

King County Monitoring Program

2007 Waste Characterization Study

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King County

Department of Natural Resources and Parks
Solid Waste Division

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Chapter 1

Executive Summary

1.1 OVERVIEW

Project Purpose & Background

Each year, residents and businesses in King County throw away over 1 million tons of garbage, also known as mixed solid waste (MSW).¹ What are people disposing, where does this waste come from, and where does it go? Since 1990, the King County Solid Waste Division has conducted its **Waste Monitoring Program** to answer these questions and learn more about the disposed waste. To help King County provide efficient and effective services, plan for future needs, and track progress towards its recycling goals, the Waste Monitoring Program includes waste characterization studies, customer surveys, and other studies as needed. Under the **Waste Monitoring Program** King County completed a waste characterization study in 2007.

- **Waste characterization studies** analyze the waste stream by collecting and sorting samples of loads from customers bringing materials to facilities in King County. These studies help the county understand both the overall waste stream and its substreams, such as the materials collected from single-family homes, apartments, businesses, and those who haul their own waste. Studying the items thrown away also helps target materials, such as food scraps and other organics, for potential future efforts to increase recycling.

Between January 2007 and December 2007, the Waste Monitoring Program sorted 421 waste loads from nine waste facilities in King County. This report presents the results of those waste sorts.

Understanding King County's Waste Stream & Facility Customers

To manage its current waste effectively and to plan for the future, King County needed to understand both its existing solid waste stream and its customer base of waste facility users. In analyzing waste materials and customers, waste flows were divided into various substreams, according to where the waste came from and who brought it to the transfer stations and drop boxes. Such analysis was useful in waste management planning because the different substreams may have different waste types, user profiles, and public programs designed to reach target customers.

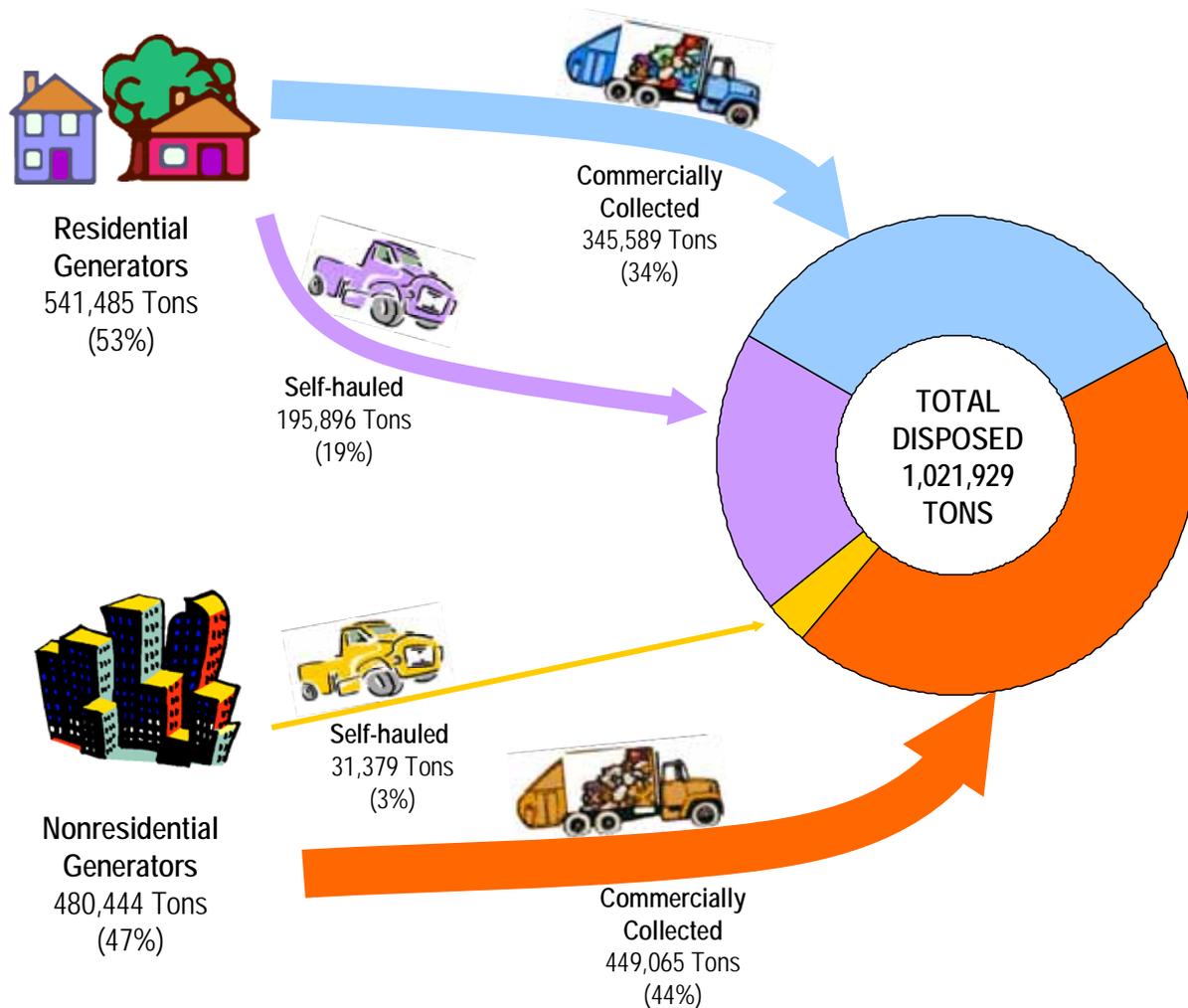
In this study, waste loads were first divided according to the source, or generator, of the waste: **residential** or **nonresidential** substreams. Then wastes were further categorized according to how materials were delivered to waste sites: **commercially collected by**

¹ This figure excludes wastes originating within the city of Seattle, which manages its solid waste separately from the rest of King County, and the city of Milton which is being serviced by Pierce County.

waste hauling companies or **self-hauled** by residents or other businesses that bring loads to waste facilities.²

Figure 1-1 illustrates how much waste each of the various substreams – residential and nonresidential, commercially collected and self-hauled – contributed to the 1,021,929 tons of solid waste disposed in King County during the study year. Chapter 2 provides additional discussion of the waste stream and its substreams beginning on page 8.

Figure 1-1. Waste Substreams & Tonnages in 2007



² Commercial haulers are firms that contract with local governments to operate a garbage collection company or operate under a state franchise in a particular geographic area. The City of Enumclaw and the Town of Skykomish operate their own waste collection systems, rather than contracting with commercial haulers. In the current study, King County included these waste deliveries with the commercially hauled loads. Self-hauled loads are categorized as residential or nonresidential according to the source of the load, not the type of hauler. For example, some companies collect waste from homes or businesses. These loads are considered self-hauled residential if the waste is produced from homes, even though a company, not the residents, delivers the material to a waste facility.

Study Methods

The 2007 study of waste composition at King County waste facilities involved three major steps.

- **Develop a sampling plan.** Waste sampling days were scheduled for each waste facility on different randomly selected days throughout the year. Waste samples were allocated according to collection type (commercially collected or self-hauled), source (residential or nonresidential), and vehicle type.
- **Capture and sort waste samples.** For the waste sampling, as vehicles entered each facility, a “gatekeeper” randomly selected waste loads according to the sampling plan. The gatekeeper recorded each load’s city of origin, source, vehicle type, and collection type. Each of the 421 waste samples were sorted into 78 distinct material types.
- **Analyze data and prepare report.** Waste sort data was entered into customized databases, compiled, and summarized. Waste composition results were calculated using a weighted average based on customer survey data and total waste tonnages provided by the King County Solid Waste Division.

The waste characterization study divided each waste sample into 78 individual materials, grouped into nine main material classes, as follows:³

- **Paper** – including *newspaper, cardboard (OCC), and other paper*;
- **Plastic** – including *PET bottles, other containers, and plastic film and bags*;
- **Wood/Yard Waste** – including *dimensional lumber/plywood, stumps, and yard waste*;
- **Food** – including *packaged bakery items, packaged vegetative food, opened, unpackaged, and scrap non-vegetative food*;
- **Other Organics** – including *carpet, tires, disposable diapers, and animal feces*;
- **Glass** – including *clear containers, brown containers, and other glass*;
- **Metal** – including *aluminum cans, tinned food cans, and other metal*;
- **Other Wastes** – including *construction and demolition wastes and appliances*; and
- **Household Hazardous** – including *used oil, vehicle batteries, latex paint, and TVs*.

Chapter 2 provides additional information on the project purpose, background, and methods used in this study.

1.2 KEY WASTE CHARACTERIZATION FINDINGS

During the waste characterization study, the project team collected and analyzed 421 randomly selected waste loads from nine waste facilities in King County. The following section summarizes the key results first for the overall waste stream, and then for each of

³ Only selected materials are listed here as examples; please see Appendix B for more details.

the four major substreams: commercially collected residential, commercially collected nonresidential, self-hauled residential, and self-hauled nonresidential waste.

