2008 COUNTY GOVERNMENT FACILITIES WASTE COMPOSITION STUDY

February 2008

Prepared for:

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WAKE COUNTY, NORTH CAROLINA
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SECTION 1.0
INTRODUCTION

1.1 Purpose

Wake County Solid Waste Management Division (SWMD) contracted Kessler Consulting, Inc. (KCI) to conduct a Waste Composition Study of solid waste disposed at Wake County government facilities. SWMD staff indicated they were particularly interested in the amount of recyclable materials still being disposed of by County employees. The results of this study will help the County gauge the effectiveness of its government recycling program, identify actions to further increase the recovery of recyclable materials and establish a baseline for future evaluations and comparisons.

1.2 Background

In 1999, the Wake County government recycling program was transferred from SWMD to the County's General Services Administration (GSA), which manages the County's portfolio consisting of approximately 3.5 million square feet of building space and performs the facility management functions for these facilities. In 2001, GSA conducted a competitive procurement for a recycling service provider, and BFI (currently Allied Waste Services) was awarded the contract. Allied Waste Services collects and processes recyclable materials generated at 49 County facilities. SWMD continues to pay for the recycling portion of GSA's solid waste bill. The following materials are collected for recycling:

- The "Office Paper Recycling" program accepts various paper grades, including blueprints, brochures, computer and copy paper, envelopes, legal and notebook paper, manila file folders, carbonless paper and checks, pamphlets, and stationary of any color.
- Corrugated cardboard and telephone books are each collected in separate containers.
- Newspapers, magazines and catalogs are collected commingled.
- Books are collected for recycling at County libraries and as requested at other government facilities.
- Aluminum cans and plastic bottles (PET and HDPE) are collected separately.

As noted above, one of the main objectives of this study was to determine the amount of these recyclable materials that continue to be discarded by County employees rather than recycled.

1.3 Acknowledgments

KCI would like to acknowledge and thank the Wake County staff members who assisted with preparation for this waste composition study: Craig Wittig, Rebekah Baker, and Meghan O'Connor, SWMD; Ray Holt, Kelli Braunbach, and Richard Black, GSA; and the staff of the South Wake Transfer Station, specifically Junior Wiseman. KCI also would like to acknowledge the cooperation of Allied Waste Services' staff in servicing the special collection routes created for the weeklong sorting event.

SECTION 2.0
METHODOLOGY

2.1 General Considerations

The methodology for this study followed industry-accepted standards for statistical sampling, as outlined in the ASTM *Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste* (D5231-92). The sampling and sorting activities took place at Wake County's South Wake Transfer Station, located in the southern Wake County, during the week of January 14-19, 2008.

Some waste composition studies make adjustments for moisture content to compensate for liquids absorbed by waste materials. Laboratory methods for estimating moisture content are available, but are usually expensive and may overestimate moisture by removing naturally occurring moisture. In addition, materials received at disposal facilities or material recovery facilities are generally measured on an "as is" basis. Therefore, KCI did not include analysis of or adjustments for moisture content as part of this study.

2.2 Sample Selection

Based on discussions with SWMD staff, KCI determined that the objectives of the County would best be met by sampling waste collected from a broad cross-section of County government facilities rather than by pulling individual samples from only a few facilities. KCI utilized the waste collection schedule for all County facilities and mapped building locations to develop a special collection route for each day of the five-day sorting event. SWMD and KCI staff decided to limit the inclusion of some County facilities, such as libraries, because of the high volume of non-county employees contributing to the overall waste stream.

On December 14, 2007, KCI and SWMD staff met with staff from GSA and Allied Waste Services (Allied) to review the list of facilities proposed for inclusion in the special collection routes and the sampling study. Based on feedback received from GSA and Allied staff, the list of offices was modified and approved by all involved parties, with the goal of providing a diverse cross section of the county's facilities and building classifications. In total, five routes, one per each day of the sorting event, of seven to twelve County facilities were established. Appendix A, *Routes Summary*, provides a list of the facilities included on each of these routes. The County agreed to compensate Allied for servicing the special routes established for this

study. SWMD and KCI staff also decided to include the compactor located at the Public Safety Center, which services five large County office buildings in the downtown central business district, in the study. KCI requested that the compactor be delivered to the South Wake Transfer Station on Thursday, rather than Friday, its normal collection day. A total of 17 representative samples were pulled from the special routes and Public Safety Center compactor for sorting.

