequencies varied by area in previous years. As a result, tracking disposal composition by collection area was important when evaluating the curbside program and obtaining accurate overall composition results.

4.3.1 Collection Zone 1

From Zone 1, 92 samples were sorted between January and December 2014. Seattle's Zone 1 residents disposed of an estimated 23,899 tons of waste in 2014. Table 4-6 lists the top ten components from Zone 1. *Food* accounted for about 28% of this waste. *Animal by-products*, *disposable diapers,* and *compostable/soiled paper* were also large components, each greater than 6% of the total. The top ten components listed in Table 4-6 summed to approximately 72% of the total waste disposed in Zone 1. The full composition results for Zone 1 are listed in Table 4-10.

Table 4-6: Top Ten Components – Zone 1
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	27.5%	27.5%	6,565
Animal By-products	11.3%	38.8%	2,705
Disposable Diapers	7.3%	46.0%	1,735
Compostable/Soiled Paper	6.3%	52.4%	1,517
Other Film	5.9%	58.2%	1,399
Mixed Low-grade Paper	4.3%	62.6%	1,032
Mixed/Other Paper	2.5%	65.0%	590
Textiles/Clothing	2.4%	67.5%	585
Miscellaneous Organics	2.0%	69.5%	483
Newspaper	2.0%	71.5%	478
Total	**71.5%**		**17,087**

4.3.2 Collection Zone 2

During the calendar year 2014, 90 loads were sampled in Zone 2. Seattle's Zone 2 residents disposed of approximately 20,111 tons in 2014. *Food* accounted for nearly 29% of this waste, by weight. *Animal by-products*, *disposable diapers, other film, and compostable/soiled paper* each accounted for more than 6% of the total disposed waste for Zone 2. The top ten components summed to over 73% of the total waste disposed in this zone and represented about 14,695 tons in 2014. The full composition results for Zone 2 are listed in Table 4-11.

Table 4-7: Top Ten Components – Zone 2
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	28.8%	28.8%	5,785
Animal By-products	10.2%	39.0%	2,050
Disposable Diapers	7.8%	46.7%	1,563
Other Film	6.3%	53.0%	1,261
Compostable/Soiled Paper	6.1%	59.1%	1,225
Mixed Low-grade Paper	4.4%	63.5%	880
Mixed/Other Paper	2.8%	66.3%	571
Textiles/Clothing	2.8%	69.1%	558
Newspaper	2.1%	71.2%	429
Carpet	1.8%	73.1%	371
Total	**73.1%**		**14,695**

4.3.3 Collection Zone 3

During the calendar year 2014, 91 loads were sampled in Zone 3. Seattle's Zone 3 residents disposed of approximately 36,513 tons in 2014. *Food* accounted for over 30% of this waste, by weight. *Animal by-products, disposable diapers,* and *compostable/soiled paper* each accounted for 6% or more of the total disposed waste for Zone 3. The top ten components summed to nearly 73% and represented 26,578 tons of the annual waste disposed. The full composition results for Zone 3 are listed in Table 4-12.

Table 4-8: Top Ten Components – Zone 3
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	30.3%	30.3%	11,050
Animal By-products	10.6%	40.8%	3,864
Disposable Diapers	6.6%	47.4%	2,405
Compostable/Soiled Paper	6.4%	53.8%	2,336
Other Film	5.3%	59.1%	1,931
Mixed Low-grade Paper	4.3%	63.4%	1,581
Textiles/Clothing	3.0%	66.4%	1,088
Newspaper	2.4%	68.9%	891
Mixed/Other Paper	2.4%	71.2%	865
Miscellaneous Organics	1.6%	72.8%	568
Total	**72.8%**		**26,578**

4.3.4 Collection Zone 4

During the calendar year 2014, 89 loads were sampled from Zone 4. Seattle's Zone 4 residents disposed of approximately 31,715 tons in 2014. *Food* accounted for about 31% of this waste, by weight. *Animal by-products*, *disposable diapers,* and *compostable/soiled paper* each accounted for more than 6% of the total disposed waste for Zone 4. The top ten components summed to more than 75% and represented 23,823 tons of the annual waste disposed. The full composition results for Zone 4 are listed in Table 4-13.

Table 4-9: Top Ten Components – Zone 4
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	30.6%	30.6%	9,713
Animal By-products	10.8%	41.5%	3,435
Disposable Diapers	8.2%	49.7%	2,611
Compostable/Soiled Paper	6.6%	56.3%	2,091
Other Film	5.6%	61.9%	1,792
Mixed Low-grade Paper	4.1%	66.1%	1,313
Textiles/Clothing	3.1%	69.1%	976
Mixed/Other Paper	2.2%	71.4%	701
Newspaper	2.1%	73.5%	679
Miscellaneous Organics	1.6%	75.1%	513
Total	**75.1%**		**23,823**

4.3.5 Detailed Composition Comparisons among Collection Zones

In all four collection zones, *food, animal by-products, and disposable diapers* were the first, second, and third largest (respectively) components of waste. While *other film* was the fourth largest component for Zone 2, *compostable/soiled paper* was the fourth largest component for Zones 1, 2, and 4. Seven of the components were common to the top ten lists from all four zones: *food, animal by-products, disposable diapers, compostable/soiled paper, mixed low-grade paper, other plastic film, and textiles/clothing*. Three of the zones (Zones 1, 3, and 4) also shared *miscellaneous organics* as a top ten component. Zone 2 was the only area in which *carpet* made the top ten list.

Table 4-10: Composition by Weight – Zone 1
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**20.5%**		**4,904**
Newspaper	2.0%	0.3%	478
Plain OCC/Kraft	1.3%	0.4%	303
Waxed OCC	0.1%	0.1%	34
Grocery/Shopping Bags	0.6%	0.1%	142
High-grade Paper	1.5%	0.4%	356
Mixed Low-grade Paper	4.3%	0.4%	1,032
Polycoated Containers	1.0%	1.0%	236
Compostable/Soiled	6.3%	0.5%	1,517
Pot. Comp. Single-use Food Service	0.6%	0.1%	139
Non-Comp. Single-use Food Service	0.3%	0.1%	78
Mixed/Other Paper	2.5%	0.4%	590
Plastic	**11.6%**		**2,781**
#1 PET Bottles	0.5%	0.1%	118
#2 HDPE Natural Bottles	0.2%	0.1%	42
#2 HDPE Colored Bottles	0.3%	0.0%	67
Other Bottles	0.2%	0.1%	41
Tubs	0.4%	0.1%	88
Expanded Poly. Non-food	0.2%	0.1%	41
Expanded Poly. Food-grade	0.2%	0.1%	51
Rigid Poly. Foam Insulation	0.1%	0.1%	21
Pot. Comp. Single-use Food Service	0.2%	0.1%	41
Non-Comp. Single-use Food Service	0.2%	0.1%	57
Other Rigid Packaging	1.0%	0.2%	229
Shopping/Dry Cleaning Bags	0.2%	0.0%	41
Stretch Wrap	0.0%	0.0%	7
Clean Polyethylene Film	0.1%	0.1%	27
Other Film	5.9%	0.4%	1,399
Plastic Pipe	0.0%	0.1%	11
Foam Carpet Padding	0.2%	0.2%	43
Durable Plastic Products	1.2%	0.2%	278
Plastic/Other Materials	0.8%	0.2%	180
Glass	**2.0%**		**485**
Clear Bottles	0.5%	0.1%	126
Green Bottles	0.4%	0.1%	98
Brown Bottles	0.4%	0.1%	94
Container Glass	0.3%	0.1%	60
Fluorescent Tubes	0.0%	0.0%	1
CFLs	0.0%	0.0%	2
Flat Glass	0.1%	0.1%	29
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	75
Metal	**3.6%**		**856**
Aluminum Beverage Cans	0.3%	0.1%	79
Aluminum Foil/Containers	0.2%	0.0%	56
Other Aluminum	0.1%	0.0%	29
Other Nonferrous	0.4%	0.4%	101
Steel Food Cans	0.6%	0.2%	141
Empty Aerosol Cans	0.1%	0.0%	29
Other Ferrous	0.4%	0.1%	97
Oil filters	0.0%	0.0%	2
Mixed Metals/Material	1.3%	0.3%	321
Organics	**52.3%**		**12,493**
Leaves and Grass	1.2%	0.9%	297
Prunings	0.3%	0.3%	72
Food	27.5%	1.4%	6,565
Fats, Oils, Grease	0.2%	0.2%	46
Textiles/Clothing	2.4%	0.4%	585
Mixed Textiles	1.3%	0.3%	300
Disposable Diapers	7.3%	0.9%	1,735
Animal By-products	11.3%	1.1%	2,705
Rubber Products	0.8%	0.3%	185
Tires	0.0%	0.0%	4
Appliances and Electronics	**0.9%**		**210**
Furniture	0.2%	0.3%	52
Mattresses	0.1%	0.2%	24
Small Appliances	0.3%	0.2%	65
Cell Phones	0.0%	0.0%	1
Audio/Visual Equipment	0.1%	0.1%	17
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.2%	0.1%	51
CDL Wastes	**5.1%**		**1,227**
Clean Dimension Lumber	0.4%	0.2%	88
Clean Engineered Wood	0.2%	0.1%	47
Pallets	0.0%	0.0%	7
Crates	0.0%	0.0%	0
Other Untreated Wood	0.4%	0.2%	89
New Painted Wood	0.3%	0.1%	65
Old Painted Wood	0.5%	0.3%	121
Creosote-treated Wood	0.0%	0.0%	8
Other Treated Wood	0.1%	0.1%	28
Contaminated Wood	0.6%	0.3%	155
New Gypsum Scrap	0.0%	0.0%	4
Demo Gypsum Scrap	0.2%	0.2%	46
Carpet	1.1%	0.5%	258
Felt Carpet Pad	0.0%	0.0%	2
Fiberglass Insulation	0.0%	0.0%	6
Concrete	0.2%	0.2%	39
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	2
Rock	0.1%	0.1%	21
Asphalt Shingles	0.2%	0.2%	41
Other Asphaltic Roofing	0.0%	0.1%	8
Ceramics	0.3%	0.1%	72
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.1%	0.1%	13
Ceiling Tiles	0.1%	0.1%	15
Other Construction	0.4%	0.3%	91
Hazardous	**0.7%**		**158**
Dried Latex Paint	0.0%	0.0%	11
Liquid Latex Paint	0.1%	0.1%	29
Solvent-based Adhesives	0.0%	0.0%	3
Water-based Adhesives	0.0%	0.0%	4
Oil-based Paint/Thinners	0.0%	0.0%	6
Caustic Cleaners	0.0%	0.0%	10
Pesticides/Herbicides	0.0%	0.0%	7
Rechargeable Batteries	0.0%	0.0%	0
Other Dry-cell Batteries	0.0%	0.0%	10
Wet-cell Batteries	0.0%	0.0%	1
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	1
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	11
Other Cleaners/Chemicals	0.1%	0.1%	18
Pharmaceuticals/Vitamins	0.0%	0.0%	5
Cosmetics	0.1%	0.0%	21
Other Potentially Harmful Waste	0.1%	0.1%	20
Fines and Misc Materials	**3.3%**		**784**
Sand/Soil/Dirt	0.9%	0.4%	214
Non-distinct Fines	0.3%	0.2%	64
Miscellaneous Organics	2.0%	0.5%	483
Miscellaneous Inorganics	0.1%	0.1%	24
Totals	**100%**		**23,899**
Sample Count	92		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-11: Composition by Weight – Zone 2
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**20.6%**		**4,135**
Newspaper	2.1%	0.4%	429
Plain OCC/Kraft	1.0%	0.2%	207
Waxed OCC	0.1%	0.1%	20
Grocery/Shopping Bags	0.7%	0.1%	134
High-grade Paper	1.5%	0.4%	309
Mixed Low-grade Paper	4.4%	0.5%	880
Polycoated Containers	0.4%	0.1%	84
Compostable/Soiled	6.1%	0.6%	1,225
Pot. Comp. Single-use Food Service	0.9%	0.3%	189
Non-Comp. Single-use Food Service	0.4%	0.1%	87
Mixed/Other Paper	2.8%	0.5%	571
Plastic	**12.1%**		**2,429**
#1 PET Bottles	0.6%	0.1%	126
#2 HDPE Natural Bottles	0.2%	0.0%	32
#2 HDPE Colored Bottles	0.3%	0.0%	50
Other Bottles	0.1%	0.0%	18
Tubs	0.4%	0.1%	76
Expanded Poly. Non-food	0.2%	0.1%	36
Expanded Poly. Food-grade	0.2%	0.0%	38
Rigid Poly. Foam Insulation	0.1%	0.0%	11
Pot. Comp. Single-use Food Service	0.3%	0.1%	54
Non-Comp. Single-use Food Service	0.2%	0.1%	42
Other Rigid Packaging	1.2%	0.2%	232
Shopping/Dry Cleaning Bags	0.2%	0.0%	37
Stretch Wrap	0.0%	0.0%	5
Clean Polyethylene Film	0.1%	0.1%	26
Other Film	6.3%	0.5%	1,261
Plastic Pipe	0.0%	0.0%	1
Foam Carpet Padding	0.2%	0.2%	47
Durable Plastic Products	1.1%	0.3%	218
Plastic/Other Materials	0.6%	0.1%	120
Glass	**2.4%**		**478**
Clear Bottles	0.6%	0.1%	117
Green Bottles	0.2%	0.1%	50
Brown Bottles	0.5%	0.1%	97
Container Glass	0.3%	0.1%	68
Fluorescent Tubes	0.0%	0.0%	2
CFLs	0.0%	0.0%	1
Flat Glass	0.1%	0.1%	21
Automotive Glass	0.1%	0.1%	14
Other Glass	0.5%	0.4%	107
Metal	**2.9%**		**591**
Aluminum Beverage Cans	0.3%	0.0%	55
Aluminum Foil/Containers	0.3%	0.0%	52
Other Aluminum	0.1%	0.0%	24
Other Nonferrous	0.1%	0.1%	27
Steel Food Cans	0.6%	0.1%	113
Empty Aerosol Cans	0.1%	0.1%	22
Other Ferrous	0.5%	0.1%	95
Oil filters	0.0%	0.0%	0
Mixed Metals/Material	1.0%	0.3%	202
Organics	**52.4%**		**10,545**
Leaves and Grass	1.1%	0.6%	214
Prunings	0.4%	0.3%	75
Food	28.8%	1.2%	5,785
Fats, Oils, Grease	0.1%	0.1%	14
Textiles/Clothing	2.8%	0.3%	558
Mixed Textiles	1.0%	0.3%	196
Disposable Diapers	7.8%	0.8%	1,563
Animal By-products	10.2%	0.8%	2,050
Rubber Products	0.4%	0.2%	88
Tires	0.0%	0.0%	1
Appliances and Electronics	**1.1%**		**224**
Furniture	0.7%	0.6%	132
Mattresses	0.0%	0.0%	0
Small Appliances	0.2%	0.1%	35
Cell Phones	0.0%	0.0%	1
Audio/Visual Equipment	0.0%	0.0%	5
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.3%	0.3%	51
CDL Wastes	**5.3%**		**1,059**
Clean Dimension Lumber	0.2%	0.1%	35
Clean Engineered Wood	0.2%	0.1%	38
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.3%	0.2%	56
New Painted Wood	0.3%	0.2%	63
Old Painted Wood	0.1%	0.1%	19
Creosote-treated Wood	0.1%	0.2%	25
Other Treated Wood	0.1%	0.1%	26
Contaminated Wood	0.5%	0.3%	93
New Gypsum Scrap	0.0%	0.0%	4
Demo Gypsum Scrap	0.7%	0.5%	140
Carpet	1.8%	0.9%	371
Felt Carpet Pad	0.0%	0.1%	7
Fiberglass Insulation	0.0%	0.0%	3
Concrete	0.0%	0.0%	8
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	3
Rock	0.0%	0.0%	2
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.3%	0.1%	58
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.1%	8
Other Construction	0.5%	0.4%	103
Hazardous	**0.7%**		**133**
Dried Latex Paint	0.1%	0.1%	13
Liquid Latex Paint	0.1%	0.1%	28
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	4
Oil-based Paint/Thinners	0.0%	0.0%	7
Caustic Cleaners	0.0%	0.0%	1
Pesticides/Herbicides	0.0%	0.0%	2
Rechargeable Batteries	0.0%	0.0%	1
Other Dry-cell Batteries	0.0%	0.0%	6
Wet-cell Batteries	0.0%	0.0%	2
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	1
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.1%	0.0%	13
Other Cleaners/Chemicals	0.0%	0.0%	3
Pharmaceuticals/Vitamins	0.0%	0.0%	6
Cosmetics	0.2%	0.1%	33
Other Potentially Harmful Waste	0.1%	0.0%	13
Fines and Misc Materials	**2.6%**		**516**
Sand/Soil/Dirt	0.3%	0.2%	70
Non-distinct Fines	0.3%	0.2%	59
Miscellaneous Organics	1.7%	0.5%	336
Miscellaneous Inorganics	0.3%	0.1%	52
Totals	**100%**		**20,111**
Sample Count	90		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-12: Composition by Weight – Zone 3
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**20.7%**		**7,549**
Newspaper	2.4%	0.4%	891
Plain OCC/Kraft	1.4%	0.3%	499
Waxed OCC	0.2%	0.1%	59
Grocery/Shopping Bags	1.0%	0.2%	365
High-grade Paper	1.5%	0.3%	559
Mixed Low-grade Paper	4.3%	0.4%	1,581
Polycoated Containers	0.3%	0.0%	94
Compostable/Soiled	6.4%	0.4%	2,336
Pot. Comp. Single-use Food Service	0.6%	0.1%	202
Non-Comp. Single-use Food Service	0.3%	0.1%	99
Mixed/Other Paper	2.4%	0.4%	865
Plastic	**11.7%**		**4,268**
#1 PET Bottles	0.7%	0.1%	239
#2 HDPE Natural Bottles	0.2%	0.1%	84
#2 HDPE Colored Bottles	0.3%	0.1%	101
Other Bottles	0.2%	0.0%	56
Tubs	0.4%	0.1%	164
Expanded Poly. Non-food	0.1%	0.0%	47
Expanded Poly. Food-grade	0.1%	0.0%	54
Rigid Poly. Foam Insulation	0.1%	0.0%	21
Pot. Comp. Single-use Food Service	0.1%	0.0%	43
Non-Comp. Single-use Food Service	0.3%	0.1%	115
Other Rigid Packaging	1.2%	0.2%	427
Shopping/Dry Cleaning Bags	0.2%	0.0%	86
Stretch Wrap	0.1%	0.1%	33
Clean Polyethylene Film	0.4%	0.4%	153
Other Film	5.3%	0.4%	1,931
Plastic Pipe	0.0%	0.1%	17
Foam Carpet Padding	0.2%	0.2%	81
Durable Plastic Products	0.9%	0.2%	312
Plastic/Other Materials	0.8%	0.2%	304
Glass	**2.7%**		**973**
Clear Bottles	0.8%	0.1%	285
Green Bottles	0.6%	0.1%	205
Brown Bottles	0.7%	0.2%	260
Container Glass	0.3%	0.1%	115
Fluorescent Tubes	0.1%	0.1%	20
CFLs	0.0%	0.0%	2
Flat Glass	0.0%	0.0%	6
Automotive Glass	0.0%	0.0%	0
Other Glass	0.2%	0.1%	78
Metal	**3.3%**		**1,214**
Aluminum Beverage Cans	0.4%	0.1%	163
Aluminum Foil/Containers	0.3%	0.1%	104
Other Aluminum	0.1%	0.0%	28
Other Nonferrous	0.3%	0.2%	111
Steel Food Cans	0.5%	0.1%	199
Empty Aerosol Cans	0.1%	0.0%	38
Other Ferrous	0.6%	0.2%	212
Oil filters	0.0%	0.0%	1
Mixed Metals/Material	1.0%	0.3%	359
Organics	**53.6%**		**19,578**
Leaves and Grass	1.0%	0.4%	383
Prunings	0.4%	0.2%	149
Food	30.3%	1.0%	11,050
Fats, Oils, Grease	0.0%	0.0%	1
Textiles/Clothing	3.0%	0.5%	1,088
Mixed Textiles	1.3%	0.2%	473
Disposable Diapers	6.6%	0.6%	2,405
Animal By-products	10.6%	1.1%	3,864
Rubber Products	0.4%	0.1%	161
Tires	0.0%	0.0%	5
Appliances and Electronics	**0.7%**		**250**
Furniture	0.1%	0.2%	40
Mattresses	0.3%	0.4%	96
Small Appliances	0.3%	0.2%	93
Cell Phones	0.0%	0.0%	0
Audio/Visual Equipment	0.0%	0.0%	7
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.0%	0.0%	15
CDL Wastes	**4.4%**		**1,594**
Clean Dimension Lumber	0.2%	0.1%	81
Clean Engineered Wood	0.1%	0.1%	54
Pallets	0.0%	0.0%	1
Crates	0.0%	0.0%	2
Other Untreated Wood	0.3%	0.1%	102
New Painted Wood	0.2%	0.2%	81
Old Painted Wood	0.3%	0.2%	100
Creosote-treated Wood	0.0%	0.0%	5
Other Treated Wood	0.3%	0.2%	99
Contaminated Wood	0.4%	0.2%	145
New Gypsum Scrap	0.0%	0.0%	10
Demo Gypsum Scrap	0.3%	0.2%	92
Carpet	1.1%	0.6%	401
Felt Carpet Pad	0.0%	0.0%	0
Fiberglass Insulation	0.2%	0.2%	57
Concrete	0.3%	0.4%	113
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	0
Rock	0.1%	0.1%	30
Asphalt Shingles	0.0%	0.0%	1
Other Asphaltic Roofing	0.0%	0.0%	6
Ceramics	0.4%	0.2%	133
Cement Fiber Board	0.0%	0.1%	15
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	0
Other Construction	0.2%	0.2%	66
Hazardous	**0.3%**		**122**
Dried Latex Paint	0.0%	0.0%	7
Liquid Latex Paint	0.1%	0.1%	20
Solvent-based Adhesives	0.0%	0.0%	2
Water-based Adhesives	0.0%	0.0%	5
Oil-based Paint/Thinners	0.0%	0.0%	6
Caustic Cleaners	0.0%	0.0%	8
Pesticides/Herbicides	0.0%	0.0%	3
Rechargeable Batteries	0.0%	0.0%	1
Other Dry-cell Batteries	0.0%	0.0%	7
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	3
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.1%	0.0%	19
Other Cleaners/Chemicals	0.0%	0.0%	3
Pharmaceuticals/Vitamins	0.0%	0.0%	10
Cosmetics	0.1%	0.0%	25
Other Potentially Harmful Waste	0.0%	0.0%	4
Fines and Misc Materials	**2.6%**		**964**
Sand/Soil/Dirt	0.6%	0.4%	228
Non-distinct Fines	0.2%	0.2%	89
Miscellaneous Organics	1.6%	0.3%	568
Miscellaneous Inorganics	0.2%	0.1%	79
Totals	**100%**		**36,513**
Sample Count	91		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-13: Composition by Weight – Zone 4
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**19.4%**		**6,140**
Newspaper	2.1%	0.3%	679
Plain OCC/Kraft	1.1%	0.3%	364
Waxed OCC	0.2%	0.1%	64
Grocery/Shopping Bags	0.5%	0.1%	173
High-grade Paper	1.1%	0.3%	345
Mixed Low-grade Paper	4.1%	0.5%	1,313
Polycoated Containers	0.4%	0.2%	120
Compostable/Soiled	6.6%	0.5%	2,091
Pot. Comp. Single-use Food Service	0.5%	0.1%	167
Non-Comp. Single-use Food Service	0.4%	0.1%	124
Mixed/Other Paper	2.2%	0.4%	701
Plastic	**10.9%**		**3,467**
#1 PET Bottles	0.7%	0.1%	207
#2 HDPE Natural Bottles	0.2%	0.0%	58
#2 HDPE Colored Bottles	0.2%	0.0%	70
Other Bottles	0.1%	0.1%	31
Tubs	0.4%	0.1%	115
Expanded Poly. Non-food	0.2%	0.0%	48
Expanded Poly. Food-grade	0.3%	0.0%	80
Rigid Poly. Foam Insulation	0.1%	0.1%	27
Pot. Comp. Single-use Food Service	0.2%	0.1%	55
Non-Comp. Single-use Food Service	0.2%	0.1%	77
Other Rigid Packaging	1.0%	0.1%	307
Shopping/Dry Cleaning Bags	0.3%	0.1%	84
Stretch Wrap	0.0%	0.0%	7
Clean Polyethylene Film	0.1%	0.0%	18
Other Film	5.6%	0.5%	1,792
Plastic Pipe	0.0%	0.0%	5
Foam Carpet Padding	0.0%	0.0%	14
Durable Plastic Products	0.8%	0.2%	261
Plastic/Other Materials	0.7%	0.2%	213
Glass	**2.1%**		**661**
Clear Bottles	0.6%	0.1%	194
Green Bottles	0.4%	0.1%	116
Brown Bottles	0.4%	0.1%	140
Container Glass	0.4%	0.1%	117
Fluorescent Tubes	0.0%	0.0%	1
CFLs	0.0%	0.0%	2
Flat Glass	0.0%	0.0%	10
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	81
Metal	**2.7%**		**861**
Aluminum Beverage Cans	0.4%	0.1%	115
Aluminum Foil/Containers	0.2%	0.0%	68
Other Aluminum	0.1%	0.0%	35
Other Nonferrous	0.2%	0.3%	68
Steel Food Cans	0.7%	0.1%	220
Empty Aerosol Cans	0.1%	0.0%	36
Other Ferrous	0.4%	0.1%	115
Oil filters	0.0%	0.0%	1
Mixed Metals/Material	0.6%	0.2%	202
Organics	**56.1%**		**17,800**
Leaves and Grass	1.5%	0.8%	481
Prunings	0.3%	0.2%	83
Food	30.6%	1.3%	9,713
Fats, Oils, Grease	0.0%	0.0%	12
Textiles/Clothing	3.1%	0.4%	976
Mixed Textiles	1.1%	0.3%	357
Disposable Diapers	8.2%	0.7%	2,611
Animal By-products	10.8%	1.2%	3,435
Rubber Products	0.3%	0.1%	107
Tires	0.1%	0.1%	26

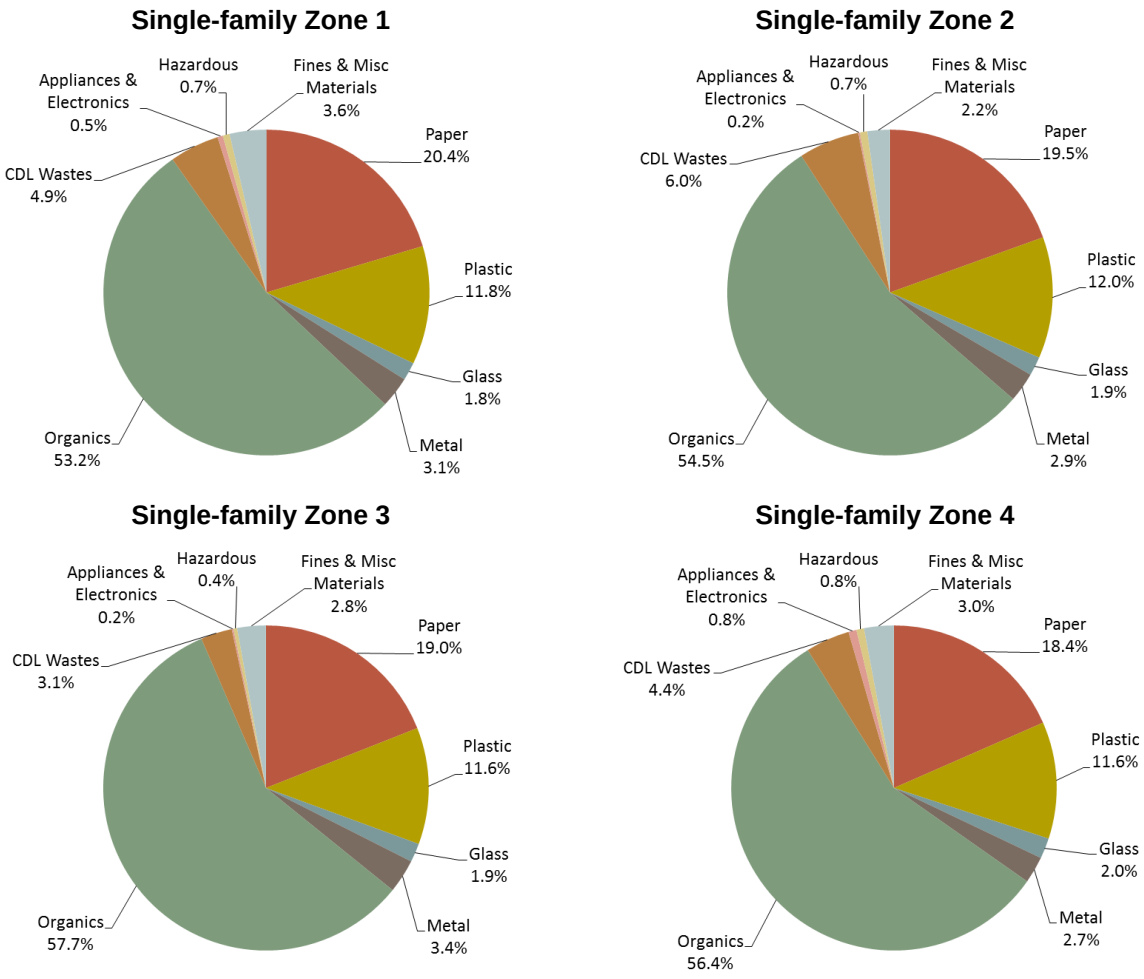
Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**1.2%**		**367**
Furniture	0.4%	0.3%	114
Mattresses	0.0%	0.0%	0
Small Appliances	0.4%	0.3%	140
Cell Phones	0.0%	0.0%	2
Audio/Visual Equipment	0.1%	0.1%	33
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.1%	0.1%	24
Other Electronics	0.2%	0.1%	54
CDL Wastes	**4.2%**		**1,332**
Clean Dimension Lumber	0.2%	0.1%	64
Clean Engineered Wood	0.2%	0.1%	65
Pallets	0.0%	0.0%	1
Crates	0.0%	0.0%	0
Other Untreated Wood	0.3%	0.3%	84
New Painted Wood	0.5%	0.3%	154
Old Painted Wood	0.6%	0.5%	205
Creosote-treated Wood	0.0%	0.0%	4
Other Treated Wood	0.1%	0.1%	28
Contaminated Wood	0.7%	0.4%	206
New Gypsum Scrap	0.2%	0.2%	58
Demo Gypsum Scrap	0.3%	0.3%	104
Carpet	0.4%	0.2%	136
Felt Carpet Pad	0.0%	0.1%	15
Fiberglass Insulation	0.0%	0.0%	4
Concrete	0.0%	0.0%	11
Asphalt Paving	0.1%	0.1%	21
Other Aggregates	0.0%	0.0%	1
Rock	0.0%	0.0%	1
Asphalt Shingles	0.0%	0.0%	1
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.2%	0.1%	54
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	0
Other Construction	0.4%	0.3%	113
Hazardous	**0.6%**		**181**
Dried Latex Paint	0.2%	0.2%	49
Liquid Latex Paint	0.1%	0.1%	32
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	3
Oil-based Paint/Thinners	0.0%	0.0%	2
Caustic Cleaners	0.0%	0.0%	2
Pesticides/Herbicides	0.0%	0.1%	10
Rechargeable Batteries	0.0%	0.0%	1
Other Dry-cell Batteries	0.0%	0.0%	8
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	1
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	13
Other Cleaners/Chemicals	0.0%	0.0%	5
Pharmaceuticals/Vitamins	0.0%	0.0%	9
Cosmetics	0.1%	0.1%	34
Other Potentially Harmful Waste	0.0%	0.0%	11
Fines and Misc Materials	**2.9%**		**906**
Sand/Soil/Dirt	0.8%	0.5%	266
Non-distinct Fines	0.2%	0.2%	74
Miscellaneous Organics	1.6%	0.4%	513
Miscellaneous Inorganics	0.2%	0.1%	53
Totals	**100%**		**31,715**
Sample Count	89		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

4.4 By Collection Zone and Residence Type: Single-family

Broad material categories (as shown in Figure 4-3) were compared across single-family waste from Zones 1 through 4. In all four collection zones, **organics** made up the majority of waste disposed, ranging from about 53% up to nearly 58%. Other predominant categories included **paper** (between 18% and 20% of the total), and, **plastic**, which accounted for about 12% in all four collection zones.