Key Waste Composition Findings

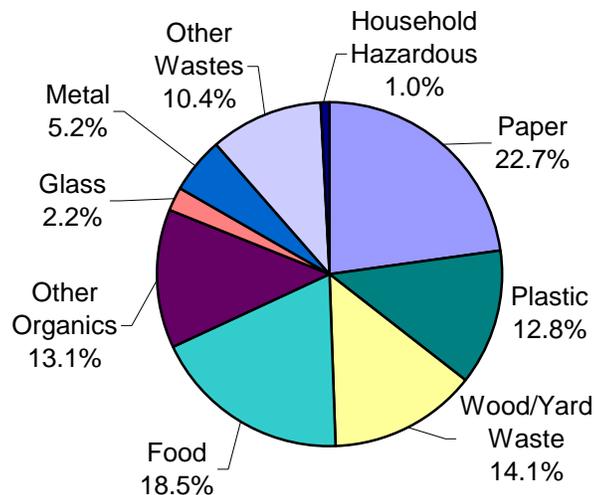
The waste composition results showed that organics and paper continue to offer excellent opportunities for increased recycling, composting, and waste reduction efforts. **Paper** and **Food** were the largest material classes in the two commercially collected substreams, accounting for 24%-29% and 20%-26% respectively. In contrast self-hauled loads contain about one third as much **Paper** (8%-9%) and one tenth as much **Food** (2%-3%). The largest material classes in self-hauled loads were **Wood/Yard Waste** (27%-34%) and **Other Wastes** (23%-27%).

Overall Waste

During the study period from January 2007 to December 2007, King County residents and businesses disposed of more than 1,021,900 tons of MSW. Figure 1-2 shows how this waste was divided among the nine major material classes, based on the percentage by weight of the overall tonnage.

- **Paper**, comprising almost one-quarter of the overall waste stream, was the largest material class; much of this material was either recyclable or compostable.
- **Food** was the second largest group and an important composting opportunity.
- **Wood/Yard Waste**, **Other Organics**, and **Plastic**, each comprised between 13% and 14% of the overall waste stream.

Figure 1-2. Waste Composition – Overall Disposed Waste
(n=421)⁴



⁴ Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see *Interpreting the Results* on page 14. The "n=" figures denote the total number of waste samples used in analyzing a particular waste stream.

Source Type: Residential or Nonresidential

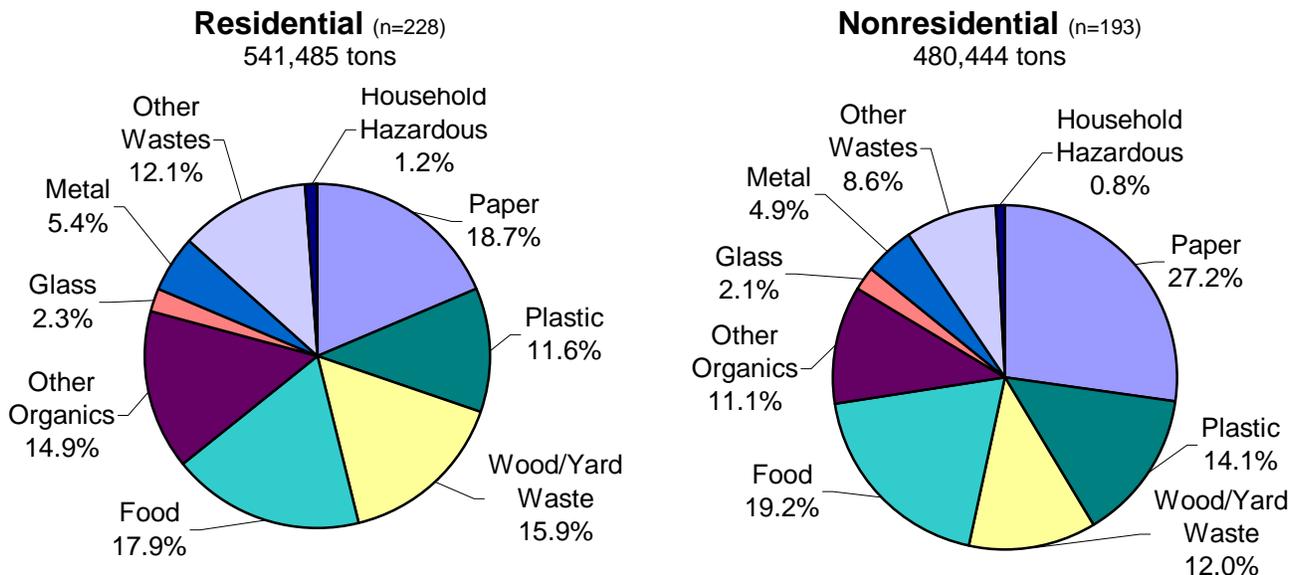
To identify differences in wastes from homes or businesses and institutions, the overall waste stream was divided on the basis of who generated the waste. The study classified waste loads into one of two major generator types: residential or nonresidential sources.

- The **residential** substream included wastes that were either commercially collected or self-hauled from residential sources, including both single-family homes and multi-family buildings. This substream accounted for nearly 541,500 tons (53%) of King County waste during the study period.
- The **nonresidential** substream included wastes that were either commercially collected or self-hauled from nonresidential sources, such as businesses and public institutions.⁵ Nonresidential waste totaled an estimated 480,400 tons (47%).

Figure 1-3 shows the proportion of the nine main classes of material in both the residential and nonresidential substreams. The following list describes the largest portions of those two substreams.

- **Paper** represented the largest share in both the residential (19%) and nonresidential (27%) substreams.
- **Food** was the second largest portion of both the residential (18%) and nonresidential (19%) substreams.
- **Wood/Yard Waste** was the third largest portion of the residential substream (16%).
- **Plastic** was the third largest portion of the nonresidential (14%) substream.

Figure 1-3. Waste Composition – Residential and Nonresidential Substreams



⁵ This substream included mixed loads that contain waste from both nonresidential (usually business waste) and residential (usually multi-family waste) sources. Commercial waste haulers (and previous studies) classify these mixed loads as “nonresidential”.

Collection Type: Commercially Collected or Self-hauled Waste Loads

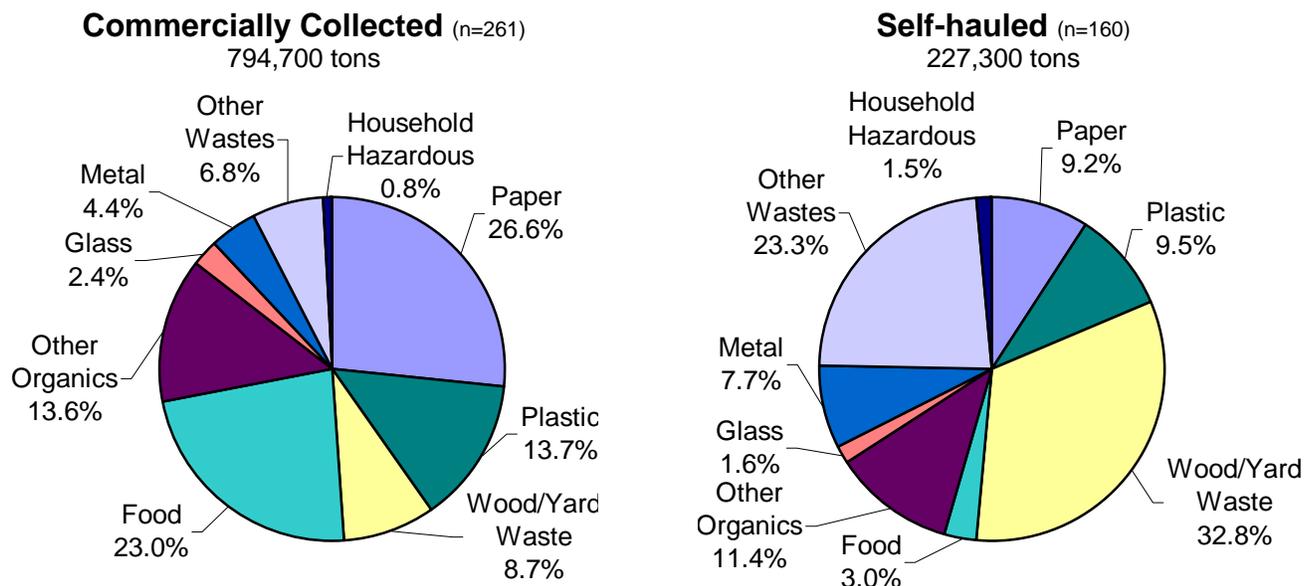
To examine differences in wastes brought by commercial waste collectors and self-haulers, the waste characterization study also divided the overall waste stream on the basis of who delivered the loads to waste facilities. The study identified waste loads according to one of two collection types: commercially collected or self-hauled waste.

- The **commercially collected** substream included waste that commercial haulers delivered to waste facilities. Commercial haulers are firms that contract with local governments to operate a garbage collection company or operate under a state franchise in a particular geographic area.⁶ This substream accounted for nearly 794,700 tons (78%) of King County waste during the study year.
- The **self-hauled** substream included materials from residents or businesses that bring loads to waste facilities. Self-hauled waste totaled nearly 227,300 tons (22%).

Figure 1-4 shows the proportion that the nine main material classes composed in both the commercially collected and self-hauled substreams. The following list describes differences in the largest material classes in these two substreams.

- The largest classes in the commercially collected substream were **Paper** (27%), **Food** (23%), and **Plastic** (14%) and **Other Organics** (14%).
- The largest classes in the self-hauled substream were **Wood/Yard Waste** (33%), **Other Wastes** (23%), and **Other Organics** (11%).

Figure 1-4. Waste Composition – Commercially Collected and Self-hauled Substreams



⁶ The City of Enumclaw and the Town of Skykomish operate their own waste collection systems, rather than contracting with commercial haulers. Beginning with the 2002-2003 study, King County has included these waste deliveries with the commercially hauled loads.

