Sedgwick County
Waste Characterization Study

Sedgwick County Department of Environmental Resources

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I. Introduction

The Sedgwick County Environmental Resources Office conducted a one-year Waste Characterization Study beginning in November 2008. The Sedgwick County Solid Waste Management Committee recommended this study and approved it on March 3, 2008. The Sedgwick County Board of County Commissioners adopted the Sedgwick County 10 –Year Solid Waste Update on June 4, 2008. The Plan stated that a seasonal waste analysis would be performed at the two transfer stations beginning in the fall of 2008. The results of this analysis will help to determine the direction of future waste minimization efforts. The results of the waste analysis will also help determine if grass clippings should be banned from the transfer stations. This determination will be made by January 1, 2010. A similar study was performed in 1997- 1998 at Brooks Landfill. The intent of that study was to evaluate the composition of the trash disposed of at the landfill. The new study will allow the County to assess the progress made by recycling and other waste diversion programs since 1998.

Prior to initiating the new study, the Environmental Resources Office evaluated the 1997-1998 study. Minor changes were made and these modifications, along with the methods used for the waste characterization study, are detailed in this report.

II. Methodology

A. Preparation

Preparation for the waste characterization study began in Spring 2008. The following items were considered and evaluated:

- Waste study performed in this community in 1997-1998
- Dates for the waste characterization study
- Cooperation of haulers, trash transfer station personnel, hired workers and volunteers
- Safety of workers
- Categories for trash
- Tools, safety equipment and other supplies
- Logistics of waste characterization study
- Number and type of vehicles to be sampled
- Weight of each sample
- Coordination of hired workers and volunteers

After evaluating the above items, the work plan was developed.

B. Determination of dates to conduct the study

The Waste Characterization Study was performed quarterly at two transfer stations located in Sedgwick County. The Waste Connections Transfer Station is located at 4300 W. 37th Street North and Waste Disposal Transfer Station is located at 5550 W. 55th Street South. A schedule for conducting each quarterly waste analysis was determined. Holidays were avoided because waste generated tends to be different around holidays than during other times of the year.

The following is a list of the scheduled dates for the 2008-2009 waste characterization study:

November 3-7, 2008	WCTS (Waste Connections Transfer Station)
November 17-21, 2008	WDTS (Waste Disposal Transfer Station)
February 2-6, 2009	WDTS
February 23-27, 2009	WCTS
May 4-8, 2009	WCTS
May 18-22, 2009	WDTS
August 24-28, 2009	WCTS
September 14-18, 2009	WDTS

C. Determination of hours of operation for Waste Characterization Study

Since Municipal Solid Waste (MSW) tends to be collected at least once a week from most generators, sampling was conducted for one consecutive five-day period (Monday through Friday) quarterly. No samples were analyzed on Saturday and Sunday due to the lack of commercial haulers.

The study was conducted during the operating hours of the transfer stations. The trash study generally began between 7-8 a.m. and concluded randomly in the afternoon. There were three components for each trash sort:

- A County staff person was positioned at the scale house to survey all vehicles entering the transfer station. The vehicle driver was surveyed to record from which area of the community the MSW was generated, and what type of MSW was being hauled. The specific type of vehicle and the weight of MSW contained in each vehicle was also recorded.

- A spotter was located on the tipping floor and recorded what was being dumped from all vehicles.

- Sampling of trucks was performed Monday through Friday during the daylight hours.

D. Coordination of workers, haulers and transfer station personnel

A letter was sent to area refuse haulers prior to the Waste Characterization Study (note Appendix A). The letter informed them of the study and that their cooperation was needed to make the study a success. Staff from the Sedgwick County Environmental Resources Office met with personnel from the trash transfer stations to ask for their input and cooperation during the study. Logistics of the study, safety issues, and communication concerns were discussed. A wide variety of workers were used throughout the year-long

waste characterization study. The workers included paid staff from the Environmental Resources Office, paid temporary workers and instructors from Chisholm Life Skills Center and volunteers from a local university.

E. Criteria used to determine trucks eligible for sampling

Samples were obtained by identifying eligible loads of MSW arriving at the trash transfer stations. Only trucks operated by commercial haulers were eligible. Individuals hauling waste from their own properties were not eligible. These private vehicles were excluded because, as a group, they accounted for a very small portion of the MSW disposed of at the facilities. Also, these loads were expected to be different from most of the MSW hauled to the landfill. Private individuals, or "hand loads," usually brought in loads from special projects, clean-ups or items too bulky to be set out for a hauler. Unique loads were noted when noticed.

F. Procedure used to select trucks

Information received from the personnel at both trash transfer stations showed that about 50% of the trucks entering the transfer stations carried commercial MSW, while the other 50% hauled residential MSW. It was determined that the number of trucks selected should reflect these numbers. Thus, for each sampling period, half of the trucks selected would haul commercial MSW and half of the selected trucks would haul residential MSW. The selection of trucks was a true random sampling. When the sorting crew was ready for a new sample, the scale house staff person was informed and the next available truck was selected. If it met the load type criteria of commercial or residential waste, this truck was selected. If the hauler carried the wrong load type, the next correct truckload was selected.

G. Determination of number of samples to obtain during each sorting period

It was not possible to sort all the MSW received at the two facilities throughout an entire year. The number of samples taken per sampling period was determined to accurately represent the entire trash amount. The Waste Connections facility receives a much larger volume of MSW as compared to the Waste Disposal facility. It was decided that 40 loads per week would be sorted at the Waste Connections facility and 30 loads per week at the Waste Disposal facility. Also, a crew of five to eight people per day could feasibly sort that number of samples. A standard crew of 5-8 people could sort through 200 lbs. (note Section I) of MSW in 1 to 1.5 hours; this allowed the crew to sort MSW from the allotted trucks per day.

H. Procedure used to obtain samples from selected trucks

The drivers of the selected trucks were briefly interviewed. Drivers were asked the geographic area from which the MSW was obtained and if the load was commercial or residential MSW. The name of the hauling company was recorded. If the entire load came from a single business, the name of that facility was recorded with a note regarding the nature of the business. The weight of the load was also recorded at the scale house.

After the interview, the transfer station tipping floor was notified via radio and a spotter directed the drivers to empty their trucks in an area free of debris and away from other trucks and heavy equipment.