Figure 4-3: Composition Summary, Single-family
(January – December 2014)



4.4.1 Single-family Zone 1

A total of 47 samples were sorted from single-family Zone 1 waste loads. This subpopulation disposed of approximately 15,115 tons during the calendar year 2014. The top ten components for the single-family Zone 1 subpopulation accounted for about 74%, or 11,226 tons, of the annual waste disposed. *Food* was the largest component, at about 27% of the waste stream. *Animal by-products* (12.2%)*, disposable diapers* (8.5%), *compostable/soiled paper* (6.5%), and *other film* (6.1%) were also large components. Table 4-18 details the full composition results for the single-family Zone 1 subpopulation.

Table 4-14: Top Ten Components – Single-family Zone 1
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	27.2%	27.2%	4,116
Animal By-products	12.2%	39.4%	1,845
Disposable Diapers	8.5%	48.0%	1,290
Compostable/Soiled Paper	6.5%	54.4%	976
Other Film	6.1%	60.6%	926
Mixed Low-grade Paper	4.3%	64.9%	655
Textiles/Clothing	2.6%	67.5%	390
Miscellaneous Organics	2.4%	69.9%	366
Mixed/Other Paper	2.3%	72.2%	353
Newspaper	2.0%	74.3%	308
Total	**74.3%**		**11,226**

4.4.2 Single-family Zone 2

A total of 45 samples of waste were sorted from single-family Zone 2 loads. This subpopulation disposed of 11,160 tons of waste between January and December 2014. The top ten components for the single-family Zone 2 subpopulation accounted for 75%, or 8,406 tons, of the annual waste disposed. *Food* accounted for nearly 28%. *Animal by-products* (12.1%) and *disposable diapers* (9.0%) were also large components. Detailed composition results for the single-family Zone 2 subpopulation are listed in Table 4-19.

Table 4-15: Top Ten Components – Single-family Zone 2
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	27.8%	27.8%	3,106
Animal By-products	12.1%	39.9%	1,351
Disposable Diapers	9.0%	48.9%	1,003
Other Film	6.5%	55.4%	726
Compostable/Soiled Paper	6.3%	61.7%	699
Mixed Low-grade Paper	3.7%	65.4%	414
Textiles/Clothing	2.8%	68.2%	313
Mixed/Other Paper	2.6%	70.8%	289
Carpet	2.4%	73.2%	268
Newspaper	2.1%	75.3%	237
Total	**75.3%**		**8,406**

4.4.3 Single-family Zone 3

A total of 45 samples were sorted from single-family Zone 3 loads. This subpopulation disposed of 13,468 tons of waste between January and December 2014. The top ten components for the single-family Zone 3 subpopulation accounted for nearly 78%, or 10,445 tons, of the annual waste disposed. *Food* accounted for approximately 29%. *Animal by-products* (13.2%), *disposable diapers* (8.8%), and *compostable/soiled paper* (6.5%) were also large components. The detailed composition results for single-family Zone 3 are listed in Table 4-20.

Table 4-16: Top Ten Components – Single-family Zone 3
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	29.3%	29.3%	3,945
Animal By-products	13.2%	42.5%	1,784
Disposable Diapers	8.8%	51.3%	1,185
Compostable/Soiled Paper	6.5%	57.9%	881
Other Film	6.1%	63.9%	817
Mixed Low-grade Paper	3.9%	67.9%	529
Textiles/Clothing	3.1%	71.0%	415
Mixed/Other Paper	2.5%	73.4%	331
Newspaper	2.3%	75.7%	307
Miscellaneous Organics	1.9%	77.6%	251
Total	**77.6%**		**10,445**

4.4.4 Single-family Zone 4

A total of 45 samples were taken from single-family Zone 4 loads. This subpopulation disposed of 20,363 tons of waste between January and December 2014. The top ten components for the single-family Zone 4 subpopulation accounted for about 77%, or 15,742 tons, of the annual waste disposed. The most prevalent component, *food*, accounted for about 29% by weight. *Animal by-products* (12.4%), *disposable diapers* (9.6%), and *compostable/soiled paper* (7.2%) were also large components. The detailed composition results for the single-family Zone 4 subpopulation are listed in Table 4-21.

Table 4-17: Top Ten Components – Single-family Zone 4
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	29.1%	29.1%	5,924
Animal By-products	12.4%	41.5%	2,521
Disposable Diapers	9.6%	51.1%	1,960
Compostable/Soiled Paper	7.2%	58.3%	1,458
Other Film	6.3%	64.5%	1,274
Mixed Low-grade Paper	3.6%	68.1%	735
Textiles/Clothing	3.2%	71.3%	649
Mixed/Other Paper	2.4%	73.7%	489
Newspaper	2.0%	75.7%	403
Miscellaneous Organics	1.6%	77.3%	329
Total	**77.3%**		**15,742**

4.4.5 Detailed Composition Comparisons among Single-family Zones 1 through 4

At around 30%, *food was* the largest component of waste from all four zones, followed by *animal by-products* and *disposable diapers. Compostable/soiled paper* was the fourth largest component for Zones 1, 3, and 4. The fourth largest component in Zone 2 was *other film.* Nine of the top ten components are common to all four top ten lists: *food, animal by-products, disposable diapers, compostable/soiled paper, mixed low-grade paper, other plastic film, textiles/clothing, mixed/other paper, and newspaper.* Zones 1, 3, and 4 had *miscellaneous organics* as the remaining top ten component, while it was *newspaper* in Zone 2.

Table 4-18: Composition by Weight – Single-family Zone 1
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**20.4%**		**3,084**
Newspaper	2.0%	0.5%	308
Plain OCC/Kraft	0.8%	0.3%	118
Waxed OCC	0.0%	0.0%	5
Grocery/Shopping Bags	0.6%	0.2%	88
High-grade Paper	1.7%	0.5%	251
Mixed Low-grade Paper	4.3%	0.6%	655
Polycoated Containers	1.4%	1.5%	210
Compostable/Soiled	6.5%	0.5%	976
Pot. Comp. Single-use Food Service	0.5%	0.1%	81
Non-Comp. Single-use Food Service	0.3%	0.1%	39
Mixed/Other Paper	2.3%	0.5%	353
Plastic	**11.8%**		**1,776**
#1 PET Bottles	0.4%	0.1%	57
#2 HDPE Natural Bottles	0.1%	0.1%	22
#2 HDPE Colored Bottles	0.2%	0.1%	35
Other Bottles	0.2%	0.1%	27
Tubs	0.4%	0.1%	54
Expanded Poly. Non-food	0.1%	0.1%	20
Expanded Poly. Food-grade	0.3%	0.1%	39
Rigid Poly. Foam Insulation	0.1%	0.1%	10
Pot. Comp. Single-use Food Service	0.2%	0.1%	30
Non-Comp. Single-use Food Service	0.2%	0.1%	31
Other Rigid Packaging	1.1%	0.3%	168
Shopping/Dry Cleaning Bags	0.2%	0.1%	28
Stretch Wrap	0.0%	0.0%	4
Clean Polyethylene Film	0.1%	0.0%	10
Other Film	6.1%	0.6%	926
Plastic Pipe	0.0%	0.0%	2
Foam Carpet Padding	0.2%	0.2%	24
Durable Plastic Products	1.1%	0.3%	173
Plastic/Other Materials	0.8%	0.2%	118
Glass	**1.8%**		**272**
Clear Bottles	0.4%	0.2%	63
Green Bottles	0.4%	0.2%	62
Brown Bottles	0.3%	0.1%	49
Container Glass	0.3%	0.1%	38
Fluorescent Tubes	0.0%	0.0%	1
CFLs	0.0%	0.0%	2
Flat Glass	0.1%	0.2%	17
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	39
Metal	**3.1%**		**466**
Aluminum Beverage Cans	0.2%	0.1%	36
Aluminum Foil/Containers	0.2%	0.0%	35
Other Aluminum	0.1%	0.1%	20
Other Nonferrous	0.3%	0.3%	41
Steel Food Cans	0.4%	0.1%	68
Empty Aerosol Cans	0.1%	0.1%	22
Other Ferrous	0.5%	0.2%	72
Oil filters	0.0%	0.0%	0
Mixed Metals/Material	1.1%	0.4%	173
Organics	**53.2%**		**8,040**
Leaves and Grass	0.8%	0.6%	117
Prunings	0.0%	0.0%	4
Food	27.2%	1.9%	4,116
Fats, Oils, Grease	0.0%	0.0%	1
Textiles/Clothing	2.6%	0.6%	390
Mixed Textiles	1.2%	0.4%	188
Disposable Diapers	8.5%	1.3%	1,290
Animal By-products	12.2%	1.5%	1,845
Rubber Products	0.6%	0.3%	84
Tires	0.0%	0.0%	4

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**0.5%**		**80**
Furniture	0.1%	0.1%	9
Mattresses	0.2%	0.3%	24
Small Appliances	0.2%	0.2%	37
Cell Phones	0.0%	0.0%	1
Audio/Visual Equipment	0.0%	0.0%	4
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.0%	0.0%	6
CDL Wastes	**4.9%**		**744**
Clean Dimension Lumber	0.4%	0.3%	64
Clean Engineered Wood	0.1%	0.2%	20
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.1%	0.1%	21
New Painted Wood	0.2%	0.2%	31
Old Painted Wood	0.5%	0.4%	77
Creosote-treated Wood	0.0%	0.0%	7
Other Treated Wood	0.1%	0.1%	18
Contaminated Wood	0.8%	0.5%	118
New Gypsum Scrap	0.0%	0.0%	4
Demo Gypsum Scrap	0.3%	0.2%	41
Carpet	0.8%	0.5%	122
Felt Carpet Pad	0.0%	0.0%	2
Fiberglass Insulation	0.0%	0.1%	5
Concrete	0.1%	0.1%	11
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	0
Rock	0.1%	0.1%	11
Asphalt Shingles	0.3%	0.3%	41
Other Asphaltic Roofing	0.1%	0.1%	8
Ceramics	0.3%	0.1%	43
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.1%	0.1%	13
Ceiling Tiles	0.1%	0.2%	14
Other Construction	0.5%	0.4%	73
Hazardous	**0.7%**		**102**
Dried Latex Paint	0.0%	0.0%	3
Liquid Latex Paint	0.2%	0.2%	27
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	2
Oil-based Paint/Thinners	0.0%	0.0%	3
Caustic Cleaners	0.1%	0.1%	9
Pesticides/Herbicides	0.0%	0.1%	6
Rechargeable Batteries	0.0%	0.0%	0
Other Dry-cell Batteries	0.1%	0.0%	8
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	0
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.1%	6
Other Cleaners/Chemicals	0.0%	0.0%	4
Pharmaceuticals/Vitamins	0.0%	0.0%	5
Cosmetics	0.1%	0.1%	16
Other Potentially Harmful Waste	0.1%	0.1%	12
Fines and Misc Materials	**3.6%**		**551**
Sand/Soil/Dirt	0.8%	0.6%	124
Non-distinct Fines	0.3%	0.2%	41
Miscellaneous Organics	2.4%	0.8%	366
Miscellaneous Inorganics	0.1%	0.1%	19
Totals	**100%**		**15,115**
Sample Count	47		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-19: Composition by Weight – Single-family Zone 2
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**19.5%**		**2,176**
Newspaper	2.1%	0.6%	237
Plain OCC/Kraft	0.7%	0.3%	80
Waxed OCC	0.0%	0.0%	3
Grocery/Shopping Bags	0.6%	0.1%	67
High-grade Paper	1.5%	0.5%	172
Mixed Low-grade Paper	3.7%	0.7%	414
Polycoated Containers	0.5%	0.3%	55
Compostable/Soiled	6.3%	0.7%	699
Pot. Comp. Single-use Food Service	1.0%	0.4%	113
Non-Comp. Single-use Food Service	0.4%	0.2%	45
Mixed/Other Paper	2.6%	0.5%	289
Plastic	**12.0%**		**1,344**
#1 PET Bottles	0.4%	0.1%	48
#2 HDPE Natural Bottles	0.1%	0.0%	14
#2 HDPE Colored Bottles	0.2%	0.0%	21
Other Bottles	0.1%	0.1%	10
Tubs	0.4%	0.1%	42
Expanded Poly. Non-food	0.2%	0.1%	21
Expanded Poly. Food-grade	0.2%	0.1%	25
Rigid Poly. Foam Insulation	0.1%	0.1%	6
Pot. Comp. Single-use Food Service	0.2%	0.1%	20
Non-Comp. Single-use Food Service	0.1%	0.1%	17
Other Rigid Packaging	1.2%	0.2%	134
Shopping/Dry Cleaning Bags	0.2%	0.0%	17
Stretch Wrap	0.0%	0.0%	2
Clean Polyethylene Film	0.2%	0.2%	23
Other Film	6.5%	0.7%	726
Plastic Pipe	0.0%	0.0%	0
Foam Carpet Padding	0.2%	0.3%	21
Durable Plastic Products	1.2%	0.4%	131
Plastic/Other Materials	0.6%	0.2%	64
Glass	**1.9%**		**210**
Clear Bottles	0.6%	0.2%	65
Green Bottles	0.2%	0.1%	18
Brown Bottles	0.5%	0.2%	52
Container Glass	0.3%	0.1%	34
Fluorescent Tubes	0.0%	0.0%	1
CFLs	0.0%	0.0%	1
Flat Glass	0.1%	0.1%	7
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	33
Metal	**2.9%**		**326**
Aluminum Beverage Cans	0.2%	0.0%	20
Aluminum Foil/Containers	0.3%	0.1%	31
Other Aluminum	0.2%	0.1%	18
Other Nonferrous	0.2%	0.1%	17
Steel Food Cans	0.5%	0.1%	51
Empty Aerosol Cans	0.1%	0.1%	15
Other Ferrous	0.4%	0.2%	45
Oil filters	0.0%	0.0%	0
Mixed Metals/Material	1.2%	0.4%	130
Organics	**54.5%**		**6,082**
Leaves and Grass	1.0%	1.0%	113
Prunings	0.2%	0.1%	20
Food	27.8%	1.7%	3,106
Fats, Oils, Grease	0.1%	0.2%	13
Textiles/Clothing	2.8%	0.5%	313
Mixed Textiles	0.8%	0.3%	93
Disposable Diapers	9.0%	1.1%	1,003
Animal By-products	12.1%	1.4%	1,351
Rubber Products	0.6%	0.3%	72
Tires	0.0%	0.0%	0

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**0.2%**		**18**
Furniture	0.0%	0.0%	0
Mattresses	0.0%	0.0%	0
Small Appliances	0.1%	0.1%	10
Cell Phones	0.0%	0.0%	1
Audio/Visual Equipment	0.0%	0.0%	0
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.1%	0.1%	7
CDL Wastes	**6.0%**		**673**
Clean Dimension Lumber	0.1%	0.1%	12
Clean Engineered Wood	0.2%	0.2%	27
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.2%	0.3%	21
New Painted Wood	0.2%	0.1%	21
Old Painted Wood	0.1%	0.2%	13
Creosote-treated Wood	0.1%	0.0%	6
Other Treated Wood	0.2%	0.2%	24
Contaminated Wood	0.5%	0.5%	59
New Gypsum Scrap	0.0%	0.0%	0
Demo Gypsum Scrap	0.9%	0.8%	97
Carpet	2.4%	1.4%	268
Felt Carpet Pad	0.0%	0.0%	1
Fiberglass Insulation	0.0%	0.0%	2
Concrete	0.1%	0.1%	8
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	1
Rock	0.0%	0.0%	2
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.3%	0.2%	34
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.1%	0.1%	8
Other Construction	0.6%	0.7%	70
Hazardous	**0.7%**		**82**
Dried Latex Paint	0.1%	0.1%	10
Liquid Latex Paint	0.2%	0.2%	17
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	4
Oil-based Paint/Thinners	0.0%	0.0%	4
Caustic Cleaners	0.0%	0.0%	1
Pesticides/Herbicides	0.0%	0.0%	2
Rechargeable Batteries	0.0%	0.0%	0
Other Dry-cell Batteries	0.0%	0.0%	4
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	1
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	3
Other Cleaners/Chemicals	0.0%	0.0%	2
Pharmaceuticals/Vitamins	0.0%	0.0%	2
Cosmetics	0.2%	0.1%	20
Other Potentially Harmful Waste	0.1%	0.1%	12
Fines and Misc Materials	**2.2%**		**249**
Sand/Soil/Dirt	0.1%	0.1%	14
Non-distinct Fines	0.2%	0.2%	25
Miscellaneous Organics	1.6%	0.6%	174
Miscellaneous Inorganics	0.3%	0.2%	36
Totals	**100%**		**11,160**
Sample Count	45		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-20: Composition by Weight – Single-family Zone 3
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**19.0%**		**2,559**
Newspaper	2.3%	0.6%	307
Plain OCC/Kraft	1.0%	0.2%	130
Waxed OCC	0.0%	0.0%	2
Grocery/Shopping Bags	0.7%	0.1%	92
High-grade Paper	1.0%	0.3%	139
Mixed Low-grade Paper	3.9%	0.6%	529
Polycoated Containers	0.3%	0.1%	37
Compostable/Soiled	6.5%	0.7%	881
Pot. Comp. Single-use Food Service	0.6%	0.1%	77
Non-Comp. Single-use Food Service	0.2%	0.1%	33
Mixed/Other Paper	2.5%	0.6%	331
Plastic	**11.6%**		**1,563**
#1 PET Bottles	0.5%	0.1%	64
#2 HDPE Natural Bottles	0.2%	0.1%	22
#2 HDPE Colored Bottles	0.3%	0.1%	41
Other Bottles	0.2%	0.1%	22
Tubs	0.4%	0.1%	57
Expanded Poly. Non-food	0.2%	0.1%	23
Expanded Poly. Food-grade	0.2%	0.0%	28
Rigid Poly. Foam Insulation	0.1%	0.1%	17
Pot. Comp. Single-use Food Service	0.1%	0.0%	17
Non-Comp. Single-use Food Service	0.3%	0.1%	45
Other Rigid Packaging	1.0%	0.2%	136
Shopping/Dry Cleaning Bags	0.2%	0.1%	33
Stretch Wrap	0.0%	0.0%	2
Clean Polyethylene Film	0.1%	0.1%	13
Other Film	6.1%	0.6%	817
Plastic Pipe	0.0%	0.0%	2
Foam Carpet Padding	0.2%	0.2%	21
Durable Plastic Products	0.9%	0.3%	119
Plastic/Other Materials	0.6%	0.2%	84
Glass	**1.9%**		**250**
Clear Bottles	0.6%	0.1%	85
Green Bottles	0.2%	0.1%	32
Brown Bottles	0.4%	0.1%	47
Container Glass	0.3%	0.1%	36
Fluorescent Tubes	0.0%	0.0%	0
CFLs	0.0%	0.0%	1
Flat Glass	0.0%	0.0%	5
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	43
Metal	**3.4%**		**451**
Aluminum Beverage Cans	0.3%	0.1%	34
Aluminum Foil/Containers	0.3%	0.1%	38
Other Aluminum	0.1%	0.0%	12
Other Nonferrous	0.2%	0.1%	21
Steel Food Cans	0.5%	0.1%	65
Empty Aerosol Cans	0.2%	0.1%	23
Other Ferrous	0.8%	0.3%	104
Oil filters	0.0%	0.0%	0
Mixed Metals/Material	1.1%	0.4%	154
Organics	**57.7%**		**7,771**
Leaves and Grass	1.1%	0.5%	152
Prunings	0.4%	0.5%	58
Food	29.3%	1.5%	3,945
Fats, Oils, Grease	0.0%	0.0%	1
Textiles/Clothing	3.1%	0.7%	415
Mixed Textiles	1.2%	0.3%	164
Disposable Diapers	8.8%	0.8%	1,185
Animal By-products	13.2%	1.6%	1,784
Rubber Products	0.5%	0.2%	67
Tires	0.0%	0.0%	0

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**0.2%**		**22**
Furniture	0.0%	0.0%	0
Mattresses	0.0%	0.0%	0
Small Appliances	0.1%	0.2%	19
Cell Phones	0.0%	0.0%	0
Audio/Visual Equipment	0.0%	0.0%	0
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.0%	0.0%	4
CDL Wastes	**3.1%**		**420**
Clean Dimension Lumber	0.1%	0.1%	14
Clean Engineered Wood	0.1%	0.0%	8
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.3%	0.3%	45
New Painted Wood	0.2%	0.2%	22
Old Painted Wood	0.1%	0.1%	14
Creosote-treated Wood	0.0%	0.0%	1
Other Treated Wood	0.2%	0.2%	24
Contaminated Wood	0.3%	0.3%	38
New Gypsum Scrap	0.1%	0.1%	10
Demo Gypsum Scrap	0.1%	0.2%	19
Carpet	0.7%	0.6%	89
Felt Carpet Pad	0.0%	0.0%	0
Fiberglass Insulation	0.1%	0.1%	9
Concrete	0.3%	0.4%	35
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	0
Rock	0.0%	0.0%	0
Asphalt Shingles	0.0%	0.0%	1
Other Asphaltic Roofing	0.0%	0.1%	6
Ceramics	0.4%	0.4%	59
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	0
Other Construction	0.2%	0.3%	27
Hazardous	**0.4%**		**49**
Dried Latex Paint	0.0%	0.0%	0
Liquid Latex Paint	0.0%	0.1%	6
Solvent-based Adhesives	0.0%	0.0%	1
Water-based Adhesives	0.0%	0.0%	4
Oil-based Paint/Thinners	0.0%	0.0%	2
Caustic Cleaners	0.0%	0.0%	4
Pesticides/Herbicides	0.0%	0.0%	3
Rechargeable Batteries	0.0%	0.0%	0
Other Dry-cell Batteries	0.0%	0.0%	4
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	0
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	6
Other Cleaners/Chemicals	0.0%	0.0%	0
Pharmaceuticals/Vitamins	0.0%	0.0%	3
Cosmetics	0.1%	0.0%	14
Other Potentially Harmful Waste	0.0%	0.0%	2
Fines and Misc Materials	**2.8%**		**383**
Sand/Soil/Dirt	0.8%	0.5%	111
Non-distinct Fines	0.1%	0.1%	10
Miscellaneous Organics	1.9%	0.5%	251
Miscellaneous Inorganics	0.1%	0.1%	10
Totals	**100%**		**13,468**
Sample Count	45		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-21: Composition by Weight – Single-family Zone 4
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**18.4%**		**3,751**
Newspaper	2.0%	0.3%	403
Plain OCC/Kraft	0.7%	0.2%	150
Waxed OCC	0.2%	0.2%	41
Grocery/Shopping Bags	0.5%	0.1%	101
High-grade Paper	0.7%	0.2%	149
Mixed Low-grade Paper	3.6%	0.7%	735
Polycoated Containers	0.2%	0.1%	49
Compostable/Soiled	7.2%	0.7%	1,458
Pot. Comp. Single-use Food Service	0.5%	0.1%	96
Non-Comp. Single-use Food Service	0.4%	0.2%	81
Mixed/Other Paper	2.4%	0.6%	489
Plastic	**11.6%**		**2,366**
#1 PET Bottles	0.6%	0.1%	117
#2 HDPE Natural Bottles	0.2%	0.1%	34
#2 HDPE Colored Bottles	0.2%	0.1%	45
Other Bottles	0.1%	0.1%	25
Tubs	0.4%	0.1%	73
Expanded Poly. Non-food	0.2%	0.1%	37
Expanded Poly. Food-grade	0.3%	0.1%	63
Rigid Poly. Foam Insulation	0.1%	0.1%	18
Pot. Comp. Single-use Food Service	0.2%	0.1%	41
Non-Comp. Single-use Food Service	0.2%	0.1%	49
Other Rigid Packaging	1.1%	0.2%	216
Shopping/Dry Cleaning Bags	0.3%	0.1%	58
Stretch Wrap	0.0%	0.0%	5
Clean Polyethylene Film	0.0%	0.0%	5
Other Film	6.3%	0.7%	1,274
Plastic Pipe	0.0%	0.0%	2
Foam Carpet Padding	0.0%	0.0%	5
Durable Plastic Products	0.8%	0.3%	165
Plastic/Other Materials	0.7%	0.2%	134
Glass	**2.0%**		**416**
Clear Bottles	0.6%	0.2%	116
Green Bottles	0.3%	0.1%	65
Brown Bottles	0.4%	0.2%	88
Container Glass	0.4%	0.1%	87
Fluorescent Tubes	0.0%	0.0%	0
CFLs	0.0%	0.0%	2
Flat Glass	0.0%	0.0%	5
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	52
Metal	**2.7%**		**543**
Aluminum Beverage Cans	0.3%	0.1%	64
Aluminum Foil/Containers	0.2%	0.0%	40
Other Aluminum	0.2%	0.1%	31
Other Nonferrous	0.3%	0.4%	59
Steel Food Cans	0.7%	0.2%	150
Empty Aerosol Cans	0.1%	0.0%	18
Other Ferrous	0.3%	0.2%	64
Oil filters	0.0%	0.0%	1
Mixed Metals/Material	0.6%	0.2%	116
Organics	**56.4%**		**11,478**
Leaves and Grass	0.6%	0.4%	116
Prunings	0.1%	0.0%	14
Food	29.1%	1.3%	5,924
Fats, Oils, Grease	0.0%	0.0%	6
Textiles/Clothing	3.2%	0.6%	649
Mixed Textiles	1.1%	0.4%	218
Disposable Diapers	9.6%	1.1%	1,960
Animal By-products	12.4%	1.6%	2,521
Rubber Products	0.3%	0.1%	68
Tires	0.0%	0.0%	2