1.3 WASTE CHARACTERIZATION CHANGES OVER TIME

The current waste characterization study examined statistical differences, using *t*-tests, between the 2007 and the 2002-2003 study. These comparisons are meant to determine if changes in the composition of King County’s disposed waste stream are statistically significant. The year-to-year comparisons were made by examining the changes in the composition percentages for selected material groupings, between select substreams. Key changes are summarized below, and Chapter 4 provides a full discussion.

- **Cardboard and Organic materials have shown a decrease in the overall disposed waste stream** since 2002-2003.
- **Paper materials have shown a decrease in multi-family commercially collected wastes** loads since 2002-2003.
- **Newspaper has shown a decrease in nonresidential commercially collected** loads since 2002-2003.
- **Wood Waste materials have increased in self-hauled waste** loads since 2002-2003.

The differences in material groupings between studies were divided into two main categories:

- **Statistically significant** — These findings were considered true differences because the probability of observing these results if there had been no actual year-to-year change was low.
- **Strong trend** — Although the results did not meet the requirements of the study’s conservative statistical tests, the data suggest a possible and noteworthy change.

Comparisons identified as “statistically significant” or “strong trends” are summarized in Table 1-1.

Table 1-1. Waste Composition Changes & General Trends, 2002-2003 to 2007

	MATERIAL GROUPING	MEAN RATIO <i>(Material Wt/Total Wt)</i>		STRENGTH OF RESULTS
		2002/2003	2007	
Overall				
Overall	Cardboard and Kraft	3.1%	2.8% ↓	Strong trend
Overall	Organics	20.9%	19.2% ↓	Statistically significant
Commercially Collected				
Multi-family	Newspaper	4.3%	2.5% ↓	Strong trend
Multi-family	Other Curbside Paper	12.9%	9.7% ↓	Strong trend
Nonresidential	Newspaper	3.4%	2.0% ↓	Statistically significant
Nonresidential	Cardboard and Kraft	6.1%	9.1% ↑	Strong trend
Self-hauled				
	Wood Waste	15.9%	21.7% ↑	Strong trend

Chapter 2

Introduction

2.1 PROJECT PURPOSE & BACKGROUND

Each year, residents and businesses in King County dispose of just over 1 million tons of garbage, also known as mixed solid waste (MSW).⁷ What are people disposing, where does this waste come from, and where does it go? The King County Solid Waste Division's Waste Monitoring Program was started in 1990 to answer these questions and learn more about the disposed waste. This ongoing program seeks to characterize King County's waste disposal and to understand the customers using its waste facilities. Monitoring the waste stream helps the county provide effective and efficient services, plan for future needs, and track progress towards its recycling goals.

Waste Management in King County

The county's waste monitoring efforts were designed to track its complex waste management system. Private waste management companies collect much of the waste from homes and businesses. Some individuals and companies also chose to haul their own waste, either occasionally or on a regular basis. Most of King County's solid waste destined for disposal first went to one of ten facilities: eight county-owned transfer stations or two county-owned drop boxes. The county-owned transfer stations include Algona, Bow Lake, Enumclaw, Factoria, Shoreline (formerly First Northeast), Houghton, Renton, and Vashon. Shoreline was closed for renovation during the 2007 study period.⁸ The two drop boxes were located at Cedar Falls and Skykomish. From these transfer stations and drop boxes, trucks hauled King County's waste to the Cedar Hills Regional Landfill for disposal.

King County's Waste Monitoring Program

The Waste Monitoring Program assessed how much and what type of materials both residents and businesses dispose. To help King County provide services and plan for the future, this program included waste characterization studies, customer surveys, and other studies as needed. Under the **Waste Monitoring Program** King County completed a waste characterization study in 2007.

⁷ This figure excludes wastes originating within the city of Seattle, which manages its solid waste separately from the rest of King County, and the city of Milton which is being serviced by Pierce County.

⁸ During this time commercially collected garbage that would normally be disposed of at Shoreline was diverted to Snohomish County and transported to the Cedar Hills landfill. Most Shoreline self-haul traffic was diverted to other transfer stations in King County and Seattle.

- **Waste characterization studies** analyze the waste stream by collecting and sorting samples of loads from customers who brought materials to facilities in King County. These studies helped the county understand both the overall waste stream and its subsets, such as the materials collected from single-family homes, apartments, businesses, and those who hauled their own waste. Studying the items thrown away also helped target materials, such as food scraps and other organics, for potential future efforts to increase recycling.

Between January 2007 and December 2007, the Waste Monitoring Program sorted 421 waste loads at the nine open waste facilities in King County⁹. During this study period, King County disposed of 1,021,929 tons of solid waste. This report presents the results of the waste sorts. Cascadia Consulting Group served as the primary contractor for this research. Table 2-1 shows the number of waste loads sampled since 1990 as part of King County’s Waste Monitoring Program.

Table 2-1. Waste Loads Sampled

Study Period	Waste Samples
2007	421
2002-2003	369
1999-2000	412
1995-1996	630
1993-1994	568
1991	569
TOTAL	2,969

2.2 UNDERSTANDING THE WASTE STREAM

To understand the overall solid waste stream better, the total waste was divided into various substreams, according to where the waste came from and who brought it to the waste facilities. Such analysis is useful because the different substreams often have different waste types, user profiles, and public programs for reaching customers.

Substreams were identified according to such factors as the source, or generator, of the waste (residential or nonresidential) as well as how materials were delivered to waste sites (commercially collected or self-hauled). The sources of waste and types of delivery were defined as follows:

⁹ Seven transfer stations and two drop boxes were sampled. Shoreline Transfer Station was closed through the duration of the study.

- **Residential waste** came from single-family or multi-family dwellings.
- **Nonresidential waste** came from businesses, schools, government offices, and other institutions that are not residences.
- **Commercially collected waste** was hauled by firms that contract with local governments to operate a garbage collection company or operate under a state franchise in a particular geographic area.¹⁰
- **Self-hauled waste** was hauled by residents or businesses that bring the waste themselves to transfer stations or drop boxes.¹¹

In this study, waste loads and customers surveyed were first divided into residential and nonresidential categories. Then those categories were further divided between commercially collected and self-hauled waste, as shown in Table 2-2. In some cases, loads contained a mixture of waste from residential and nonresidential sources, but these “mixed loads” represented only a small portion of the total waste.

Table 2-2. Substream Definitions

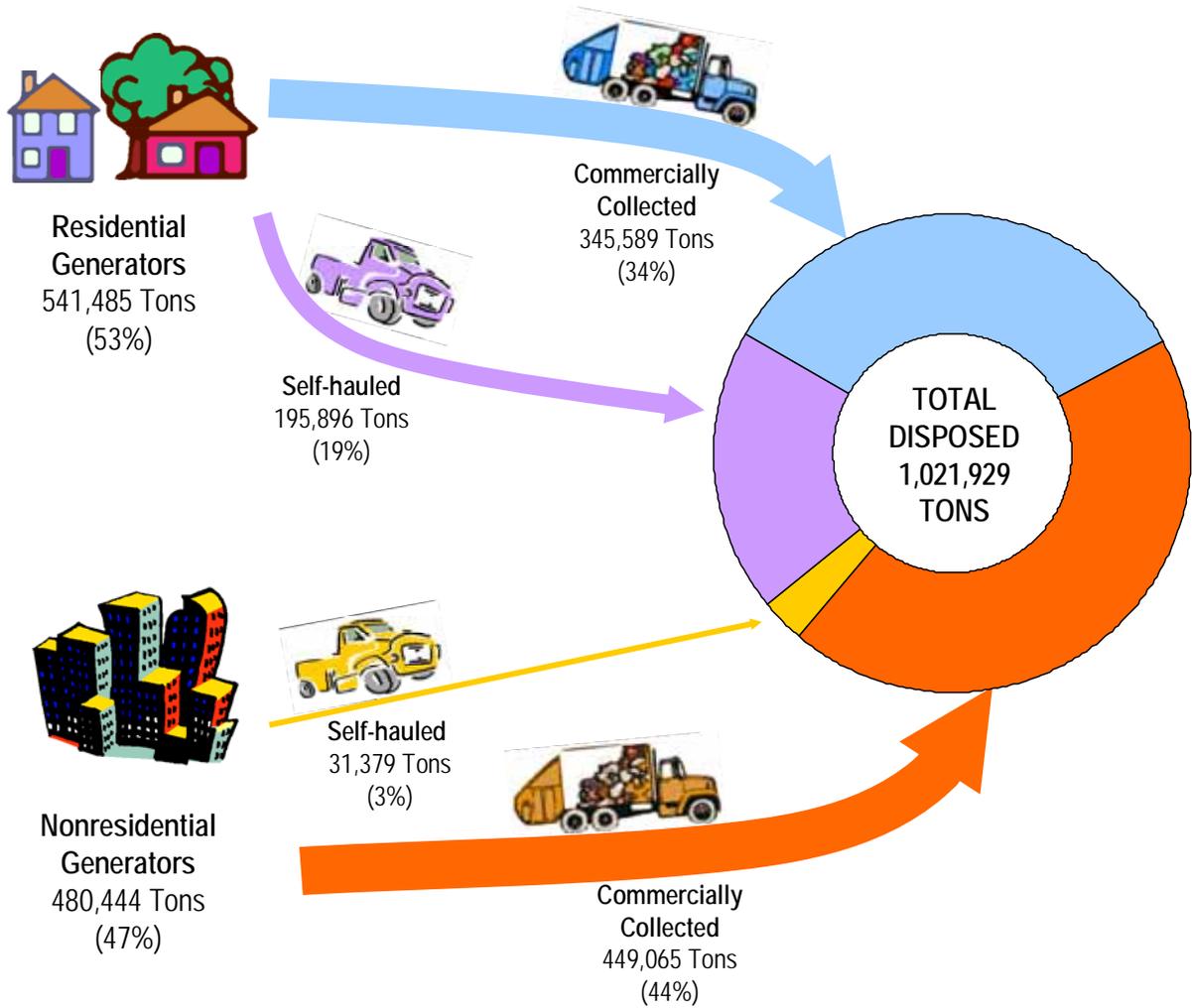
	Commercially Collected	Self-hauled
Residential Waste	Commercially collected waste from residential sources	Self-hauled waste from residential sources
Nonresidential Waste	Commercially collected waste from nonresidential sources	Self-hauled waste from nonresidential sources