2.3 Material Categories

KCI worked with SWMD staff to develop a list of material categories into which the County facility waste would be sorted. KCI requested a list of materials currently recovered in the County government recycling programs and incorporated these recyclables, as well as other materials of interest to the County, in the material category list. All other waste was placed in the "Other Non-recyclable Trash" category, which included contaminated paper, three-ring binders, chipboard or paperboard, batteries, liquids from partially full beverage containers, textiles, non-program plastics, and other non-recyclable materials. Appendix B, *Description of Material Categories,* provides the list of material categories and their descriptions.

2.4 Sort Preparation

SWMD and KCI staff determined that the most practical sorting location would be at the South Wake Transfer Station. To prepare for the sorting event, KCI reviewed all equipment necessary for conducting the sort and provided all equipment not available at the transfer station. Wake County, with assistance from Waste Industries, the contractor that operates the transfer station, provided the sorting location, a bobcat and operator, tent, and sorting tables. KCI visited the transfer station on December 14, 2007 to determine the best location for the sort and to meet the transfer station personnel.

Several days before the sorting event, KCI provided Allied with an information packet containing a daily schedule of County facilities to be serviced on each of the special routes requested for the sort, and yellow placards to be placed in the vehicles that would be servicing these routes and the Public Safety Center compactor. The placards were used to help scalehouse staff identify the trucks, upon entering the transfer station, in order to direct them to the sort location.

A site safety plan was developed for this study and provided to County staff for review and approval prior to the sorting event. Each morning of the sorting event, sorters were given thorough safety instructions. No injuries or emergencies occurred during the sorting event.

2.5 Sampling and Sorting Procedures

Upon arrival at the scalehouse, Allied's collection vehicles were directed by scalehouse personnel to proceed to the far side of the transfer station bay. Upon entering the bay, KCI's Sampling Supervisor interviewed the driver to confirm that the truck contained waste from only those facilities requested by KCI, as depicted in Figure 2.1. Upon confirmation, the load was then tipped and representative samples of at least 200 pounds each were pulled and placed on individual tarps for sorting. Figure 2.2 depicts a typical sample ready for sorting.

Figure 2.1: Interviewing Driver to Confirm Waste Source

Figure 2.2: Typical Solid Waste Sample

Samples were then sorted into the previously defined material categories. After the entire sample was sorted, the Sorting Supervisor weighed and recorded the weights of each container on a data recording form. Tare weights of empty containers, recorded prior to sorting, were subtracted from the weights of the containers after sorting to obtain the net weight of each material category. The Sorting Supervisor also noted any unusual items or large quantities of materials sorted into non-specific categories such as "Other Non-recyclable Trash." Figure 2.3 depicts the recording of container tare weights prior to sorting and Figure 2.4 shows the sorting activities.

2.6 Analytical Procedures

After the sorting event, KCI analyzed the data by first calculating the percentage by weight of each material category in each sample. The results of individual samples were combined based on the actual load weights to obtain weighted material category averages for County government facilities as a whole. Confidence intervals were then calculated for each material category using a standard statistical t-test.

KCI also reviewed and evaluated data regarding the quantity of recyclables collected from County offices from November 2006 through October 2007. This information was used to further evaluate the relative effectiveness of the existing recycling program and for future comparison purposes.

Figure 2.3: Recording Tare Weights

Figure 2.4: Waste Sorting Activities

SECTION 3.0
STUDY RESULTS

3.1 Waste Composition Results

Table 3.1 presents the results of the 2008 County government facilities waste composition study. The table includes the weighted average of each material category, as well as the lower and upper bounds of the 90 percent confidence interval.

The confidence interval indicates that, with a 90 percent level of confidence, the actual arithmetic mean (the arithmetic mean obtained if an infinite number of samples were sorted) is within the upper and lower limits shown. This provides an understanding of how much variation occurred in the quantity of that material category found in the samples sorted. Generally, the more homogeneous the waste stream and the greater the number of samples sorted, the higher the level of accuracy achieved and the narrower the margin between the upper and lower bounds of the confidence interval.