When trucks were unloaded, the MSW tended to spread into a pile that was longer than it was wide, resembling a loaf of bread. A County staff person determined the center of the load. The random sample was taken from this center area. The bagged and bulky items were "pulled" by hand when possible and loaded into the bed of a pickup truck. When items representing a large make-up of the load were apparent and not located near the center of the load, select amounts were loaded for sorting. When selecting the sample to be sorted, employee safety included no walking or climbing on the load, and no "pulling" of material that could cause other material to fall from the selected load.

I. Determination of optimal sample weight

The target weight of each sample was 200 pounds. The target weight was based on a study by Klee and Carruth ("Sample Weights in Solid Waste Composition Studies") and other waste characterization studies which showed that samples weighing 200 pounds provided significant results. Samples that weigh substantially less than 200 pounds supply significantly less information than samples that weigh 200 pounds, and samples that weigh more do not provide significantly more information than samples weighing 200 pounds. Staff found obtaining the optimal sample size to be challenging. Sample composition and deceiving size-to-weight ratios of materials made "eyeballing" the sample weight difficult. However, with time, County staff learned to judge sample sizes more easily and accurately.
An average sample weight of 201.8 pounds of material was selected and sorted during the study.

J. Determination of MSW sorting categories

The primary objective of the study is to determine what percentage of MSW, by weight, falls within each of the sorting categories. The separation of co-mingled MSW into separate categories was necessary to determine the composition of residential and commercial MSW. The Environmental Resources Office staff determined these categories. Additionally, a review of local recycling markets and their requirements was used to help determine exact categories for MSW separation. Sorting categories were based on broad categories of paper, glass, metals, plastics, organics, inorganics, and other waste. These general categories were then divided into more specific categories. A total of 22 specific categories was used for the sorting of MSW. The detailed categories used for sorting materials were:

<u>PAPER</u>
Newsprint - Anything printed on newsprint, including advertising.

Corrugated cardboard and kraft paper - All non-waxed cardboard made of brown or yellow-brown paper and containing corrugations, and all heavy brown paper of the type used to construct corrugated cardboard (brown grocery bags).

Office-grade paper - White bond paper, computer printout paper, notebook paper, copy machine paper, typing paper, white cash register receipts, colored uncoated bond paper, canceled checks, index cards, yellow tablets, manila file folders, envelopes, and fax paper. It will not include carbon paper or paper used in multi-copy carbonless forms.

Magazines - All periodicals, catalogs, and phone books.

Other paper - All paper products other than those listed above. Included soft drink 12-pack cardboard boxes, milk cartons, boxboard and other types of paper packaging, paper towels, tissues, construction

paper, paper with tape or adhesives, advertising inserts not found with newspapers, paper plates, paper cups, tablets with colored glue bindings.

YARD WASTE

Grass clippings - Does not include grass ripped out, with roots attached.

Leaves – Does not include leaves attached to branches.

Other yard waste - Shrubs, garden trimmings, flower arrangements, weeds, wild grasses, pine needles, pinecones, tree branches and twigs, vegetative ground litter, and associated dirt. Included grass with roots attached.

PLASTICS

PET (polyethylene terephthalate labeled #1) bottles - Clear and green plastic carbonated soft drink bottles, and other bottles if identified with PET label.

Clear HDPE (high-density polyethylene labeled #2) containers - Translucent plastic milk, water, and juice containers.

Pigmented HDPE (white and colored HDPE #2) - Containers for beverages, cleaning products such as detergents, other cleaning products, and personal hygiene products, such as shampoos.

Other plastic – Polystyrene and all plastic (#3-#7) that does not meet the criteria of the other 3 categories.

METALS

Aluminum cans - All food and beverage cans that were all-aluminum.

Tin/steel and bi-steel cans - Food and beverage cans having steel sides. Did not include paint cans, aerosol spray cans, or the type of cans in which paint thinner is sold.

Other metal - All iron-based objects other than cans. All aluminum-based objects other than cans. Included steel trash cans, steel furniture, wire hangers, steel parts of electrical and electronic devices or motors, paint cans, paint thinner cans, nuts, bolts, copper, brass, lead, zinc, bronze, and tin (but not “tin” cans). Includes solder and electrical wire. Did not include batteries.

TEXTILES, RUBBER, LEATHER

All fabrics, rubber and leather. Included all clothing, such as sneakers, vinyl raincoats, belts and shoes. Included handbags and purses. Included foam rubber, pillows, cushions, carpet, carpet padding, rugs. Included bedding, towels, washcloths, cloth napkins, place mats, curtains, tents, umbrellas, tires, rubber hose, and surgical gloves.

FOOD WASTE

All food wastes, including bones, coffee grounds, and the contents of food and beverage containers.

GLASS

Clear glass containers - No tint or color in the glass.

Tinted glass containers - Brown or amber tint, green, emerald, or blue tints in the glass, including faint hues.

CONSTRUCTION AND DEMOLITION

Wood (all wood other than tree branches), including lumber, plywood, particleboard, composition board, chipboard, sawdust, wood shavings, cork, tool handles, wooden furniture, wicker, creosote or pressure treated lumber, painted wood, laminated wood, interior paneling, roofing materials, poured concrete, bricks, concrete blocks, gypsum board and plaster.

OTHER

Electronics – Personal computers (PCs), central processing units (CPUs), monitors or cathode ray tubes (CRTs), keyboards, televisions, videocassette recorders (VCRs), stereos and radios, personal digital assistants (PDAs), cells phones, electronic games, digital versatile disk (DVD) players, reusable/rechargeable batteries and miscellaneous peripheral items.

All Other – Non-rechargeable batteries, furniture (all furniture not in the wood or metal category, including mattresses, box springs, upholstered furniture), white good (large appliances), disposable diapers, household cleaning products, hardware/shop products, gardening/yard waste, animal wastes or by-products, sharps, blades, syringes and needles, disposable razors and all other waste and non-distinct waste not listed in above categories.

K. Determination of tools, safety equipment and other supplies needed

Past experience, observation of other MSW picks, and research of other communities waste analyses were an essential part of assembling a list of what items were needed. The following supplies were necessary:

Personal protective equipment. Workers were provided with clothing and equipment to protect them from exposure to the MSW they sorted.

a. Tyvek coveralls, pants and/or aprons

b. Tyvek shoe covers

c. Nitrile or Latex gloves (liners)

d. Nitrile-coated gloves and/or leather palm gloves

e. Traffic vests (when applicable)

f. Safety glasses

g. Vapor masks

Workers were asked to place their names on this equipment and wear it to its fullest extent. These items were disposed of when necessary, due to any contamination, excessive dirt, etc.