In this study, the composition of the waste in each substream was analyzed separately. To describe King County’s overall waste stream, the waste composition estimates from these substreams were combined and weighted according to each substream’s contribution to the total waste stream. Figure 2-1 illustrates how much waste the various substreams – residential and nonresidential, commercially collected and self-hauled – contributed to the 1,021,929 tons of solid waste disposed in King County in 2007.

¹⁰ The City of Enumclaw and the Town of Skykomish operate their own waste collection systems, rather than contracting with commercial haulers. Beginning with the 2002-2003 study, King County has included these waste deliveries with the commercially hauled loads.

¹¹ Self-hauled loads were categorized as residential or nonresidential according to the source of the load, not the type of hauler. For example, some companies collect waste from homes or businesses. These loads were considered self-hauled residential if the waste was produced from homes, even though a company, not the residents, delivered the material to a waste facility.

Figure 2-1. Waste Substreams & Tonnages in 2007

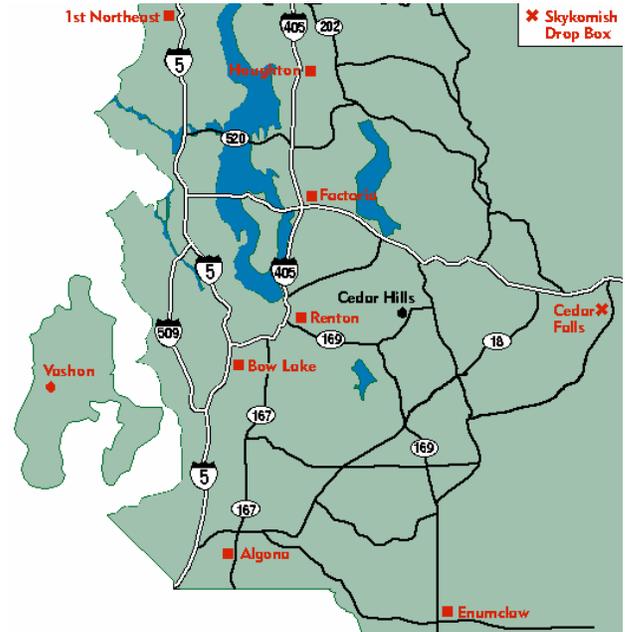


2.3 SUMMARY OF METHODS

The following section provides an overview of the 2007 study methodology. This study of waste composition and customer use involved four major steps. Please see Appendix A for a detailed description of the waste sampling methodology.

Step 1. Develop Sampling Plan

- Samples were allocated by collection type (commercially collected or self-hauled) and then according to source or generator (residential or nonresidential) and vehicle type (packers or drop boxes for the commercially collected substream, passenger vehicles or other large vehicles for the self-hauled substream).
- A sampling schedule was constructed for the study period of January 2007 through December 2007, consisting of two to six days at each transfer station during the year. Sampling days were randomly selected to assure a representative distribution across the days of the week and weeks of the month. Sampling took place at each of the county's seven open transfer stations. The Skykomish and Cedar Falls drop boxes are tipped at the Houghton and Factoria transfer stations, respectively and sampled at those facilities during their regularly scheduled sampling day.



King County transfer stations and drop boxes

Step 2. Survey Incoming Vehicles

- The gatekeeper gathered information from the driver of every vehicle such collection type (commercially collected or self-hauled), vehicle type (packer, passenger vehicle, etc.), category of waste brought for disposal (e.g., mixed garbage, yard waste, construction/demolition), and source or generator of the material (residential or nonresidential). When a vehicle arrived that met the sampling criteria the gatekeeper affixed a *Sample Placard* to the vehicle's windshield and directed the driver to the sample collection area.



Sampling crew sorting waste into material types

Step 3. Capture & Sort Samples

- If a vehicle was selected for sampling by the gatekeeper, the Sort Crew Manager removed the *Sample Placard* and the sample collection area then directed a front loader operator to scoop a portion of the waste dumped from the vehicle. About 250 pounds of the waste was placed on a tarpaulin for sorting.
- For this study, a total of 421 samples were sorted into 78 distinct material types, such as *high-grade paper* or *clear glass containers*.

Data-entry form in customized database

Step 4. Analyze Data & Prepare Report

- Each month, the sort and survey data were entered into a customized database and reviewed for data entry errors.
- At the conclusion of the study, waste composition estimates were calculated by aggregating waste sample data using a *weighted average* procedure. The calculations for the weighted averages were based on the surveys as well as waste tonnage data that the King County Solid Waste Division provided.

Table 2-3 shows the number of surveys and samples that were obtained from each facility during the study.

**Table 2-3. Total Number of Waste Samples
January 2007 - December 2007**

	Sample Count
Algona	71
Cedar Falls	1
Bow Lake	87
Enumclaw	31
Factoria	79
Houghton	60
Renton	61
Skykomish	1
Vashon	30
TOTAL	421

2.4 INTERPRETING THE RESULTS

Means and Error Ranges

The data from the sorting process were treated with a statistical procedure that provided two kinds of information for each of the material categories:

- the percent-by-weight estimated composition of waste represented by the samples examined in this study, and
- the degree of precision of our composition estimates.

All estimates of precision were calculated at the 90% confidence level. The equations used in these calculations appear in Appendix C.

The example below illustrates how the results can be interpreted. In this example, the best estimate of the amount of newspaper present in the universe of waste sampled is 2.7%. The term 0.3% reflects the precision of the estimate. With calculations performed at the 90% confidence level, we are 90% certain that the mean estimate for newspaper is between 2.7% - 0.3% and 2.7% + 0.3%. In other words, we are 90% certain that the mean lies between 2.4% and 3.0%.

Waste Material	Mean	+ / -
Newspaper	2.7%	0.3%

Rounding

When interpreting the results presented in the tables and figures in this report, it was important to consider the effect of rounding.

To keep the waste composition tables and figures readable, estimated tonnages were rounded to the nearest ton, and estimated percentages were rounded to the nearest tenth of a percent. Due to this rounding, the tonnages presented in the report, when added together, might not equal the subtotals and totals shown, which were calculated using more precise percentages. Similarly, the percentages, when added together, might not equal the subtotals or totals shown, which represented the more precise percentages.

It is important to recognize that the tons shown in the report were calculated using the more precise percentages. Therefore, using the rounded percentages to calculate tonnages yields quantities that are less precise than those shown in the report.

An example will help illustrate the effects of rounding in the report. If the rounded percentage for *opened/unpacked scrap vegetative food* in Table 3-3 was used to calculate the tonnage, it would have yielded the following: 10.0% x 1,021,929 (the total tonnage) = 102,192.9 tons. However, if the more precise percentage for this material was used, it would have yielded the following: 9.99154680343243% x 1,021,929 (the total tonnage) = 102,106.514332849 tons, or 102,107 tons when rounded to the nearest ton. It was the more precise tonnage of 102,107 that was used in the table.

Chapter 3

Waste Composition Results

3.1 WASTE COMPOSITION OVERVIEW & KEY FINDINGS

During the study period from January 2007 to December 2007, King County residents and businesses disposed of 1,021,929 tons of MSW. In the study, the project team collected and sorted 421 randomly selected waste loads from waste facilities in King County. The waste characterization effort divided this overall waste stream into 78 individual materials, grouped into nine main material classes, as follows (see Appendix B for a complete listing and description of the materials and classes):

- **Paper** – including *newspaper, cardboard (OCC), and other paper*;
- **Plastic** – including *PET bottles, other containers, and plastic film and bags*;
- **Wood/Yard Waste** – including *dimensional lumber/plywood, stumps, and yard waste*;
- **Food** – including *packaged bakery items, packaged vegetative food, opened, unpackaged, and scrap non-vegetative food*;
- **Other Organics** – including *carpet, tires, disposable diapers, and animal feces*;
- **Glass** – including *clear containers, brown containers, and other glass*;
- **Metal** – including *aluminum cans, tinned food cans, and other metal*;
- **Other Wastes** – including *construction and demolition wastes and appliances*; and
- **Household Hazardous** – including *used oil, vehicle batteries, latex paint, and TVs*.