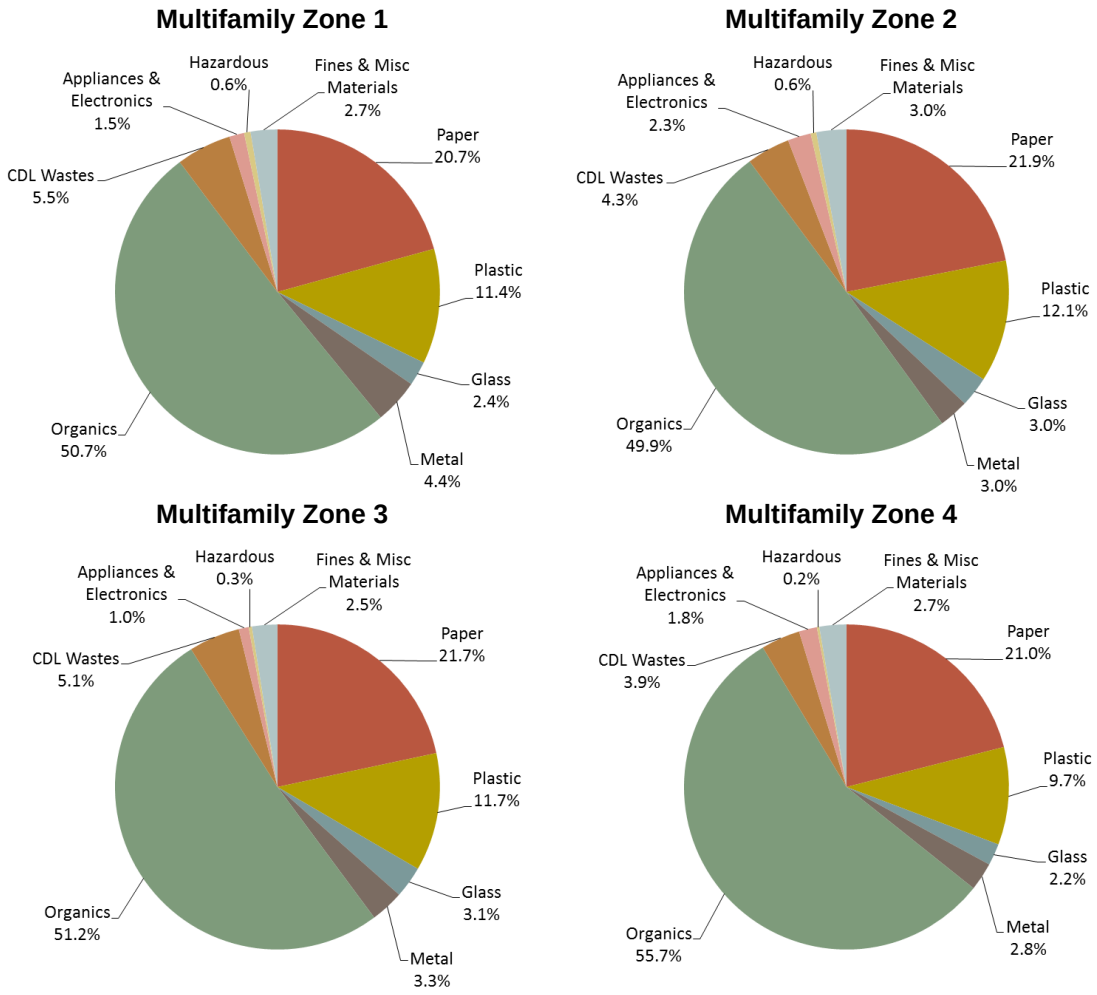
Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**0.8%**		**163**
Furniture	0.4%	0.4%	80
Mattresses	0.0%	0.0%	0
Small Appliances	0.3%	0.3%	54
Cell Phones	0.0%	0.0%	2
Audio/Visual Equipment	0.0%	0.0%	6
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.1%	0.1%	22
CDL Wastes	**4.4%**		**891**
Clean Dimension Lumber	0.2%	0.2%	37
Clean Engineered Wood	0.2%	0.2%	31
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.2%	0.3%	39
New Painted Wood	0.7%	0.4%	133
Old Painted Wood	0.9%	0.8%	192
Creosote-treated Wood	0.0%	0.0%	4
Other Treated Wood	0.1%	0.1%	28
Contaminated Wood	0.1%	0.1%	23
New Gypsum Scrap	0.2%	0.3%	41
Demo Gypsum Scrap	0.3%	0.2%	58
Carpet	0.6%	0.3%	117
Felt Carpet Pad	0.0%	0.1%	10
Fiberglass Insulation	0.0%	0.0%	4
Concrete	0.1%	0.1%	11
Asphalt Paving	0.1%	0.2%	21
Other Aggregates	0.0%	0.0%	1
Rock	0.0%	0.0%	0
Asphalt Shingles	0.0%	0.0%	1
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.2%	0.1%	36
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	0
Other Construction	0.5%	0.4%	104
Hazardous	**0.8%**		**153**
Dried Latex Paint	0.2%	0.3%	48
Liquid Latex Paint	0.2%	0.1%	31
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	2
Oil-based Paint/Thinners	0.0%	0.0%	1
Caustic Cleaners	0.0%	0.0%	2
Pesticides/Herbicides	0.0%	0.1%	10
Rechargeable Batteries	0.0%	0.0%	0
Other Dry-cell Batteries	0.0%	0.0%	4
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	1
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	7
Other Cleaners/Chemicals	0.0%	0.0%	4
Pharmaceuticals/Vitamins	0.0%	0.0%	7
Cosmetics	0.1%	0.1%	29
Other Potentially Harmful Waste	0.0%	0.0%	6
Fines and Misc Materials	**3.0%**		**602**
Sand/Soil/Dirt	0.9%	0.7%	193
Non-distinct Fines	0.2%	0.2%	48
Miscellaneous Organics	1.6%	0.5%	329
Miscellaneous Inorganics	0.2%	0.2%	31
Totals	**100%**		**20,363**
Sample Count	45		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

4.5 By Collection Zone and Residence Type: Multifamily

As shown in Figure 4-4, **organics** made up roughly half of the waste from multifamily residences in all four collection zones. The next largest category, **paper**, composed about 20% of the total for each subpopulation. **Plastic** accounted for between about 9% and 12% in all zones.

Figure 4-4: Composition Summary, Multifamily
(January – December 2014)



4.5.1 Multifamily Zone 1

A total of 45 loads were sampled for the multifamily Zone 1 subpopulation. Approximately 8,784 tons of waste were disposed by this subpopulation in calendar year 2014. Almost 28% of the waste was composed of *food*. *Animal by-products* (9.8%) and *compostable/soiled paper* (6.2%) were the next largest material components by weight. The full composition results for the multifamily Zone 1 subpopulation are listed in Table 4-26.

Table 4-22: Top Ten Components – Multifamily Zone 1
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	27.9%	27.9%	2,449
Animal By-products	9.8%	37.7%	859
Compostable/Soiled Paper	6.2%	43.8%	540
Other Film	5.4%	49.2%	474
Disposable Diapers	5.1%	54.3%	444
Mixed Low-grade Paper	4.3%	58.5%	377
Mixed/Other Paper	2.7%	61.2%	236
Textiles/Clothing	2.2%	63.5%	195
Plain OCC/Kraft	2.1%	65.6%	185
Leaves and Grass	2.0%	67.6%	180
Total	**67.6%**		**5,939**

4.5.2 Multifamily Zone 2

To characterize waste from the multifamily Zone 2 subpopulation, 45 samples were sorted. It is estimated that multifamily residents in Zone 2 disposed about 8,950 tons in 2014. The top ten components for this subpopulation accounted for nearly 71%, or 6,347 tons. Approximately 30% of the waste was composed of *food*. *Animal by-products, disposable diapers,* and *other film* each accounted for at least 6%. Table 4-27 lists detailed composition results for waste from multifamily residences in Zone 2.

Table 4-23: Top Ten Components – Multifamily Zone 2
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	29.9%	29.9%	2,680
Animal By-products	7.8%	37.8%	700
Disposable Diapers	6.3%	44.0%	560
Other Film	6.0%	50.0%	535
Compostable/Soiled Paper	5.9%	55.9%	526
Mixed Low-grade Paper	5.2%	61.1%	466
Mixed/Other Paper	3.2%	64.2%	282
Textiles/Clothing	2.7%	67.0%	245
Newspaper	2.1%	69.1%	192
Miscellaneous Organics	1.8%	70.9%	161
Total	**70.9%**		**6,347**

4.5.3 Multifamily Zone 3

A total of 46 samples were sorted to characterize waste from the multifamily Zone 3 subpopulation. It is estimated that multifamily residents in Zone 3 disposed about 23,045 tons in 2014. The top ten components for this subpopulation accounted for 70%, or 16,235 tons. Approximately 31% of the waste was composed of *food*. *Animal by-products*, and *compostable/soiled paper* each accounted for at least 6%. Table 4-28 lists detailed composition results for waste from multifamily residences in Zone 3.

Table 4-24: Top Ten Components – Multifamily Zone 3
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	30.8%	30.8%	7,105
Animal By-products	9.0%	39.9%	2,079
Compostable/Soiled Paper	6.3%	46.2%	1,455
Disposable Diapers	5.3%	51.5%	1,219
Other Film	4.8%	56.3%	1,114
Mixed Low-grade Paper	4.6%	60.9%	1,052
Textiles/Clothing	2.9%	63.8%	673
Newspaper	2.5%	66.3%	584
Mixed/Other Paper	2.3%	68.6%	535
High-grade Paper	1.8%	70.4%	419
Total	**70.4%**		**16,235**

4.5.4 Multifamily Zone 4

To characterize waste from the multifamily Zone 4 subpopulation, 44 samples were sorted. It is estimated that multifamily residents in Zone 4 disposed about 11,352 tons in 2014. The top ten components for this subpopulation accounted for 73%, or 8,264 tons. About 33% of the waste was composed of *food*. *Animal by-products* (over 8%) was the next largest component. Table 4-29 lists detailed composition results for waste from multifamily residences in Zone 4.

Table 4-25: Top Ten Components – Multifamily Zone 4
(January – December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	33.4%	33.4%	3,789
Animal By-products	8.1%	41.4%	914
Disposable Diapers	5.7%	47.2%	650
Compostable/Soiled Paper	5.6%	52.7%	633
Mixed Low-grade Paper	5.1%	57.8%	578
Other Film	4.6%	62.4%	518
Leaves and Grass	3.2%	65.6%	365
Textiles/Clothing	2.9%	68.5%	326
Newspaper	2.4%	70.9%	276
Plain OCC/Kraft	1.9%	72.8%	213
Total	**72.8%**		**8,264**

4.5.5 Detailed Composition Comparisons among Multifamily Zones 1 through 4

For Zones 1 through 4, *food* was the largest material component, composing about 30% of waste disposed. *Animal by-products* was the second largest material component, for all zones, but the third largest varied between *disposable diapers* (Zones 2 and 4), and *compostable/soiled paper* (Zones 1 and 3). Seven of the top ten components were the same across all four zones: *food*, *compostable/soiled paper*, *mixed low-grade paper*, *animal by-products*, *disposable diapers*, *textiles/clothing*, and *other plastic film*. *Newspaper* was a top ten component in Zones 2, 3, and 4, while *plain OCC/Kraft* and *leaves and grass* were top ten components in Zones 1 and 4. The only single occurrence of a material component in the top ten was *miscellaneous organics* in Zone 2.

Table 4-26: Composition by Weight – Multifamily Zone 1
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**20.7%**		**1,820**
Newspaper	1.9%	0.5%	170
Plain OCC/Kraft	2.1%	0.9%	185
Waxed OCC	0.3%	0.2%	29
Grocery/Shopping Bags	0.6%	0.2%	54
High-grade Paper	1.2%	0.3%	105
Mixed Low-grade Paper	4.3%	0.6%	377
Polycoated Containers	0.3%	0.1%	26
Compostable/Soiled	6.2%	1.2%	540
Pot. Comp. Single-use Food Service	0.7%	0.2%	58
Non-Comp. Single-use Food Service	0.4%	0.2%	39
Mixed/Other Paper	2.7%	0.8%	236
Plastic	**11.4%**		**1,004**
#1 PET Bottles	0.7%	0.1%	61
#2 HDPE Natural Bottles	0.2%	0.1%	20
#2 HDPE Colored Bottles	0.4%	0.1%	32
Other Bottles	0.2%	0.1%	13
Tubs	0.4%	0.1%	34
Expanded Poly. Non-food	0.2%	0.1%	21
Expanded Poly. Food-grade	0.1%	0.0%	11
Rigid Poly. Foam Insulation	0.1%	0.1%	11
Pot. Comp. Single-use Food Service	0.1%	0.1%	11
Non-Comp. Single-use Food Service	0.3%	0.1%	26
Other Rigid Packaging	0.7%	0.1%	61
Shopping/Dry Cleaning Bags	0.2%	0.0%	13
Stretch Wrap	0.0%	0.0%	3
Clean Polyethylene Film	0.2%	0.2%	18
Other Film	5.4%	0.6%	474
Plastic Pipe	0.1%	0.1%	9
Foam Carpet Padding	0.2%	0.3%	19
Durable Plastic Products	1.2%	0.3%	105
Plastic/Other Materials	0.7%	0.3%	62
Glass	**2.4%**		**214**
Clear Bottles	0.7%	0.2%	63
Green Bottles	0.4%	0.1%	36
Brown Bottles	0.5%	0.2%	45
Container Glass	0.3%	0.1%	22
Fluorescent Tubes	0.0%	0.0%	0
CFLs	0.0%	0.0%	0
Flat Glass	0.1%	0.1%	12
Automotive Glass	0.0%	0.0%	0
Other Glass	0.4%	0.3%	36
Metal	**4.4%**		**391**
Aluminum Beverage Cans	0.5%	0.1%	43
Aluminum Foil/Containers	0.2%	0.1%	21
Other Aluminum	0.1%	0.1%	10
Other Nonferrous	0.7%	0.9%	60
Steel Food Cans	0.8%	0.4%	74
Empty Aerosol Cans	0.1%	0.0%	8
Other Ferrous	0.3%	0.1%	25
Oil filters	0.0%	0.0%	2
Mixed Metals/Material	1.7%	0.6%	148
Organics	**50.7%**		**4,453**
Leaves and Grass	2.0%	2.3%	180
Prunings	0.8%	0.7%	68
Food	27.9%	2.1%	2,449
Fats, Oils, Grease	0.5%	0.6%	45
Textiles/Clothing	2.2%	0.5%	195
Mixed Textiles	1.3%	0.5%	112
Disposable Diapers	5.1%	1.1%	444
Animal By-products	9.8%	1.5%	859
Rubber Products	1.1%	0.7%	100
Tires	0.0%	0.0%	0

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**1.5%**		**130**
Furniture	0.5%	0.7%	43
Mattresses	0.0%	0.0%	0
Small Appliances	0.3%	0.3%	28
Cell Phones	0.0%	0.0%	0
Audio/Visual Equipment	0.2%	0.2%	13
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.5%	0.3%	46
CDL Wastes	**5.5%**		**483**
Clean Dimension Lumber	0.3%	0.1%	24
Clean Engineered Wood	0.3%	0.2%	28
Pallets	0.1%	0.1%	7
Crates	0.0%	0.0%	0
Other Untreated Wood	0.8%	0.4%	69
New Painted Wood	0.4%	0.3%	34
Old Painted Wood	0.5%	0.4%	44
Creosote-treated Wood	0.0%	0.0%	1
Other Treated Wood	0.1%	0.1%	10
Contaminated Wood	0.4%	0.4%	36
New Gypsum Scrap	0.0%	0.0%	0
Demo Gypsum Scrap	0.0%	0.1%	4
Carpet	1.6%	1.2%	137
Felt Carpet Pad	0.0%	0.0%	0
Fiberglass Insulation	0.0%	0.0%	1
Concrete	0.3%	0.3%	27
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	2
Rock	0.1%	0.1%	10
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.3%	0.2%	29
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	1
Other Construction	0.2%	0.3%	19
Hazardous	**0.6%**		**56**
Dried Latex Paint	0.1%	0.1%	9
Liquid Latex Paint	0.0%	0.0%	2
Solvent-based Adhesives	0.0%	0.1%	3
Water-based Adhesives	0.0%	0.0%	2
Oil-based Paint/Thinners	0.0%	0.0%	3
Caustic Cleaners	0.0%	0.0%	1
Pesticides/Herbicides	0.0%	0.0%	1
Rechargeable Batteries	0.0%	0.0%	0
Other Dry-cell Batteries	0.0%	0.0%	1
Wet-cell Batteries	0.0%	0.0%	1
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	0
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.1%	0.1%	5
Other Cleaners/Chemicals	0.2%	0.3%	14
Pharmaceuticals/Vitamins	0.0%	0.0%	0
Cosmetics	0.1%	0.0%	5
Other Potentially Harmful Waste	0.1%	0.1%	8
Fines and Misc Materials	**2.7%**		**234**
Sand/Soil/Dirt	1.0%	0.6%	89
Non-distinct Fines	0.3%	0.3%	23
Miscellaneous Organics	1.3%	0.4%	117
Miscellaneous Inorganics	0.1%	0.1%	5
Totals	**100%**		**8,784**
Sample Count	45		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-27: Composition by Weight – Multifamily Zone 2
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**21.9%**		**1,960**
Newspaper	2.1%	0.4%	192
Plain OCC/Kraft	1.4%	0.4%	126
Waxed OCC	0.2%	0.1%	17
Grocery/Shopping Bags	0.7%	0.1%	67
High-grade Paper	1.5%	0.5%	137
Mixed Low-grade Paper	5.2%	0.5%	466
Polycoated Containers	0.3%	0.1%	29
Compostable/Soiled	5.9%	1.1%	526
Pot. Comp. Single-use Food Service	0.8%	0.3%	76
Non-Comp. Single-use Food Service	0.5%	0.2%	42
Mixed/Other Paper	3.2%	0.9%	282
Plastic	**12.1%**		**1,086**
#1 PET Bottles	0.9%	0.1%	78
#2 HDPE Natural Bottles	0.2%	0.1%	18
#2 HDPE Colored Bottles	0.3%	0.1%	29
Other Bottles	0.1%	0.0%	8
Tubs	0.4%	0.1%	34
Expanded Poly. Non-food	0.2%	0.1%	14
Expanded Poly. Food-grade	0.1%	0.1%	13
Rigid Poly. Foam Insulation	0.1%	0.1%	5
Pot. Comp. Single-use Food Service	0.4%	0.2%	34
Non-Comp. Single-use Food Service	0.3%	0.1%	25
Other Rigid Packaging	1.1%	0.3%	98
Shopping/Dry Cleaning Bags	0.2%	0.1%	20
Stretch Wrap	0.0%	0.0%	3
Clean Polyethylene Film	0.0%	0.0%	2
Other Film	6.0%	0.8%	535
Plastic Pipe	0.0%	0.0%	1
Foam Carpet Padding	0.3%	0.3%	25
Durable Plastic Products	1.0%	0.4%	87
Plastic/Other Materials	0.6%	0.2%	56
Glass	**3.0%**		**268**
Clear Bottles	0.6%	0.2%	53
Green Bottles	0.4%	0.1%	33
Brown Bottles	0.5%	0.2%	45
Container Glass	0.4%	0.1%	33
Fluorescent Tubes	0.0%	0.0%	1
CFLs	0.0%	0.0%	1
Flat Glass	0.2%	0.2%	15
Automotive Glass	0.2%	0.3%	14
Other Glass	0.8%	0.9%	74
Metal	**3.0%**		**265**
Aluminum Beverage Cans	0.4%	0.1%	36
Aluminum Foil/Containers	0.2%	0.1%	21
Other Aluminum	0.1%	0.0%	6
Other Nonferrous	0.1%	0.1%	10
Steel Food Cans	0.7%	0.2%	62
Empty Aerosol Cans	0.1%	0.0%	7
Other Ferrous	0.6%	0.2%	50
Oil filters	0.0%	0.0%	0
Mixed Metals/Material	0.8%	0.4%	72
Organics	**49.9%**		**4,463**
Leaves and Grass	1.1%	0.7%	101
Prunings	0.6%	0.7%	56
Food	29.9%	1.8%	2,680
Fats, Oils, Grease	0.0%	0.0%	1
Textiles/Clothing	2.7%	0.5%	245
Mixed Textiles	1.1%	0.5%	103
Disposable Diapers	6.3%	0.9%	560
Animal By-products	7.8%	0.8%	700
Rubber Products	0.2%	0.1%	16
Tires	0.0%	0.0%	1

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**2.3%**		**207**
Furniture	1.5%	1.4%	132
Mattresses	0.0%	0.0%	0
Small Appliances	0.3%	0.2%	25
Cell Phones	0.0%	0.0%	0
Audio/Visual Equipment	0.1%	0.1%	5
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.5%	0.7%	43
CDL Wastes	**4.3%**		**386**
Clean Dimension Lumber	0.3%	0.1%	23
Clean Engineered Wood	0.1%	0.1%	10
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.4%	0.3%	35
New Painted Wood	0.5%	0.4%	43
Old Painted Wood	0.1%	0.1%	5
Creosote-treated Wood	0.2%	0.4%	19
Other Treated Wood	0.0%	0.0%	2
Contaminated Wood	0.4%	0.3%	34
New Gypsum Scrap	0.0%	0.0%	4
Demo Gypsum Scrap	0.5%	0.4%	42
Carpet	1.2%	0.7%	103
Felt Carpet Pad	0.1%	0.1%	6
Fiberglass Insulation	0.0%	0.0%	1
Concrete	0.0%	0.0%	0
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	1
Rock	0.0%	0.0%	0
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.3%	0.2%	24
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	0
Other Construction	0.4%	0.3%	33
Hazardous	**0.6%**		**50**
Dried Latex Paint	0.0%	0.0%	4
Liquid Latex Paint	0.1%	0.2%	11
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	0
Oil-based Paint/Thinners	0.0%	0.0%	2
Caustic Cleaners	0.0%	0.0%	0
Pesticides/Herbicides	0.0%	0.0%	0
Rechargeable Batteries	0.0%	0.0%	1
Other Dry-cell Batteries	0.0%	0.0%	1
Wet-cell Batteries	0.0%	0.0%	2
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	0
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.1%	0.1%	10
Other Cleaners/Chemicals	0.0%	0.0%	2
Pharmaceuticals/Vitamins	0.0%	0.0%	4
Cosmetics	0.1%	0.1%	13
Other Potentially Harmful Waste	0.0%	0.0%	1
Fines and Misc Materials	**3.0%**		**266**
Sand/Soil/Dirt	0.6%	0.5%	55
Non-distinct Fines	0.4%	0.3%	34
Miscellaneous Organics	1.8%	0.9%	161
Miscellaneous Inorganics	0.2%	0.2%	16
Totals	**100%**		**8,950**
Sample Count	45		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-28: Composition by Weight – Multifamily Zone 3
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**21.7%**		**4,990**
Newspaper	2.5%	0.4%	584
Plain OCC/Kraft	1.6%	0.4%	368
Waxed OCC	0.2%	0.2%	57
Grocery/Shopping Bags	1.2%	0.3%	273
High-grade Paper	1.8%	0.5%	419
Mixed Low-grade Paper	4.6%	0.6%	1,052
Polycoated Containers	0.2%	0.0%	57
Compostable/Soiled	6.3%	0.6%	1,455
Pot. Comp. Single-use Food Service	0.5%	0.2%	124
Non-Comp. Single-use Food Service	0.3%	0.1%	66
Mixed/Other Paper	2.3%	0.5%	535
Plastic	**11.7%**		**2,705**
#1 PET Bottles	0.8%	0.1%	175
#2 HDPE Natural Bottles	0.3%	0.1%	62
#2 HDPE Colored Bottles	0.3%	0.1%	60
Other Bottles	0.1%	0.1%	34
Tubs	0.5%	0.1%	107
Expanded Poly. Non-food	0.1%	0.0%	23
Expanded Poly. Food-grade	0.1%	0.0%	27
Rigid Poly. Foam Insulation	0.0%	0.0%	4
Pot. Comp. Single-use Food Service	0.1%	0.0%	26
Non-Comp. Single-use Food Service	0.3%	0.1%	70
Other Rigid Packaging	1.3%	0.3%	291
Shopping/Dry Cleaning Bags	0.2%	0.1%	53
Stretch Wrap	0.1%	0.1%	31
Clean Polyethylene Film	0.6%	0.7%	140
Other Film	4.8%	0.5%	1,114
Plastic Pipe	0.1%	0.1%	15
Foam Carpet Padding	0.3%	0.3%	60
Durable Plastic Products	0.8%	0.3%	193
Plastic/Other Materials	1.0%	0.4%	220
Glass	**3.1%**		**723**
Clear Bottles	0.9%	0.2%	200
Green Bottles	0.8%	0.2%	173
Brown Bottles	0.9%	0.3%	213
Container Glass	0.3%	0.1%	79
Fluorescent Tubes	0.1%	0.1%	20
CFLs	0.0%	0.0%	1
Flat Glass	0.0%	0.0%	1
Automotive Glass	0.0%	0.0%	0
Other Glass	0.2%	0.1%	35
Metal	**3.3%**		**763**
Aluminum Beverage Cans	0.6%	0.1%	129
Aluminum Foil/Containers	0.3%	0.1%	66
Other Aluminum	0.1%	0.0%	16
Other Nonferrous	0.4%	0.3%	90
Steel Food Cans	0.6%	0.1%	134
Empty Aerosol Cans	0.1%	0.0%	15
Other Ferrous	0.5%	0.3%	108
Oil filters	0.0%	0.0%	1
Mixed Metals/Material	0.9%	0.3%	205
Organics	**51.2%**		**11,808**
Leaves and Grass	1.0%	0.5%	232
Prunings	0.4%	0.3%	90
Food	30.8%	1.4%	7,105
Fats, Oils, Grease	0.0%	0.0%	0
Textiles/Clothing	2.9%	0.6%	673
Mixed Textiles	1.3%	0.3%	310
Disposable Diapers	5.3%	0.8%	1,219
Animal By-products	9.0%	1.5%	2,079
Rubber Products	0.4%	0.2%	94
Tires	0.0%	0.0%	5

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**1.0%**		**228**
Furniture	0.2%	0.3%	40
Mattresses	0.4%	0.7%	96
Small Appliances	0.3%	0.3%	74
Cell Phones	0.0%	0.0%	0
Audio/Visual Equipment	0.0%	0.0%	7
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.0%	0.0%	11
CDL Wastes	**5.1%**		**1,174**
Clean Dimension Lumber	0.3%	0.2%	67
Clean Engineered Wood	0.2%	0.2%	46
Pallets	0.0%	0.0%	1
Crates	0.0%	0.0%	2
Other Untreated Wood	0.2%	0.2%	57
New Painted Wood	0.3%	0.3%	59
Old Painted Wood	0.4%	0.3%	86
Creosote-treated Wood	0.0%	0.0%	4
Other Treated Wood	0.3%	0.3%	75
Contaminated Wood	0.5%	0.3%	108
New Gypsum Scrap	0.0%	0.0%	0
Demo Gypsum Scrap	0.3%	0.3%	72
Carpet	1.4%	0.8%	312
Felt Carpet Pad	0.0%	0.0%	0
Fiberglass Insulation	0.2%	0.4%	48
Concrete	0.3%	0.5%	78
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	0
Rock	0.1%	0.2%	30
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.3%	0.2%	74
Cement Fiber Board	0.1%	0.1%	15
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	0
Other Construction	0.2%	0.2%	38
Hazardous	**0.3%**		**73**
Dried Latex Paint	0.0%	0.0%	7
Liquid Latex Paint	0.1%	0.1%	14
Solvent-based Adhesives	0.0%	0.0%	1
Water-based Adhesives	0.0%	0.0%	1
Oil-based Paint/Thinners	0.0%	0.0%	4
Caustic Cleaners	0.0%	0.0%	4
Pesticides/Herbicides	0.0%	0.0%	0
Rechargeable Batteries	0.0%	0.0%	1
Other Dry-cell Batteries	0.0%	0.0%	3
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	3
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.1%	0.0%	13
Other Cleaners/Chemicals	0.0%	0.0%	2
Pharmaceuticals/Vitamins	0.0%	0.0%	7
Cosmetics	0.1%	0.0%	12
Other Potentially Harmful Waste	0.0%	0.0%	2
Fines and Misc Materials	**2.5%**		**581**
Sand/Soil/Dirt	0.5%	0.6%	117
Non-distinct Fines	0.3%	0.3%	79
Miscellaneous Organics	1.4%	0.5%	317
Miscellaneous Inorganics	0.3%	0.2%	69
Totals	**100%**		**23,045**
Sample Count	46		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-29: Composition by Weight – Multifamily Zone 4
(January – December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**21.0%**		**2,389**
Newspaper	2.4%	0.5%	276
Plain OCC/Kraft	1.9%	0.6%	213
Waxed OCC	0.2%	0.1%	23
Grocery/Shopping Bags	0.6%	0.2%	73
High-grade Paper	1.7%	0.7%	196
Mixed Low-grade Paper	5.1%	0.7%	578
Polycoated Containers	0.6%	0.6%	71
Compostable/Soiled	5.6%	0.8%	633
Pot. Comp. Single-use Food Service	0.6%	0.2%	70
Non-Comp. Single-use Food Service	0.4%	0.2%	44
Mixed/Other Paper	1.9%	0.3%	211
Plastic	**9.7%**		**1,102**
#1 PET Bottles	0.8%	0.1%	90
#2 HDPE Natural Bottles	0.2%	0.1%	24
#2 HDPE Colored Bottles	0.2%	0.1%	24
Other Bottles	0.1%	0.0%	7
Tubs	0.4%	0.1%	42
Expanded Poly. Non-food	0.1%	0.0%	11
Expanded Poly. Food-grade	0.1%	0.0%	17
Rigid Poly. Foam Insulation	0.1%	0.1%	9
Pot. Comp. Single-use Food Service	0.1%	0.1%	14
Non-Comp. Single-use Food Service	0.2%	0.1%	28
Other Rigid Packaging	0.8%	0.2%	92
Shopping/Dry Cleaning Bags	0.2%	0.1%	26
Stretch Wrap	0.0%	0.0%	2
Clean Polyethylene Film	0.1%	0.1%	13
Other Film	4.6%	0.6%	518
Plastic Pipe	0.0%	0.0%	2
Foam Carpet Padding	0.1%	0.1%	9
Durable Plastic Products	0.8%	0.2%	96
Plastic/Other Materials	0.7%	0.3%	79
Glass	**2.2%**		**245**
Clear Bottles	0.7%	0.2%	78
Green Bottles	0.4%	0.2%	51
Brown Bottles	0.5%	0.1%	52
Container Glass	0.3%	0.1%	30
Fluorescent Tubes	0.0%	0.0%	0
CFLs	0.0%	0.0%	0
Flat Glass	0.0%	0.1%	5
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	29
Metal	**2.8%**		**318**
Aluminum Beverage Cans	0.5%	0.1%	52
Aluminum Foil/Containers	0.3%	0.1%	29
Other Aluminum	0.0%	0.0%	4
Other Nonferrous	0.1%	0.1%	9
Steel Food Cans	0.6%	0.1%	70
Empty Aerosol Cans	0.2%	0.1%	18
Other Ferrous	0.4%	0.2%	51
Oil filters	0.0%	0.0%	0
Mixed Metals/Material	0.8%	0.3%	86
Organics	**55.7%**		**6,322**
Leaves and Grass	3.2%	2.1%	365
Prunings	0.6%	0.4%	68
Food	33.4%	3.0%	3,789
Fats, Oils, Grease	0.0%	0.0%	6
Textiles/Clothing	2.9%	0.5%	326
Mixed Textiles	1.2%	0.4%	139
Disposable Diapers	5.7%	0.7%	650
Animal By-products	8.1%	1.6%	914
Rubber Products	0.3%	0.2%	39
Tires	0.2%	0.4%	24