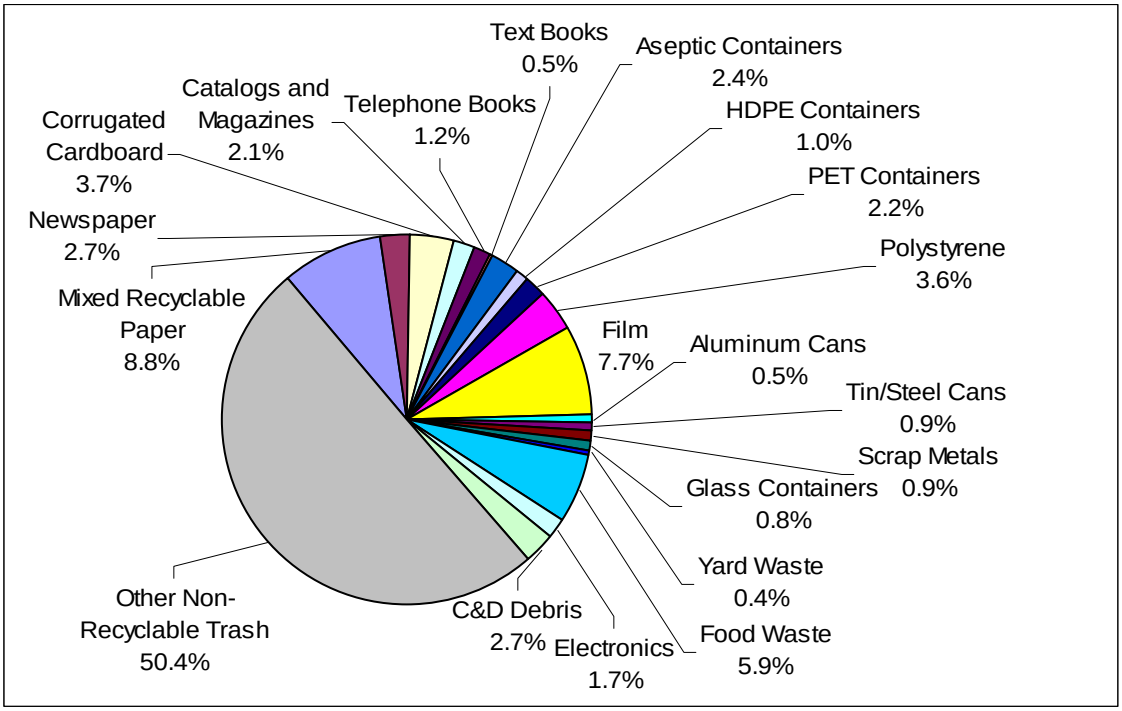
The wide range between the lower and upper limits for some material categories, such as food waste and construction and demolition (C&D) debris, is because these materials are found at very different levels in various offices depending upon their activities and purpose. The relatively wide confidence intervals for materials that are included in the County facility recycling program, such as mixed recyclable paper, are more likely an indication of the variability in recycling participation levels at the various offices.

Figure 3.1 depicts the composition of the waste disposed at the Wake County government facilities in a pie chart format.

Table 3.1: Composition of Waste Disposed by County Facilities (% by weight)

	Material Categories	Weighted Average	Confidence Intervals	
			Lower	Upper
1	Mixed Recyclable Paper	**8.8%**	4.5%	13.1%
2	Newspaper	**2.7%**	0.7%	4.8%
3	Corrugated Cardboard	**3.7%**	2.5%	4.9%
4	Catalogs and Magazines	**2.1%**	0.0%	4.2%
5	Telephone Books	**1.2%**	0.5%	1.9%
6	Text Books	**0.5%**	0.0%	0.9%
7	Aseptic Containers	**2.4%**	1.2%	3.7%
8	HDPE Containers	**1.0%**	0.7%	1.3%
9	PET Containers	**2.2%**	1.1%	3.2%
10	Polystyrene	**3.6%**	1.6%	5.5%
11	Plastic Film	**7.7%**	6.2%	9.1%
12	Aluminum Cans	**0.5%**	0.4%	0.7%
13	Tin/Steel Cans	**0.9%**	0.5%	1.4%
14	Scrap Metals	**0.9%**	0.3%	1.6%
15	Glass Containers	**0.8%**	0.0%	2.0%
16	Yard Waste	**0.4%**	0.0%	0.8%
17	Food Waste	**5.9%**	3.0%	8.8%
18	Electronics	**1.7%**	0.0%	4.1%
19	Construction & Demolition (C&D) Debris	**2.7%**	0.5%	5.0%
20	Other Non-recyclable Trash	**50.4%**	44.9%	55.8%
	TOTALS	**100.0%**		

Figure 3.1: Composition of Waste Disposed by County Facilities (% by weight)



3.2 Analysis of Recyclable Materials

Results of the 2008 waste composition study reveal that more than 22 percent of the waste stream generated in the Wake County government facilities is comprised of recyclable materials that are accepted in the County's existing recycling program. As noted in Table 3.2, this includes recyclable paper (18.5 percent) and recyclable containers (3.7 percent). Mixed recyclable paper, which includes the types of paper currently accepted in the County's "Office Paper Recycling" program, represented the largest percentage of recyclable materials.