This chapter presents the results of the analyses for the following waste streams:

- Overall Disposed Waste
- Residential Substream
- Nonresidential Substream
- Commercially Collected Substream
- Commercially Collected Residential Substream
- Commercially Collected Nonresidential Substream
- Self-hauled Substream
- Self-hauled Residential Substream
- Self-hauled Nonresidential Substream

For each waste stream, the report presents an overview of disposed waste with a pie chart showing the relative proportion of the nine main material classes. Each section also

contains a list of the substream's ten most common materials components. For each substream, detailed composition tables can be found in Appendix D.

Appendix A provides detail on the waste sampling methodology and Appendix C details the waste composition calculations. Appendix E provides waste composition analysis for the commercially collected residential single-family, and multi-family substreams, which are not otherwise discussed in this report.

Table 3-1¹² shows the amount of MSW delivered to each of King County's eight transfer facilities, two drop boxes, and Cedar Hills landfill during the study period. More than 1,021,900 tons were delivered to these county facilities.¹³ Of the county facilities, the Bow Lake transfer station received the largest share with more than 335,000 tons, or 33% of the County's total tonnage. Tons of waste taken to Skykomish represented the smallest share with just over 900 tons, or less than 1% of the total King County stream.

**Table 3-1. Annual Disposed Tons
January 2007 – December 2007¹⁴**

	Annual Tons	% of Total
Algona	155,182	15%
Bow Lake	335,193	33%
Cedar Falls Drop Box	4,607	0%
Enumclaw	25,589	3%
Factoria	170,153	17%
Shoreline	34,502	3%
Houghton	182,096	18%
Renton	74,354	7%
Skykomish Drop Box	913	0%
Vashon	9,434	1%
Subtotal	992,023	97%
Regional Direct Waste	29,906	3%
Total	1,021,929	100%

¹² Data in Table 3-1 were obtained from King County solid waste facility transaction data. All composition data is based on tonnage data from King County's ten transfer stations, two drop boxes, and Cedar Hills landfill. Tons associated with the Shoreline transfer station were estimated. Loads of regional direct waste were not sampled, though the tons associated with regional direct waste are included in the composition results

¹³ *Regional direct waste* refers to any solid waste generated and collected in King County and transported to the Cedar Hills landfill by conventional long-haul transfer vehicles from solid waste transfer stations or intermediate processing facilities permitted by Public Health – Seattle & King County as provided for in KCC 10.08.090 and the Board of Health's regulation. Both definitions originate from the *King County Comprehensive Solid Waste Management Plan, Glossary*. These are primarily residual tons from regional MRF facilities.

¹⁴ During the study period commercially collected garbage that would normally be disposed of at Shoreline was diverted to Snohomish County and transported to the Cedar Hills landfill. Most Shoreline self-haul traffic was diverted to other transfer stations in King County and Seattle.

Key Waste Composition Findings

- **Paper**, comprising more than one-fifth (22%) of the overall waste stream, was the largest material class and an important recycling opportunity. Major material class components are *compostable paper*, *corrugated cardboard*, and *low grade recyclable paper*.
- **Food** constituted the second largest material class (18%), representing an important composting opportunity. *Opened/unpack/scrap vegetative food* (10%) was the largest single material component in the overall waste stream.
- **Wood/Yard Wastes** (14%), **Other Organics** (13%), and **Plastic** (13%), were the next largest classes in the overall waste stream. *Compostable paper* (6.1%) is the second largest single material component and is followed closely by *Plastic film and bags* (6.0%).

See Table 3-2 for a summary of materials that compose more than 5% of the overall waste stream or the four main substreams.¹⁵

Opened/unpack/scrap vegetative food, at about 10%, is the most common material in King County's overall waste stream. Similarly, *opened/unpack/scrap vegetative food* accounted for an estimated 15% of the commercially collected residential substream and about 10% of the commercially collected nonresidential substream. *Compostable paper* and *plastic film and bags* and were also key components of King County's overall waste stream. The second most common material in the commercially collected residential substream was *compostable paper* (8%), while in the commercially collected nonresidential substream it was *corrugated cardboard (OCC)* (9%).

The most common materials in the self-hauled substreams differed from the overall waste stream and commercially collected substreams. In the self-hauled residential substream, *dimensional lumber/plywood* accounted for (13%) of the waste, making it the most common material. In the self-hauled nonresidential substream *C&D wastes* comprised the largest share (17%).

¹⁵ While Table 3-2 presents only the materials accounting for 5% or more of the waste stream, the "Top 10" tables found in the following sections present the ten most common materials, by weight, regardless of their relative size.

**Table 3-2. Materials Composing 5% or More of Disposed Waste, by Substream
January 2007 - December 2007**

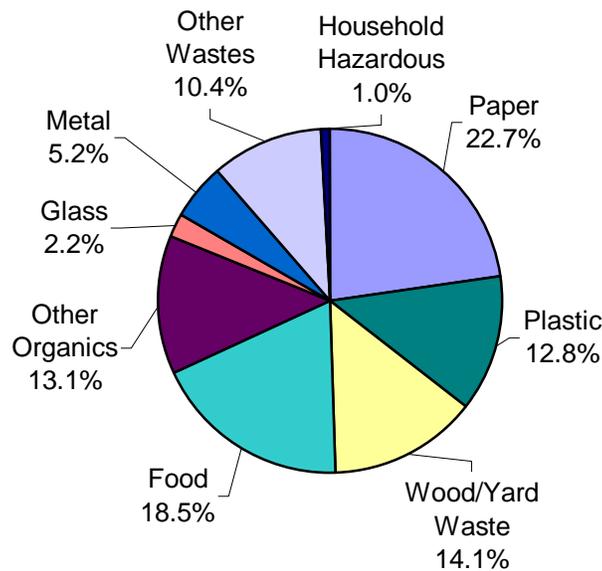
	OVERALL	RESIDENTIAL		NONRESIDENTIAL	
		Commercially Collected	Self-hauled	Commercially Collected	Self-hauled
Opened/Unpack/Scrap Vegetative	10.0%	15.1%		10.4%	
Plastic Film and Bags	6.0%	6.2%		8.1%	
Compostable Paper	6.1%	8.2%		7.0%	
Corrugated Cardboard (OCC)	5.8%			8.7%	
Dimensional Lumber/Plywood	5.3%		13.2%	5.2%	7.3%
Low Grade Recyclable Paper	5.8%	7.2%		6.3%	
C&D Wastes			10.7%		16.6%
Opened/Unpack/Scrap Non-vegetative		5.9%		5.5%	
Disposable Diapers		5.5%			
Animal Feces		5.2%			
Yard Wastes			8.7%		6.2%
Furniture/Mattresses			6.8%		6.6%
Carpet			5.5%		8.4%
Other Ferrous					6.0%
Subtotal	39.0%	53.3%	44.8%	51.1%	51.1%
<i>All other materials combined</i>	<i>61.0%</i>	<i>46.7%</i>	<i>55.2%</i>	<i>48.9%</i>	<i>48.9%</i>
Total Tons	1,021,929	345,589	195,896	449,065	31,379

Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

3.2 OVERALL DISPOSED WASTE

During the study period from January 2007 to December 2007, residents and businesses disposed of more than 1,021,900 tons of MSW. Figure 3-1 shows the proportion of the nine main classes of material in this overall waste stream, based on their share of the overall tonnage. At nearly 23%, **Paper** made up the largest share of the overall waste stream. **Food** followed at nearly 19%.

**Figure 3-1. Overview of Waste Composition – Overall Disposed Waste
January 2007 - December 2007 (n=421)**



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-3 shows the ten most common materials, by weight, in the overall waste stream, arranged in descending order. As shown, *opened, unpackaged, or scrap vegetative food* totaled more than 102,100 tons and represented 10% of the overall waste stream. *Compostable paper, plastic film and bags, low grade recyclable paper, corrugated cardboard, and dimensional lumber/plywood* were also large components of King County's solid waste stream, each accounting for 5% or more, by weight.

**Table 3-3. Ten Most Common Materials, by Weight –
Overall Disposed Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
Opened/Unpack/Scrap Vegetative	10.0%	10.0%	102,107
Compostable Paper	6.1%	16.1%	62,152
Plastic Film and Bags	6.0%	22.1%	61,600
Low Grade Recyclable	5.8%	27.9%	59,319
Corrugated Cardboard (OCC)	5.8%	33.7%	59,074
Dimensional Lumber/Plywood	5.3%	39.0%	54,469
C&D Wastes	4.7%	43.8%	48,425
Opened/Unpack/Scrap Non-vegetative	4.6%	48.3%	46,662
Yard Wastes	4.5%	52.8%	45,643
Carpet	3.2%	56.0%	32,507
Subtotal	56.0%		571,956
<i>All other materials combined</i>	<i>44.0%</i>		<i>449,973</i>
Total	100.0%		1,021,929

Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

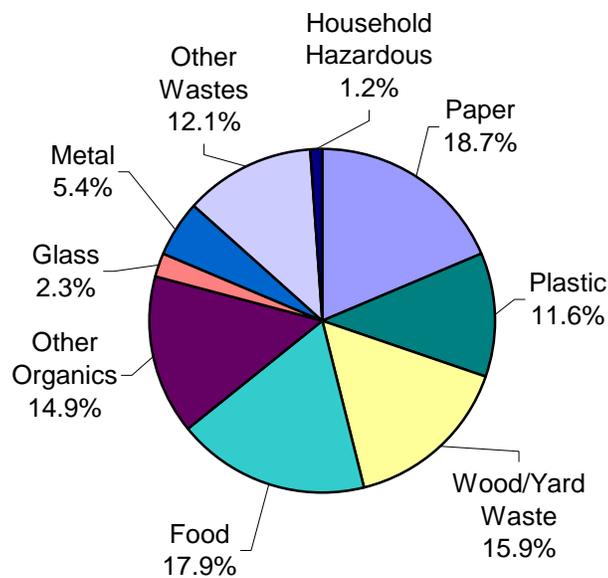
The detailed composition table for this waste stream can be found in Appendix D, on page D-2.