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**1.8%**		**203**
Furniture	0.3%	0.4%	34
Mattresses	0.0%	0.0%	0
Small Appliances	0.8%	0.7%	86
Cell Phones	0.0%	0.0%	0
Audio/Visual Equipment	0.2%	0.2%	27
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.2%	0.3%	24
Other Electronics	0.3%	0.3%	33
CDL Wastes	**3.9%**		**441**
Clean Dimension Lumber	0.2%	0.3%	27
Clean Engineered Wood	0.3%	0.2%	33
Pallets	0.0%	0.0%	1
Crates	0.0%	0.0%	0
Other Untreated Wood	0.4%	0.5%	45
New Painted Wood	0.2%	0.2%	21
Old Painted Wood	0.1%	0.1%	14
Creosote-treated Wood	0.0%	0.0%	0
Other Treated Wood	0.0%	0.0%	1
Contaminated Wood	1.6%	1.1%	183
New Gypsum Scrap	0.2%	0.2%	17
Demo Gypsum Scrap	0.4%	0.6%	46
Carpet	0.2%	0.2%	20
Felt Carpet Pad	0.0%	0.1%	5
Fiberglass Insulation	0.0%	0.0%	0
Concrete	0.0%	0.0%	0
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	0
Rock	0.0%	0.0%	1
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.2%	0.1%	18
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	0
Other Construction	0.1%	0.1%	9
Hazardous	**0.2%**		**28**
Dried Latex Paint	0.0%	0.0%	1
Liquid Latex Paint	0.0%	0.0%	2
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	1
Oil-based Paint/Thinners	0.0%	0.0%	0
Caustic Cleaners	0.0%	0.0%	0
Pesticides/Herbicides	0.0%	0.0%	0
Rechargeable Batteries	0.0%	0.0%	0
Other Dry-cell Batteries	0.0%	0.0%	4
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	0
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.1%	6
Other Cleaners/Chemicals	0.0%	0.0%	1
Pharmaceuticals/Vitamins	0.0%	0.0%	2
Cosmetics	0.0%	0.0%	5
Other Potentially Harmful Waste	0.0%	0.1%	5
Fines and Misc Materials	**2.7%**		**304**
Sand/Soil/Dirt	0.6%	0.6%	73
Non-distinct Fines	0.2%	0.2%	26
Miscellaneous Organics	1.6%	0.6%	184
Miscellaneous Inorganics	0.2%	0.2%	22
Totals	**100%**		**11,352**
Sample Count	44		

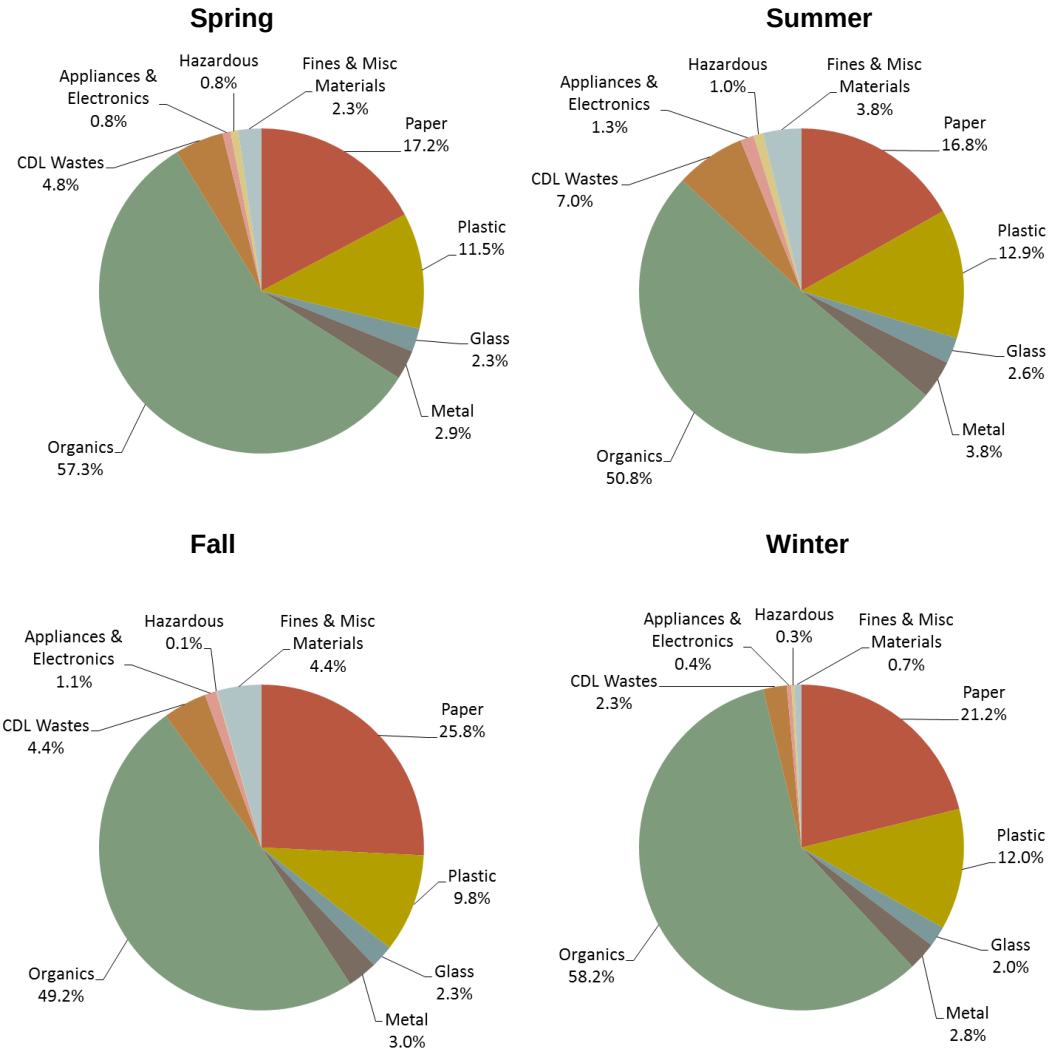
Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

4.6 By Season

Samples were classified into four seasons according to the month in which they were sorted: Spring (March, April, May), Summer (June, July, August), Fall (September, October, November), and Winter (January, February, December).

Figure 4-5 summarizes the results by broad material category for each season. When summed together, **organics** and **paper** accounted for the largest portion of the total tonnage in each of the four seasons, collectively representing between 68% and 76%. The relative proportions of the broad material categories remained relatively consistent across the seasons; however, **organics** decreased to about 50% in the summer and fall, compared to about 58% in the other two seasons.

Figure 4-5: Composition Summary, by Season



4.6.1 Spring

A total of 121 samples were sorted from the 27,990 tons of residential waste disposed between the months of March and May 2014. The top ten components, which are listed in Table 4-30, sum to 74% of the total. *Food* accounted for 32% of the total waste disposed in the spring. *Animal by-products* (11.7%)*, disposable diapers* (7.9%)*,* and *compostable/soiled paper* (6.0%) were the next largest material components. Table 4-34 lists the full composition results for residential waste disposed during the spring of 2014.

Table 4-30: Top Ten Components – Spring
(March – May 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	32.2%	32.2%	9,005
Animal By-products	11.7%	43.9%	3,271
Disposable Diapers	7.9%	51.7%	2,198
Compostable/Soiled Paper	6.0%	57.7%	1,677
Other Film	5.5%	63.2%	1,531
Mixed Low-grade Paper	3.6%	66.8%	1,003
Textiles/Clothing	2.9%	69.6%	808
Mixed/Other Paper	1.6%	71.2%	442
Mixed Textiles	1.5%	72.7%	414
Newspaper	1.5%	74.2%	408
Total	**74.2%**		**20,757**

4.6.2 Summer

A total of 120 samples were captured and sorted from the 28,339 tons of residential waste disposed between June and August 2014. As shown in Table 4-31, *food* was the largest component at almost 27%. *Animal by-products*, *disposable diapers,* and *compostable/soiled paper* each accounted for more than 6% of the total, by weight. See Table 4-35 for a complete list of the composition results for residential waste disposed in summer.

Table 4-31: Top Ten Components – Summer
(June – August 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	26.7%	26.7%	7,577
Animal By-products	10.9%	37.6%	3,091
Disposable Diapers	7.2%	44.9%	2,052
Compostable/Soiled Paper	6.4%	51.3%	1,819
Other Film	5.8%	57.1%	1,647
Mixed Low-grade Paper	4.0%	61.1%	1,127
Textiles/Clothing	3.2%	64.3%	919
Mixed Metals/Material	1.4%	65.7%	398
Miscellaneous Organics	1.4%	67.1%	388
Sand/Soil/Dirt	1.3%	68.4%	372
Total	**68.4%**		**19,389**

4.6.3 Fall

A total of 61 samples were sorted from the 28,234 tons of residential waste disposed between September and November 2014. Table 4-32 lists the top ten components of waste disposed in the fall. *Food* composed about 23% of the total, the lowest food percentage of any season. *Animal by-products*, *disposable diapers,* and *compostable/soiled paper* each made up more than 7% of the total. When summed together, the top ten components made up nearly 74% of the total waste disposed in fall 2014. Table 4-36 lists the composition results for this season in detail.

Table 4-32: Top Ten Components – Fall
(September – November 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	23.2%	23.2%	6,555
Animal By-products	10.9%	34.1%	3,065
Disposable Diapers	8.9%	42.9%	2,499
Compostable/Soiled Paper	7.0%	49.9%	1,970
Mixed/Other Paper	4.6%	54.5%	1,305
Newspaper	4.5%	59.0%	1,269
Other Film	4.4%	63.4%	1,231
Mixed Low-grade Paper	4.2%	67.6%	1,187
Miscellaneous Organics	3.9%	71.5%	1,109
Leaves and Grass	2.7%	74.2%	754
Total	**74.2%**		**20,945**

4.6.4 Winter

This study sorted waste during the calendar year 2014, so winter samples were split between January and February at the beginning of the study year and December at the end of the study year. A total of 60 samples were sorted from the 27,674 tons of residential waste disposed during these months. The top ten components are listed in
Table 4-33 and sum to nearly 80% of the total. As in the other seasons, *food* was the top waste component and represented over 36% of the waste stream. A*nimal by-products* (9.5%), *other film* (7.1%), and *compostable/soiled paper* (6.2%) each made up more than 6% of the waste disposed during December, January, and February 2014. Table 4-37 details the full composition results of this season's waste.

Table 4-33: Top Ten Components – Winter
(January, February, and December 2014)

Material	Est. Percent	Cum. Percent	Est. Tons
Food	36.1%	36.1%	9,977
Animal By-products	9.5%	45.5%	2,627
Other Film	7.1%	52.7%	1,974
Compostable/Soiled Paper	6.2%	58.8%	1,702
Disposable Diapers	5.6%	64.5%	1,563
Mixed Low-grade Paper	5.4%	69.9%	1,489
Textiles/Clothing	3.3%	73.2%	927
Mixed/Other Paper	2.6%	75.9%	732
Newspaper	2.0%	77.8%	541
Mixed Textiles	1.8%	79.6%	494
Total	**79.6%**		**22,027**

4.6.5 Detailed Composition Comparisons among Seasons

Food was the largest component for each of the four seasons. The percentage of *food* waste was highest in winter (36.1%) and lowest in fall (23.2%). *Newspaper* was among the top ten material components for spring, fall, and winter, while *mixed textiles* made the top ten in spring and winter. There were two single occurrences of material components in the top ten lists across all seasons: *leaves and grass* comprised nearly 3% of the fall weight, while *sand, soil, and dirt* accounted for just over 1% of waste disposed in the summer months.

Table 4-34: Composition by Weight – Spring
(March – May 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**17.2%**		**4,816**
Newspaper	1.5%	0.2%	408
Plain OCC/Kraft	1.2%	0.3%	326
Waxed OCC	0.1%	0.1%	34
Grocery/Shopping Bags	0.6%	0.1%	166
High-grade Paper	1.1%	0.2%	309
Mixed Low-grade Paper	3.6%	0.3%	1,003
Polycoated Containers	0.3%	0.1%	86
Compostable/Soiled	6.0%	0.4%	1,677
Pot. Comp. Single-use Food Service	1.0%	0.1%	272
Non-Comp. Single-use Food Service	0.3%	0.1%	93
Mixed/Other Paper	1.6%	0.2%	442
Plastic	**11.5%**		**3,227**
#1 PET Bottles	0.6%	0.1%	169
#2 HDPE Natural Bottles	0.1%	0.0%	42
#2 HDPE Colored Bottles	0.3%	0.1%	88
Other Bottles	0.1%	0.0%	22
Tubs	0.3%	0.1%	95
Expanded Poly. Non-food	0.1%	0.0%	38
Expanded Poly. Food-grade	0.3%	0.0%	75
Rigid Poly. Foam Insulation	0.1%	0.0%	15
Pot. Comp. Single-use Food Service	0.2%	0.1%	64
Non-Comp. Single-use Food Service	0.4%	0.1%	106
Other Rigid Packaging	0.8%	0.1%	214
Shopping/Dry Cleaning Bags	0.3%	0.1%	83
Stretch Wrap	0.0%	0.0%	4
Clean Polyethylene Film	0.2%	0.1%	49
Other Film	5.5%	0.3%	1,531
Plastic Pipe	0.1%	0.1%	27
Foam Carpet Padding	0.3%	0.2%	75
Durable Plastic Products	1.1%	0.2%	304
Plastic/Other Materials	0.8%	0.1%	227
Glass	**2.3%**		**652**
Clear Bottles	0.5%	0.1%	150
Green Bottles	0.5%	0.1%	130
Brown Bottles	0.5%	0.1%	141
Container Glass	0.4%	0.1%	115
Fluorescent Tubes	0.0%	0.0%	3
CFLs	0.0%	0.0%	3
Flat Glass	0.1%	0.1%	18
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.1%	92
Metal	**2.9%**		**818**
Aluminum Beverage Cans	0.3%	0.0%	75
Aluminum Foil/Containers	0.3%	0.0%	78
Other Aluminum	0.1%	0.0%	20
Other Nonferrous	0.2%	0.2%	68
Steel Food Cans	0.4%	0.1%	125
Empty Aerosol Cans	0.1%	0.0%	24
Other Ferrous	0.5%	0.1%	137
Oil filters	0.0%	0.0%	1
Mixed Metals/Material	1.0%	0.2%	290
Organics	**57.3%**		**16,039**
Leaves and Grass	0.7%	0.2%	187
Prunings	0.1%	0.1%	39
Food	32.2%	1.1%	9,005
Fats, Oils, Grease	0.0%	0.0%	8
Textiles/Clothing	2.9%	0.4%	808
Mixed Textiles	1.5%	0.2%	414
Disposable Diapers	7.9%	0.7%	2,198
Animal By-products	11.7%	1.2%	3,271
Rubber Products	0.4%	0.1%	107
Tires	0.0%	0.0%	2

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**0.8%**		**223**
Furniture	0.0%	0.0%	2
Mattresses	0.0%	0.0%	0
Small Appliances	0.4%	0.2%	102
Cell Phones	0.0%	0.0%	1
Audio/Visual Equipment	0.1%	0.0%	22
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.3%	0.3%	98
CDL Wastes	**4.8%**		**1,357**
Clean Dimension Lumber	0.3%	0.1%	94
Clean Engineered Wood	0.3%	0.2%	93
Pallets	0.0%	0.0%	7
Crates	0.0%	0.0%	0
Other Untreated Wood	0.0%	0.0%	14
New Painted Wood	0.5%	0.2%	126
Old Painted Wood	0.3%	0.2%	72
Creosote-treated Wood	0.0%	0.0%	5
Other Treated Wood	0.0%	0.0%	11
Contaminated Wood	0.5%	0.2%	136
New Gypsum Scrap	0.0%	0.0%	4
Demo Gypsum Scrap	0.3%	0.2%	86
Carpet	1.3%	0.6%	360
Felt Carpet Pad	0.0%	0.1%	12
Fiberglass Insulation	0.0%	0.0%	5
Concrete	0.2%	0.1%	49
Asphalt Paving	0.1%	0.1%	21
Other Aggregates	0.0%	0.0%	3
Rock	0.1%	0.2%	34
Asphalt Shingles	0.1%	0.1%	25
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.5%	0.2%	129
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	3
Other Construction	0.2%	0.2%	67
Hazardous	**0.8%**		**216**
Dried Latex Paint	0.1%	0.1%	29
Liquid Latex Paint	0.1%	0.1%	19
Solvent-based Adhesives	0.0%	0.0%	1
Water-based Adhesives	0.0%	0.0%	2
Oil-based Paint/Thinners	0.0%	0.0%	1
Caustic Cleaners	0.1%	0.0%	18
Pesticides/Herbicides	0.0%	0.0%	9
Rechargeable Batteries	0.0%	0.0%	1
Other Dry-cell Batteries	0.0%	0.0%	12
Wet-cell Batteries	0.0%	0.0%	1
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	3
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.1%	0.1%	29
Other Cleaners/Chemicals	0.0%	0.0%	9
Pharmaceuticals/Vitamins	0.0%	0.0%	14
Cosmetics	0.2%	0.1%	53
Other Potentially Harmful Waste	0.1%	0.0%	16
Fines and Misc Materials	**2.3%**		**643**
Sand/Soil/Dirt	1.0%	0.6%	291
Non-distinct Fines	0.0%	0.0%	2
Miscellaneous Organics	0.9%	0.2%	257
Miscellaneous Inorganics	0.3%	0.2%	93
Totals	**100%**		**27,990**
Sample Count	121		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-35: Composition by Weight – Summer
(June – August 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**16.8%**		**4,772**
Newspaper	0.9%	0.1%	259
Plain OCC/Kraft	1.2%	0.2%	353
Waxed OCC	0.1%	0.0%	21
Grocery/Shopping Bags	0.8%	0.1%	225
High-grade Paper	0.7%	0.2%	198
Mixed Low-grade Paper	4.0%	0.3%	1,127
Polycoated Containers	0.4%	0.0%	100
Compostable/Soiled	6.4%	0.4%	1,819
Pot. Comp. Single-use Food Service	0.8%	0.2%	222
Non-Comp. Single-use Food Service	0.7%	0.1%	201
Mixed/Other Paper	0.9%	0.1%	248
Plastic	**12.9%**		**3,643**
#1 PET Bottles	0.7%	0.1%	193
#2 HDPE Natural Bottles	0.2%	0.0%	54
#2 HDPE Colored Bottles	0.3%	0.0%	97
Other Bottles	0.0%	0.0%	13
Tubs	0.9%	0.1%	244
Expanded Poly. Non-food	0.1%	0.0%	40
Expanded Poly. Food-grade	0.3%	0.0%	95
Rigid Poly. Foam Insulation	0.0%	0.0%	11
Pot. Comp. Single-use Food Service	0.1%	0.0%	19
Non-Comp. Single-use Food Service	0.4%	0.1%	108
Other Rigid Packaging	1.2%	0.2%	344
Shopping/Dry Cleaning Bags	0.3%	0.0%	87
Stretch Wrap	0.1%	0.1%	39
Clean Polyethylene Film	0.2%	0.1%	67
Other Film	5.8%	0.4%	1,647
Plastic Pipe	0.0%	0.0%	6
Foam Carpet Padding	0.1%	0.1%	26
Durable Plastic Products	1.2%	0.2%	331
Plastic/Other Materials	0.8%	0.3%	222
Glass	**2.6%**		**734**
Clear Bottles	0.7%	0.1%	199
Green Bottles	0.5%	0.1%	135
Brown Bottles	0.5%	0.1%	149
Container Glass	0.4%	0.1%	124
Fluorescent Tubes	0.0%	0.0%	0
CFLs	0.0%	0.0%	4
Flat Glass	0.1%	0.0%	15
Automotive Glass	0.0%	0.0%	0
Other Glass	0.4%	0.1%	107
Metal	**3.8%**		**1,084**
Aluminum Beverage Cans	0.3%	0.1%	99
Aluminum Foil/Containers	0.3%	0.0%	92
Other Aluminum	0.1%	0.0%	17
Other Nonferrous	0.1%	0.1%	23
Steel Food Cans	0.6%	0.1%	171
Empty Aerosol Cans	0.2%	0.0%	58
Other Ferrous	0.8%	0.2%	222
Oil filters	0.0%	0.0%	3
Mixed Metals/Material	1.4%	0.3%	398
Organics	**50.8%**		**14,397**
Leaves and Grass	0.7%	0.2%	208
Prunings	0.5%	0.3%	137
Food	26.7%	1.2%	7,577
Fats, Oils, Grease	0.0%	0.0%	9
Textiles/Clothing	3.2%	0.3%	919
Mixed Textiles	1.0%	0.2%	287
Disposable Diapers	7.2%	0.7%	2,052
Animal By-products	10.9%	1.0%	3,091
Rubber Products	0.4%	0.1%	105
Tires	0.0%	0.0%	10

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**1.3%**		**382**
Furniture	0.7%	0.5%	205
Mattresses	0.0%	0.0%	0
Small Appliances	0.3%	0.2%	78
Cell Phones	0.0%	0.0%	2
Audio/Visual Equipment	0.1%	0.1%	24
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.1%	0.1%	24
Other Electronics	0.2%	0.1%	48
CDL Wastes	**7.0%**		**1,977**
Clean Dimension Lumber	0.5%	0.2%	143
Clean Engineered Wood	0.4%	0.2%	103
Pallets	0.0%	0.0%	2
Crates	0.0%	0.0%	2
Other Untreated Wood	0.1%	0.1%	28
New Painted Wood	0.7%	0.4%	186
Old Painted Wood	0.7%	0.5%	192
Creosote-treated Wood	0.1%	0.1%	37
Other Treated Wood	0.3%	0.2%	99
Contaminated Wood	0.4%	0.2%	119
New Gypsum Scrap	0.2%	0.2%	61
Demo Gypsum Scrap	0.7%	0.4%	202
Carpet	1.1%	0.4%	323
Felt Carpet Pad	0.0%	0.0%	11
Fiberglass Insulation	0.0%	0.0%	11
Concrete	0.0%	0.0%	10
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	1
Rock	0.1%	0.1%	15
Asphalt Shingles	0.1%	0.1%	18
Other Asphaltic Roofing	0.0%	0.1%	14
Ceramics	0.4%	0.1%	127
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.1%	13
Ceiling Tiles	0.1%	0.1%	14
Other Construction	0.9%	0.4%	245
Hazardous	**1.0%**		**272**
Dried Latex Paint	0.1%	0.1%	17
Liquid Latex Paint	0.3%	0.2%	80
Solvent-based Adhesives	0.0%	0.0%	5
Water-based Adhesives	0.0%	0.0%	12
Oil-based Paint/Thinners	0.0%	0.0%	12
Caustic Cleaners	0.0%	0.0%	4
Pesticides/Herbicides	0.0%	0.0%	2
Rechargeable Batteries	0.0%	0.0%	2
Other Dry-cell Batteries	0.0%	0.0%	13
Wet-cell Batteries	0.0%	0.0%	2
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	2
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.1%	0.0%	18
Other Cleaners/Chemicals	0.0%	0.0%	2
Pharmaceuticals/Vitamins	0.0%	0.0%	12
Cosmetics	0.2%	0.1%	57
Other Potentially Harmful Waste	0.1%	0.1%	33
Fines and Misc Materials	**3.8%**		**1,079**
Sand/Soil/Dirt	1.3%	0.6%	372
Non-distinct Fines	1.0%	0.3%	276
Miscellaneous Organics	1.4%	0.3%	388
Miscellaneous Inorganics	0.2%	0.1%	43
Totals	**100%**		**28,339**
Sample Count	120		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-36: Composition by Weight – Fall
(September – November 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**25.8%**		**7,274**
Newspaper	4.5%	0.5%	1,269
Plain OCC/Kraft	1.6%	0.4%	439
Waxed OCC	0.3%	0.2%	80
Grocery/Shopping Bags	0.6%	0.1%	161
High-grade Paper	2.3%	0.4%	660
Mixed Low-grade Paper	4.2%	0.5%	1,187
Polycoated Containers	0.2%	0.0%	48
Compostable/Soiled	7.0%	0.6%	1,970
Pot. Comp. Single-use Food Service	0.4%	0.2%	122
Non-Comp. Single-use Food Service	0.1%	0.1%	33
Mixed/Other Paper	4.6%	0.5%	1,305
Plastic	**9.8%**		**2,757**
#1 PET Bottles	0.7%	0.1%	195
#2 HDPE Natural Bottles	0.3%	0.1%	83
#2 HDPE Colored Bottles	0.2%	0.1%	69
Other Bottles	0.3%	0.1%	78
Tubs	0.1%	0.0%	30
Expanded Poly. Non-food	0.2%	0.1%	58
Expanded Poly. Food-grade	0.1%	0.0%	31
Rigid Poly. Foam Insulation	0.1%	0.1%	26
Pot. Comp. Single-use Food Service	0.2%	0.1%	47
Non-Comp. Single-use Food Service	0.2%	0.1%	58
Other Rigid Packaging	0.8%	0.1%	230
Shopping/Dry Cleaning Bags	0.3%	0.1%	77
Stretch Wrap	0.0%	0.0%	8
Clean Polyethylene Film	0.0%	0.0%	0
Other Film	4.4%	0.4%	1,231
Plastic Pipe	0.0%	0.0%	0
Foam Carpet Padding	0.2%	0.2%	58
Durable Plastic Products	0.9%	0.3%	267
Plastic/Other Materials	0.7%	0.2%	211
Glass	**2.3%**		**647**
Clear Bottles	0.7%	0.1%	200
Green Bottles	0.4%	0.1%	111
Brown Bottles	0.7%	0.2%	190
Container Glass	0.2%	0.1%	65
Fluorescent Tubes	0.0%	0.0%	2
CFLs	0.0%	0.0%	0
Flat Glass	0.0%	0.0%	0
Automotive Glass	0.1%	0.1%	14
Other Glass	0.2%	0.1%	64
Metal	**3.0%**		**844**
Aluminum Beverage Cans	0.5%	0.1%	138
Aluminum Foil/Containers	0.1%	0.0%	39
Other Aluminum	0.2%	0.1%	48
Other Nonferrous	0.5%	0.4%	138
Steel Food Cans	0.8%	0.2%	220
Empty Aerosol Cans	0.0%	0.0%	14
Other Ferrous	0.2%	0.1%	47
Oil filters	0.0%	0.0%	0
Mixed Metals/Material	0.7%	0.2%	200
Organics	**49.2%**		**13,884**
Leaves and Grass	2.7%	1.1%	754
Prunings	0.1%	0.1%	17
Food	23.2%	1.3%	6,555
Fats, Oils, Grease	0.2%	0.2%	55
Textiles/Clothing	2.0%	0.3%	553
Mixed Textiles	0.5%	0.2%	130
Disposable Diapers	8.9%	0.7%	2,499
Animal By-products	10.9%	1.0%	3,065
Rubber Products	0.8%	0.2%	230
Tires	0.1%	0.1%	24