Table 3.2: Recyclable Materials in the County Facility Waste Stream (% by weight)

	Weighted Average
Mixed Recyclable Paper	**8.8%**
Newspaper	**2.7%**
Corrugated Cardboard	**3.7%**
Catalogs and Magazines	**2.1%**
Telephone Books	**1.2%**
Recyclable Paper	**18.5%**
Aluminum Cans	**0.5%**
HDPE Containers	**1.0%**
PET Containers	**2.2%**
Recyclable Containers	**3.7%**
Total Recyclables	**22.2%**

Table 3.3 identifies other material categories that could *potentially* be recovered for recycling or composting if sufficient quantities of uncontaminated materials could be collected and viable markets could be found. Recovering these items as part of an office-wide program might not be cost-effective, with the exception of aseptic containers if they could be added to either the commingled container or mixed paper recycling streams.

Table 3.3: Other Potentially Recoverable Materials (% by weight)

	Weighted Average
Plastic Film	**7.7%**
Food Waste	**5.9%**
Polystyrene	**3.6%**
Construction & Demolition Debris	**2.7%**
Aseptic Containers	**2.4%**

Plastic film was the largest of these material categories; however, much of this consisted of contaminated plastic bags. Recovering some of these materials from certain locations or at certain times might be feasible. For example, recovering C&D debris during major construction or renovation projects, recovering packaging materials (e.g., polystyrene and plastic film) from central purchasing locations, or recovering food waste from facilities with large food service operations might be feasible.

3.3 Analysis of Recovered Materials

To further analyze the County's government facility recycling program, KCI evaluated the quantities of recyclables recovered between November 1, 2006 and October 31, 2007, which are shown in Table 3.4. The quantity of waste disposed during that period is not known; therefore, an accurate recycling rate could not be determined. However, a very rough estimate was made by first calculating the waste density based on the weight of waste collected for the sorting event and the number and size of collection containers serviced. This density figure was then extrapolated to estimate the amount of waste generated during a month, which was compared to the average amount of materials collected monthly for recycling. Based on this very rough calculation, a waste diversion rate of approximately 24 percent was estimated.[1]

Table 3.4: Recyclable Materials Recovered (November 1, 2006 – October 31, 2007)

	Tons / Year	Pounds / Employee / Month [A]	Pounds / Employee / Day [B]
Mixed Recyclable Paper	297.69	15.03	0.752
Newspaper	53.55	2.70	0.135
Corrugated Cardboard	22.09	1.12	0.056
Library and Phone Books	10.80	0.55	0.027
HDPE and PET Containers	1.49	0.08	0.004
Aluminum Cans	1.32	0.07	0.003
Total	386.94	19.54	0.977

A - Calculated using the Wake County Economic Development estimate of 3,300 County employees.
B - Assumes an average of 20 workdays per month.

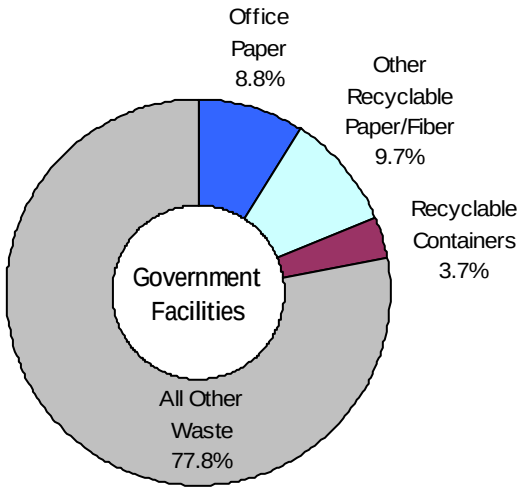
[1] Waste Disposal Estimate: ((55 lbs/cy X 562 uncompacted cy of disposal capacity/week) + (326 lbs/cy X 51 compacted cy of disposal capacity/week)) x 4.33 weeks/month = 204,405 lbs/month.
Waste Diversion Estimate: 64,482 pounds of recyclables/month / 268,887 pounds of waste generated/month = 24%