Residential Substream

The residential substream included wastes that were either commercially collected or self-hauled from residential sources (single family or multi-family units). This substream accounted for nearly 541,500 tons of King County solid waste.

Figure 3-2 shows the proportion of the nine main classes of material in the residential substream, based on their share of this substream's total tonnage. As shown, **Paper** accounted for nearly 19%, with **Food** following at nearly 18% of the substream.

**Figure 3-2. Overview of Waste Composition – Residential Waste
January 2007 - December 2007 (n=228)**



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-4 shows the ten most common materials, by weight, in the residential waste stream, arranged in descending order. The material component *opened, unpacked, or scrap vegetative food* accounted for the largest share with nearly 55,200 tons (10%). Four other material components, *yard wastes, low-grade recyclable paper, compostable paper, and dimensional lumber/plywood* each accounted for 5% or more of the substream. Cumulatively, the top 10 materials accounted for over half of the substream.

**Table 3-4. Ten Most Common Materials, by Weight –
Residential Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
Opened/Unpack/Scrap Vegetative	10.2%	10.2%	55,159
Yard Wastes	5.8%	16.0%	31,244
Low Grade Recyclable	5.6%	21.6%	30,380
Compostable Paper	5.6%	27.2%	30,353
Dimensional Lumber/Plywood	5.4%	32.5%	29,036
C&D Wastes	4.8%	37.3%	25,941
Plastic Film and Bags	4.6%	41.9%	24,683
Opened/Unpack/Scrap Non-vegetative	4.1%	46.0%	22,104
Furniture/Mattresses	4.0%	49.9%	21,528
Disposable Diapers	3.7%	53.6%	19,868
Subtotal	53.6%		290,296
<i>All other materials combined</i>	<i>46.4%</i>		<i>251,189</i>
Total	100.0%		541,485

Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

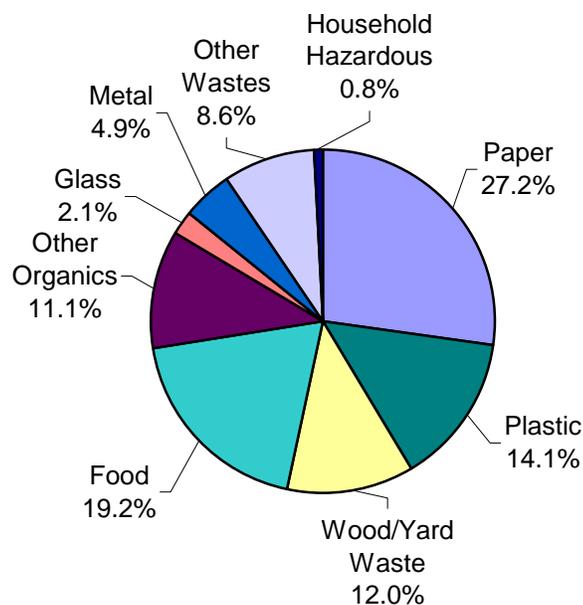
The detailed composition table for this waste stream can be found in Appendix D, on page D-3.

Nonresidential Substream

The nonresidential substream included wastes that were either commercially collected or self-hauled from nonresidential sources, such as businesses and government establishments. In addition, this substream included mixed loads that contained both nonresidential waste (usually business waste) and residential waste (usually multi-family waste). Commercial waste haulers typically classify these mixed loads as “nonresidential.” To be consistent, mixed loads are included in the nonresidential substream in this study.

Nonresidential waste totaled more than 480,400 tons. Figure 3-3 shows the proportion of the nine main classes of material in the nonresidential substream, based on their share of this substream’s total tonnage. **Paper** comprised more than 27% of the substream and **Food** accounted for more than 19%.

**Figure 3-3. Overview of Waste Composition – Nonresidential Waste
January 2007 - December 2007 (n=193)**



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-5 shows the ten most common materials, by weight, in the nonresidential waste stream, arranged in descending order. With more than 46,900 tons (10%) *opened, unpackaged, or scrap vegetative food* comprised the largest share of the substream. Other large material components included *corrugated cardboard, plastic film and bags, compostable paper, low-grade recyclable paper, dimensional lumber/plywood, and opened/unpackaged/scrap non-vegetative food* each accounted for over 5% of the nonresidential substream.

**Table 3-5. Ten Most Common Materials, by Weight –
Nonresidential Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
Opened/Unpack/Scrap Vegetative	9.8%	9.8%	46,948
Corrugated Cardboard (OCC)	8.4%	18.2%	40,481
Plastic Film and Bags	7.7%	25.9%	36,917
Compostable Paper	6.6%	32.5%	31,798
Low Grade Recyclable	6.0%	38.5%	28,939
Dimensional Lumber/Plywood	5.3%	43.8%	25,434
Opened/Unpack/Scrap Non-vegetative	5.1%	48.9%	24,558
C&D Wastes	4.7%	53.6%	22,483
Carpet	4.1%	57.7%	19,813
Yard Wastes	3.0%	60.7%	14,398
Subtotal	60.7%		291,769
<i>All other materials combined</i>	<i>39.3%</i>		<i>188,675</i>
Total	100.0%		480,444

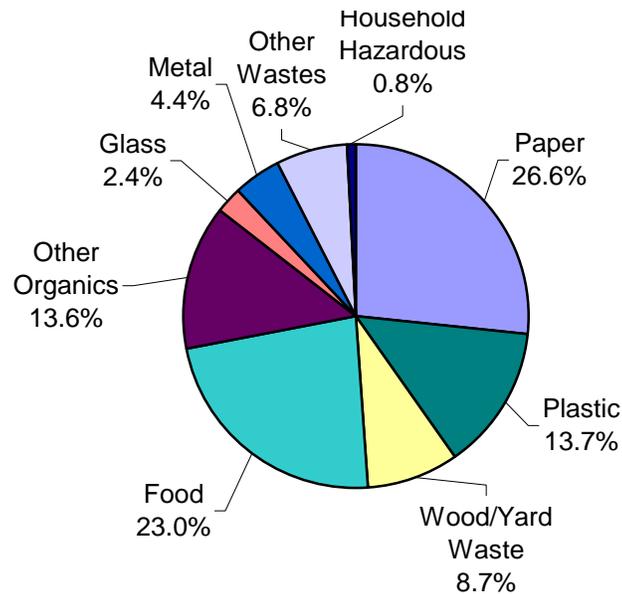
Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

The detailed composition table for this waste stream can be found in Appendix D, on page D-4.

3.3 COMMERCIALY COLLECTED SUBSTREAM

Commercial waste haulers collected nearly 794,700 tons of MSW from King County. Figure 3-4 shows the proportion of the nine main classes of material in the commercially collected waste substream, based on their share of the substream's total tonnage. **Paper** accounted for just over one fourth (27%) of the substream, followed by **Food** (23%), **Plastic** (14%), and **Other Organics** (14%).

**Figure 3-4. Overview of Waste Composition – Commercially Collected Waste
January 2007 - December 2007 (n=261)**



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-6 shows the ten most common materials, by weight, in the commercially collected waste stream, arranged in descending order. *Opened, unpackaged, or scrap vegetative food* comprised just over 12% of the commercially collected substream. Additional materials in the top ten, each accounting for more than 5% of the substream, included *compostable paper* (8%), *plastic film and bags* (7%), *low-grade recyclable paper* (7%), *corrugated cardboard* (6%), and *opened, unpackaged, or scrap non-vegetative food* (6%).

**Table 3-6. Ten Most Common Materials, by Weight –
Commercially Collected Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
Opened/Unpack/Scrap Vegetative	12.4%	12.4%	98,758
Compostable Paper	7.5%	20.0%	59,823
Plastic Film and Bags	7.2%	27.2%	57,549
Low Grade Recyclable	6.7%	33.9%	53,408
Corrugated Cardboard (OCC)	6.4%	40.3%	50,700
Opened/Unpack/Scrap Non-vegetative	5.7%	46.0%	44,915
Disposable Diapers	3.5%	49.5%	28,151
Yard Wastes	3.4%	52.8%	26,639
Dimensional Lumber/Plywood	3.3%	56.2%	26,359
C&D Wastes	2.8%	59.0%	22,276
Subtotal	59.0%		468,577
<i>All other materials combined</i>	<i>41.0%</i>		<i>326,077</i>
Total	100.0%		794,654

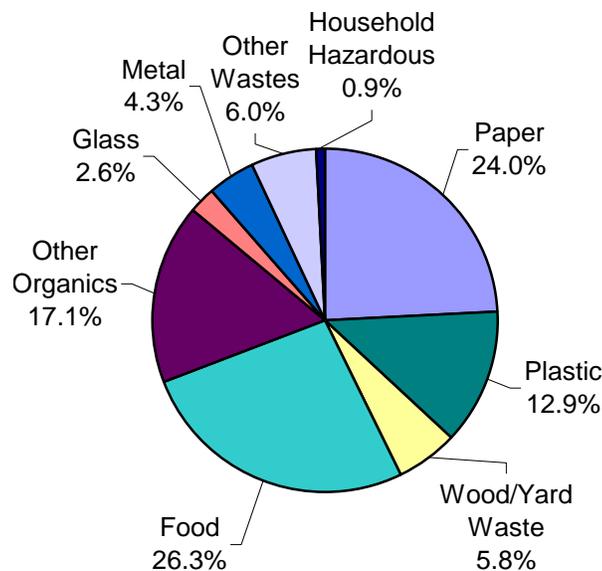
Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

The detailed composition table for this waste stream can be found in Appendix D, on page D-5.