Sorting tables. Four standard folding tables were used in the sorting area. A fifth table was used to hold the boxes of personal protective equipment, first aid kit, water jugs, and towels for clean up.

Sorting area. The sorting was done indoors at the Waste Connections facility and outdoors at the Waste Disposal facility. When sorting was performed outdoors, tarpaulin "wind breaks" were added to lessen strong winds and cold weather. The addition of a kerosene heater made the outdoor sorting area bearable during cold days. Folding chairs gave the workers a place to sit at lunch and take an occasional break.

Plastic barrels and buckets. 13-, 32-, and 43-gallon barrels were used for holding waste that had been sorted. The containers had a laminated sign adhered to the outside indicating what material should be placed in the container. Twenty-two containers were used for sorting. Each of the three container sizes was weighed for TARE, or empty, weight for recording purposes.

> The largest barrels (43 gallon) were used for the bulky items - corrugated cardboard and leaves.
>
> Intermediate barrels (32 gallon) were used for frequently occurring items and those that were not as bulky; for example, other paper, other plastic, the various plastic containers, grass clippings and other yard waste.
>
> The small barrels (13 gallon) were used for office grade paper, magazines and catalogs, newsprint, glass, metal, food waste, and rubber, textile and leather.

The TARE weight was incorporated with the MSW sample to give a gross weight when each category was weighed. This amount was later subtracted to give a true sample weight. The TARE weight for each of the container sizes was as follows: 13-gallon barrels weighed 3.2 pounds, 32-gallon barrels weighed 6.2 pounds, and 43-gallon barrels weighed 8.6 pounds.

Other supplies. These included two digital scales, rakes, push brooms, brush and dust pan, utility blades, hand cultivators, tongs, hand scrubber brushes and ice chest.

> A digital scale was used to weigh the barrels into which the samples were sorted. The scale had a 400-pound capacity, a remote readout, and operated with alkaline batteries. It registered to the nearest 1/5 pound. A second digital scale was used as a backup should the first scale break down.
>
> Rakes and brooms were used to remove MSW from the bed of the truck after samples were sorted and weighed, as well as aided in cleanup of the sorting area.
>
> Brush and dustpan were used to sweep up fine material from sorting tables, sweeping small articles from bed of truck and general cleanup.
>
> Utility blades and hand cultivators were used to cut or tear open bags for sorting.
>
> Tongs were used as an aid for picking up various materials when sorting.
>
> Hand scrubber brushes were used to clean out sorting containers.
>
> The ice chest was used to hold bottled water and ice. The water at the Waste Connections facility was not drinkable, so water was supplied to workers in coolers.

Safety equipment. A standard first aid kit was on-site in case of emergencies. This was stored in a large tote.

Pickup truck. The samples were loaded in the bed of the pickup from the tipping deck and transported to the sorting area. Bulky items were generally removed directly from the bed and placed in appropriate containers. Other items were taken to the tables for sorting. After samples were sorted, weighed and information recorded, containers' contents were unloaded into the bed. The trash was then transported back to the tipping floor and unloaded. The pickup was also used to transport the sorting equipment to the trash transfer stations, replenishing supplies when necessary, and removing supplies and equipment from the landfill when the final waste analysis was completed.

Two-way radios. The radios were used to allow communication between the staff at the scale house and the staff sorting through MSW.

L. Procedure used to sort samples

Samples were taken from the transfer station tipping floor to the sorting area. The staff supervisor looked over the sample to determine if any materials were potentially dangerous to the sorters. Bulky items were pulled directly from the pickup truck and placed in proper containers. All other material was taken to the sorting tables. Bags were sliced open and the contents viewed. Workers were instructed not to reach blindly into the bags for safety purposes. If medical or hazardous waste was present, that material was set aside for the supervisor to sort.

Items were sorted and placed in the appropriate containers. The most frequently used barrels were positioned nearest the sorters. Generally, a sorter picked out a specific type of material from the sample and made a small pile. When this material accumulated, it was carried to the appropriate container. Great care was taken to ensure items were separated and placed in the correct containers. The supervisor checked the barrels to make sure sorters were sorting material into the correct barrels. If items were out of place, the mistake was corrected.

Items were frequently composed of more than one kind of material. For example, if several unused ketchup condiment packets were present, most were placed in the barrel marked Food Waste and a few were placed into the barrel marked Other Plastics. If an item weighing several pounds was composed of more than one material and could not be easily disassembled, it was weighed later. The total weight of the item was recorded and the weight of each type of material present was estimated and recorded.

Small material remaining in the bed of the truck and on sorting tables was swept with a broom. This material was placed in the All Other container.

The containers were weighed after the entire load was separated. The supervisor was responsible for recording the gross weight and the barrel TARE weight. Weights were recorded on a form (note Appendix B). Sorters placed the barrels on the scale with the item name facing the recorder. The gross weight was recorded. The containers were removed from the scale and the sample placed in the bed of the truck. This procedure continued until all categories were weighed, recorded and unloaded into the truck.

The sorted sample was hauled back to the tipping floor and unloaded at a safe location. The bed of the truck was swept to ensure the material from the prior sample was not sorted again. The sort supervisor radioed the scale house staff and requested the next eligible truck.

III. Results

During the quarterly Waste Characterization Study, information was recorded at the sorting area of the transfer stations. The information gathered was calculated and the following data shows the composition and characteristics of the MSW.

A. Scale house Information

A total of 53,903,020 pounds, or 26,952 tons, entered the transfer stations during the 8 weeks the study was conducted. These weights were recorded and are listed in Table 1.

Table 1.
Solid Waste Weights Recorded at the Scalehouse

Date	Waste Connections TS	Waste Disposal TS	Total
Nov. 3-7 and 17-21, 2008	11,514,000 lbs.	4,642,380 lbs.	16,156,380 lbs.
Feb. 2-6 and 23-27, 2009	9,410,000 lbs.	3,997,380 lbs.	13,407,380 lbs.
May 4-8 and 18-22, 2009	12,532,000 lbs.	5,167,500 lbs.	17,699,500 lbs.
Aug. 24-28 and Sept. 14-18, 2009	10,890,000 lbs.	4,749,900 lbs.	15,639,900 lbs.
Total	35,346,000 lbs.	18,557,020 lbs.	53,903,020 lbs.

The average weekly (five-day) weight was 13,475,755 pounds, or 6,738 tons, with a daily average of 1,348 tons. This is in comparison to the 1997-1998 waste analysis average weekday total weight of 18,508,052 pounds, or 9,254 tons, with a daily average of 1,851 tons.