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**1.1%**		**323**
Furniture	0.3%	0.4%	99
Mattresses	0.4%	0.6%	120
Small Appliances	0.2%	0.2%	65
Cell Phones	0.0%	0.0%	2
Audio/Visual Equipment	0.1%	0.1%	16
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.1%	0.1%	21
CDL Wastes	**4.4%**		**1,230**
Clean Dimension Lumber	0.1%	0.1%	28
Clean Engineered Wood	0.0%	0.0%	7
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.6%	0.2%	181
New Painted Wood	0.1%	0.1%	18
Old Painted Wood	0.2%	0.1%	48
Creosote-treated Wood	0.0%	0.0%	0
Other Treated Wood	0.2%	0.2%	50
Contaminated Wood	1.0%	0.6%	286
New Gypsum Scrap	0.0%	0.0%	0
Demo Gypsum Scrap	0.1%	0.1%	28
Carpet	1.4%	0.7%	386
Felt Carpet Pad	0.0%	0.0%	0
Fiberglass Insulation	0.2%	0.3%	48
Concrete	0.0%	0.0%	0
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	1
Rock	0.0%	0.0%	6
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.2%	0.1%	60
Cement Fiber Board	0.1%	0.1%	15
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	6
Other Construction	0.2%	0.3%	60
Hazardous	**0.1%**		**23**
Dried Latex Paint	0.0%	0.0%	13
Liquid Latex Paint	0.0%	0.0%	0
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	0
Oil-based Paint/Thinners	0.0%	0.0%	0
Caustic Cleaners	0.0%	0.0%	0
Pesticides/Herbicides	0.0%	0.0%	0
Rechargeable Batteries	0.0%	0.0%	1
Other Dry-cell Batteries	0.0%	0.0%	2
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	0
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	2
Other Cleaners/Chemicals	0.0%	0.0%	0
Pharmaceuticals/Vitamins	0.0%	0.0%	4
Cosmetics	0.0%	0.0%	1
Other Potentially Harmful Waste	0.0%	0.0%	0
Fines and Misc Materials	**4.4%**		**1,253**
Sand/Soil/Dirt	0.3%	0.2%	98
Non-distinct Fines	0.0%	0.0%	6
Miscellaneous Organics	3.9%	0.7%	1,109
Miscellaneous Inorganics	0.1%	0.1%	40
Totals	**100%**		**28,234**
Sample Count	61		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-37: Composition by Weight – Winter
(January, February, and December 2014)

Material	Est. Percent	+ / -	Est. Tons
Paper	**21.2%**		**5,865**
Newspaper	2.0%	0.4%	541
Plain OCC/Kraft	0.9%	0.2%	254
Waxed OCC	0.1%	0.1%	41
Grocery/Shopping Bags	0.9%	0.3%	263
High-grade Paper	1.5%	0.4%	401
Mixed Low-grade Paper	5.4%	0.7%	1,489
Polycoated Containers	1.1%	0.9%	300
Compostable/Soiled	6.2%	0.7%	1,702
Pot. Comp. Single-use Food Service	0.3%	0.1%	80
Non-Comp. Single-use Food Service	0.2%	0.1%	62
Mixed/Other Paper	2.6%	0.6%	732
Plastic	**12.0%**		**3,319**
#1 PET Bottles	0.5%	0.1%	132
#2 HDPE Natural Bottles	0.1%	0.0%	38
#2 HDPE Colored Bottles	0.1%	0.0%	34
Other Bottles	0.1%	0.1%	34
Tubs	0.3%	0.1%	75
Expanded Poly. Non-food	0.1%	0.1%	35
Expanded Poly. Food-grade	0.1%	0.0%	20
Rigid Poly. Foam Insulation	0.1%	0.1%	28
Pot. Comp. Single-use Food Service	0.2%	0.1%	62
Non-Comp. Single-use Food Service	0.1%	0.0%	19
Other Rigid Packaging	1.5%	0.3%	408
Shopping/Dry Cleaning Bags	0.0%	0.0%	1
Stretch Wrap	0.0%	0.0%	2
Clean Polyethylene Film	0.4%	0.6%	107
Other Film	7.1%	0.7%	1,974
Plastic Pipe	0.0%	0.0%	0
Foam Carpet Padding	0.1%	0.1%	25
Durable Plastic Products	0.6%	0.2%	167
Plastic/Other Materials	0.6%	0.2%	158
Glass	**2.0%**		**566**
Clear Bottles	0.6%	0.2%	174
Green Bottles	0.3%	0.1%	93
Brown Bottles	0.4%	0.2%	112
Container Glass	0.2%	0.1%	56
Fluorescent Tubes	0.1%	0.1%	19
CFLs	0.0%	0.0%	1
Flat Glass	0.1%	0.1%	33
Automotive Glass	0.0%	0.0%	0
Other Glass	0.3%	0.3%	77
Metal	**2.8%**		**776**
Aluminum Beverage Cans	0.4%	0.1%	100
Aluminum Foil/Containers	0.3%	0.1%	73
Other Aluminum	0.1%	0.0%	32
Other Nonferrous	0.3%	0.2%	78
Steel Food Cans	0.6%	0.1%	157
Empty Aerosol Cans	0.1%	0.0%	28
Other Ferrous	0.4%	0.3%	112
Oil filters	0.0%	0.0%	0
Mixed Metals/Material	0.7%	0.3%	195
Organics	**58.2%**		**16,097**
Leaves and Grass	0.8%	0.8%	225
Prunings	0.7%	0.4%	184
Food	36.1%	1.5%	9,977
Fats, Oils, Grease	0.0%	0.0%	0
Textiles/Clothing	3.3%	0.6%	927
Mixed Textiles	1.8%	0.4%	494
Disposable Diapers	5.6%	0.8%	1,563
Animal By-products	9.5%	1.3%	2,627
Rubber Products	0.4%	0.2%	99
Tires	0.0%	0.0%	0

Material	Est. Percent	+ / -	Est. Tons
Appliances and Electronics	**0.4%**		**123**
Furniture	0.1%	0.2%	32
Mattresses	0.0%	0.0%	0
Small Appliances	0.3%	0.3%	88
Cell Phones	0.0%	0.0%	0
Audio/Visual Equipment	0.0%	0.0%	0
CRT Monitors	0.0%	0.0%	0
CRT Televisions	0.0%	0.0%	0
Other Electronics	0.0%	0.0%	4
CDL Wastes	**2.3%**		**649**
Clean Dimension Lumber	0.0%	0.0%	2
Clean Engineered Wood	0.0%	0.0%	1
Pallets	0.0%	0.0%	0
Crates	0.0%	0.0%	0
Other Untreated Wood	0.4%	0.3%	108
New Painted Wood	0.1%	0.1%	32
Old Painted Wood	0.5%	0.4%	134
Creosote-treated Wood	0.0%	0.0%	0
Other Treated Wood	0.1%	0.1%	20
Contaminated Wood	0.2%	0.2%	58
New Gypsum Scrap	0.0%	0.1%	9
Demo Gypsum Scrap	0.2%	0.3%	65
Carpet	0.4%	0.2%	98
Felt Carpet Pad	0.0%	0.0%	0
Fiberglass Insulation	0.0%	0.0%	6
Concrete	0.4%	0.5%	113
Asphalt Paving	0.0%	0.0%	0
Other Aggregates	0.0%	0.0%	0
Rock	0.0%	0.0%	0
Asphalt Shingles	0.0%	0.0%	0
Other Asphaltic Roofing	0.0%	0.0%	0
Ceramics	0.0%	0.0%	1
Cement Fiber Board	0.0%	0.0%	0
Single-ply Roofing Membranes	0.0%	0.0%	0
Ceiling Tiles	0.0%	0.0%	0
Other Construction	0.0%	0.0%	1
Hazardous	**0.3%**		**83**
Dried Latex Paint	0.1%	0.1%	21
Liquid Latex Paint	0.0%	0.1%	11
Solvent-based Adhesives	0.0%	0.0%	0
Water-based Adhesives	0.0%	0.0%	2
Oil-based Paint/Thinners	0.0%	0.0%	7
Caustic Cleaners	0.0%	0.0%	0
Pesticides/Herbicides	0.0%	0.1%	11
Rechargeable Batteries	0.0%	0.0%	0
Other Dry-cell Batteries	0.0%	0.0%	3
Wet-cell Batteries	0.0%	0.0%	0
Gasoline/Kerosene	0.0%	0.0%	0
Motor Oil/Diesel Oil	0.0%	0.0%	0
Asbestos	0.0%	0.0%	0
Explosives	0.0%	0.0%	0
Medical Wastes	0.0%	0.0%	6
Other Cleaners/Chemicals	0.1%	0.1%	18
Pharmaceuticals/Vitamins	0.0%	0.0%	0
Cosmetics	0.0%	0.0%	3
Other Potentially Harmful Waste	0.0%	0.0%	0
Fines and Misc Materials	**0.7%**		**195**
Sand/Soil/Dirt	0.1%	0.1%	16
Non-distinct Fines	0.0%	0.0%	2
Miscellaneous Organics	0.5%	0.3%	145
Miscellaneous Inorganics	0.1%	0.1%	32
Totals	**100%**		**27,674**
Sample Count	60		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

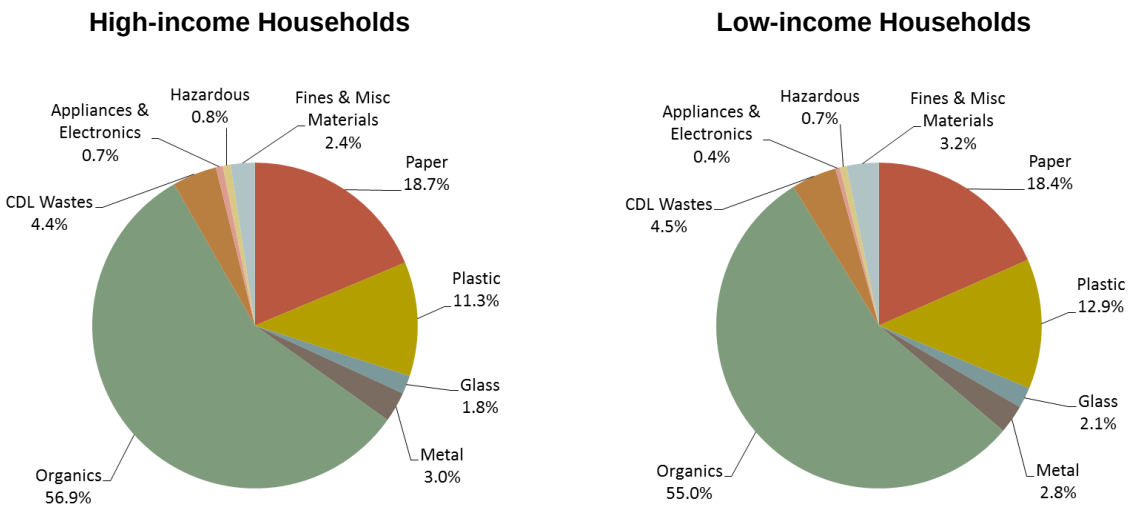
4.7 By Demographics

Waste compositions for various demographic groups were calculated by considering the median household income and mean household size of each sampled garbage route. Median household income for each route was calculated based on information from the 2009-2013 American Community Survey 5-year estimates, at the Census Block Group level of geography.[19] The total population and number of households for each route were calculated using information from the 2010 Census, at the Census Block level of geography. Sampled routes were divided into quartiles based on the median income and mean household size of each garbage route. Waste samples from the first (0 - 25%) quartile of routes were used to calculate waste compositions for low-income and small households (separately). Samples from the top quartile (75% - 100%) were used to calculate composition profiles for high-income and large households. See Appendix D for more details on demographic calculations.

4.7.1 By Household Income

Figure 4-6 summarizes the composition by broad material category for each household income type. **Organics** accounted for a higher percentage of disposed waste for high-income (56.9%) than for low-income households (55.0%). **Paper** was the second largest broad material category in both income groups, making up between 18% and 19% of the total waste disposed.

Figure 4-6: Composition Summary, by Household Income
(January – December 2014)



[19] A Census Block is generally equivalent to a city block. A Block Group is a collection of Blocks. For reference, a Tract is a collection of Block Groups. There are approximately 9,200 Census Blocks; 570 Block Groups; and 126 Tracts in Seattle.

4.7.1.1 High-income Households

A total of 41 waste samples from routes classified as high-income were collected and sorted in 2014. Table 4-38 lists the top ten components, which sum to approximately 77% of the total. The largest component, *food*, accounted for approximately 29% of the waste stream. *Animal by-products* (13.0%) and *disposable diapers* (9.6%) were the next largest components. The detailed composition results for high-income routes are listed in Table 4-40.

Table 4-38: Top Ten Components – High-income Households
(January – December 2014)

Material	Est. Percent	Cum. Percent
Food	28.8%	28.8%
Animal By-products	13.0%	41.8%
Disposable Diapers	9.6%	51.4%
Compostable/Soiled Paper	6.3%	57.7%
Other Film	6.3%	64.0%
Mixed Low-grade Paper	3.9%	67.9%
Textiles/Clothing	2.8%	70.7%
Mixed/Other Paper	2.4%	73.1%
Newspaper	1.9%	75.0%
Miscellaneous Organics	1.6%	76.6%
Total	**76.6%**	

4.7.1.2 Low-income Households

A total of 31 samples from routes classified as low-income were collected and sorted in 2014. The top ten components of these samples are listed in Table 4-39. *Food* made up about 29% of the total waste. *Animal by-products* and *disposable diapers*, together, accounted for another 20%. The top ten components amounted to approximately 76% of this waste. Table 4-41 details the waste composition results for low-income routes.

Table 4-39: Top Ten Components – Low-income Households
(January – December 2014)

Material	Est. Percent	Cum. Percent
Food	28.9%	28.9%
Animal By-products	12.2%	41.1%
Disposable Diapers	7.9%	49.0%
Compostable/Soiled Paper	6.9%	55.9%
Other Film	6.6%	62.5%
Mixed Low-grade Paper	3.6%	66.1%
Textiles/Clothing	3.4%	69.6%
Miscellaneous Organics	2.1%	71.7%
Newspaper	2.0%	73.7%
Mixed/Other Paper	2.0%	75.7%
Total	**75.7%**	

4.7.1.3 Detailed Composition Comparisons between High- and Low-income Households

The seven most prevalent components were the same for both income groups: *food*, *animal by-products*, *disposable diapers*, *compostable/soiled paper*, *mixed low-grade paper*, *other plastic film*, and *textiles/clothing*. In addition, the category *newspaper* appears in both top ten lists. No material categories were exclusive to one demographic, but *miscellaneous organics* were more prevalent in low-income households, while *mixed/other paper* was more prevalent in waste from high-income households.

Table 4-40: Composition by Weight – High-income Households
(January – December 2014)

Material	Est. Percent	+ / -
Paper	**18.7%**	
Newspaper	1.9%	0.5%
Plain OCC/Kraft	0.9%	0.2%
Waxed OCC	0.0%	0.0%
Grocery/Shopping Bags	0.7%	0.1%
High-grade Paper	1.3%	0.4%
Mixed Low-grade Paper	3.9%	0.6%
Polycoated Containers	0.3%	0.1%
Compostable/Soiled	6.3%	0.6%
Pot. Comp. Single-use Food Service	0.7%	0.2%
Non-Comp. Single-use Food Service	0.3%	0.1%
Mixed/Other Paper	2.4%	0.7%
Plastic	**11.3%**	
#1 PET Bottles	0.4%	0.1%
#2 HDPE Natural Bottles	0.2%	0.1%
#2 HDPE Colored Bottles	0.2%	0.1%
Other Bottles	0.1%	0.1%
Tubs	0.4%	0.1%
Expanded Poly. Non-food	0.2%	0.1%
Expanded Poly. Food-grade	0.2%	0.1%
Rigid Poly. Foam Insulation	0.1%	0.1%
Pot. Comp. Single-use Food Service	0.1%	0.0%
Non-Comp. Single-use Food Service	0.1%	0.1%
Other Rigid Packaging	1.0%	0.2%
Shopping/Dry Cleaning Bags	0.2%	0.1%
Stretch Wrap	0.0%	0.0%
Clean Polyethylene Film	0.1%	0.0%
Other Film	6.3%	0.6%
Plastic Pipe	0.0%	0.0%
Foam Carpet Padding	0.0%	0.1%
Durable Plastic Products	1.0%	0.3%
Plastic/Other Materials	0.6%	0.2%
Glass	**1.8%**	
Clear Bottles	0.4%	0.1%
Green Bottles	0.3%	0.1%
Brown Bottles	0.3%	0.1%
Container Glass	0.3%	0.1%
Fluorescent Tubes	0.0%	0.0%
CFLs	0.0%	0.0%
Flat Glass	0.2%	0.2%
Automotive Glass	0.0%	0.0%
Other Glass	0.3%	0.1%
Metal	**3.0%**	
Aluminum Beverage Cans	0.2%	0.1%
Aluminum Foil/Containers	0.3%	0.1%
Other Aluminum	0.1%	0.0%
Other Nonferrous	0.1%	0.1%
Steel Food Cans	0.5%	0.1%
Empty Aerosol Cans	0.1%	0.1%
Other Ferrous	0.6%	0.3%
Oil filters	0.0%	0.0%
Mixed Metals/Material	1.2%	0.4%
Organics	**56.9%**	
Leaves and Grass	1.0%	0.5%
Prunings	0.3%	0.3%
Food	28.8%	1.7%
Fats, Oils, Grease	0.0%	0.0%
Textiles/Clothing	2.8%	0.7%
Mixed Textiles	1.0%	0.4%
Disposable Diapers	9.6%	1.2%
Animal By-products	13.0%	1.5%
Rubber Products	0.4%	0.1%
Tires	0.0%	0.0%

Material	Est. Percent	+ / -
Appliances and Electronics	**0.7%**	
Furniture	0.3%	0.5%
Mattresses	0.0%	0.0%
Small Appliances	0.4%	0.3%
Cell Phones	0.0%	0.0%
Audio/Visual Equipment	0.0%	0.0%
CRT Monitors	0.0%	0.0%
CRT Televisions	0.0%	0.0%
Other Electronics	0.0%	0.0%
CDL Wastes	**4.4%**	
Clean Dimension Lumber	0.1%	0.1%
Clean Engineered Wood	0.1%	0.2%
Pallets	0.0%	0.0%
Crates	0.0%	0.0%
Other Untreated Wood	0.2%	0.2%
New Painted Wood	0.5%	0.4%
Old Painted Wood	0.1%	0.1%
Creosote-treated Wood	0.0%	0.1%
Other Treated Wood	0.2%	0.2%
Contaminated Wood	0.4%	0.3%
New Gypsum Scrap	0.0%	0.0%
Demo Gypsum Scrap	0.3%	0.3%
Carpet	1.1%	0.7%
Felt Carpet Pad	0.0%	0.0%
Fiberglass Insulation	0.0%	0.1%
Concrete	0.1%	0.1%
Asphalt Paving	0.0%	0.0%
Other Aggregates	0.0%	0.0%
Rock	0.0%	0.0%
Asphalt Shingles	0.0%	0.0%
Other Asphaltic Roofing	0.0%	0.0%
Ceramics	0.2%	0.1%
Cement Fiber Board	0.0%	0.0%
Single-ply Roofing Membranes	0.1%	0.2%
Ceiling Tiles	0.1%	0.2%
Other Construction	0.6%	0.6%
Hazardous	**0.8%**	
Dried Latex Paint	0.1%	0.2%
Liquid Latex Paint	0.3%	0.2%
Solvent-based Adhesives	0.0%	0.0%
Water-based Adhesives	0.0%	0.0%
Oil-based Paint/Thinners	0.0%	0.0%
Caustic Cleaners	0.1%	0.1%
Pesticides/Herbicides	0.0%	0.0%
Rechargeable Batteries	0.0%	0.0%
Other Dry-cell Batteries	0.0%	0.0%
Wet-cell Batteries	0.0%	0.0%
Gasoline/Kerosene	0.0%	0.0%
Motor Oil/Diesel Oil	0.0%	0.0%
Asbestos	0.0%	0.0%
Explosives	0.0%	0.0%
Medical Wastes	0.0%	0.0%
Other Cleaners/Chemicals	0.0%	0.0%
Pharmaceuticals/Vitamins	0.0%	0.0%
Cosmetics	0.2%	0.1%
Other Potentially Harmful Waste	0.1%	0.1%
Fines and Misc Materials	**2.4%**	
Sand/Soil/Dirt	0.3%	0.3%
Non-distinct Fines	0.5%	0.3%
Miscellaneous Organics	1.6%	0.6%
Miscellaneous Inorganics	0.0%	0.0%
Totals	**100%**	
Sample Count	41	

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-41: Composition by Weight – Low-income Households
(January – December 2014)

Material	Est. Percent	+ / -
Paper	**18.4%**	
Newspaper	2.0%	0.6%
Plain OCC/Kraft	0.9%	0.3%
Waxed OCC	0.2%	0.3%
Grocery/Shopping Bags	0.6%	0.1%
High-grade Paper	0.9%	0.3%
Mixed Low-grade Paper	3.6%	0.6%
Polycoated Containers	0.3%	0.1%
Compostable/Soiled	6.9%	0.7%
Pot. Comp. Single-use Food Service	0.5%	0.1%
Non-Comp. Single-use Food Service	0.4%	0.2%
Mixed/Other Paper	2.0%	0.6%
Plastic	**12.9%**	
#1 PET Bottles	0.7%	0.1%
#2 HDPE Natural Bottles	0.2%	0.1%
#2 HDPE Colored Bottles	0.3%	0.1%
Other Bottles	0.2%	0.1%
Tubs	0.5%	0.1%
Expanded Poly. Non-food	0.2%	0.1%
Expanded Poly. Food-grade	0.4%	0.1%
Rigid Poly. Foam Insulation	0.1%	0.1%
Pot. Comp. Single-use Food Service	0.2%	0.2%
Non-Comp. Single-use Food Service	0.3%	0.1%
Other Rigid Packaging	1.1%	0.2%
Shopping/Dry Cleaning Bags	0.3%	0.1%
Stretch Wrap	0.0%	0.0%
Clean Polyethylene Film	0.3%	0.4%
Other Film	6.6%	0.7%
Plastic Pipe	0.0%	0.0%
Foam Carpet Padding	0.0%	0.1%
Durable Plastic Products	0.9%	0.3%
Plastic/Other Materials	0.7%	0.2%
Glass	**2.1%**	
Clear Bottles	0.7%	0.2%
Green Bottles	0.3%	0.1%
Brown Bottles	0.4%	0.2%
Container Glass	0.3%	0.1%
Fluorescent Tubes	0.0%	0.0%
CFLs	0.0%	0.0%
Flat Glass	0.0%	0.0%
Automotive Glass	0.0%	0.0%
Other Glass	0.4%	0.2%
Metal	**2.8%**	
Aluminum Beverage Cans	0.4%	0.1%
Aluminum Foil/Containers	0.3%	0.1%
Other Aluminum	0.2%	0.1%
Other Nonferrous	0.0%	0.0%
Steel Food Cans	0.8%	0.3%
Empty Aerosol Cans	0.2%	0.1%
Other Ferrous	0.4%	0.3%
Oil filters	0.0%	0.0%
Mixed Metals/Material	0.7%	0.2%
Organics	**55.0%**	
Leaves and Grass	1.0%	0.6%
Prunings	0.1%	0.1%
Food	28.9%	2.2%
Fats, Oils, Grease	0.1%	0.0%
Textiles/Clothing	3.4%	0.8%
Mixed Textiles	0.9%	0.4%
Disposable Diapers	7.9%	1.1%
Animal By-products	12.2%	1.8%
Rubber Products	0.5%	0.3%
Tires	0.0%	0.0%
Appliances and Electronics	**0.4%**	
Furniture	0.1%	0.1%
Mattresses	0.0%	0.0%
Small Appliances	0.2%	0.2%
Cell Phones	0.0%	0.0%
Audio/Visual Equipment	0.0%	0.0%
CRT Monitors	0.0%	0.0%
CRT Televisions	0.0%	0.0%
Other Electronics	0.2%	0.1%
CDL Wastes	**4.5%**	
Clean Dimension Lumber	0.1%	0.1%
Clean Engineered Wood	0.2%	0.2%
Pallets	0.0%	0.0%
Crates	0.0%	0.0%
Other Untreated Wood	0.3%	0.3%
New Painted Wood	0.7%	0.6%
Old Painted Wood	1.2%	1.1%
Creosote-treated Wood	0.0%	0.0%
Other Treated Wood	0.1%	0.1%
Contaminated Wood	0.0%	0.0%
New Gypsum Scrap	0.0%	0.0%
Demo Gypsum Scrap	0.2%	0.2%
Carpet	0.1%	0.1%
Felt Carpet Pad	0.0%	0.0%
Fiberglass Insulation	0.0%	0.0%
Concrete	0.0%	0.0%
Asphalt Paving	0.2%	0.3%
Other Aggregates	0.0%	0.0%
Rock	0.0%	0.0%
Asphalt Shingles	0.3%	0.5%
Other Asphaltic Roofing	0.0%	0.0%
Ceramics	0.3%	0.2%
Cement Fiber Board	0.0%	0.0%
Single-ply Roofing Membranes	0.0%	0.0%
Ceiling Tiles	0.0%	0.1%
Other Construction	0.8%	0.8%
Hazardous	**0.7%**	
Dried Latex Paint	0.0%	0.0%
Liquid Latex Paint	0.0%	0.0%
Solvent-based Adhesives	0.0%	0.0%
Water-based Adhesives	0.0%	0.0%
Oil-based Paint/Thinners	0.0%	0.0%
Caustic Cleaners	0.0%	0.0%
Pesticides/Herbicides	0.1%	0.1%
Rechargeable Batteries	0.0%	0.0%
Other Dry-cell Batteries	0.0%	0.0%
Wet-cell Batteries	0.0%	0.0%
Gasoline/Kerosene	0.0%	0.0%
Motor Oil/Diesel Oil	0.0%	0.0%
Asbestos	0.0%	0.0%
Explosives	0.0%	0.0%
Medical Wastes	0.1%	0.1%
Other Cleaners/Chemicals	0.0%	0.0%
Pharmaceuticals/Vitamins	0.0%	0.0%
Cosmetics	0.2%	0.1%
Other Potentially Harmful Waste	0.1%	0.1%
Fines and Misc Materials	**3.2%**	
Sand/Soil/Dirt	0.7%	0.8%
Non-distinct Fines	0.3%	0.3%
Miscellaneous Organics	2.1%	0.8%
Miscellaneous Inorganics	0.1%	0.1%
Totals	**100%**	
Sample Count	35	

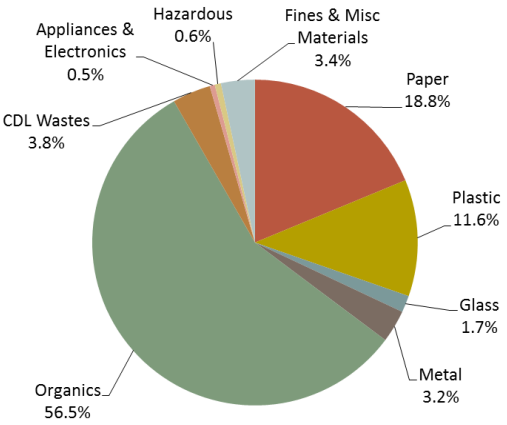
Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

4.7.2 By Household Size

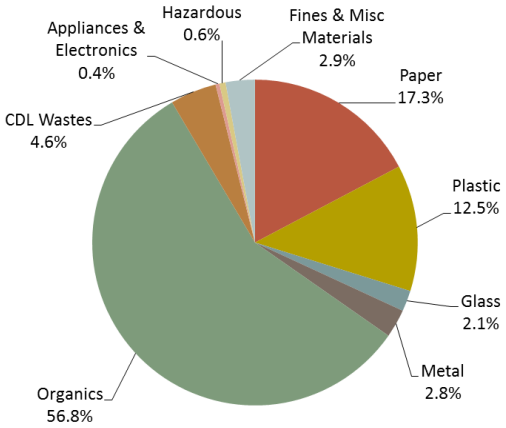
Figure 4-7 presents a waste composition summary by broad material category for waste disposed by small and large households. **Organics** was the largest broad material category for both household types, accounting for around 57% of disposed waste. **Paper** was slightly more prevalent in small household waste (nearly 19%) compared to large households (17%). Waste percentages by broad material categories are very similar for the remaining categories.

Figure 4-7: Composition Summary, by Household Size
(January – December 2014)

Small Households



Large Households



4.7.2.1 Small Households

A total of 38 samples were collected and sorted from small household routes. Table 4-42 lists the top ten components for small households. The most prevalent component, *food* (28.2%), accounted for nearly twice as much as the second most prevalent component (*animal by-products,* 14.6%). The top ten components, together, accounted for approximately 77% of the total waste. The full composition results for waste from small households are listed in Table 4-4.

Table 4-42: Top Ten Components – Small Households
(January – December 2014)

Material	Est. Percent	Cum. Percent
Food	28.2%	28.2%
Animal By-products	14.6%	42.8%
Disposable Diapers	8.6%	51.4%
Compostable/Soiled Paper	6.6%	58.0%
Other Film	6.3%	64.3%
Mixed Low-grade Paper	3.7%	68.0%
Textiles/Clothing	2.6%	70.6%
Miscellaneous Organics	2.2%	72.8%
Mixed/Other Paper	2.1%	74.9%
Newspaper	1.9%	76.9%
Total	**76.9%**	

4.7.2.2 Large Households

A total of 32 samples were captured and sorted from large household routes. As shown in Table 4-43, *food* accounted for about 31% of the waste. *Animal by-products, disposable diapers*, *compostable/soiled paper,* and *other film* each accounted for between 6% and 12% of the total. Table 4-45 lists the detailed composition results for waste from large households.

Table 4-43: Top Ten Components – Large Households
(January – December 2014)

Material	Est. Percent	Cum. Percent
Food	30.7%	30.7%
Animal By-products	11.4%	42.1%
Disposable Diapers	9.1%	51.2%
Compostable/Soiled Paper	6.9%	58.1%
Other Film	6.7%	64.9%
Mixed Low-grade Paper	3.5%	68.3%
Textiles/Clothing	3.3%	71.6%
Mixed/Other Paper	1.9%	73.5%
Miscellaneous Organics	1.8%	75.3%
Newspaper	1.7%	77.0%
Total	**77.0%**	

4.7.3 Detailed Composition Comparisons between Small and Large Households

The seven most prevalent components were the same for small and large households: *food*, *animal by-products*, *disposable diapers*, *compostable/soiled paper*, *mixed low-grade paper*, *other plastic film*, and *textiles/clothing*. Three other components, *miscellaneous organics, newspaper* and *mixed/other paper*, also appear in both top ten lists, though in different orders. *Miscellaneous organics* were more prevalent in the small household waste stream, while *mixed/other paper* was more prevalent in the large household waste stream.