Commercially Collected Residential Substream

The commercially collected residential substream totaled nearly 345,600 tons. Figure 3-5 shows the proportion of the nine main classes of material in the commercially collected residential substream, based on their share of this substream's total tonnage. Two materials classes - **Food** (26%) and **Paper** (24%) - accounted for half of the substream's material.

**Figure 3-5. Overview of Waste Composition – Commercially Collected Residential Waste
January 2007 - December 2007 (n=100)**



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-7 shows the ten most common materials, by weight, in the commercially collected residential waste stream, arranged in descending order. *Opened, unpackaged, or scrap vegetative food*, with nearly 55,200 tons (15%) accounted for the largest share of the substream. *Compostable paper, low-grade recyclable paper, plastic film and bags, opened, unpackaged, or scrap non-vegetative food, disposable diapers, and animal feces* each accounted for over 5% of the total substream, by weight.

**Table 3-7. Ten Most Common Materials, by Weight –
Commercially Collected Residential Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
Opened/Unpack/Scrap Vegetative	15.1%	15.1%	52,196
Compostable Paper	8.2%	23.3%	28,220
Low Grade Recyclable	7.2%	30.5%	24,985
Plastic Film and Bags	6.2%	36.7%	21,387
Opened/Unpack/Scrap Non-vegetative	5.9%	42.6%	20,382
Disposable Diapers	5.5%	48.1%	18,967
Animal Feces	5.2%	53.3%	18,039
Yard Wastes	4.1%	57.4%	14,191
Corrugated Cardboard (OCC)	3.3%	60.7%	11,454
Newspaper (ONP)	2.6%	63.3%	8,957
Subtotal	63.3%		218,777
<i>All other materials combined</i>	<i>36.7%</i>		<i>126,812</i>
Total	100.0%		345,589

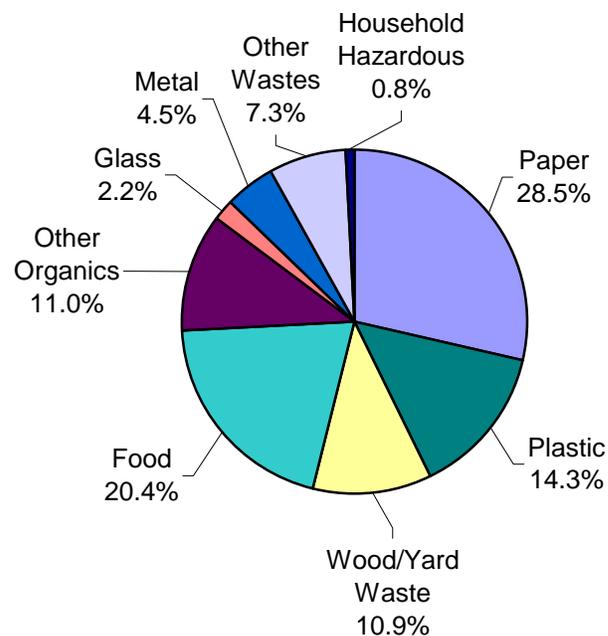
Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

The detailed composition table for this waste stream can be found in Appendix D, on page D-6.

Commercially Collected Nonresidential Substream

Commercially collected nonresidential waste totaled approximately 449,100 tons of King County's disposed waste stream. Figure 3-6 shows the proportion of the nine main classes of material in the commercially collected nonresidential substream, based on their share of this substream's total tonnage. Like the previous substream, the commercially collected nonresidential substream consisted largely of **Paper** (29%) and **Food** (20%).

Figure 3-6. Overview of Waste Composition – Commercially Collected Nonresidential Waste
January 2007 - December 2007 (n=161)



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-8 shows the ten most common materials, by weight, in the commercially collected nonresidential waste stream, arranged in descending order. *Opened, unpackaged, or scrap vegetative food* was the most prevalent material with nearly 46,600 tons (10%) of the substream. Other large components included *corrugated cardboard* (9%), *plastic film and bags* (8%) *compostable paper* (7%), *low-grade recyclable paper* (6%), *opened, unpackaged, or scrap non-vegetative food* (6%), and *dimensional lumber/plywood* (5%).

**Table 3-8. Ten Most Common Materials, by Weight –
Commercially Collected Nonresidential Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
Opened/Unpack/Scrap Vegetative	10.4%	10.4%	46,561
Corrugated Cardboard (OCC)	8.7%	19.1%	39,246
Plastic Film and Bags	8.1%	27.2%	36,162
Compostable Paper	7.0%	34.2%	31,603
Low Grade Recyclable	6.3%	40.5%	28,424
Opened/Unpack/Scrap Non-vegetative	5.5%	46.0%	24,533
Dimensional Lumber/Plywood	5.2%	51.1%	23,129
C&D Wastes	3.8%	55.0%	17,273
Carpet	3.8%	58.8%	17,178
Yard Wastes	2.8%	61.6%	12,448
Subtotal	61.6%		276,556
<i>All other materials combined</i>	<i>38.4%</i>		<i>172,509</i>
Total	100.0%		449,065

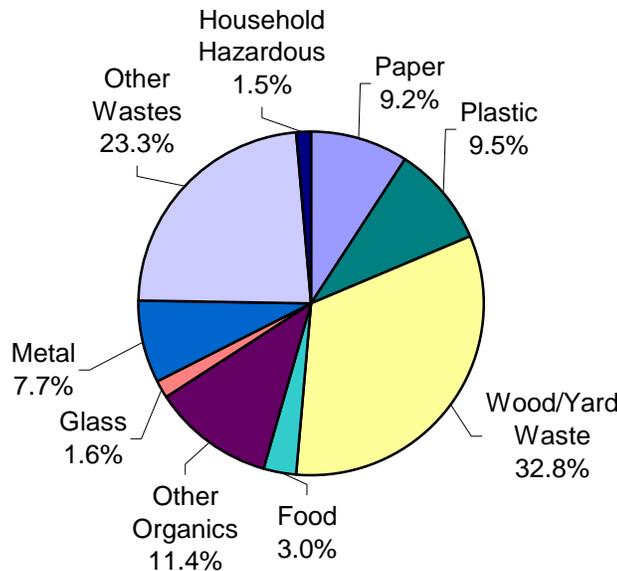
Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

The detailed composition table for this waste stream can be found in Appendix D, on page D-7.

3.4 SELF-HAULED SUBSTREAM

Self-hauled waste totaled nearly 227,300 tons of MSW brought to King County’s public facilities for disposal. This estimate includes material from both residential and nonresidential sources. Figure 3-7 shows the proportion of the nine main classes of material in the self-hauled substream, based on their share of this substream’s total tonnage. **Wood/Yard Waste** (33%) accounted for the largest share of material brought for disposal by self-haulers. **Other Wastes** accounted for the second largest slice of the substream at 23%.

**Figure 3-7. Overview of Waste Composition – Self-hauled Waste
January 2007 - December 2007 (n=160)**



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-9 shows the ten most common materials, by weight, in the self-hauled waste stream, arranged in descending order. Unlike the commercially collected substreams, *dimensional lumber/plywood* comprised the largest share (12%), followed by *C&D wastes* (12%), *yard wastes* (8%), *furniture/mattresses* (7%), and *carpet* (6%). *Opened, unpackaged, or scrap vegetative food* comprised less than 2% of the self-hauled substream, compared to 12% of commercially collected materials. The top ten materials combined to account for nearly two-thirds of the substream.

**Table 3-9. Ten Most Common Materials, by Weight –
Self-hauled Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
Dimensional Lumber/Plywood	12.4%	12.4%	28,110
C&D Wastes	11.5%	23.9%	26,149
Yard Wastes	8.4%	32.2%	19,004
Furniture/Mattresses	6.8%	39.0%	15,356
Carpet	5.9%	44.9%	13,342
Other Ferrous	4.7%	49.6%	10,776
Contaminated Wood	4.3%	53.9%	9,850
Treated Wood	3.9%	57.9%	8,931
Plastic Products	3.9%	61.7%	8,756
Corrugated Cardboard (OCC)	3.7%	65.4%	8,374
Subtotal	65.4%		148,647
<i>All other materials combined</i>	<i>34.6%</i>		<i>78,628</i>
Total	100.0%		227,275

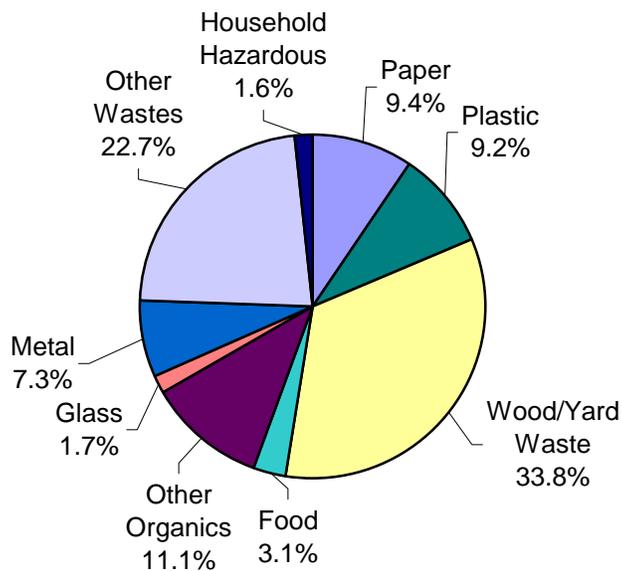
Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

The detailed composition table for this waste stream can be found in Appendix D, on page D-8.