B. Sorting Area Information

Samples of MSW were obtained from trucks operated by commercial haulers arriving at Waste Connections and Waste Disposal transfer stations. Information received from these facilities showed that about 50% of the trucks entering the transfer stations carried commercial MSW and 50% carried residential MSW. To reflect these numbers, each day the trash was sampled, 50% of the trucks selected carried commercial MSW and 50% carried residential MSW. Forty trucks were selected for each weekly period at the Waste Connections facility. Thirty trucks were selected for the week at the Waste Disposal facility. Fewer trucks were selected at the Waste Disposal facility due to the fact that a much smaller volume of MSW is disposed there. From each truck, a sample of approximately 200 pounds was taken to the sorting area and separated into 22 categories. After each sample was sorted, the MSW was weighed and recorded.

The MSW sorted and categorized weighed 56,492.2 pounds, or 28.25 tons. The actual average sample weight for the residential loads was 204.5 pounds. The actual average sample weight for commercial loads was 199 pounds. The combined average sample was 201.8 pounds.
The results of the Waste Characterization Study by weight can be seen in Appendix E.

Table 2 and Figure 1 show the results of the Waste Characterization Study for residential MSW. Table 3 and Figure 2 show the results of the Waste Characterization Study for commercial MSW. Table 4 and Figure 3 show the results of the Waste Characterization Study for total MSW.

Table 5 and Figure 4 show the total MSW comparisons by weight for the 8 major categories throughout the year.

Figure 5 shows the comparisons of the 2008-2009 study, 1997-1998 study and the 2007 National study per category.

Table 2.
2008- 2009 Total Residential MSW Statistics

Category	%	Weight (lbs)
Paper	21.8	6,238.0
Glass	3.3	938.6
Metal	3.2	928.6
Plastic	9.1	2604.8
Food Waste	11.8	3381
Yard Waste	31	8874.2
Construction/Demolition	1.7	481.4
Textiles, Rubber, Leather	6.4	1821.4
Other	11.7	3363.6
Total	100	28,631.6

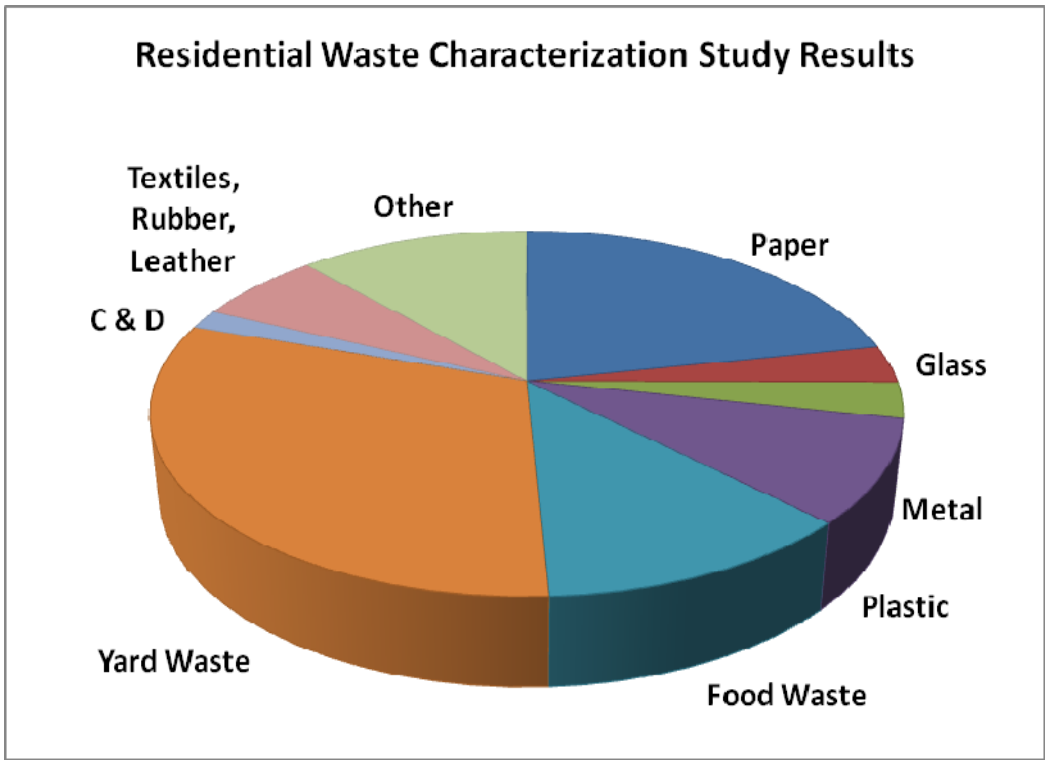

Figure 1.

Table 3.
2008-2009 Total Commercial MSW Statistics

Category	%	Weight (lbs)
Paper	36.9	10,282.8
Glass	2.1	597.2
Metal	3.6	989.4
Plastic	19.5	5445
Food Waste	7.7	2140.6
Yard Waste	2.8	790.4
Construction/Demolition	14.6	4060.2
Textiles, Rubber, Leather	5.7	1578.8
Other	7.1	1976.2
Total	100	27,860.6