SECTION 4.0
CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

To estimate the amount of recyclable materials still being disposed of by Wake County government facilities and to identify other materials that could potentially be recovered from the waste steam, a waste composition study was conducted in January 2008. Based on the study results, Wake County has an effective government facility recycling program in place. Commercial waste streams, especially those with a significant amount of office waste, typically consist of at least 40 percent recyclable paper. Wake County's facilities waste stream contained less than 20 percent recyclable paper. Although an accurate waste diversion rate could not be calculated, because total disposal tonnage was not available, KCI utilized available information to calculate a very rough waste diversion estimate of approximately 24 percent. Details regarding the study results are presented in Section 3.0 of this report, and are summarized in this section.

Although commendable recovery rates have been achieved, the study results reveal an opportunity to further increase recovery. More than 22 percent of the waste disposed by County government employees is comprised of recyclable materials currently included in the County facilities recycling program. Office paper comprises nearly 9 percent of the waste stream and other types of recyclable paper make up almost 10 percent. Recyclable containers comprise close to 4 percent of the waste stream.



To determine the quantity of recyclable paper still being disposed that could be recovered through the County recycling program, KCI estimated the tonnage of waste disposed by government facilities based on the size of the disposal containers serviced for the sorting event and the weight of the waste they contained. Applying the results of the waste composition study

to this waste generation figure indicates that more than 4 additional tons of recyclable paper are potentially available for recovery each month.[2]

4.2 Recommendations

Based on the results of this study, KCI offers the following recommendations to maximize waste diversion and increase the effectiveness of the County's government facilities recycling program.

(1) **Dual-stream recovery system:** Enhancing the convenience to employees to participate in recycling leads to higher recovery rates. Currently, paper is recovered in four or five (where books are recovered) different streams, and containers in two streams (aluminum and plastics). Converting to a dual-stream system – all paper in one stream and commingled containers in the other – should simplify the program and make it easier and more convenient for employees to participate. In order to determine whether such a conversion is feasible, the existing recycling vendor and other local recycling vendors should be contracted to ensure they are able to accept and process dual-stream recyclables. This is an opportune time to consider this conversion since it is KCI's understanding that the term of the contract with Allied has expired, although both parties have agreed to continue operating under the contract. If a decision is made to convert to dual-stream, employees would need to be educated about the change. This would give the County an opportunity to revitalize its recycling education program, which is discussed below. Container signage and educational materials would need to be revised, but additional recycling containers should not be needed. Internal handling procedures for recyclables should be simplified by this change.

(2) **Education and technical assistance:** Revitalizing educational materials is another mechanism that typically leads to increased participation. Regular updates regarding the recycling program's progress, such as through agency newsletters or electronic bulletins, are also important to keep employees engaged and maintain participation. Hands-on technical assistance to facilities or departments with low participation can also be very effective. Conducting site visits and visual waste audits at individual offices helps identify specific departments that might need more recycling education and hands-on assistance. Site visits also help ensure proper placement of recycling containers and use of clear and accurate signage. Another tool that is often successful is formation of an

[2] Recyclable Paper Estimate: ((55 lbs/cy X 562 uncompacted cy of disposal capacity/week) + (326 lbs/cy X 51 compacted cy of disposal capacity/week)) x 4.33 weeks/month x 18.5% = 8,796 lbs/month.

inter-agency environmental team to discuss barriers to recycling, disseminate information, and promote recycling participation in their respective agencies or departments. KCI was informed that the County previously had an Environmental Stewardship Network. It is possible that re-establishing this network could meet this need, or it might be more effective to undertake a fresh start with a new inter-agency group.

(3) **Expanding recyclable materials:** The County facilities recycling program is appropriately targeting those recyclables that make up the largest portion of the waste stream. However, other potentially recyclable materials were found in the waste stream that might warrant recovery. If local recycling vendors are surveyed, as recommended above, the feasibility and cost-effectiveness of adding materials should be discussed. Specifically, chipboard/paperboard could potentially be included in an all-paper stream or to one of the existing paper streams, and the full range of containers (aluminum, tin, plastic, and glass) might be accepted in the commingled stream. Aseptic containers could potentially be included in either the mixed paper or commingled container stream. Other potentially recyclable materials were identified that, while not in sufficient quantities to warrant countywide recovery, might lend themselves to recovery at individual facilities where significant quantities are generated. For example, recovering food waste from facilities with large food service operations, recovering packaging materials (e.g., polystyrene and plastic film) from central purchasing or distribution centers, or recovering construction and demolition (C&D) debris during major construction or renovation projects should be considered. Further evaluation of the costs versus benefits of these facility-specific recovery programs is warranted.