Self-hauled Residential Substream

Self-hauled residential waste loads totaled nearly 195,900 tons. Figure 3-8 shows the proportion of the nine main classes of material in the self-hauled residential substream, based on their share of the substream's total tonnage. Like the self-hauled substream, **Wood/Yard Waste** (34%) accounted for the largest share of the self-hauled residential substream.

**Figure 3-8. Overview of Waste Composition – Self-hauled Residential Waste
January 2007 - December 2007 (n=128)**



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-10 shows the ten most common materials, by weight, in the self-hauled residential waste stream, arranged in descending order. *Dimensional lumber/plywood*, the single most prevalent material in the substream, accounted for more than 25,800 tons (13%) of the total. Other large components of self-hauled residential waste included *C&D wastes* (11%), *yard wastes* (9%), *furniture/mattresses* (7%), and *carpet* (6%).

**Table 3-10. Ten Most Common Materials, by Weight –
Self-hauled Residential Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
Dimensional Lumber/Plywood	13.2%	13.2%	25,805
C&D Wastes	10.7%	23.9%	20,939
Yard Wastes	8.7%	32.6%	17,053
Furniture/Mattresses	6.8%	39.4%	13,300
Carpet	5.5%	44.8%	10,706
Other Ferrous	4.5%	49.4%	8,889
Contaminated Wood	4.4%	53.7%	8,550
Plastic Products	4.1%	57.8%	7,945
Treated Wood	3.8%	61.6%	7,506
Corrugated Cardboard (OCC)	3.6%	65.3%	7,140
Subtotal	65.3%		127,834
<i>All other materials combined</i>	<i>34.7%</i>		<i>68,062</i>
Total	100.0%		195,896

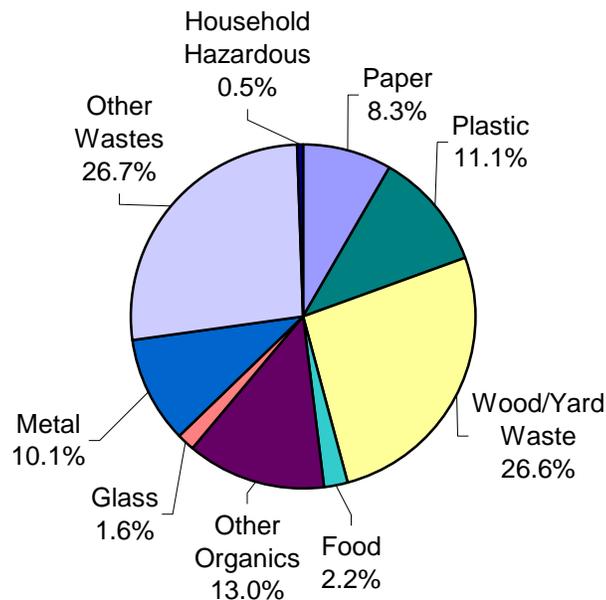
Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

The detailed composition table for this waste stream can be found in Appendix D, on page D-9.

Self-hauled Nonresidential Substream

Representing the smallest substream, self-hauled nonresidential waste totaled nearly 31,400 tons of material. Figure 3-9 shows the proportion of the nine main classes of material in the self-hauled nonresidential substream, based on their share of this substream's total tonnage. Together, **Wood/Yard Waste** and **Other Wastes** made up more than 53% of this substream.

**Figure 3-9. Overview of Waste Composition – Self-hauled Nonresidential Waste
January 2007 - December 2007 (n=32)**



Note: Estimated percentages are rounded to the nearest tenth of a percent and, when added together, may not equal 100%, due to rounding. For more detail, please see Interpreting the Results on page 14.

Of the 78 materials sampled, Table 3-11 shows the ten most common materials, by weight, in the self-hauled nonresidential waste stream, arranged in descending order. C&D wastes (17%) was the largest single material in the self-hauled nonresidential substream. Each with over 5%, *carpet, dimensional lumber/plywood, furniture/mattresses, yard wastes, and other ferrous*, accounted for next largest materials of the substream.

**Table 3-11. Ten Most Common Materials, by Weight –
Self-hauled Nonresidential Waste
January 2007 - December 2007**

WASTE MATERIAL	MEAN	CUM. %	TONS
C&D Wastes	16.6%	16.6%	5,210
Carpet	8.4%	25.0%	2,635
Dimensional Lumber/Plywood	7.3%	32.3%	2,304
Furniture/Mattresses	6.6%	38.9%	2,056
Yard Wastes	6.2%	45.1%	1,951
Other Ferrous	6.0%	51.1%	1,886
Treated Wood	4.5%	55.7%	1,424
Foam Rubber and Padding	4.5%	60.2%	1,411
Contaminated Wood	4.1%	64.3%	1,300
Corrugated Cardboard (OCC)	3.9%	68.2%	1,234
Subtotal	68.2%		21,412
<i>All other materials combined</i>	31.8%		9,967
Total	100.0%		31,379

Note: Estimated tonnage is rounded to the nearest ton. Estimated mean percentage is rounded to the nearest tenth of a percent. Therefore, the tonnages and mean percentages of the top 10 materials as displayed in the table, when added together, may not equal the subtotals shown, due to rounding. For more detail, please see Interpreting the Results on page 14.

The detailed composition table for this waste stream can be found in Appendix D, on page D-10.

Chapter 4

Comparisons with Previous Study

4.1 STUDY COMPARISON OVERVIEW & KEY FINDINGS

This chapter compares waste composition results of the current study with the previous study, from 2002-2003.

Key Comparison Study Findings

- **Cardboard and Organic materials have shown a decrease in the overall disposed waste** stream since 2002-2003.
- **Paper materials have shown a decrease in multi-family commercially collected wastes** loads since 2002-2003.
- **Newspaper has shown a decrease in nonresidential commercially collected** loads since 2002-2003.
- **Wood Waste materials have increased in self-hauled** waste loads since 2002-2003.

4.2 WASTE COMPOSITION COMPARISONS

King County waste composition data collected during previous studies allowed for a useful examination of trends and changes in the waste stream. This section presents findings from statistical comparisons between the 2007 waste composition data and the previous study period in 2002-2003. The analysis then examines statistical differences, using *t*-tests, between the 2007 and the 2002-2003 study. These comparisons are meant to determine if changes in the composition of King County's disposed waste stream are statistically significant. This report does not attempt to examine potential causes of the changes in waste composition over time.

The year-to-year comparisons were made by examining the changes in the composition percentages for selected material groupings. The material groupings included:

- Newspaper;
- Cardboard and Kraft paper;
- Other curbside paper — low-grade recyclable paper, high-grade paper, and computer paper;
- Curbside recyclable containers — plastic bottles, glass bottles and containers, aluminum cans, and tin food cans;
- Compostable organics — food and yard wastes, other paper, animal feces and carcasses;

- Construction and demolition wastes – roofing, gypsum, and other C&D waste;
- Wood waste – lumber, treated wood, and other wood; and
- Hazardous waste – all vehicle fluids, batteries, paints, glues, medical waste, other hazardous wastes.

Statistical tests were used to analyze differences in the composition percentages between years for the following substreams:

- Commercially collected single-family residential;
- Commercially collected multi-family residential;
- Commercially collected nonresidential; and
- Self-hauled (including both residential and nonresidential).

More detail regarding the material groupings and the statistical analyses can be found in Appendix F, page F-2.

The differences in material groupings between studies can be divided into two main categories:

- **Statistically significant** — These findings can be considered true differences because the probability of observing these results if there had been no actual year-to-year change is low.
- **Strong trend** — Although the results did not meet the requirements of the study’s conservative statistical tests, the data suggest a possible and noteworthy change.

Comparisons identified as “statistically significant” or “strong trends” are summarized in Table 4-1. Because the waste composition results are expressed as percentages, rather than absolute tonnages, significant changes for one material may affect the percentages for other materials. Accordingly, increases over time in materials recycled may alter the percentages for other materials remaining in the waste stream.

Table 4-1. Waste Composition Changes & General Trends, 2002-2003 to 2007

	MATERIAL GROUPING	MEAN RATIO <i>(Material Wt/Total Wt)</i>		STRENGTH OF RESULTS
		2002/2003	2007	
Overall				
Overall	Cardboard and Kraft	3.1%	2.8% ↓	Strong trend
Overall	Organics	20.9%	19.2% ↓	Statistically significant
Commercially Collected				
Multi-family	Newspaper	4.3%	2.5% ↓	Strong trend
Multi-family	Other Curbside Paper	12.9%	9.7% ↓	Strong trend
Nonresidential	Newspaper	3.4%	2.0% ↓	Statistically significant
Nonresidential	Cardboard and Kraft	6.1%	9.1% ↑	Strong trend
Self-hauled				
	Wood Waste	15.9%	21.7% ↑	Strong trend