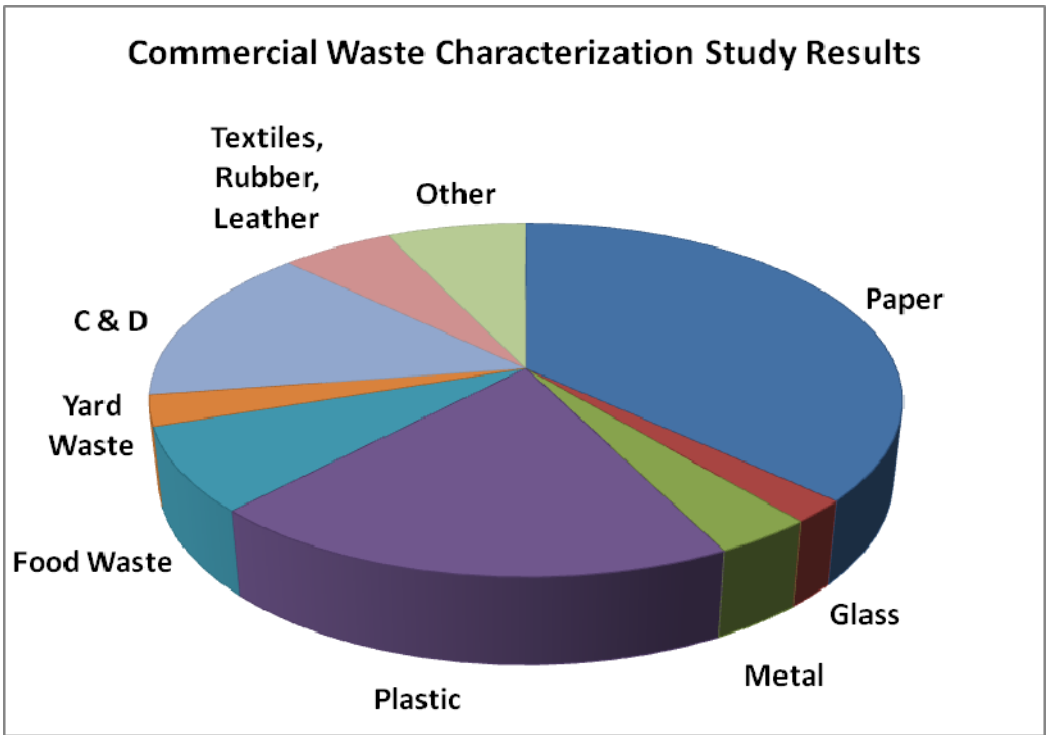

Figure 2.

Table 4.
2008-2009 Total MSW Statistics

Category	%	Weight (lbs)
Paper	29.2	16,520.80
Glass	2.7	1535.8
Metal	3.4	1918.0
Plastic	14.3	8049.8
Food Waste	9.8	5521.6
Yard Waste	17.1	9664.6
Construction/Demolition	8.0	4541.6
Textiles, Rubber, Leather	6.0	3400.2
Other	9.5	5339.8
Total	100	56,492.20

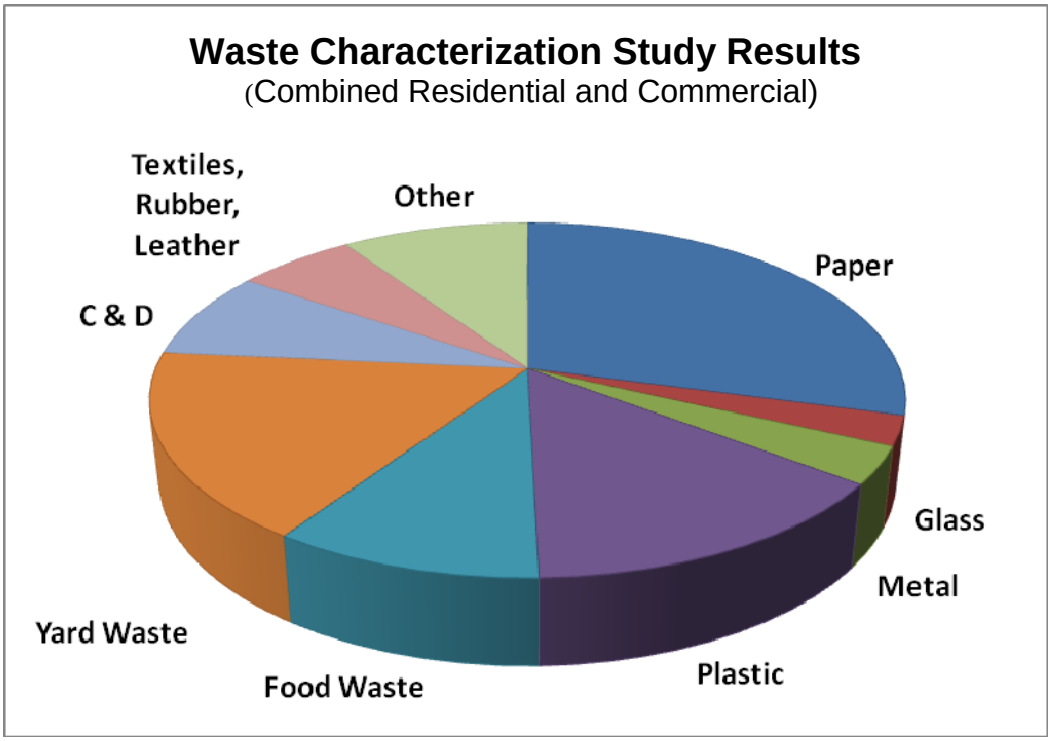

Figure 3.

Table 5.
Total MSW Comparisons throughout the Year by Weight

Category	Fall 2008	Winter 2009	Spring 2009	Summer 2009	Average
Paper	31.2%	35.3%	24.9%	26.7%	29%
Glass	3.4%	3.6%	1.9%	2.0%	3%
Metal	3.0%	3.1%	2.9%	4.6%	3%
Plastic	11.6%	17.2%	12.8%	15.4%	14%
Food	8.6%	11.1%	10.0%	9.4%	10%
Textiles, Rubber, Leather	5.1%	4.8%	8.1%	6.1%	6%
Yard Waste	20.5%	7.6%	20.3%	18.8%	17%
Construction/Demolition	8.0%	5.4%	8.8%	9.9%	8%
Other	8.6%	11.8%	10.3%	7.2%	10%