(4) **Right-sizing disposal containers:** Utilizing the number and size of the dumpsters serviced during the one-week sorting event and the quantity of waste delivered, KCI estimated the density of waste collected at the County facilities to be approximately 55 pounds per cubic yard for uncompacted waste and 326 pounds per cubic yard for compacted waste. A one-week snapshot such as this is far from definitive, but it is the only information available to KCI to evaluate waste density. Based on KCI's industry experience, as well as on waste density averages published by the Solid Waste Association of North America (SWANA), the density of uncompacted solid waste generally ranges from 100 to 250 pounds per cubic yard and 300 to 500 pounds per cubic yard for compacted waste. The comparatively low estimated density for uncompacted waste from County facilities suggests that the County should consider monitoring

disposal containers to determine whether the recycling program has reduced the waste disposal stream sufficiently to warrant adjusting the container sizes and/or frequency of collection. If so, this could result in a cost savings to the County.

(5) **Competitive procurement for recycling services:** As mentioned previously, it is KCI's understanding that the initial term of the recycling agreement with Allied has expired. Recycling markets are currently strong, so it is an opportune time to initiate a competitive procurement for a contractor to service the County facilities recycling program. Expanding the scope of the contract to include other county recycling programs, such as the public school program, might enable the County to obtain more cost-effective recycling services, and possibly a share of the market revenue. The details of the scope of services would be developed based on the discussions with local recycling vendors, that are recommended above, and the County's program objectives.

(6) **Program tracking:** To accurately calculate the program's waste diversion or recycling rate, two pieces of information are needed: (1) the quantity of waste being recovered and (2) the quantity of waste being disposed. Allied reports material recovery, but the County does not currently have an accurate accounting of amount of waste disposed by government facilities. To estimate waste disposal, KCI recommends that all County facilities' waste be collected and weighed separate from other waste streams for a one-week period during each quarter of the year. In addition, the County should consider conducting a waste composition study every two to three years to monitor program progress and potential changes in the waste stream. Although prohibited by cost constraints this year, the County may wish to split the County facilities into various generator types (e.g., libraries, offices, regional centers) in future waste composition studies.

The waste composition study results indicate that Wake County has an effective government facility recycling program in place, but also revealed opportunities for improvement. The recommendations outlined above should help the County further reduce its waste stream, conserve valuable resources, and preserve disposal capacity. The study will also serve as a baseline by which to evaluate future program progress.

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Appendix A – Routes Summary

Monday, January 14, 2008
- Alcohol Treatment Center
- Mental Health Center
- Detention Annex
- Detention Annex
- Agricultural Services
- Community Services Center
- Commons Building
- Health & Youth Services
- South Wilmington Street Center
- Human Services Swinburne

Tuesday, January 15, 2008
- South Wilmington Street Center
- Human Services Swinburne
- Public Health Center
- Lake Crabtree Maintenance
- Cornerstone Building
- General Services
- General Services
- A.A. Thompson Center

Wednesday, January 16, 2008
- South Wilmington Street Center
- Human Services Swinburne
- Community Services Center
- Health & Youth Services
- Eastern Regional Center
- Eastern Regional Library
- Library Administration Building

Thursday, January 17, 2008
- South Wilmington Street Center
- Human Services Swinburne
- Alcohol Treatment Center
- Mental Health Center
- Detention Annex
- Detention Annex
- Agricultural Services
- Commons Building
- Bannister Warehouse
- Richard Harrison Library
- Green Road Branch Library
- Yates Mill Park

Thursday, January 17, 2008
- Public Safety Center (compactor)

Friday, January 18, 2008
- South Wilmington Street Center
- Human Services Swinburne
- Community Services Center
- Health & Youth Services
- Public Health Center
- Lake Crabtree Maintenance
- General Services

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Appendix B – Description of Material Categories