Table 4-44: Composition by Weight – Small Households (January – December 2014)

Material	Est. Percent	+ / -
Paper	**18.8%**	
Newspaper	1.9%	0.6%
Plain OCC/Kraft	0.9%	0.3%
Waxed OCC	0.0%	0.0%
Grocery/Shopping Bags	0.7%	0.2%
High-grade Paper	1.0%	0.3%
Mixed Low-grade Paper	3.7%	0.6%
Polycoated Containers	1.1%	1.4%
Compostable/Soiled	6.6%	0.7%
Pot. Comp. Single-use Food Service	0.5%	0.1%
Non-Comp. Single-use Food Service	0.3%	0.1%
Mixed/Other Paper	2.1%	0.6%
Plastic	**11.6%**	
#1 PET Bottles	0.4%	0.1%
#2 HDPE Natural Bottles	0.1%	0.1%
#2 HDPE Colored Bottles	0.2%	0.1%
Other Bottles	0.1%	0.1%
Tubs	0.4%	0.1%
Expanded Poly. Non-food	0.2%	0.1%
Expanded Poly. Food-grade	0.2%	0.0%
Rigid Poly. Foam Insulation	0.1%	0.1%
Pot. Comp. Single-use Food Service	0.2%	0.1%
Non-Comp. Single-use Food Service	0.2%	0.1%
Other Rigid Packaging	1.1%	0.2%
Shopping/Dry Cleaning Bags	0.2%	0.1%
Stretch Wrap	0.0%	0.0%
Clean Polyethylene Film	0.0%	0.0%
Other Film	6.3%	0.6%
Plastic Pipe	0.0%	0.0%
Foam Carpet Padding	0.0%	0.0%
Durable Plastic Products	1.1%	0.4%
Plastic/Other Materials	0.6%	0.2%
Glass	**1.7%**	
Clear Bottles	0.4%	0.2%
Green Bottles	0.3%	0.1%
Brown Bottles	0.4%	0.2%
Container Glass	0.3%	0.1%
Fluorescent Tubes	0.0%	0.0%
CFLs	0.0%	0.0%
Flat Glass	0.0%	0.0%
Automotive Glass	0.0%	0.0%
Other Glass	0.2%	0.1%
Metal	**3.2%**	
Aluminum Beverage Cans	0.2%	0.1%
Aluminum Foil/Containers	0.3%	0.1%
Other Aluminum	0.1%	0.1%
Other Nonferrous	0.1%	0.1%
Steel Food Cans	0.5%	0.1%
Empty Aerosol Cans	0.1%	0.0%
Other Ferrous	0.8%	0.4%
Oil filters	0.0%	0.0%
Mixed Metals/Material	1.1%	0.3%
Organics	**56.5%**	
Leaves and Grass	0.6%	0.3%
Prunings	0.1%	0.1%
Food	28.2%	2.2%
Fats, Oils, Grease	0.0%	0.0%
Textiles/Clothing	2.6%	0.5%
Mixed Textiles	1.3%	0.4%
Disposable Diapers	8.6%	1.0%
Animal By-products	14.6%	1.8%
Rubber Products	0.6%	0.3%
Tires	0.0%	0.0%

Material	Est. Percent	+ / -
Appliances and Electronics	**0.5%**	
Furniture	0.2%	0.3%
Mattresses	0.2%	0.3%
Small Appliances	0.1%	0.1%
Cell Phones	0.0%	0.0%
Audio/Visual Equipment	0.1%	0.1%
CRT Monitors	0.0%	0.0%
CRT Televisions	0.0%	0.0%
Other Electronics	0.0%	0.0%
CDL Wastes	**3.8%**	
Clean Dimension Lumber	0.1%	0.1%
Clean Engineered Wood	0.1%	0.1%
Pallets	0.0%	0.0%
Crates	0.0%	0.0%
Other Untreated Wood	0.3%	0.2%
New Painted Wood	0.4%	0.4%
Old Painted Wood	0.3%	0.3%
Creosote-treated Wood	0.0%	0.0%
Other Treated Wood	0.1%	0.1%
Contaminated Wood	0.5%	0.4%
New Gypsum Scrap	0.1%	0.1%
Demo Gypsum Scrap	0.0%	0.1%
Carpet	0.6%	0.4%
Felt Carpet Pad	0.0%	0.0%
Fiberglass Insulation	0.1%	0.1%
Concrete	0.4%	0.5%
Asphalt Paving	0.0%	0.0%
Other Aggregates	0.0%	0.0%
Rock	0.0%	0.0%
Asphalt Shingles	0.0%	0.0%
Other Asphaltic Roofing	0.0%	0.0%
Ceramics	0.2%	0.1%
Cement Fiber Board	0.0%	0.0%
Single-ply Roofing Membranes	0.0%	0.0%
Ceiling Tiles	0.0%	0.0%
Other Construction	0.6%	0.5%
Hazardous	**0.6%**	
Dried Latex Paint	0.2%	0.3%
Liquid Latex Paint	0.1%	0.1%
Solvent-based Adhesives	0.0%	0.0%
Water-based Adhesives	0.0%	0.0%
Oil-based Paint/Thinners	0.0%	0.0%
Caustic Cleaners	0.0%	0.0%
Pesticides/Herbicides	0.1%	0.1%
Rechargeable Batteries	0.0%	0.0%
Other Dry-cell Batteries	0.0%	0.0%
Wet-cell Batteries	0.0%	0.0%
Gasoline/Kerosene	0.0%	0.0%
Motor Oil/Diesel Oil	0.0%	0.0%
Asbestos	0.0%	0.0%
Explosives	0.0%	0.0%
Medical Wastes	0.1%	0.1%
Other Cleaners/Chemicals	0.0%	0.0%
Pharmaceuticals/Vitamins	0.0%	0.0%
Cosmetics	0.0%	0.0%
Other Potentially Harmful Waste	0.0%	0.0%
Fines and Misc Materials	**3.4%**	
Sand/Soil/Dirt	0.9%	0.7%
Non-distinct Fines	0.1%	0.2%
Miscellaneous Organics	2.2%	0.9%
Miscellaneous Inorganics	0.1%	0.1%
Totals	**100%**	
Sample Count	38	

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Table 4-45: Composition by Weight – Large Households
(January – December 2014)

Material	Est. Percent	+ / -
Paper	**17.3%**	
Newspaper	1.7%	0.6%
Plain OCC/Kraft	0.7%	0.3%
Waxed OCC	0.3%	0.3%
Grocery/Shopping Bags	0.6%	0.1%
High-grade Paper	0.7%	0.2%
Mixed Low-grade Paper	3.5%	0.8%
Polycoated Containers	0.2%	0.1%
Compostable/Soiled	6.9%	0.7%
Pot. Comp. Single-use Food Service	0.5%	0.1%
Non-Comp. Single-use Food Service	0.4%	0.2%
Mixed/Other Paper	1.9%	0.7%
Plastic	**12.5%**	
#1 PET Bottles	0.6%	0.1%
#2 HDPE Natural Bottles	0.2%	0.1%
#2 HDPE Colored Bottles	0.2%	0.0%
Other Bottles	0.1%	0.1%
Tubs	0.5%	0.2%
Expanded Poly. Non-food	0.1%	0.1%
Expanded Poly. Food-grade	0.4%	0.1%
Rigid Poly. Foam Insulation	0.0%	0.0%
Pot. Comp. Single-use Food Service	0.3%	0.2%
Non-Comp. Single-use Food Service	0.3%	0.1%
Other Rigid Packaging	1.2%	0.2%
Shopping/Dry Cleaning Bags	0.3%	0.1%
Stretch Wrap	0.0%	0.0%
Clean Polyethylene Film	0.1%	0.0%
Other Film	6.7%	1.0%
Plastic Pipe	0.0%	0.0%
Foam Carpet Padding	0.0%	0.0%
Durable Plastic Products	0.8%	0.3%
Plastic/Other Materials	0.8%	0.3%
Glass	**2.1%**	
Clear Bottles	0.5%	0.2%
Green Bottles	0.3%	0.1%
Brown Bottles	0.4%	0.2%
Container Glass	0.4%	0.1%
Fluorescent Tubes	0.0%	0.0%
CFLs	0.0%	0.0%
Flat Glass	0.0%	0.0%
Automotive Glass	0.0%	0.0%
Other Glass	0.4%	0.2%
Metal	**2.8%**	
Aluminum Beverage Cans	0.3%	0.1%
Aluminum Foil/Containers	0.3%	0.1%
Other Aluminum	0.2%	0.1%
Other Nonferrous	0.1%	0.1%
Steel Food Cans	0.6%	0.1%
Empty Aerosol Cans	0.2%	0.1%
Other Ferrous	0.4%	0.2%
Oil filters	0.0%	0.0%
Mixed Metals/Material	0.8%	0.3%
Organics	**56.8%**	
Leaves and Grass	0.8%	0.5%
Prunings	0.1%	0.0%
Food	30.7%	2.1%
Fats, Oils, Grease	0.0%	0.0%
Textiles/Clothing	3.3%	0.8%
Mixed Textiles	1.1%	0.5%
Disposable Diapers	9.1%	1.1%
Animal By-products	11.4%	2.3%
Rubber Products	0.3%	0.2%
Tires	0.0%	0.0%
Appliances and Electronics	**0.4%**	
Furniture	0.0%	0.0%
Mattresses	0.0%	0.0%
Small Appliances	0.2%	0.2%
Cell Phones	0.0%	0.0%
Audio/Visual Equipment	0.0%	0.0%
CRT Monitors	0.0%	0.0%
CRT Televisions	0.0%	0.0%
Other Electronics	0.1%	0.1%
CDL Wastes	**4.6%**	
Clean Dimension Lumber	0.1%	0.1%
Clean Engineered Wood	0.2%	0.2%
Pallets	0.0%	0.0%
Crates	0.0%	0.0%
Other Untreated Wood	0.2%	0.4%
New Painted Wood	0.3%	0.2%
Old Painted Wood	1.2%	1.1%
Creosote-treated Wood	0.0%	0.0%
Other Treated Wood	0.1%	0.1%
Contaminated Wood	0.2%	0.2%
New Gypsum Scrap	0.0%	0.0%
Demo Gypsum Scrap	0.2%	0.2%
Carpet	0.3%	0.2%
Felt Carpet Pad	0.0%	0.0%
Fiberglass Insulation	0.0%	0.0%
Concrete	0.1%	0.1%
Asphalt Paving	0.2%	0.3%
Other Aggregates	0.0%	0.0%
Rock	0.0%	0.0%
Asphalt Shingles	0.0%	0.0%
Other Asphaltic Roofing	0.0%	0.0%
Ceramics	0.3%	0.1%
Cement Fiber Board	0.0%	0.0%
Single-ply Roofing Membranes	0.0%	0.0%
Ceiling Tiles	0.2%	0.3%
Other Construction	1.1%	0.9%
Hazardous	**0.6%**	
Dried Latex Paint	0.1%	0.2%
Liquid Latex Paint	0.0%	0.0%
Solvent-based Adhesives	0.0%	0.0%
Water-based Adhesives	0.0%	0.0%
Oil-based Paint/Thinners	0.0%	0.0%
Caustic Cleaners	0.0%	0.1%
Pesticides/Herbicides	0.1%	0.1%
Rechargeable Batteries	0.0%	0.0%
Other Dry-cell Batteries	0.0%	0.0%
Wet-cell Batteries	0.0%	0.0%
Gasoline/Kerosene	0.0%	0.0%
Motor Oil/Diesel Oil	0.0%	0.0%
Asbestos	0.0%	0.0%
Explosives	0.0%	0.0%
Medical Wastes	0.0%	0.0%
Other Cleaners/Chemicals	0.0%	0.0%
Pharmaceuticals/Vitamins	0.0%	0.0%
Cosmetics	0.2%	0.1%
Other Potentially Harmful Waste	0.0%	0.0%
Fines and Misc Materials	**2.9%**	
Sand/Soil/Dirt	0.8%	0.9%
Non-distinct Fines	0.2%	0.3%
Miscellaneous Organics	1.8%	0.7%
Miscellaneous Inorganics	0.1%	0.1%
Totals	**100%**	
Sample Count	32	

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

Appendix A. Material Components

Waste samples were sorted by hand into 115 waste components, which were grouped into ten broad categories. The waste categories in the 2014 study are based on those used in Seattle's 2012 commercial and self-haul waste study. Refer to Table A-1 for additional details regarding the changes in components and categories.

Medical wastes were excluded from sorting. A list of component categories and definitions follows.

PAPER

1. *NEWSPAPER*: Printed ground wood newsprint. Includes advertising "slicks" (glossy paper), if found mixed with newspaper; otherwise, ad slicks are included with mixed low grade.

2. *PLAIN OCC/KRAFT PAPER*: Old unwaxed/uncoated corrugated container boxes and Kraft paper.

3. *WAXED OCC*: Old waxed/coated corrugated container boxes and Kraft paper.

4. *GROCERY/SHOPPING BAGS:* Paper grocery and shopping bags. Includes all brown paper bags and bags with non-paper handles.

5. *HIGH-GRADE PAPER*: White and lightly colored bond, rag, or stationary grade paper. This includes white or lightly colored sulfite/sulfate bond, copy papers, notebook paper, envelopes, continuous-feed sulfite/sulfate computer printouts and forms of all types, excluding carbonless paper.

6. *MIXED LOW-GRADE PAPER*: Mixed paper acceptable in Seattle's residential curbside program. This includes junk mail, magazines, colored papers, bleached Kraft, boxboard, mailing tubes, carbonless copy paper, ground wood computer printouts, paperback books, telephone directories, spiral notebooks, and frozen/refrigerator packaging. Excludes juice concentrate cans.

7. POLYCOATED CONTAINERS: Polycoated milk, ice cream, and aseptic juice containers, including those with plastic spouts attached.

8. *COMPOSTABLE/SOILED PAPER*: Paper towels, waxed paper, tissues, and other papers that were soiled with food during use (e.g., pizza box inserts).

9. *POTENTIALLY COMPOSTABLE SINGLE-USE FOOD SERVICE PAPER:* Paper plates, bowls, and cups, including wax-coated paper plates, bowls, and cups, and items labeled "compostable." Excludes items with visible plastic coating or lining.

10. *NON-COMPOSTABLE SINGLE-USE FOOD SERVICE PAPER*: Paper plates, bowls, and cups not labeled "compostable" and that appear to have a plastic lining or coating.

11. *MIXED/OTHER PAPER*: Predominantly paper with other materials attached (e.g. orange juice cans), and other non-recyclable papers such as carbon copy paper, hardcover books, and photographs.

PLASTIC

12. *PET BOTTLES*: Blow-molded polyethylene terephthalate (#1) bottles and jars, excluding toxic product containers.

13. *HDPE NATURAL BOTTLES*: Blow-molded high-density translucent polyethylene (#2) bottles and jars, excluding toxic product containers. Examples include milk, juice, beverage, oil, vinegar, and distilled water.

14. *HDPE COLORED BOTTLES*: Blow-molded high-density colored polyethylene (#2) bottles and jars, excluding toxic product containers. Examples include liquid detergent bottles and some hair care bottles.

15. *OTHER PLASTIC BOTTLES*: Blow-molded #3-#7 plastic bottles and jars and unknown bottles. Excludes toxic product containers.

16. *TUBS:* #1-#7 tubs containing products such as yogurt, cottage cheese, margarine, and prescription medication. Excludes toxic product containers.

17. *EXPANDED POLYSTYRENE NON-FOOD GRADE:* Includes non-food packaging and finished products made of expanded polystyrene. Excludes Styrofoam products such as cups, plates, bowls, and rigid foam insulation.

18. *EXPANDED POLYSTYRENE FOOD-GRADE: Styrofoam* products used to contain food, such as "clamshells," cups, plates, and bowls.

19. *RIGID POLYSTYRENE FOAM INSULATION*: Rigid panels of expanded polystyrene used to insulate walls and roofs. Excludes non-polystyrene rigid foam insulation.

20. *POTENTIALLY COMPOSTABLE SINGLE-USE FOOD SERVICE PLASTICS:* Includes clamshells, cups, cup lids, and salad trays, if they are labeled “compostable.” Excludes clamshells, cups, plates, bowls, and other food service items made of Styrofoam.

21. *NON-COMPOSTABLE SINGLE-USE FOOD SERVICE PLASTICS:* Includes forks, spoons, clamshells, cups, cup lids, and salad trays, as long as they are not labeled “compostable.” Excludes clamshells, cups, plates, bowls, and other food service items made of Styrofoam.

22. *OTHER RIGID PACKAGING*: #1-#7 and unmarked rigid plastic packaging (excluding expanded polystyrene, or Styrofoam), such as cookie tray inserts, plastic spools, plastic frozen food trays, plastic toothpaste tubes, and disposable plant pots. Also includes toxic product containers, such as for motor oil or antifreeze.

23. *CLEAN SHOPPING/DRY CLEANER BAGS*: Labeled grocery, merchandise, dry cleaner, and newspaper polyethylene film bags that were not contaminated with food, liquid or grit during use.

24. *STRETCH WRAP:* Polyethylene pallet wrap or stretch wrap.

25. *OTHER CLEAN POLYETHYLENE FILM*: Polyethylene film and bags, other than those identified above, which were not contaminated with food, liquid, or grit during use. Includes clean plastic sheeting, clean trash bags, and mattress packaging.

26. *OTHER FILM*: Film packaging not defined above, or: was contaminated with food, liquid or grit during use; is woven together (e.g., grain bags); or that contains multiple layers of film or other materials that have been fused together (e.g., potato chip bags). This category also includes contaminated plastic sheeting, photographic negatives, shower curtains, any bags used to contain liquid or food (e.g., produce), contaminated trash bags, used garbage bags, and shopping bags used as garbage bags.

27. *PLASTIC PIPE*: Pipes and fittings made of PVC (polyvinyl chloride), ABS (acrylonitrile butadiene styrene), or other rigid plastics.

28. *FOAM CARPET PADDING:* Foam material used under carpet to provide insulation and padding. Most commonly made of urethane foam. Can be solid-colored or have a marbled appearance.

29. *DURABLE PLASTIC PRODUCTS*: Finished plastic products made entirely of plastic such as toys, toothbrushes, vinyl hose, plastic lawn furniture, and foam mattresses. Includes fiberglass resin products and materials, and durable plastic pots.

30. *PLASTIC/OTHER MATERIALS*: Items that are predominately plastic with other materials attached, such as disposable razors, pens, lighters, toys, and 3-ring binders.

GLASS

31. *CLEAR BEVERAGE*: Bottles that are clear in color, including pop, liquor, wine, juice, beer, and vinegar bottles.

32. *GREEN BEVERAGE*: Bottles that are green in color, including green pop, liquor, wine, beer, and lemon juice bottles.

33. *BROWN BEVERAGE*: Bottles that are brown in color, including brown pop, beer, liquor, juice, and extract bottles.

34. *CONTAINER GLASS*: Glass containers of all colors that held solid materials such as mayonnaise, non-dairy creamer, and facial cream.

35. *FLUORESCENT TUBES*: Fluorescent light tubes.

36. *COMPACT FLUORESCENT LIGHTS (CFL):* Small, fluorescent bulbs similar in appearance to incandescent bulbs. These bulbs typically have a spiral or tubular design.

37. *FLAT GLASS:* Clear or tinted glass that is flat. Examples include glass window panes, doors and table tops, safety glass, and architectural glass. Excludes windshields, laminated glass, or any curved glass.

38. *AUTOMOTIVE GLASS:* Windshield and side window auto glass.

39. *OTHER GLASS:* Mirrors, light bulbs (except fluorescent tubes), glassware, and blue glass bottles.

METAL

40. *ALUMINUM CANS*: Aluminum beverage cans (UBC) and bi-metal cans made mostly of aluminum.

41. *ALUMINUM FOIL/CONTAINERS*: Aluminum food containers, trays, and foil.

42. *OTHER ALUMINUM*: Aluminum products and scrap such as window frames and cookware.

43. *OTHER NONFERROUS*: Metals not derived from iron, to which a magnet will not adhere, and which are not significantly contaminated with other metals or materials.

44. *STEEL FOOD CANS*: Steel food containers, including bi-metal cans made mostly of steel.

45. *EMPTY AEROSOL CANS:* Empty, mixed material/metal aerosol cans. (Aerosols that still contain product are sorted according to that material—for instance, solvent-based paint.)

46. *OTHER FERROUS*: Ferrous and alloyed ferrous scrap metals to which a magnet adheres and which are not significantly contaminated with other metals or materials.

47. *OIL FILTERS:* Metal oil filters used in cars and other automobiles.

48. *MIXED METALS/MATERIALS*: Items that are predominately metal with other materials attached, such as motors, insulated wire, and finished products containing a mixture of metals, or metals and other materials. White goods are banned from Seattle's disposal. However, segments of large appliances are occasionally found; they are included in this category.

COMPOSTABLE ORGANICS

49. *LEAVES AND GRASS*: Non-woody plant materials from a yard or garden area, including grass clippings, leaves, weeds, and garden wastes.

50. *PRUNINGS*: Cut prunings, 6" or less in diameter, from bushes, shrubs, and trees.

51. *FOOD*: Food wastes and scraps, including bone, rinds, etc. Excludes the weight of food containers, except when container weight is not appreciable compared to the food inside. Biodegradable packaging peanuts (made from corn starch) are also included in this category. Excludes fats, oils, and grease.

52. *FATS, OILS, AND GREASE:* Fatty by-products of food preparation. Includes cooking oil, butter, lard, and gravy. Can be in liquid or solid form.

OTHER ORGANICS

53. *TEXTILES*: Rag stock fabric materials including natural and synthetic textiles such as cotton, wool, silk, woven nylon, rayon, and polyester.

54. *MIXED TEXTILES:* Non-rag stock grade textiles such as upholstered items, non-leather shoes and handbags, heavy linens, and draperies.

55. *DISPOSABLE DIAPERS:* Diapers made from a combination of fibers, synthetic and/or natural, and made for the purpose of single use. This includes disposable baby diapers and adult protective undergarments.

56. *ANIMAL BY-PRODUCTS*: Animal carcasses not resulting from food storage or preparation, animal wastes, and kitty litter.

57. *RUBBER PRODUCTS*: Finished products and scrap materials made of natural and synthetic rubber, such as bath mats, inner tubes, rubber hoses, rubber carpet padding, and foam rubber.

58. *TIRES*: Vehicle tires of all types. Tubes are put into the rubber category.

FURNITURE, APPLIANCES, AND ELECTRONICS

59. *FURNITURE*: Mixed-material furniture such as upholstered chairs. Furniture that is made purely of one material, such as plastic or metal, would be categorized according to that material (e.g., plastic products or other ferrous metal).

60. *MATTRESSES*: Mattresses and box springs.

61. *SMALL APPLIANCES*: Small electric appliances such as toasters, microwave ovens, power tools, curling irons, and light fixtures.

62. *CELL PHONES:* Personal digital assistants (PDA) and cell phones.

63. *AUDIO/VISUAL EQUIPMENT*: Examples include stereos, radios, tape decks, VCRs, camcorders, and digital cameras.

64. *COMPUTER MONITORS:* Computer monitors containing a cathode ray tube (CRT).

65. *TELEVISIONS:* Television sets containing a cathode ray tube (CRT).

66. *OTHER ELECTRONICS:* Computer items not containing CRTs, such as processors, mice and mouse pads, keyboards, disk drives, laptops, and other video displays without cathode ray tubes (CRT).

CONSTRUCTION DEBRIS

67. *CLEAN DIMENSION LUMBER:* Milled lumber commonly used in construction for framing and related uses, including 2x4s and 2x6s, that is clean (only including trace amounts of paint, nails, and other contaminants). Includes 2x4s with painted ends.

68. *CLEAN ENGINEERED WOOD*: Clean sheets of plywood, strandboard, particleboard, and other wood created using glue (only including trace amounts of paint, nails, and other contaminants).

69. *PALLETS*: Untreated wood pallets, whole and broken.

70. *CRATES*: Untreated crates, pieces of crates, and other packaging lumber/panelboard.

71. *OTHER UNTREATED WOOD*: Compostable prunings or stumps that are 6" or more in diameter.

72. *NEW PAINTED WOOD:* Lumber and wood products from new construction that have been painted so as to render them difficult to compost.

73. *OLD PAINTED WOOD*: Painted wood from demolition jobs. May be flaky and oxidized. Includes lead-based painted wood

74. *CREOSOTE-TREATED WOOD*: Lumber and wood products that have been treated with creosote so as to render them difficult to compost (with generally 50% or more of the surface area treated).

75. *OTHER TREATED WOOD*: Lumber and wood products that have been treated (other than painted or treated with creosote) so as to render them difficult to compost. This includes chemically treated lumber.

76. *CONTAMINATED WOOD:* Predominantly wood and lumber products that are mixed with other materials in such a way that they cannot easily be separated. This includes wood with metal, gypsum, concrete, or other contaminants that would not compost easily.

77. *NEW GYPSUM SCRAP*: Calcium sulfate dehydrate sandwiched between heavy layers of Kraft-type paper. Also known as drywall. This category includes new drywall that has not been painted or treated in other ways. Excludes GP DensGlass (and other brands) of exterior or roof paneling which is gypsum sandwiched between a fiberglass-reinforced coating.

78. *DEMO GYPSUM SCRAP*: Used or demolition gypsum wallboard scrap that has been painted or treated.

79. *CARPET:* General category of flooring applications and non-rag stock textiles consisting of various natural or synthetic fibers bonded to some type of backing material.

80. *FELT CARPET PAD:* Fiber carpet pads made of jute, hair, or synthetic materials, such as recycled carpet fibers. This material may be coated with latex or other resin.

81. *FIBERGLASS INSULATION*: Fiberglass building and mechanical insulation, batt or rigid.

82. *CONCRETE:* A hard material made from sand, gravel, aggregate, cement mix, and water. This category includes concrete containing steel mesh and/or reinforcement bars, or "rebar". Examples include pieces of building foundations, concrete paving, and cinder blocks.

83. *ASPHALT PAVING*: A black or brown, tar-like material mixed with aggregate and used as a paving material. This category includes asphalt paving containing steel mesh and/or reinforcement bars, or "rebar."

84. *OTHER AGGREGATES:* Aggregates other than concrete and asphalt paving, such as bricks, masonry tile, and clay roofing tiles.

85. *ROCK:* Rock gravel larger than 2" in diameter.

86. *ASPHALT SHINGLES*: Roofing material composed of fiberglass or organic felts saturated with asphalt and covered with inert aggregates as well as attached roofing tar and tar paper. Commonly known as three-tab roofing shingles but including older designs as well.

87. *OTHER ASPHALTIC ROOFING*: Other roofing material made with layers of felt, asphalt, aggregates, and attached roofing tar and tar paper, most commonly used on flat/low pitched roofs on commercial buildings. Includes tar and gravel or "built-up roof membranes" as well as other asphaltic roofing membranes.

88. *CERAMICS*: Finished ceramic or porcelain products such as toilets, sinks, and some dishware.

89. *CEMENT FIBER BOARD*: A composite building material containing cement and wood fiber. Includes Hardiplank, Hardiboard, tile backer board, and other similar products.

90. *DRIED LATEX PAINTS:* Water-based paints and similar products that have dried. Excludes empty paint containers and paint that is outweighed by the container.

91. *SINGLE-PLY ROOFING MEMBRANES:* Plastic roofing membranes typically installed in gray, white, or black sheets. This category includes thermoplastic membranes, such as PVC or thermoplastic olefin (TPO), or thermoset roofing membranes, such as Ethylene Propylene Diene Monomer (EPDM) or "rubber" roofs.

92. *CEILING TILES*: Fiber or composite acoustic ceiling tiles.

93. *OTHER CONSTRUCTION DEBRIS:* Construction debris (other than wood) that cannot be classified elsewhere and mixed fine building material scraps. For example, floor sweepings from construction activities containing sawdust, nails, wire, etc. Includes GP DensGlass (and other brands) of exterior or roof paneling which is gypsum sandwiched between a fiberglass-reinforced coating.

POTENTIALLY HARMFUL WASTES

94. *LIQUID LATEX PAINTS*: Water-based paints and similar products in liquid form. Excludes empty paint containers and paint that is outweighed by the container.

95. *SOLVENT-BASED ADHESIVES/GLUES*: Oil/resin/volatile solvent-based glues and adhesives, including epoxy, rubber cement, two-part glues and sealers, and auto body fillers.

96. *WATER-BASED ADHESIVES/GLUES*: Water-based glues, caulking compounds, grouts, and Spackle.

97. *OIL-BASED PAINT/SOLVENT*: Solvent-based paints, varnishes, and similar products. Various solvents, including chlorinated and flammable solvents, paint strippers, solvents

contaminated with other products such as paints, degreasers and some other cleaners if the primary ingredient is (or was) a solvent, or alcohol such as methanol and isopropanol.

98. *CAUSTIC CLEANERS:* Caustic acids and bases whose primary purpose is to clean surfaces, unclog drains, or perform other actions.

99. *PESTICIDES/HERBICIDES*: Variety of poisons with the purpose of discouraging or killing insects, weeds, or microorganisms. Fungicides and wood preservatives, such as pentachlorophenol, are also included.