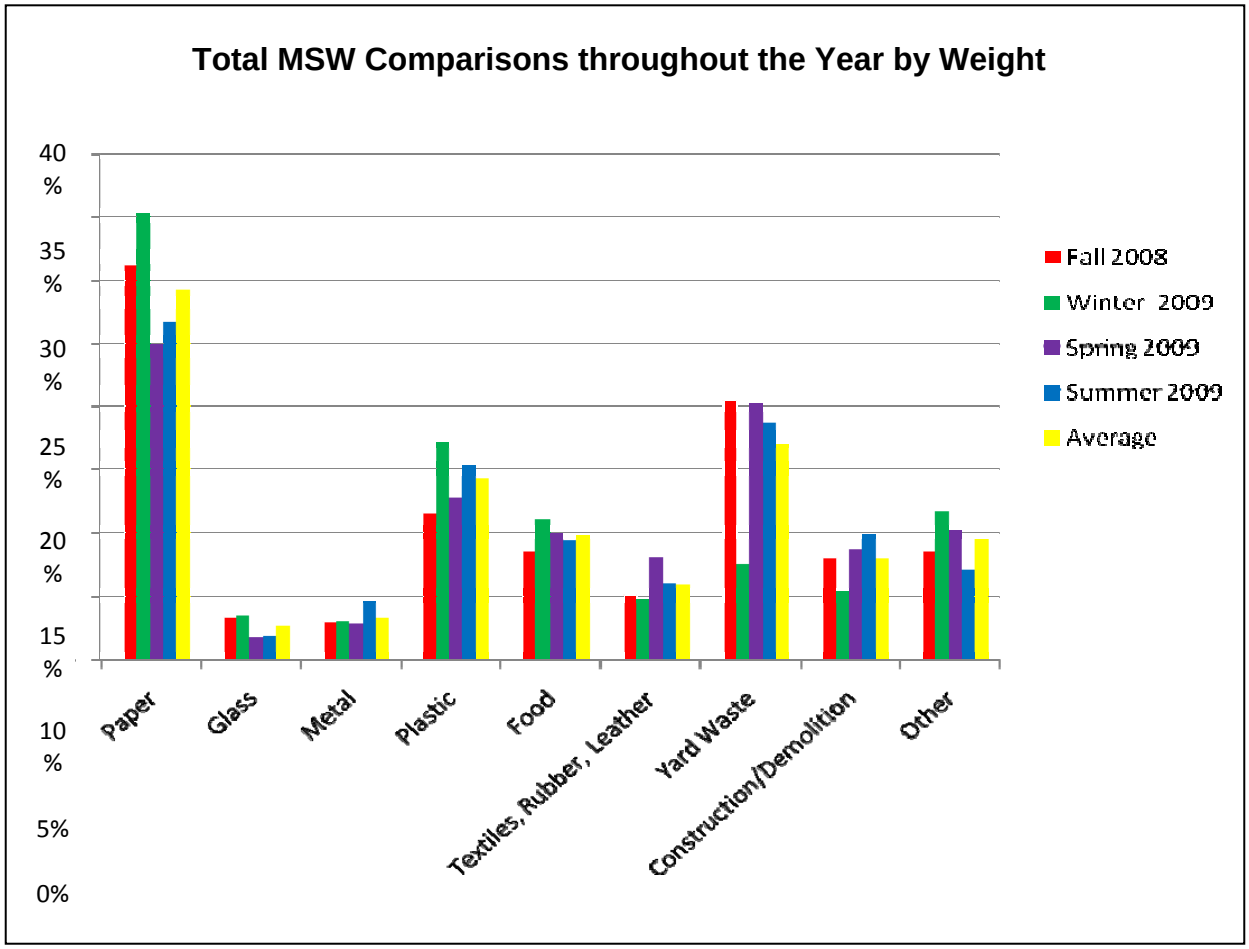

Figure 4.

C. Tipping Floor Information

The following is a list of items noted due to the unique or singular composition of the load:

- Corrugated cardboard – Some loads were 90%-100% of this material.
- Wood pallets – Some loads were 90%-100% of this material.
- Thrift Shop discards – Items that were donated by individuals but were disposed of for unknown reasons.
- Milk jugs and Milk – Material was out of date.
- Vehicle tires – Large number of tires found in commercial load, removed by transfer station staff.

IV. Conclusions

The Waste Characterization Study showed that approximately 1,348 tons a day (Monday – Friday) of MSW was received at the two trash transfer stations during the 8 weeks of the study.

Trucks were randomly selected at the scale house for the waste analysis. An average of 201.8 pounds of material was sorted through and divided into 22 categories. The final result of the year-long waste characterization study indicates that, of the 22 categories, the largest single component of the waste stream by weight was Other Plastic at 12.2%, followed by Corrugated Cardboard at 10.8%. The third largest component was Other Paper at 10.5%, followed by Food Waste at 9.8%. It should be noted that a difference in MSW composition was observed between residential and commercial MSW. For instance, the largest single component of residential MSW was Grass Clippings at 13.9%, while the largest single component for commercial MSW was Corrugated Cardboard at 19.6%.

This is in contrast to the 1997-1998 study where the largest single component of the waste stream was Corrugated Cardboard at 12.7%, closely followed by Wood at 12.1%. The third largest component was Other Paper at 9.4%, followed by Other Yard Waste at 6.8%. The category Other Plastic was the seventh largest component at 5.8%. The largest single component of residential MSW was Other Paper at 13.7%, while the largest single component for construction MSW was Wood Waste at 18.5%.

It should be noted that since October 2001, commercially produced construction and demolition (C & D) waste has been diverted from the municipal solid waste stream. Commercially generated construction and demolition debris is disposed of at licensed construction and demolition landfills.

The 22 individual categories were grouped into 9 larger categories. The final results of the total MSW by weight are shown by percentage in descending order:

2008-2009 Local Results

- Paper – 29.2%
- Yard Waste – 17.1%
- Plastic – 14.3%
- Food Waste – 9.8%
- Other – 9.5%
- Construction/Demolition – 8%
- Textiles, Rubber, Leather – 6%
- Metal – 3.4%
- Glass – 2.7%

As a comparison, the results of the 1997-1998 study can be seen below:

1997-1998 Local Results:

- Paper – 30%
- Yard Waste – 12.5%
- C & D Wood- 12%
- Plastic – 11%
- Metal – 8%
- Other C & D – 7.5%
- Textiles, Rubber, Leather – 6.5%
- Food Waste – 6%
- Other – 3.5
- Glass – 3%

According to EPA Municipal Solid Waste in the United States: 2007 Facts and Figures, the national average of MSW by weight for 2007 is listed below in descending order:

2007 National Results

- Paper – 32.7%
- Yard Trimmings – 12.8%
- Food – 12.5%
- Plastics – 12.1%
- Metals – 8.2%
- Textiles, Rubber, Leather – 7.6%
- Wood – 5.6%
- Glass – 5.3%
- Other – 3.2%

Figure 5 shows the comparisons of these studies per category.