#	Material Categories	Description of Categories
1	Mixed Paper	Brochures, pamphlets, computer/copy paper, envelopes, manila folders, legal/notebook paper, NCR carbonless paper and checks, junk mail, colored paper, file folders, and posters. *Blueprints allowed for County Offices only *Sticky notes allowed for County Schools only
2	Newspaper	Newspaper (loose, tied or shredded) including other paper normally distributed inside newspaper such as ads, flyers, etc.
3	Corrugated Cardboard (OCC)	Uncoated brown "cardboard" boxes with a wavy core (no plastic liners, waxy coatings). Includes clean pizza boxes.
4	Catalogs and Magazines	All telephone directories, magazines, catalogs, and other printed material on glossy and non-glossy paper.
5	Old Telephone Directories	Phone books, white and yellow pages.
6	Textbooks	Hard and soft covered textbooks.
7	Aseptic Containers	Gable top milk cartons, juice boxes, and other similar containers.
8	HDPE Containers	Clear/natural and pigmented bottles or containers coded HDPE #2 such as milk jugs, detergent bottles, etc.
9	PET Containers	Clear and colored bottles or containers coded PET #1 such as soda bottles, water bottles, etc.
10	Polystyrene	Styrofoam plates, bowls, trays, cups and any other items that can successfully be recycled together.
11	Film	Grocery bags, garbage bags, plastic sheeting, saran wrap, visqueen, etc.

#	Material Categories	Material Descriptions
12	Aluminum Cans	Aluminum soft drink, beer, and some food cans.
13	Tin/Steel Cans	Tin-plated steel cans, usually food containers, and aerosol cans.
14	Other Metals	Scrap aluminum, aluminum foil, and other non-magnetic metal, copper wiring and tubing, brass fixtures. Steel, clothes hangers, sheet metal products, pipes, miscellaneous metal scraps, and other magnetic metal items.
15	Glass Containers	Clear, Brown, and Green glass bottles and containers.
16	Yard Waste	Shrub and brush prunings, household bedding plants, weeds, leaves, grass clippings, and other landscaping and gardening wastes.
17	Food Waste	Meat and vegetable waste (includes coffee grinds and tea bags).
18	Electronics	Electronic devices such as hairdryers, televisions, toasters, computers, etc.
19	C&D Debris	Construction and demolition debris that includes concrete, carpet, drywall, furniture, insulation, ceiling tiles, filters, and treated and untreated lumber, including pallets.
20	Other Non-recyclable Trash	All other wastes not included in the above categories, including construction paper, lined writing paper, carrier stock, contaminated paper, laminated paper, tissues and paper napkins, paper plates and plastic cutlery, wax paper cups, plastic lids and straws, batteries, textiles and mop heads, non-program plastics, liquids from partially full beverage containers, aluminum foil and catering trays, rubber products, lab wastes and medical wrappers, and products that contain combinations of materials such as frozen juice cans, binders, etc. Also includes indistinguishable items less than 1-inch square that are organic or inorganic including kitty litter, sweepings, and hair.

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Appendix C – Individual Sample Results