100. *RECHARGEABLE BATTERIES:* Rechargeable batteries, such as those found in cordless power tools, cell phones, laptops, digital cameras, toothbrushes, and remote control toys.

101. *OTHER DRY-CELL BATTERIES*: Dry-cell batteries of various sizes and types commonly used in households. Includes button cell batteries, such as those found in watches and hearing aids.

102. *WET-CELL BATTERIES*: Wet-cell batteries of various sizes and types commonly used in automobiles.

103. *GASOLINE/KEROSENE*: Gasoline, diesel fuel, and fuel oils.

104. *MOTOR OIL/DIESEL OIL*: Lubricating oils, primarily used in vehicles but including other types with similar characteristics.

105. *ASBESTOS*: Asbestos and asbestos-containing wastes (if this is the primary hazard associated with these wastes).

106. *EXPLOSIVES*: Gunpowder, unspent ammunition, picric acid, and other potentially explosive chemicals.

107. *MEDICAL WASTES*: Materials typically discarded in a health care setting, such as I.V. tubing and patient drapes, specimen containers, and Petri dishes. Medical wastes that could be considered a biohazard are weighed, but not further sorted.

108. *OTHER CLEANERS/CHEMICALS*: Non-caustic cleaners, and other household chemicals.

109. *PHARMACEUTICALS AND VITAMINS:* Both prescription and over-the-counter medications and supplements in all forms, including pills, liquid medications, creams, and ointments. Does not include containers for these items, except for tubes for creams and ointments and other containers that cannot be easily separated from the product they contain.

110. *PERSONAL CARE/COSMETICS:* Hygiene and grooming products, including bar soap, shower gel, shampoo, conditioner, hairspray, deodorant, body powder, lotions, nail polish and remover, makeup, etc. Does not include containers for these items, except when containers cannot be easily separated from the product they contain.

111. *OTHER POTENTIALLY HARMFUL WASTES:* Other chemicals or potentially harmful wastes that do not fit into the above categories, including *unidentifiable materials.*

FINES AND MISCELLANEOUS MATERIALS

112. *SAND/SOIL/DIRT*: Sand, soil, dirt, and gravel smaller than 2" in diameter.

113. *NONDISTINCT FINES:* Mixed MSW fines smaller than 2" in diameter.

114. *MISCELLANEOUS ORGANICS*: Combustible materials including wax; cigarette butts; scraps of leather and leather products including shoes and belts; feminine hygiene products; briquettes; fireplace, burn barrel and fire pit ash; and other organic materials not classified elsewhere.

115. *MISCELLANEOUS INORGANICS*: Other inorganic, non-combustible materials not classified elsewhere.

Changes to Waste Component Categories

The material types used to categorize Seattle's waste stream have been refined over the years. The component categories for 2014 were updated and divided into 115 material components to provide more detail about specific materials in the waste stream. The material categories in the 2014 study are based on those used in Seattle's 2012 commercial and self-haul waste study.

Table A-1 provides an explanation of changes shown in Table A-2. Table A-2 tracks how the component categories have changed since 1988/1989. An "X" signifies that the component remained the same from the previous study period. If a component was split into two or more component categories (e.g., *compostable/soiled paper* into *compostable/soiled paper* and *OCC/Kraft, waxed*), then the rows will look like the example highlighted below in 1994 and 1996. If the two or more materials are combined into one material component category (e.g., *mixed low grade* and *polycoated paper* into *mixed low grade*), the rows will look like the example highlighted below in 2004 and 2006.

Table A-1: Explanation of Track Changes

1994	1996	1998/99	2000	2002	2004	2006
PAPER						
New spaper	x	x	x	x	x	New spaper
OCC/Kraft	OCC/Kraft, Unw axed	x	x	x	x	Plain OCC/Kraft
Office Paper	x	x	x	x	High Grade Paper	High Grade Paper
Computer Paper	x	x	x	x		
Mixed Low Grade	x	x	x	x	Mixed Low Grade	Mixed Low Grade
Phone Books	x	x	x	x		
Milk/Juice Polycoats	x	x	x	x	Polycoated Paper	
Frozen Food Polycoats	x	x	x	x		
Compostable/Soiled	x	x	x	Compostable Paper	x	Compostable Paper
	OCC/Kraft, Waxed	x	x	x	x	Waxed OCC/Kraft
Paper/Other Materials	x	x	x	x	Mixed/Other Paper	Mixed/Other Paper
Other Paper	x	x	x	x		

Table A-2: Changes to Waste Component Categories, 1988 to present

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
PAPER													
Newspaper	x	x	x	x	x	x	x	x	x	x	x	x	x
Corrugated Paper	x	x	x	x	x	x	x	x	x	x	x	Plain OCC/ Kraft Paper	x
												Grocery/ Shopping Bags	x
Office Paper	x	x	x	x	x	x	x	High-grade Paper	x	x	x	x	x
Computer Paper	x	x	x	x	x	x	x						
Mixed Scrap Paper	x	x	Mixed Scrap Paper	x	x	x	x	Mixed Low-grade Paper	Mixed Low-grade Paper	x	x	Mixed Low-grade Paper	x
			Phone Books	x	x	x	x						
Other Paper	x	x	Milk/Juice Polycoats	x	x	x	x	Polycoated Paper				Polycoated Paper	x
			Frozen Food Polycoats	x	x	x	x						
			Compostable/ Soiled Paper	Compostable/ Soiled Paper	x	x	x	x	x	Compostable/ Soiled Paper	x	x	x
										Single-use Food Service Paper	Potentially Compostable Single-use Food Service	x	x
											Other Single-use Food Service Paper	Non-Compostable Single-Use Food Service	x
				OCC/Kraft, Waxed	x	x	x	x	x	x	x	x	x
			Paper/ Other Materials	x	x	x	x	Mixed/Other Paper	x	x	x	x	x
			Other Paper	x	x	x	x						

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
PLASTIC													
PET Bottles	x	x	x	PET Pop & Liquor	x	x	x	x	#1 PET Bottles	#1 PET Bottles	x	x	x
				Other PET Bottles	x	x	x	x	*Moved to "Other Plastic Bottles"*				
HDPE Bottles	x	x	HDPE Milk & Juice	x	x	x	x	#2 HDPE Natural Bottles	x	x	x	x	x
								#2 HDPE Colored	x	x	x	x	x
			Other HDPE Bottles	x	x	x	x	*Moved to "Other Plastic Bottles"*	*Moved to "Other Rigid Packaging"*	x	x	x	x
Plastic Packaging	Other Plastic Bottles	x	x	x	x	x	x	x	x	x	x	Other Plastic Bottles	x
	Plastic Packaging	x	Other Rigid Containers	Jars & Tubs	x	x	x	x	x	Tubs #1-#7	x	x	x
Plastic Packaging	x	x	Other Rigid Packaging	x	x	x	x	x	x	Single-use Food Service Plastics	Potentially Compostable Single-use Food Service	x	x
											Non-Compostable Single-use Food Service	x	x
										Other Rigid Packaging #1-#7	x	x	x
Plastic Packaging	x	x	Grocery/ Bread Bags	x	x	x	x	Clean Shopping/ Dry Cleaner Bags	x	x	x	x	x
			Other Film	Garbage Bags	x	x	x	Other Clean PE Film	x	x	x	Other Clean PE Film	x
				Other Film	x	x	x					Stretch Wrap	x
								Other Film	x	x	x	x	x

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
Expanded Polystyrene	x	x	x	x	x	x	x	x	x	Expanded Poly. Food-grade	x	x	x
										Expanded Polystyrene Non-food Grade	Rigid Poly. Foam Insulation	x	x
											Expanded Poly. Non-food Grade	x	x
Other Plastic Products	x	x	Plastic Products	x	x	x	x	x	x	x	Plastic Pipe	x	x
											Foam Carpet Padding	x	x
											Durable Plastic Products	x	x
			Plastic/ Other Materials	x	x	x	x	x	x	x	x	x	x
GLASS													
Non-refillable Pop	x	x	Clear Beverage	x	x	x	x	x	x	x	x	x	x
Refillable Pop	x	x	Green Beverage	x	x	x	x	x	x	x	x	x	x
Non-refillable Beer	x	x	Brown Beverage	x	x	x	x	x	x	x	x	x	x
Refillable Beer	x	x	*(After 1994, characterized according to color)*										
Container Glass	x	x	x	x	x	x	x	x	x	x	x	x	x
Non-recyclable Glass	x	x	x	Fluorescent Tubes	x	x	x	x	x	x	CFLs	x	x
											Fluorescent Tubes	x	x
				Other Glass	x	x	x	x	x	Flat Glass	x	Flat Glass	x
												Automotive Glass	x
										Other Glass	x	x	x

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
METAL													
Aluminum Cans	x	x	x	x	x	x	x	x	x	x	x	x	x
Aluminum Foil/ Containers	x	x	x	x	x	x	x	x	x	x	x	x	x
Nonferrous	x	x	Nonferrous	Other Nonferrous	x	x	x	x	x	x	x	x	x
			Other Aluminum	Other Aluminum	x	x	x	x	x	x	x	x	x
				Empty Aerosol Cans	x	x	x	x	x	x	x	x	x
Tinned Cans	x	x	x	x	x	x	x	x	x	x	x	Steel Food Cans	x
Bi-metal Cans	x	x	*(After 1994, characterized according to predominant metal)*										
Ferrous	x	x	x	x	x	x	x	x	x	x	x	Other Ferrous	x
Mixed Metals/ Materials	x	x	x	x	x	x	x	x	x	x	x	x	x
(Before 1998/99, was not characterized)					Metal Oil Filters	x	x	x	x	x	x	x	x
White Goods	x	x	*(After 1994, banned from disposal. Parts show up in "Mixed Metals")*										
COMPOSTABLE ORGANICS													
Leaves and Grass	x	x	x	x	x	x	x	x	x	x	x	x	x
Prunings	x	x	x	x	x	x	x	x	x	x	x	x	x
Food	x	x	x	x	x	x	x	x	x	x	Fats, Oils, & Grease	x	x
											Food	x	x

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
(COMPOSTABLE and OTHER ORGANICS Combined as ORGANICS prior to 2012)												**OTHER ORGANICS**	
Textiles	x	x	Textiles	Textiles/ Clothing	x	x	x	*Moved to "Organics"*	Textiles	x	x	x	x
			Carpet/ Upholstery	x	x	x	x		Mixed Textiles	x	x	x	x
									Carpet	x	x	*Moved to Construction Debris*	x
Disposable Diapers	x	x	x	x	x	x	x		Disposable Diapers	x	x	x	x
(Discarded from samples prior to 1994)			Animal By-Products	x	x	x	x		Animal By-products	x	x	x	x
Rubber Products	x	x	*moved to "Other Materials"*	x	x	x	x		Rubber Products	x	x	x	x
Tires	x	x	*moved to "Other Materials"*	x	x	x	x		Tires	x	x	x	x
FURNITURE, APPLIANCES, AND ELECTRONICS													
(Prior to 1994, split among various materials; Mixed Metal, Textiles, Other Plastics, etc.)			Furniture	x	x	x	x	*Moved to "Furniture, Appliances, & Electronics"*	Furniture	x	x	x	x
(Prior to 1994, split among various materials; Mixed Metal, Textiles, Other Plastics, etc.)			Mattresses	x	x	x	x		Mattresses	x	x	x	x
(Prior to 1994, split among various materials; Mixed Metal, Textiles, Other Plastics, etc.)			Small Appliances	x	x	x	x		Small Appliances	x	x	x	x

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
(Prior to 1994, split among various materials; Mixed Metal, Textiles, Other Plastics, etc.)			A/V Equipment	x	x	x	x	Moved to "Furniture, Appliances, & Electronics"	Audio/Visual Equipment	x	Cell Phones	x	x
											Audio/Visual Equipment	x	x
						Televisions & Computer Monitors	Television Sets		Computer Monitors	x	x	x	x
							Computer Monitors		Televisions	x	x	x	x
						Other Computer Equipment	x		Other Computer Equipment	x	Other Electronics	x	x
CONSTRUCTION DEBRIS													
Wood	x	Untreated Wood	Untreated Wood	Dimension Lumber	x	x	x	x	x	Clean Dimension Lumber	x	x	x
										Clean Engineered Wood	x	x	x
			Crates/ Pallets	Other Untreated Wood	x	x	x	x	x	x	x	x	x
				Pallets	x	x	x	x	x	x	x	x	x
				Crates/Boxes	x	x	x	x	Crates	x	x	x	x
Wood	x	Treated Wood	x	Treated Wood	*x*	*x*	*x*	*x*	*x*	New Painted Wood	x	x	x
										Old Painted Wood	x	x	x
										Creosote-treated Wood	x	x	x
										Other Treated Wood	x	x	x
				Contaminated Wood	x	x	x	x	x	x	x	x	x

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
Gypsum Drywall	x	x	x	New Gypsum Scrap	x	x	x	x	x	x	x	x	x
				Demo Gypsum Scrap	x	x	x	x	x	x	x	x	x
Fiberglass Insulation	x	x	x	*Moved to "Construction Debris"*	*x*	*x*	*x*	*x*	x	x	x	x	x
Rock/ Concrete/ Brick	x	x	x	*Moved to "Construction Debris"*	x	x	x	x	x	x	x	Concrete	x
												Asphalt Paving	x
												Other Aggregates	x
												Rock	x
Ceramics, Porcelain, China	x	x	x	x	x	x	x	*Moved to "Construction Debris"*	Ceramics	x	x	x	x
Other Construction Debris	x	x	x	Asphaltic Roofing	x	x	x	x	x	Asphalt Shingles	x	x	x
										Other Asphaltic Roofing	x	x	x
										Other Construction Debris	Cement Fiber Board	x	x
											Other Construction Debris	Dried Latex Paint	x
												Single-ply Roofing Membranes	x
												Ceiling Tiles	x
												Other Construction Debris	x

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
POTENTIALLY HARMFUL WASTE													
Latex Paints	x	x	x	x	x	x	x	x	x	x	Liquid Latex Paint	x	x
											Dried Latex Paint	*Moved to "Construction Debris"*	x
Adhesives/ Glues	x	x	x	Hazardous Glue/Adhesives	x	x	x	Solvent-based Adhesives/ Glues	x	x	x	x	x
				Non-hazardous Glue/Adhesives	x	x	x	Water-based Adhesives/ Glues	x	x	x	x	x
Oil-based Paints/ Solvents	x	x	x	x	x	x	x	x	x	x	x	x	x
Cleaners	x	x	x	x	x	x	x	Caustic Cleaners	x	x	x	x	x
Pesticides/ Herbicides	x	x	x	x	x	x	x	x	x	x	x	x	x
Batteries	x	x	Dry-cell Batteries	x	x	x	x	x	x	x	x	x	x
			Wet-cell Batteries	x	x	x	x	x	x	x	x	x	x
Gasoline/ Kerosene	x	x	x	x	x	x	x	x	x	x	x	x	x
Motor Oil/ Diesel Oil	x	x	x	x	x	x	x	x	x	x	x	x	x
Asbestos	x	x	x	x	x	x	x	x	x	x	x	x	x
Explosives	x	x	x	x	x	x	x	x	x	x	x	x	x

1988/89	1990	1992	1994	1996	1998/99	2000	2002	2004	2006	2008	2010	2012	2014
Other Chemicals	x	x	x	Other Hazardous Chemicals	x	x	x	Medical Waste	x	x	x	x	x
								Other Cleaners/ Chemicals	x	x	x	x	Other Cleaners/ Chemicals
													Pharmaceuticals/ Vitamins
													Personal Care/ Cosmetics
				Other Non-hazardous Chemicals	x	x	x	Other Potentially Harmful Wastes	x	x	x	x	x
FINES AND MISCELLANEOUS MATERIALS													
Sand, Dirt, Non-distinct Fines	x	x	Sand/Soil/ Dirt	*Moved to "Construction Debris"*	*x*	*x*	*x*	*Moved to "Fines & Miscellaneous Materials"*	Sand/Soil/ Dirt	x	x	x	x
			Non-distinct Fines	x	x	x	x	*Moved to "Fines & Miscellaneous Materials"*	Non-distinct Fines	x	x	x	x
Ash	x	x	x	x	x	x	x	*Moved to "Fines & Miscellaneous Materials"*	Misc. Organics	x	x	x	x
Leather	x	x	x	x	x	x	x						
(Prior to 1994, mostly in "Sand, Dirt, Non-distinct Fines; also in various "Mixed" and "Other" categories)			Misc. Organics	x	*x*	*x*	*x*						
(Prior to 1994, mostly in "Sand, Dirt, Non-distinct Fines; also in various "Mixed" and "Other" categories)			Misc. Inorganics	x	*x*	*x*	*x*	*Moved to "Fines & Miscellaneous Materials"*	Misc. Inorganics	x	x	x	x

Appendix B. Sampling Methodology

Overview

The objective of the 2014 Seattle Waste Composition Study was to provide statistically significant data on the composition of residential wastes from single-family and multifamily households in the City of Seattle. The residential waste stream was last sampled in 2010. The current project followed the same basic methodology as the previous study.

This appendix outlines the sampling methodology for the current study.

Sampling Populations

This study examined waste disposed by two types of generators: single-family and multifamily residences. All materials were collected from Seattle's two contracted haulers, each serving two of the four collection zones located throughout the City (Figure B-1). Self-hauled residential waste loads were not included in this study.

Figure B-1: Seattle's Collection Zones

In Seattle, single-family and multifamily generators are defined as follows:

- ***Single-family:*** Primarily detached single-family, duplex, triplex, and four-plex homes. Waste is collected from garbage cans.

- ***Multifamily:*** Primarily apartments and condominiums with five or more units. Waste is collected from dumpsters.

The single-family and multifamily samples were evenly distributed across the four waste collection zones to ensure comparability of data across all four zones. Table B-1 shows the eight residential subpopulations, according to residence type and collection zones.

Table B-1: Subpopulations, by Residence Type and Collection Zones

	Generator Type	
	Single-family	*Multifamily*
Waste Collection Zones *One*	Single-family Zone 1	Multifamily Zone 1
Two	Single-family Zone 2	Multifamily Zone 2
Three	Single-family Zone 3	Multifamily Zone 3
Four	Single-family Zone 4	Multifamily Zone 4

Sample Allocation

In the past Seattle housing was predominately comprised of single-family residences. This has recently shifted, and currently there is nearly a 1:1 ratio between single-family and multifamily residential units in Seattle. To match the shift in Seattle's housing stock, equal numbers of study samples are allocated to the single-family and multifamily substreams. This shift also mitigates a potential source of bias (different sample numbers) when comparing the composition data between the two generator types. Table B-2 outlines the total number of waste samples that were planned for the 2014 study and the actual number of samples sorted, by residence type and service area.

Table B-2: Planned versus Actual Number of Samples

	Planned Number of Samples	Actual Number of Samples
Single-family		
Zone 1	45	47
Zone 2	45	45
Zone 3	45	45
Zone 4	45	45
Multifamily		
Zone 1	45	45
Zone 2	45	45
Zone 3	45	46
Zone 4	45	44
Total	360	362

Sampling Calendar

To reflect seasonal variation in the amounts and types of waste disposed by Seattle residents, the samples were distributed across the 12-month study period. Since the field crew can sort approximately 12 samples of waste per day, 30 days of sampling were initially scheduled. Sampling events were completed every other month, beginning in January. Monthly sampling events each consisted of five consecutive days (Monday-Friday) of sampling.

Sampling dates at each facility were selected using a random process and then adjusted in several instances to avoid sampling on or around holidays, to accommodate the sorting crew's availability, or to improve the distribution across days of the week and weeks of the month. The sampling calendar was designed using the following steps.

- **Step 1: Selected weeks for sampling events.** Sampling was scheduled for every other month starting in January of 2014, for five consecutive days. The week of sampling for each of the six months was randomly selected, then assessed for conflicts. Sampling weeks for January and November were adjusted to accommodate the sampling crew's availability, and the sampling week in May was adjusted to avoid the Memorial Day holiday. In all, sampling events for three months were adjusted due to conflicts.

- **Step 2: Selected days within each sampling week.** Because each season included five days of sorting, and to maximize the sort crew efficiency, each sampling event began on a Monday.

- **Step 3: Assigned sampling days to transfer stations.** Waste sampling days were randomly assigned to a transfer station for the first sampling season in January. The North Recycling and Disposal Stations (NRDS) closed Jan 20, 2014, for renovation for the remainder of the year, so all sampling over the final five sampling months (or events) occurred at the South Recycling and Disposal Station (SRDS).

Table B-3 presents the waste sampling calendar, as well as the planned and actual samples sorted on each day.

Table B-3: Waste Sampling Calendar

Date	Facility	Day of the Week	Week of the Month	Planned Samples	Actual Samples	Difference
1/13/2014	**NRDS**	Monday	2	12	5	-7
1/14/2014	**NRDS**	Tuesday	2	12	13	1
1/15/2014	SRDS	Wednesday	3	12	20	8
1/16/2014	**NRDS**	Thursday	3	12	13	1
1/17/2014	SRDS	Friday	3	12	9	-3
3/3/2014	SRDS	Monday	1	12	15	3
3/4/2014	SRDS	Tuesday	1	12	12	0
3/5/2014	SRDS	Wednesday	1	12	9	-3
3/6/2014	SRDS	Thursday	1	12	14	2
3/7/2014	SRDS	Friday	1	12	11	-1
5/19/2014	SRDS	Monday	3	12	13	1
5/20/2014	SRDS	Tuesday	3	12	14	2
5/21/2014	SRDS	Wednesday	3	12	11	-1

Date	Facility	Day of the Week	Week of the Month	Planned Samples	Actual Samples	Difference
5/22/2014	SRDS	Thursday	4	12	12	0
5/23/2014	SRDS	Friday	4	12	10	-2
7/14/2014	SRDS	Monday	2	12	16	4
7/15/2014	SRDS	Tuesday	3	12	9	-3
7/16/2014	SRDS	Wednesday	3	12	11	-1
7/17/2014	SRDS	Thursday	3	12	11	-1
7/18/2014	SRDS	Friday	3	12	13	1
9/22/2014	SRDS	Monday	4	12	13	1
9/23/2014	SRDS	Tuesday	4	12	12	0
9/24/2014	SRDS	Wednesday	4	12	16	4
9/25/2014	SRDS	Thursday	4	12	11	-1
9/26/2014	SRDS	Friday	4	12	8	-4
11/3/2014	SRDS	Monday	1	12	14	2
11/4/2014	SRDS	Tuesday	1	12	14	2
11/5/2014	SRDS	Wednesday	1	12	15	3
11/6/2014	SRDS	Thursday	1	12	9	-3
11/7/2014	SRDS	Friday	1	12	9	-3
Total				**360**	**362**	**2**

The distribution of sampling events across weeks of the month is shown in Table B-4 and the distribution across days of the week is shown in Table B-5.

Table B-4: Distribution of Waste Sampling Days by Weeks of the Month

Facility	Week of the Month					Overall
	First	Second	Third	Fourth	Fifth	
Overall	**10**	**3**	**10**	**7**	**0**	**30**

Table B-5: Distribution of Waste Sampling Days by Season and Day of the Week

Facility (Season)	Day of the Week					Overall
	Monday	Tuesday	Wednesday	Thursday	Friday	
Winter	1	1	1	1	1	**5**
Spring	2	2	2	2	2	**10**
Summer	2	2	2	2	2	**10**
Fall	1	1	1	1	1	**5**
Total	**6**	**6**	**6**	**6**	**6**	**30**

Sample Selection

The study's universe of waste loads included all residential waste routes within the City of Seattle. To compile the universe, detailed route information was collected from Seattle Public Utilities (SPU) as well as from CleanScapes and Waste Management. This information included collection zone, route number, collection day, and generator type.

To select which loads would be sampled on a given sampling day, a random number was assigned to every load that was expected to arrive at the sampling facility that day. These

random numbers were sorted, and the loads with the lowest random number were selected in sequence until the target number of samples was achieved. For subsequent sampling days, a new random number was assigned to each load, and the process was repeated. An additional single-family route was added to the list of routes scheduled on each sampling day. The additional routes provided "contingency samples" that were obtained and sorted in the event that one of the vehicles for the regularly-planned collection route failed to arrive on time or was not intercepted in time to obtain a sample.

This study was designed to sample "pure" loads of single-family and multifamily waste only. When mixed loads were selected for sampling, drivers were instructed by the contracted haulers to collect multifamily waste separately from commercial waste to deliver a pure multifamily load for sampling.

As the study progressed, the sampling plan was modified to meet the objectives of the study. For example, additional sampling days were added in some months to compensate for previous months where sorting crews could not sample an adequate number of loads. Missed sampling days could often be attributed to miscommunication between the drivers and the sampling crews. Appendix C provides more details regarding monthly sampling events.

Hauler and Transfer Station Participation

The City owns and operates two transfer stations (North and South Recycling and Disposal Stations – NRDS and SRDS). In the past, both of the City's contracted haulers delivered most residential waste loads to the two stations. In January of 2014, the NRDS was closed down for a remodel and the remainder of sampling for the calendar year occurred at SRDS. Depending on several factors that vary daily (e.g., time needed to cover a specified route, traffic at the site), loads from the four service areas are typically taken to SRDS, but may be diverted to a private station if there is a problem at the nearest city station.

At the outset of the study, meetings were held with hauler and transfer station staff to communicate study objectives and explain all sampling procedures. Additionally, hauler and transfer station contacts received a schedule of all the sampling events for the year.

Haulers were sent reminders the week prior to each sampling event. Several days prior to each selected sampling day, the universe of routes believed to be scheduled for the sampling day was sent to each hauler. The hauler verified that route numbers were correct; added truck numbers, driver names, and vehicle arrival times; and returned the list. From the lists of routes, the target numbers of routes were randomly selected to correspond to the number of samples required from each subpopulation on each sampling day. The list of vehicles selected for sampling were forwarded to the hauler and verified verbally. In addition, the haulers were reminded to notify drivers of selected vehicles that they were to participate in the sampling activities and to which transfer station they were expected to deliver their selected load.

Affected transfer station personnel were contacted using a similar process as used with haulers: affected transfer station staff were notified the week and the day prior to sampling to ensure that all staff were aware of the sampling event and that no conflicting circumstances had arisen.

Field Procedures

The field supervisor coordinated all logistics involving truck selection, sample extraction, sorting area, and disposal of sorted materials with transfer station staff. As the selected truck dumped at the transfer station, a loader operator "nosed" the bucket of the loader into the stream of material falling from the truck and captured about 1 cubic yard (approximately 250 pounds) of garbage.

Each sample was placed on a clean tarp and sorted by hand into 115 component categories as defined in Appendix A. Components were placed in plastic laundry baskets to be weighed and recorded. Each sample was sorted to the greatest reasonable detail. The field supervisor monitored the homogeneity of the component baskets as material accumulated, rejecting items that may have been improperly classified. Open laundry baskets allowed the field supervisor to see the material at all times. The weights of all materials were recorded on a waste tally sheet (see Appendix F).

Changes in Methodology from 2010 Study

The sampling methodology for this study differed from 2010 in the following ways:

- Equal numbers of samples were allocated to the single-family and multifamily substreams instead of a 2:1 ratio as in previous studies.
- Samples were collected for five consecutive days every other month of the year instead of two to three days every month.
- NRDS was closed for the March through November field seasons. All samples were collected at SRDS during that time period.
- The component categories were updated to provide more detail about specific materials in the waste stream. These category changes are tracked in Appendix A.

Appendix C. Comments on Monthly Sampling Events

This section presents monthly sampling progress reports that were sent to the SPU project manager throughout the year. Each summary presents days and station(s) where sampling took place, either at the North Recycling Disposal Station (NRDS) or the South Recycling Disposal Station (SRDS); the total number of samples sorted compared to the goal for that sampling event; and whether any samples were missed or replaced by a different zone or sector. Each section also includes a table detailing the number of samples that were actually sorted versus the number originally planned, by sector and zone.

January

Five days of sampling took place from Monday, January 13 to Friday, January 17. Overall, 60 samples were sorted; 60 samples was the goal. Due to a communications breakdown with the haulers, most of the Zone 1 samples on January 13 went to SRDS instead of NRDS. The field crew worked with the route managers through the rest of the week to collect and sort additional Zone 1 samples at SRDS. For each day and zone, the difference from planned samples ranged from zero to seven. For the week, actual samples were within one of the target for each zone.

	Generator	Zone	1/13/2014	1/14/2014	1/15/2014	1/16/2014	1/17/2014	Total
Actual	Single-family	1	1		4	2	2	9
	Single-family	2		3	4	2	1	10
	Single-family	3		3	4	3	1	11
	Single-family	4		1	4	1	4	10
	Multifamily	1	4					4
	Multifamily	2		1		2	1	4
	Multifamily	3		3	2	2		7
	Multifamily	4		2	2	1		5
Difference from Planned	Single-family	1	(7)	0	4	2	2	1
	Single-family	2	0	1	1	(1)	(2)	(1)
	Single-family	3	0	(1)	1	2	(1)	1
	Single-family	4	0	(1)	2	(3)	1	(1)
	Multifamily	1	0	0	0	0	0	0
	Multifamily	2	0	0	0	0	(1)	(1)
	Multifamily	3	0	1	0	1	(1)	1
	Multifamily	4	0	1	0	0	(1)	0

March

Five days of sampling took place from Monday, March 3 to Friday, March 7. Overall, 61 samples of residential waste were sorted in March; 60 samples was the goal. On most days in most zones, the planned number of samples were sorted; the actual number of samples sorted differed from the planned number of samples by one in some cases. For the week, one fewer Zone 3 single-family sample, one greater Zone 3 multifamily sample, and one greater Zone 4 multifamily sample was sorted than planned.