Comparisons of Local Results and National Results

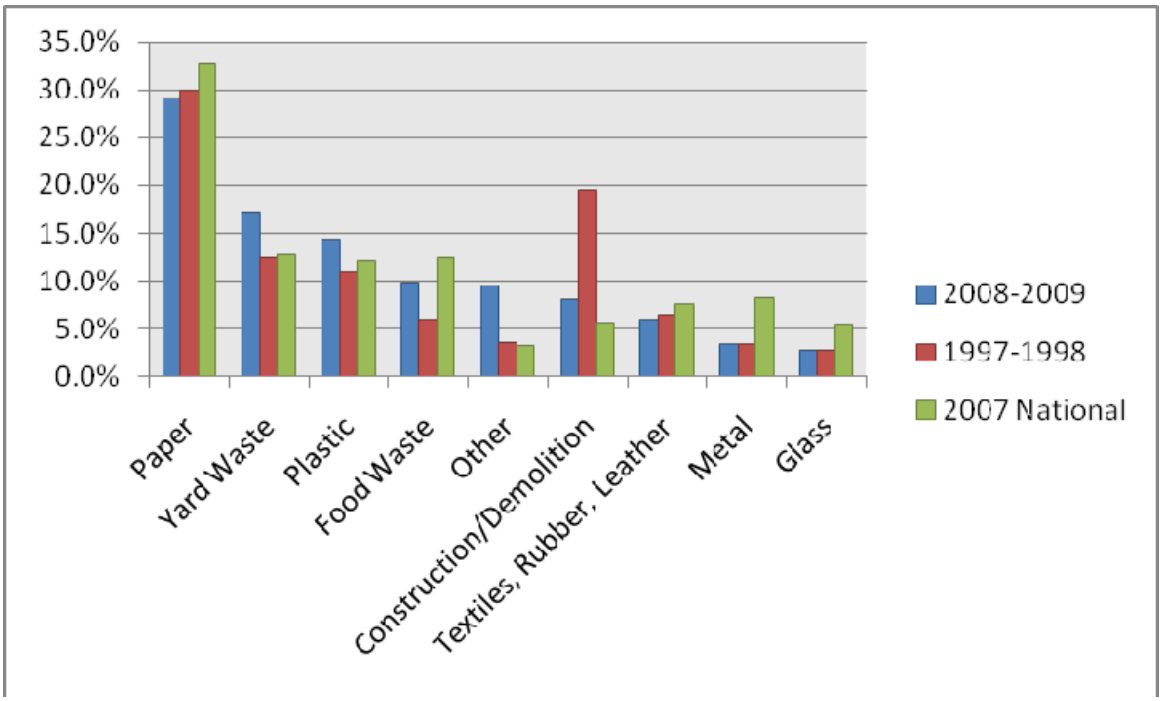

Figure 5

The 2008-2009 study results and the 2007 national average results are similar in that both Paper and Yard Waste are the top two categories. The largest discrepancy of the local results and the national results was the Other category. Locally the category included Batteries, Disposable Diapers, Aerosol Cans, Animal Wastes, some Furniture and items that did not fit distinctly in with the other 21 categories. Electronics were also included here. However, electronics accounted for only 1.4% of the total weight. The exact reason for the difference is not known. One reason for the higher percentage of material locally may be the lack of recycling and composting opportunities for certain items. An example is the higher Yard Waste figure at the local level. Another reason may be that bans on certain materials across the nation lowers the percentage of materials in the national results.

The Paper and Yard Waste categories topped both Sedgwick County study results as well. The most notable difference between the 1997-1998 and 2008-2009 study was construction and demolition waste. This material weight decreased by 11.5%. This can be explained by the ban on commercially generated C & D waste from local MSW transfer stations. The C&D category included wood lumber, pallets and furniture, which made up the majority of material that entered the transfer stations. The Other category increased by 6% and metal and yard waste both increased by 4.6%. The diversion of the C & D material and decreased weight average of 11.5% may account for the three categories total increase of 15.2%.

Seasonal comparisons of MSW by weight indicate that the composition of MSW varies throughout the year. For instance, Yard Waste comprised 7.6% in the February 2009 period compared to almost 20% in the other months.

During the process of separating the MSW into separate categories, certain noteworthy items were placed into various corresponding categories. These materials included syringes with needles, whole uncooked turkeys, partially consumed bottles of soda beverages, prescription medicines, blood-saturated items, and clothing with store price tags still attached. However, these were generally in small quantities.

The results from this Waste Characterization Study will allow the County to assess the progress made by recycling and other waste diversion programs since 1998. The results from this waste characterization study will provide reliable data on the composition of the MSW generated in Sedgwick County. This information will be useful for market development for recyclables, curbside recycling program development and as a baseline reference against which to gauge future recycling program success.

Appendices

Appendix A

Sedgwick County Department of Environmental Resources
2625 S. Tyler Rd.
Wichita, Kansas 67215
316-660-7200

September 30, 2008

On November 5, 2007, the Sedgwick County Solid Waste Management Committee voted 12-0 to recommend a new waste analysis, not as comprehensive as the past study, for the purpose of future planning. On March 3, 2008, the Committee voted 9-1 to begin a waste analysis.

The Sedgwick County Environmental Resources Office will be conducting the Waste Stream Analysis beginning November 2008. The purpose of this study is to evaluate the composition of the trash disposed of at the transfer stations. A similar study was performed in 1997 to 1998 at Brooks Landfill. The new study will allow the County to assess the progress made by recycling and other waste diversion programs since 1998.

This is simply an informative letter for the solid waste collection companies. The proposed dates for the study are as follows:

November 3-7, 2008	Waste Connections Transfer Station
November 17-21, 2008	Waste Disposal Transfer Station
February 2-6, 2009	Waste Connections Transfer Station
February 16-20, 2009	Waste Disposal Transfer Station
May 4-8, 2009	Waste Connections Transfer Station
May 18-22, 2009	Waste Disposal Transfer Station
August 3-7, 2009	Waste Connections Transfer Station
August 17-21, 2009	Waste Disposal Transfer Station

The process will be simple. Each day 4 residential and 4 commercial loads will be randomly selected. The driver of the selected vehicle will be asked to unload in a safe area of the building. After the vehicle has left the building, a small sample will be removed for sorting. We ask the drivers entering the facilities be cooperative and aware of this event. A safe environment is a must and with your assistance this should not be an issue.

If you have any questions regarding the waste stream analysis please feel free to contact our office at 660-7200.