	Material Categories / Sample #	County Offices Monday FEL Route	County Offices Monday FEL Route	County Offices Monday FEL Route	County Offices Tuesday FEL Route	County Offices Tuesday FEL Route	County Offices Tuesday FEL Route	County Offices Wednesday FEL Route	County Offices Wednesday FEL Route	County Offices Wednesday FEL Route	County Offices Compactor	County Offices Compactor	County Offices Compactor	County Offices Thursday FEL Route	County Offices Thursday FEL Route	County Offices Friday FEL Route	County Offices Friday FEL Route	County Offices Friday FEL Route	
	Material Categories **Sample #**	**1**	**2**	**3**	**9**	**10**	**11**	**15**	**16**	**17**	**25**	**26**	**27**	**28**	**29**	**38**	**39**	**40**	**Weighted Avg.**
1	MIXED RECYCLABLE PAPER	19.62%	20.73%	15.03%	22.69%	4.79%	2.89%	11.81%	12.40%	2.16%	2.50%	9.40%	1.09%	4.46%	3.55%	14.58%	3.42%	5.53%	8.80%
2	NEWSPAPER	2.35%	2.90%	0.46%	2.14%	2.89%	1.25%	0.53%	1.30%	2.72%	1.24%	0.72%	2.22%	2.35%	10.81%	0.91%	14.06%	4.69%	2.72%
3	CORRUGATED CARDBOARD (OCC)	4.35%	7.63%	0.91%	2.70%	4.39%	2.30%	4.13%	1.92%	3.31%	6.54%	1.61%	6.61%	1.64%	2.48%	1.50%	0.00%	0.74%	3.69%
4	CATALOGS AND MAGAZINES	3.74%	1.67%	1.30%	1.87%	0.59%	0.39%	14.86%	5.47%	2.70%	1.64%	1.58%	0.00%	1.79%	0.00%	2.93%	0.00%	3.88%	2.09%
5	TELEPHONE BOOKS	0.00%	0.00%	3.03%	0.00%	2.14%	0.00%	0.00%	0.00%	0.00%	0.00%	5.71%	0.95%	0.00%	1.70%	0.00%	0.00%	0.00%	1.20%
6	TEXTBOOKS	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	4.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.49%
7	ASEPTIC CONTAINERS	1.00%	2.77%	2.78%	0.10%	0.28%	0.90%	0.26%	0.00%	2.47%	4.10%	2.11%	7.19%	2.37%	0.00%	0.07%	1.55%	0.65%	2.43%
8	HDPE CONTAINERS	0.73%	0.11%	0.40%	0.52%	0.45%	0.68%	0.00%	2.40%	0.34%	0.76%	0.98%	2.58%	0.95%	1.18%	1.02%	0.52%	1.36%	0.97%
9	PET CONTAINERS	1.39%	1.93%	1.22%	3.27%	1.47%	2.64%	1.56%	2.40%	0.84%	1.56%	2.95%	1.55%	2.44%	2.08%	2.86%	5.30%	6.39%	2.15%
10	POLYSTYRENE	1.82%	2.12%	4.40%	1.25%	0.36%	0.96%	0.81%	1.12%	1.09%	5.97%	10.94%	3.73%	2.88%	0.76%	0.45%	0.66%	0.96%	3.56%
11	PLASTIC FILM	6.72%	4.70%	7.54%	5.51%	3.46%	4.59%	9.37%	5.75%	5.11%	13.32%	3.97%	12.35%	10.11%	5.42%	5.52%	5.17%	9.46%	7.68%
12	ALUMINUM CANS	0.33%	0.71%	0.72%	0.64%	0.78%	0.80%	0.62%	0.58%	0.54%	0.34%	0.41%	0.10%	0.76%	0.63%	0.66%	1.34%	0.62%	0.53%
13	TIN/STEEL CANS	0.10%	0.93%	1.05%	0.79%	0.40%	2.81%	0.46%	0.26%	4.84%	1.89%	0.87%	0.20%	0.78%	0.21%	0.52%	0.49%	0.55%	0.94%
14	SCRAP METALS	0.27%	0.00%	0.00%	1.20%	4.74%	0.57%	0.18%	0.15%	0.00%	0.00%	3.89%	0.00%	0.00%	1.87%	0.00%	3.11%	0.00%	0.91%
15	GLASS CONTAINERS	0.22%	0.00%	0.82%	0.71%	6.81%	5.25%	0.64%	0.76%	0.48%	0.00%	0.43%	0.00%	0.00%	0.78%	1.45%	0.49%	1.92%	0.76%
16	YARD WASTE	0.00%	3.51%	0.25%	0.00%	0.00%	1.48%	0.00%	0.02%	0.13%	0.00%	0.00%	0.00%	0.00%	0.15%	0.36%	0.00%	0.19%	0.36%
17	FOOD WASTE	8.21%	3.86%	11.93%	4.43%	0.74%	19.88%	2.48%	3.52%	14.19%	4.08%	2.45%	1.17%	17.11%	4.79%	2.18%	0.95%	2.49%	5.94%
18	ELECTRONICS	1.88%	1.82%	1.07%	0.27%	0.55%	2.23%	4.44%	0.06%	19.66%	0.00%	1.19%	0.00%	0.69%	2.12%	0.00%	0.00%	1.39%	1.68%
19	C&D DEBRIS	4.63%	1.41%	1.33%	0.84%	9.87%	1.88%	16.07%	0.00%	0.00%	0.72%	0.00%	0.00%	2.04%	12.78%	2.63%	0.00%	0.00%	2.73%
20	OTHER NON-RECYCLABLE TRASH	42.65%	43.20%	45.76%	51.07%	55.28%	48.50%	31.55%	61.89%	39.40%	51.22%	50.78%	60.24%	49.64%	48.72%	62.35%	62.94%	59.18%	50.36%
	TOTALS	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%