	Generator	Zone	3/3/2014	3/4/2014	3/5/2014	3/6/2014	3/7/2014	Total
Actual	Single-family	1	2	2	1	2	1	8
	Single-family	2	2	2	1	1	1	7
	Single-family	3	1	1	1	2	1	6
	Single-family	4	2	1		2	1	6
	Multifamily	1	2	2	2	1	2	9
	Multifamily	2	3	1	1	2	1	8
	Multifamily	3	2	1	2	2	2	9
	Multifamily	4	1	2	1	2	2	8
Difference from Planned	Single-family	1	0	0	(1)	1	0	0
	Single-family	2	0	0	0	0	0	0
	Single-family	3	0	0	(1)	0	0	(1)
	Single-family	4	0	0	(1)	1	0	0
	Multifamily	1	0	0	0	(1)	1	0
	Multifamily	2	1	(1)	(1)	1	0	0
	Multifamily	3	0	0	0	1	0	1
	Multifamily	4	0	0	0	0	1	1

May

Five days of sampling took place from Monday, May 19 through Friday, May 23. By generator, day, and zone, the actual samples differed from the planned number of samples by two at the most. For the week, the number of samples completed was one fewer than planned for Single-family Zone 1, Multifamily Zone 1, and Multifamily Zone 3. For Single-family Zone 3 and 4 and Multifamily Zone 4, one more sample was sorted than planned.

	Generator	Zone	5/19/2014	5/20/2014	5/21/2014	5/22/2014	5/23/2014	Total
Actual	Single-family	1	2	2	1	1	1	7
	Single-family	2	1	2	1	2	1	7
	Single-family	3	1	2		4	1	8
	Single-family	4	1		3	1	2	7
	Multifamily	1	2	3	2		1	8
	Multifamily	2	2	2	1	1	2	8
	Multifamily	3	2	1	1	2	1	7
	Multifamily	4	2	2	2	1	1	8
Difference from Planned	Single-family	1	1	0	0	0	0	1
	Single-family	2	0	0	0	0	0	0
	Single-family	3	(1)	0	(2)	3	0	0
	Single-family	4	(1)	(1)	1	(1)	1	(1)
	Multifamily	1	0	1	0	0	0	1
	Multifamily	2	0	0	0	0	0	0
	Multifamily	3	0	0	0	0	0	0
	Multifamily	4	0	0	0	0	0	0

July

Five days of sampling took place from Monday, July 14 through Friday, July 18. Overall, 60 samples were sorted, one greater than planned. By generator, day, and zone, the actual samples differed from the planned number of samples by two at the most. For the week, the number of samples completed was one fewer than planned for Multifamily Zone 3. One more sample was sorted than planned for Single-family Zone 2 and Multifamily Zone 2.

	Generator	Zone	7/14/2014	7/15/2014	7/16/2014	7/17/2014	7/18/2014	Total
Actual	Single-family	1	2		3	1	1	7
	Single-family	2	3	1	1	2	1	8
	Single-family	3	2	1	1	3	2	9
	Single-family	4	1		3		2	6
	Multifamily	1	2	2	1	1	1	7
	Multifamily	2	2	3	1	2	2	10
	Multifamily	3	3			1	2	6
	Multifamily	4	1	2	1	1	2	7
Difference from Planned	Single-family	1	0	(1)	1	0	0	0
	Single-family	2	1	(1)	0	1	0	1
	Single-family	3	0	(1)	(1)	1	1	0
	Single-family	4	0	(2)	2	(1)	1	0
	Multifamily	1	0	0	0	0	0	0
	Multifamily	2	0	1	(1)	0	1	1
	Multifamily	3	1	(1)	(1)	(1)	1	(1)
	Multifamily	4	0	0	0	0	0	0

September

Five days of sampling took place from Monday, September 22 to Friday, September 26. Overall, 60 samples were sorted, the same number as planned. For the week, one fewer single-family and one greater multifamily sample were sorted than planned. By generator, day, and zone, the actual samples differed from the planned number of samples by one at the most. For the week, the number of samples completed was one fewer than planned for Single-family Zone 3 and Multifamily Zone 1. One more sample was sorted than planned for both Multifamily Zones 3 and 4.

	Generator	Zone	9/22/2014	9/23/2014	9/24/2014	9/25/2014	9/26/2014	Total
Actual	Single-family	1	2	1	3	1	0	7
	Single-family	2	2	2	2	1	0	7
	Single-family	3	1	1	1	1	1	5
	Single-family	4	2	2	1	1	1	7
	Multifamily	1	2	2	2	2	0	8
	Multifamily	2	1	2	2	1	2	8
	Multifamily	3	2	1	2	2	2	9
	Multifamily	4	1	1	3	2	2	9
Difference from Planned	Single-family	1	0	0	1	0	(1)	0
	Single-family	2	0	0	1	0	(1)	0
	Single-family	3	0	(1)	0	0	0	(1)
	Single-family	4	0	0	0	0	0	0
	Multifamily	1	0	0	0	0	(1)	(1)
	Multifamily	2	0	0	0	(1)	1	0
	Multifamily	3	0	0	0	0	1	1
	Multifamily	4	(1)	(1)	1	1	1	1

November

Five days of sampling took place from Monday, November 3 through Friday, November 7. Overall, 61 samples were sorted, one greater than what was planned. For the week, two greater single-family and one fewer multifamily sample were sorted than planned. By generator, day, and zone, the actual samples differed from the planned number of samples by two at the most. For the week, the number of samples completed was one fewer than planned for Multifamily Zone 4. Two more samples were sorted than planned for Single-family Zone 1.

	Generator	Zone	11/3/2014	11/4/2014	11/5/2014	11/6/2014	11/7/2014	Total
Actual	Single-family	1	2	2	2	1	2	9
	Single-family	2	1	2	1	1	1	6
	Single-family	3	1	2	1	1	1	6
	Single-family	4	2	2	0	3	2	9
	Multifamily	1	2	2	3	1	1	9
	Multifamily	2	2	1	3	1	0	7
	Multifamily	3	2	2	2	1	1	8
	Multifamily	4	2	1	3	0	1	7
Difference from Planned	Single-family	1	0	1	0	0	1	2
	Single-family	2	0	0	0	0	0	0
	Single-family	3	0	0	0	0	0	0
	Single-family	4	0	0	(2)	1	1	0
	Multifamily	1	0	0	1	(1)	0	0
	Multifamily	2	0	0	1	0	(1)	0
	Multifamily	3	0	0	0	0	0	0
	Multifamily	4	0	(1)	1	(1)	0	(1)

Overall

By sector, all sampling goals but one were met for 2014. The number of Zone 4 Multifamily samples was one short of the goal for the year. As shown in the table below, 362 samples were completed, two more than the goal.

Generator	Zone	Completed Samples	Overall Target	% Complete	Current Target (based on % complete)	Difference
Single-family	1	47	45	100%	45	2
Single-family	2	45	45	100%	45	0
Single-family	3	45	45	100%	45	0
Single-family	4	45	45	100%	45	0
Subtotal, Single-family		*182*	*180*		*180*	*2*
Multifamily	1	45	45	100%	45	0
Multifamily	2	45	45	100%	45	0
Multifamily	3	46	45	100%	45	1
Multifamily	4	44	45	100%	45	(1)
Subtotal, Multifamily		*180*	*180*		*180*	*0*
Total		**362**	**360**		**360**	**2**

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Appendix D. Waste Composition Calculations

Composition Calculations

The composition estimates represent the **ratio of the components' weight to the total waste** for each noted subpopulation. They were derived by summing each component's weight across all of the selected records and dividing by the sum of the total weight of waste, as shown in the following equation:

$$r_j = \frac{\sum_i c_{ij}}{\sum_i w_i}$$

where:

c = weight of particular component

w = sum of all component weights

for i 1 to n

where n = number of selected samples

for j 1 to m

where m = number of components

The confidence interval for this estimate was derived in two steps. First, the variance around the estimate was calculated, accounting for the fact that the ratio includes two random variables (the component and total sample weights). The **variance of the ratio estimator** equation follows:

$$\hat{V}_{r_j} = \left(\frac{1}{n}\right) \cdot \left(\frac{1}{\overline{w}^2}\right) \cdot \left(\frac{\sum_i \left(c_{ij} - r_j w_i\right)^2}{n-1}\right)$$

where:

$$\overline{w} = \frac{\sum_i w_i}{n}$$

Second, confidence intervals at the 90% confidence level were calculated for a component's mean as follows:

$$r_j \pm \left(t \cdot \sqrt{\hat{V}_{r_j}}\right)$$

where:

t = the value of the t-statistic (1.645) corresponding to a 90% confidence level

For more detail, please refer to Chapter 6 "Ratio, Regression and Difference Estimation" of *Elementary Survey Sampling* by R.L. Scheaffer, W. Mendenhall and L. Ott (PWS Publishers, 1986).

Weighted Averages

Waste composition estimates were calculated by using a weighted average procedure. For example, to develop composition estimates for Seattle's multifamily residential waste, sample data from all four zones were combined, with much more importance given to the Multifamily Zone 3 samples (contributing approximately 44% of total multifamily tons disposed).

Seattle provided the estimate of tonnage disposed by each of the eight subpopulations. The composition estimates were applied to the relevant tonnages to estimate the amount of waste disposed for each component category for each residence type, collection zone, and season.

The **weighted average for an overall composition estimate** was performed as follows:

$$O_j = \left(p_1 * r_{j1}\right) + (p_2 * r_{j2}) + (p_3 * r_{j3}) + \ldots$$

where:

p = the proportion of tonnage contributed by the noted subpopulation

r = ratio of component weight to total waste weight in the noted subpopulation

for j 1 to m

where m = number of components

The **variance of the weighted average** was calculated:

$$VarO_j = (p_1^{\,2} * \hat{V}_{r_{j1}}) + (p_2^{\,2} * \hat{V}_{r_{j2}}) + (p_3^{\,2} * \hat{V}_{r_{j3}}) + \ldots$$

Table D-1 show the weighting percentages that were used to produce the estimates for the overall residential waste stream as well as estimates by generator, zone, and season.

Table D-1: Weighting Percentages, Overall

Generator	Season	Zone	Tons Disposed	Percent of Total
Single-family	Fall	1	3,779	3.37%
	Fall	2	2,864	2.55%
	Fall	3	3,327	2.96%
	Fall	4	5,046	4.50%
	Spring	1	3,742	3.33%
	Spring	2	2,696	2.40%
	Spring	3	3,375	3.01%
	Spring	4	5,097	4.54%
	Summer	1	3,827	3.41%
	Summer	2	2,861	2.55%
	Summer	3	3,430	3.06%
	Summer	4	5,177	4.61%
	Winter	1	3,766	3.36%
	Winter	2	2,739	2.44%
	Winter	3	3,336	2.97%
	Winter	4	5,044	4.49%
Multifamily	Fall	1	2,243	2.00%
	Fall	2	2,280	2.03%
	Fall	3	5,840	5.20%
	Fall	4	2,855	2.54%
	Spring	1	2,164	1.93%
	Spring	2	2,262	2.02%
	Spring	3	5,756	5.13%
	Spring	4	2,899	2.58%
	Summer	1	2,252	2.01%
	Summer	2	2,179	1.94%
	Summer	3	5,816	5.18%
	Summer	4	2,798	2.49%
	Winter	1	2,126	1.89%
	Winter	2	2,230	1.99%
	Winter	3	5,633	5.02%
	Winter	4	2,800	2.49%
	Total		**112,238**	**100.00%**

Comparison Calculations

Identifying statistically significant differences requires a two-step calculation. First, assuming that the two groups to be compared have the same variance, a **pooled sample variance** was calculated:

$$S_{pool}^{\ 2} = \frac{\left[(n1-1)\cdot\left(n1\cdot\hat{V}_{r_j 1}\right)\right]+\left[(n2-1)\cdot\left(n2\cdot\hat{V}_{r_j 2}\right)\right]}{n1+n2-2}$$

Next, the **t-statistic** was constructed:

$$t = \frac{(r1-r2)}{\sqrt{\frac{S_{pool}^{\ 2}}{n1}+\frac{S_{pool}^{\ 2}}{n2}}}$$

The **p-value** of the t-statistic was calculated based on (n1+n2 -2) degrees of freedom.

Demographic Calculations

Waste compositions for different demographic groups were calculated by considering the median household income and mean household size of each sampled garbage route. Single-family waste samples were grouped according to whether they were collected from garbage routes with high-income, low-income, large household size, or small household size. Once the waste samples were identified as belonging to one of these four demographic groups, waste composition calculations were performed as described above under "Composition Calculations."

Calculations of each garbage route's **mean household size** were performed as follows:

Population and number of households were obtained for each Census Block in Seattle via the 2010 Census Redistricting Data Summary Files. Geographic locations for Census Blocks in Seattle were obtained in GIS shapefile format from the Census website.[1]

1. Census Blocks were identified by the Seattle single-family garbage route (serviced by Cleanscapes and Waste Management) that covered that Block area. These companies provided GIS shapefiles of their recent garbage routes. The total population and total households for each garbage route were then calculated by summing the population and number of households for all Census Blocks contained within each route.
2. Mean household size was calculated by dividing the total population of each route by the total number of households.

Calculations of each garbage route's **median income** were performed as follows, using information from the 2009-2013 American Community Survey 5-year estimates Summary File.[2] Each Census Block Group was identified by the garbage route that covers that Block Group. Figure D-1 presents an example where Block Groups A, B, and C are identified by one designated garbage route, Garbage Route 321.

The number of households in each Census Block Group was used to calculate a weighted median income for the route. For instance, because Block Group C contains more households than Block Groups A and B, the median income of Block Group C would be given more importance than the other two Block Groups in calculating the median income for the

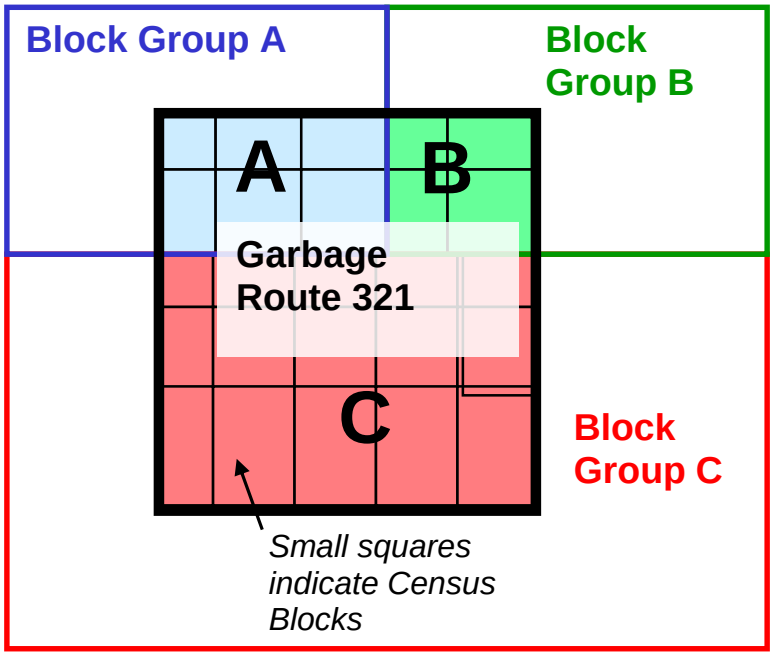
[1] http://www.census.gov/rdo/data/2010_census_redistricting_data_pl_94-171_summary_files.html
[2] http://www.census.gov/acs/www/data_documentation/summary_file/

designated garbage route, Garbage Route 321. The weighting was carried out as follows, where "Households" refers to the number of households in each Block Group, and "Income" refers to the median income of each Block Group within the designated route.

$$\textbf{Estimated Median Income of Garbage Route 321} = \frac{\textbf{A}\text{ Households} * \textbf{A}\text{ Income} + \textbf{B}\text{ Households} * \textbf{B}\text{ Income} + \textbf{C}\text{ Households} * \textbf{C}\text{ Income}}{\textbf{A}\text{ Households} + \textbf{B}\text{ Households} + \textbf{C}\text{ Households}}$$

1. The result of this weighting is an approximation of the median income for the designated route.

Figure D-1: Geographies Used in Demographic Calculations



Sampled routes were then divided into quartiles based on the median income and mean household size of each garbage route. Waste samples from the first (0 - 25%) quartile were used to calculate "low income" and "small household" waste compositions and samples from the top quartile (75% - 100%) were used to calculate "high income" and "large household" waste compositions.

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Appendix E. Comparison Calculations

The comparison methodology is outlined in the first section of this appendix and the calculations are outlined in Appendix D. For more detail, the remaining sections describe technical issues regarding the statistics.

Background

In an ongoing effort to monitor the types and amounts of materials disposed locally, Seattle has performed several waste composition studies. Differences are often apparent between project years. In this appendix, detailed results from the following comparisons are presented. The results of these comparisons can be used to indicate trends in the composition data.

- This report presents the below year-to-year comparisons
  - 1988/89 vs. 2014
  - 2010 vs. 2014

Comparisons examined the changes in the composition percentages for each of the eight broad material categories.[3] In order to control for population changes and other factors that may influence the total amount of waste disposed from year to year, the tests described in this appendix measure waste proportions, not actual tonnage. For example, say that *mixed low-grade* paper accounts for 10% of a particular substream's disposed waste each year, and that a total of 1,000 tons of waste was disposed in one year and 2,000 tons of waste in the next. While the amount of newspaper increased from 100 to 200 tons, the percentage remained the same. Therefore, the tests would indicate that there had been no change.

The purpose of conducting these comparisons is to identify trends within the residential substream, in the percentage of selected types of waste disposed over time. One specific example is stated as follows:

Hypothesis: "There is no statistically significant difference between the 1988/89 and 2014 study periods in the percentage of paper disposed."

Statistics are then employed to look for evidence disproving the hypothesis. A "significant" result means that there is enough evidence to disprove the hypothesis and it can be concluded that there is a true difference across years. "Insignificant" results indicate that either a) there is no true difference, or b) even though there may be a difference, there is not enough evidence to prove it.[4]

The purpose of these tests is to identify changes across years. However, the study did not attempt to investigate *why* or *how* these changes occurred. The changes may be due to a variety of factors. For example, the decrease in paper could be due to any combination of the following:

[3] The material components for each season have been adjusted to match a uniform material list: (1) the material list has changed from 52 material components in 1988/89 to 115 materials in 2014 and (2) several materials have been moved to different broad material categories to better reflect new policies in recycling and composting.

[4] Please see the "Power Analysis" discussion on page E-3.

- Consumer Preferences—plastic containers might have captured some of the market previously held by corrugated containers.
- Technology—manufacturers might use thinner paperboard than in the past, which would decrease the weight of cardboard, even if the same number of boxes were disposed.
- Recycling—more residents may participate in paper recycling programs due to new education programs or new programs such as commingled recycling.

Future studies could be designed to test the influence of various potential sources of the increase/decrease of specific materials in the disposed waste stream.

Statistical Considerations

The analyses were based on the component percentages, by weight. As described in Appendix D, these percentages are calculated by dividing the sum of the selected component weights by the sum of the corresponding sample weights. T-tests (modified for ratio estimation) were used to examine the variations from year-to-year and within subpopulations.

Normality

The distributions of some of the waste categories (particularly the hazardous materials) are skewed and may not follow a normal distribution. Although t-tests assume a normal distribution, they are very robust to departures from this assumption, particularly with large sample sizes. In addition, most of the selected categories are sums of several individual waste components, which improve our ability to meet the assumptions of normality.

Dependence

There may be dependence between waste types (if a person disposes of material A, they always dispose of material B at the same time).

There is certainly a degree of dependence between the calculated percentages. Because the percentages sum to 100 (in the case of year-to-year comparisons) or near 100 (in the case of subpopulation comparisons), if the percentage of material A increases, the percentage of some other material must decrease.

Multiple T-Tests

In all statistical tests, there is a chance of incorrectly concluding that a result is significant. The year-to-year comparison required conducting several t-tests (one for each broad material class) **each** of which carries that risk. However, we were willing to accept only a 10% chance, **overall**, of making an incorrect conclusion. Therefore, each test was adjusted by setting the significance threshold to $\frac{0.10}{w}$ (w = the number of t-tests).

The adjustment can be explained as follows:

For each test, we set a $1-\frac{0.10}{w}$ chance of not making a mistake, which results in a $\left(1-\frac{0.10}{w}\right)^{w}$ chance of not making a mistake during all *w* tests.

Since one minus the chance of not making a mistake equals the chance of making a mistake, by making this adjustment, we have set the overall risk of making a wrong conclusion during any one of the tests at $\left(1-\left(1-\frac{0.10}{w}\right)^{w}\right)=0.10$.

The chance of a "false positive" for the year-to-year comparisons made in this study is restricted to 10% overall, or 1.25% for each test (10% divided by the eight tests equals 1.25%).

For more detail regarding this issue, please refer to Section 11.2 "The Multiplicity Problem and the Bonferroni Inequality" of *An Introduction to Contemporary Statistics* by L.H. Koopmans (Duxbury Press, 1981).

Power Analysis

As the number of samples is increased, so is the ability to detect differences. In the future, an *a priori* power analysis might benefit this research by determining how many samples would be required to detect a particular minimum difference of interest.

Interpreting the Calculation Results

This section interprets the statistical results for year-to-year comparisons.

For the purposes of this study, only those calculation results with a p-value of less than 1.25% are considered to be statistically significant. As described above, the threshold for determining statistically significant results (the "alpha-level") is conservative, accounting for the fact that so many individual tests were calculated. An asterisk notes the statistically significant differences.

The t-statistic is calculated from the data. According to statistical theory, the larger the absolute value of the t-statistic the less likely that the two populations have the same mean. The p-value describes the probability of observing the calculated t-statistic if there were no true difference between the population means.

The key differences between study years are summarized below and shown in detail in Tables E-1 and E-2.

Between the first residential waste study in 1988/89 and the current study, several material categories show significant variations (Table E-1). **Paper, glass, metal, organics,** and **CDL wastes** show decreasing trends, while **plastic** and **other materials** show increasing trends**. Other materials** includes a variety of materials, such as diapers, carpet, tires, mattresses, A/V equipment, small appliances, miscellaneous organics, and miscellaneous inorganics. The change between the proportions of **hazardous materials** was not significant.

Table E-1: Comparison of Residential Composition Results, 1988/89 vs. 2014

	Mean Ratio (Material Wt/Total Wt)		t-Statistic	p-Value (Cut-off for statistically valid difference = 0.0125)	
	1988/89	*2014*			
Paper	31.24%	19.58%	14.6233	0.0000	*
Plastic	8.06%	11.63%	11.4658	0.0000	*
Glass	6.41%	2.34%	16.8222	0.0000	*
Metal	5.27%	3.30%	7.4436	0.0000	*
Organics	33.42%	30.70%	2.5566	0.0108	*
Other Materials	6.14%	27.07%	30.7350	0.0000	*
CDL Wastes	8.80%	4.75%	6.0641	0.0000	*
Hazardous	0.66%	0.63%	0.3588	0.7199	
Number of Samples	*212*	*362*			

Table E-2 presents the results of the comparison calculations between the previous residential waste study in 2010 and the current study. The **paper** and **plastic** proportions increased significantly over the last 4 years. Variations among the other category proportions were not significant.

Table E-2: Comparison of Residential Composition Results, 2010 vs. 2014

	Mean Ratio (Material Wt/Total Wt)		t-Statistic	p-Value (Cut-off for statistically valid difference = 0.0125)	
	2010	*2014*			
Paper	17.7%	19.6%	3.6449	0.0003	*
Plastic	10.4%	11.6%	4.1428	0.0000	*
Glass	2.1%	2.3%	1.9199	0.0553	
Metal	4.0%	3.3%	2.3664	0.0182	
Organics	31.4%	30.7%	0.9030	0.3668	
Other Materials	27.9%	27.1%	1.0327	0.3021	
CDL Wastes	5.7%	4.8%	1.4951	0.1353	
Hazardous	0.9%	0.6%	1.5721	0.1164	
Number of Samples	*361*	*362*			

Appendix F. Field Forms

The field forms are included in the following order:

- Vehicle Selection Sheet
- Waste Tally Sheet

Vehicle Selection Sheet

Vehicle Selection Sheet

Seattle Residential Waste Composition Study

Monday, November 03, 2014 **Facility: SRDS**

NEED?	Selected	Truck No.	Route	Zone	Hauler	Sample ID	Sector	Truck Type	1st or 2nd Dump?	Notes and dimensions
2		**264769**	1311	1	WM	SF-6101	SF			
		264767	1302	1	WM	SF-6105	SF			
		264776	1309	1	WM	SF-6106	SF			
2		**264747**	1327	4	WM	SF-6102	SF			
		264742	1323	4	WM	SF-6103	SF			
		264744	1324	4	WM	SF-6104	SF			
2		**363088**	A12H	1	WM	MF-6101	MF			
		362945	A12C	1	WM	MF-6105	MF			
		362949	A12J	1	WM	MF-6106	MF			
2		**362948**	A12G	4	WM	MF-6102	MF			
		209796	A11C	4	WM	MF-6103	MF			
		209794	A11A	4	WM	MF-6104	MF			
1			1126	2	CS	SF-6107	SF			
			1120	2	CS	SF-6110	SF			
1			1145	3	CS	SF-6108	SF			
			1143	3	CS	SF-6109	SF			
2			1249	2	CS	MF-6108	MF			
			1248	2	CS	MF-6111	MF			
			1224	2	CS	MF-6112	MF			
2			1240	3	CS	MF-6107	MF			
			1220	3	CS	MF-6109	MF			
			1221	3	CS	MF-6110	MF			

14 Total Samples Today

Waste Tally Sheet, Front

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2014 Seattle Waste Composition Study

PAPER	Newspaper				
	Plain OCC/Kraft				
	Waxed OCC/Kraft				
	Grocery/Shopping Bags				
	High Grade				
	Mixed Low-grade				
	Polycoated Containers				
	Compostable/Soiled				
	Pot. Comp. Single-use Food Service				
	Other Single-use Food Service				
	Mixed/Other Paper				

PLASTIC	#1 PET Bottles				
	#2 HDPE Natural Bottles				
	#2 HDPE Colored Bottles				
	Other Bottles				
	Tubs				
	Expanded Poly. Nonfood				
	Expanded Poly. Food grade				
	Rigid Poly. Foam Insulation				
	Pot. Comp. Single-use Food Service				
	Other Single-use Food Service				
	Other Rigid Packaging				
	Shopping/Dry Cleaning Bags				
	Stretch Wrap				
	Clean PE Film				
	Other Film				
	Plastic Pipe				
	Foam Carpet Padding				
	Durable Plastic Products				
	Plastic/Other Materials				

GLASS	Clear Bottles				
	Green Bottles				
	Brown Bottles				
	Container Glass				
	Fluorescent Tubes				
	CFLs				
	Flat Glass				
	Automotive Glass				
	Other Glass				

METAL	Alum. Beverage Cans				
	Alum. Foil/Containers				
	Other Aluminum				
	Other Nonferrous				
	Tin Food Cans				
	Empty Aerosol Cans				
	Other Ferrous				
	Oil filters			Filter Count:	
	Mixed Metals/Material				

ORGANICS	Leaves & Grass				
	Prunings				
	Food				
	Fats/Oils/Grease				
	Textiles/Clothing				
	Mixed Textiles				
	Disposable Diapers				
	Animal By-products				
	Rubber Products				
	Tires				

VEHICLE TYPE:	RL-Rear Loader	FL-Front Loader	SL-Side Loader
HAULER:	CleanScapes		Waste Management
FACILITY:	NRDS		SRDS

TRUCK #	**LOAD #**
ROUTE #	**ZONE #**
DATE:	**TIME:**
SAMPLE #	

Waste Tally Sheet, Back

CONSTRUCTION DEBRIS	Clean Dimension Lumber				
	Clean Engineered Wood				
	Pallets				
	Crates				
	Other Untreated Wood				
	New Painted Wood				
	Old Painted Wood				
	Creosote-treated Wood				
	Other Treated Wood				
	Contaminated Wood				
	New Gypsum Scrap				
	Demo Gypsum Scrap				
	Carpet				
	Felt Carpet Pad				
	Fiberglass Insulation				
	Concrete				
	Asphalt Paving				
	Other Aggregates				
	Rock				
	Asphalt Shingles				
	Other Asphaltic Roofing				
	Ceramics				
	Cement Fiber Board				
	Dried Latex Paint				
	Single-ply Roofing Materials				
	Ceiling Tiles				
	Other Construction Debris				

FURNITURE, APPLIANCES, AND ELECTRONICS	Furniture				
	Mattresses				
	Small Appliances				
	Cell Phones				
	Audio/Visual Equipment				
	CRT Monitors				
	CRT Televisions				
	Other Electronics				

POTENTIALLY HARMFUL WASTE	Liquid Latex Paint		
	Solvent-based Adhesives		
	Water-based Adhesives		
	Oil-based Paint/Thinners		
	Caustic Cleaners		
	Pesticides/Herbicides		
	Rechargeable Batteries		
	Wet-cell Batteries		
	Other Dry-cell Batteries		
	Gasoline/Kerosene		
	Motor Oil/Diesel Oil		
	Asbestos		
	Explosives		
	Medical Wastes		
	Other Cleaners/Chemicals		
	Pharmaceuticals/Vitamins		
	Cosmetics		
	Other Potentially Toxic		

FINES & MISC.	Sand/Soil/Dirt		
	Non-distinct Fines		
	Misc. Organics		
	Misc. Inorganics		

NOTES:

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Revised 12/13/13