Thank You,
Joe Renfro

Total Residential Loads

(Weight in Pounds)

Category	Nov. 2008	Feb. 2009	May. 2009	Aug. 2009	Total wt.	%	Group wt.	Group %
newsprint	277.4	328	183.8	202	991.2	3.5		
corrugated cardboard	154.8	226.2	122.8	169.6	673.4	2.4		
office-grade paper	228.2	292.2	191	214.6	926	3.2		
magazines	180.6	208.8	115.4	168	672.8	2.3		
other paper	711.4	1021.6	579.4	662.2	2974.6	10.4	6238	Paper 21.8%
clear glass containers	141.8	175	113.2	120	550	1.9		
tinted glass containers	104.4	101.8	89	93.4	388.6	1.4	938.6	Glass 3.3%
aluminum cans	55	81.4	53.8	61	251.2	0.9		
tin/steel cans	89.8	113.8	69.2	87.4	360.2	1.3		
other metal	69	61.8	87.2	99.2	317.2	1.1	928.6	Metal 3.2%
PET plastic (#1)	108.2	139	77.6	99.2	424	1.5		
clear HDPE (#2)	36	40	39.8	39.2	155	0.5		
pigmented HDPE (#2)	34	41.6	46.8	42.8	165.2	0.6		
other plastic	415	591.4	397.4	456.8	1860.6	6.5	2604.8	Plastic 9.1%
food waste	713.8	1055.6	776.2	835.4	3381	11.8	3381	Food 11.8%
textiles, rubber, leather	493.6	452.4	450.2	425.2	1821.4	6.4	1821.4	Textiles 6.4%
grass clippings	441.8	0	1735.6	1796.8	3974.2	13.9		
leaves	1775	475.4	319.8	36.6	2606.8	9.1		
other yard waste	487.2	428.8	590.8	786.4	2293.2	8.0	8874.2	Yard Waste 31%
construction/demolition	63.6	121.4	182.6	113.8	481.4	1.7	481.4	C&D 1.7%
electronics	86.8	95.6	31	107	320.4	1.1		
all other	549.6	966.8	922.6	604.2	3043.2	10.6	3363.6	Other 11.7%
Total	7217	7018.6	7175.2	7220.8	28631.6		28631.6	

Total Commercial Loads
(Weight in Pounds)

Category	Nov. 2008	Feb. 2009	May. 2009	Aug. 2009	Total wt.	%	Group wt.	Group %
newsprint	54.2	117.4	45.2	37.6	254.4	0.9		
corrugated cardboard	1362.8	1536.8	1192.4	1355	5447	19.6		
office-grade paper	396.2	284	366.4	170.8	1217.4	4.3		
magazines	87.8	38	128.4	147.2	401.4	1.4		
other paper	916.4	923.6	607	648.8	2962.6	10.6	10282.8	Paper 36.9%
clear glass containers	103.8	68.2	48	42.2	262.2	0.9		
tinted glass containers	125	158.2	23.4	28.4	335	1.2	597.2	Glass 2.1%
aluminum cans	22.4	26.4	21.4	24.4	94.6	0.3		
tin/steel cans	31.2	21	31.6	29.8	113.6	0.4		
other metal	153.8	137.4	143.8	346.2	781.2	2.8	989.4	Metal 3.6%
PET plastic (#1)	50.4	66.6	43.4	50.4	210.8	0.8		
clear HDPE (#2)	20.2	25.8	18.8	10.8	75.6	0.3		
pigmented HDPE (#2)	71.8	30	29	10	140.8	0.5		
other plastic	888.8	1494	1163.6	1471.4	5017.8	18.0	5445	Plastic 19.5%
food waste	492	504.4	646.4	497.8	2140.6	7.7	2140.6	Food 7.7%
textiles, rubber, leather	222.2	222.8	698.8	435	1578.8	5.7	1578.8	Textiles 5.7%
grass clippings	0	0	20	21.6	41.6	0.2		
leaves	85.2	48.4	90.8	0	224.4	0.8		
other yard waste	82.2	117.6	121.8	24	524.4	1.9	790.4	Yard Waste 2.8%
construction/demolition	1051.2	644	1071.2	1293.8	4060.2	14.6	4060.2	C&D 14.6%
electronics	91.8	45.6	140.4	162	439.8	1.6		
all other	478.8	554	361.8	141.8	1536.4	5.5	1976.2	Other 7.1%
Total	6788.2	7064.2	7013.6	6949	27860.6		27860.6	

Appendix E

Total MSW Loads
(Weight in Pounds)

Category	Residential Weight	Commercial Weight	Total Weight	Group Weight	%	Group %
newsprint	991.2	254.4	1245.6		2.2	
corrugated cardboard	673.4	5447	6120.4		10.8	
office-grade paper	926	1217.4	2143.4		3.8	
magazines	672.8	401.4	1074.2		1.9	
other paper	2974.6	2962.6	5937.2	16520.8	10.5	Paper 29.2%
clear glass containers	550	262.2	812.2		1.4	
tinted glass containers	388.6	335	723.6	1535.8	1.3	Glass 2.7%
aluminum cans	251.2	94.6	345.8		0.6	
tin/steel cans	360.2	113.6	473.8		0.8	
other metal	317.2	781.2	1098.4	1918	1.9	Metal 3.4%
PET plastic (#1)	424	210.8	634.8		1.1	
clear HDPE (#2)	155	75.6	230.6		0.4	
pigmented HDPE (#2)	165.2	140.8	306		0.5	
other plastic	1860.6	5017.8	6878.4	8049.8	12.2	Plastic 14.2%
food waste	3381	2140.6	5521.6	5521.6	9.8	Food Waste 9.8%
textiles, rubber, leather	1821.4	1578.8	3400.2	3400.2	6.0	Textiles 6%
grass clippings	3974.2	41.6	4015.8		7.1	
leaves	2606.8	224.4	2831.2		5.0	
other yard waste	2293.2	524.4	2817.6	9664.6	5.0	Yard Waste 17.1%
construction/demolition	481.4	4060.2	4541.6	4541.6	8.0	C&D 8%
electronics	320.4	439.8	760.2		1.4	
all other	3043.2	1536.4	4579.6	5339.8	8.1	Other 9.5%
Total	28631.6	27860.6	56492.2	56492.2		

SAMPLE NUMBER_____ DATE_____ TIME_____ SUPERVISOR_____

Vehicle Owner _____ Vehicle Type _____

Residential/Commercial

MSW Weight _____

MSW Origin _____

MSW Load Makeup _____

CATEGORY	CATEGORY NAME	GROSS WEIGHT	TARE WEIGHT	SAMPLE WEIGHT
1	newsprint		3.2	
2	corrugated cardboard		8.6	
3	office-grade paper		3.2	
4	magazines		3.2	
5	other paper		6.2	
6	clear glass containers		3.2	
7	tinted glass containers		3.2	
8	aluminum cans		3.2	
9	tin/steel cans		3.2	
10	other metal		3.2	
11	PET plastic (#1)		6.2	
12	clear HDPE (#2)		6.2	
13	pigmented HDPE (#2)		6.2	
14	other plastic		6.2	
15	food waste		3.2	
16	textiles, rubber, leather		3.2	
17	grass clippings		6.2	
18	leaves		8.6	
19	other yard waste		6.2	
20	electronics		6.2	
21	construction/demolition		6.2	
22	all other		6.2	

DATA NOTES:

Weather:

Sample:

Problems or Other Information: