

Final Report

**WAKE COUNTY SCHOOLS
RECYCLING PROJECT:
WASTE COMPOSITION AUDITS
AND FOLLOW UP INTERVIEWS**

Wake County
Solid Waste Management Division

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R. W. BECK

**WAKE COUNTY SCHOOLS RECYCLING PROJECT:
WASTE COMPOSITION AUDITS AND FOLLOW UP INTERVIEWS**

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WAKE COUNTY SCHOOLS RECYCLING PROJECT: SCHOOL WASTE COMPOSITION AUDITS AND FOLLOW UP INTERVIEWS

Methodology

R.W. Beck performed on-site waste composition audits, during the week of November 3rd, 2003, at thirteen schools selected by Wake County Solid Waste and the County Public School System. Information about waste handling practices at these schools is provided in Table 1. These were visual "spot" audits, conducted by two members of the R.W. Beck project team as follows:

- Each dumpster was measured to determine its volume;
- The volume of waste inside each dumpster was measured;
- Visual estimates of the waste composition by volume in each dumpster were made using nineteen material categories;
- Custodial and, in some instances, cafeteria staff were interviewed at each school (when available) to develop an understanding of waste generation patterns, sources of particular waste streams, and existing waste management practices within each school;
- A determination was made regarding the availability of additional space for another dumpster or rollout carts at each school; and
- Observations were made about the buildings layout that might impact the design of a recycling program for each school.

Subsequent to completing the on-site waste audits, telephone interviews were conducted with the coordinators of recycling programs identified as present in selected schools.

School Waste Composition Audits and Follow Up Interviews

Table 1
Schools Included in Waste Audit

School Name	Level	Address	Location	# Waste Coll'n Dumpsters	Service Frequency (days/wk.)	Service Schedule
Apex	MS	6150 Old Jenks Rd	Apex	2	3	M W F
Daniels	MS	2816 Oberlin Rd.	Raleigh	3	3	M W F
Davis Drive	ES	2151 Davis Dr	Cary	2	3	M W F
Douglas	ES	600 Ortega Rd	Raleigh	1	3	M W F
Durant Road	MS	10401 Durant Rd	Raleigh	2	3	M W F
Fuquay	ES	6600 Johnson Pond Rd	Fuquay	1	3	M W F
Green	ES	5307 Six Forks Rd	Raleigh	1	3	M W F
Green Hope	HS	2500 Carpenter Upchurch Rd	Cary	2	3	M W F
Holly Springs	ES	401 Holly Springs Rd	Holly Springs	1	5	5 days
Leesville Road	HS	8409 Leesville Rd	Raleigh	2	5	5 days
Sanderson	HS	5500 Dixon Drive	Raleigh	3	4	M, T, TH, F
Timber Drive	ES	1601 Timber Dr	Garner	1	3	M W F
Yates Mill	ES	5993 Yates Mill Pond Rd	Wake Co.	1	2	T F

Note: Data provided by BFI and WCPSS.

Findings

Waste Composition

Raw composition data for each school audited is provided in Appendix A. It was observed that, based on the audit data, all audited elementary schools had roughly the same waste composition; all middle schools had roughly the same waste composition; and all high schools had roughly the same waste composition. Given the relative uniformity of waste composition by school type, R. W. Beck applied these waste compositions to all WCPSS schools of the same type. Figures 1-6 (respectively) show the projected compositions of the elementary, middle, and high school waste by volume and by weight. The volume composition was determined by estimating the percent composition, which was then multiplied by the total volume of waste. The weight composition was determined by converting the volume numbers to weights using specific density factors (see Table 2). Material categories not shown in the pie charts comprised less than one percent of the waste stream.

School Waste Composition Audits and Follow Up Interviews

Figure 1. Composition of Elementary School Waste (by volume)

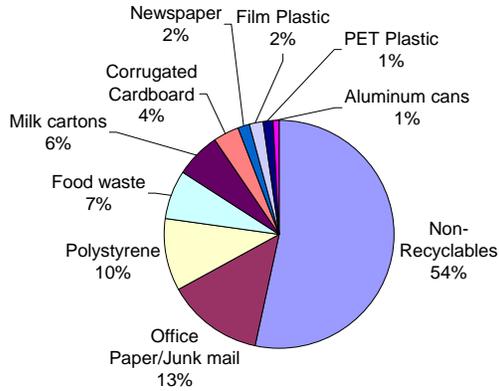


Figure 2. Composition of Elementary School Waste (by weight)

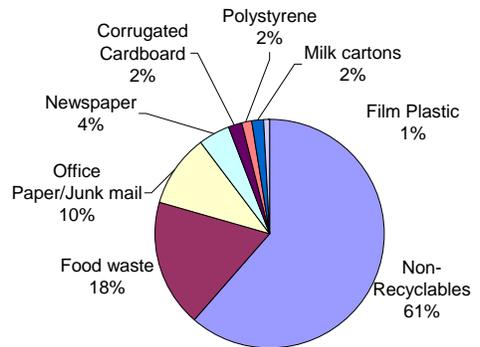


Figure 3. Composition of Middle School Waste (by volume)

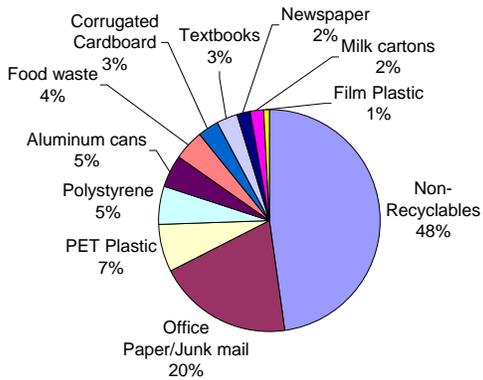
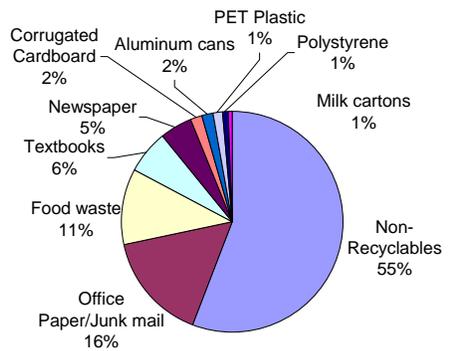


Figure 4. Composition of Middle School Waste (by weight)



School Waste Composition Audits and Follow Up Interviews

Figure 5. Composition of High School Waste (by volume)

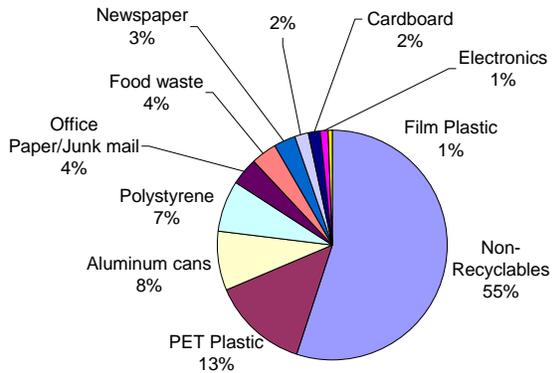


Figure 6. Composition of High School Waste (by weight)

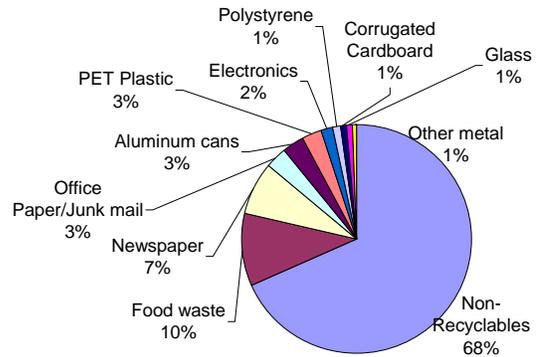


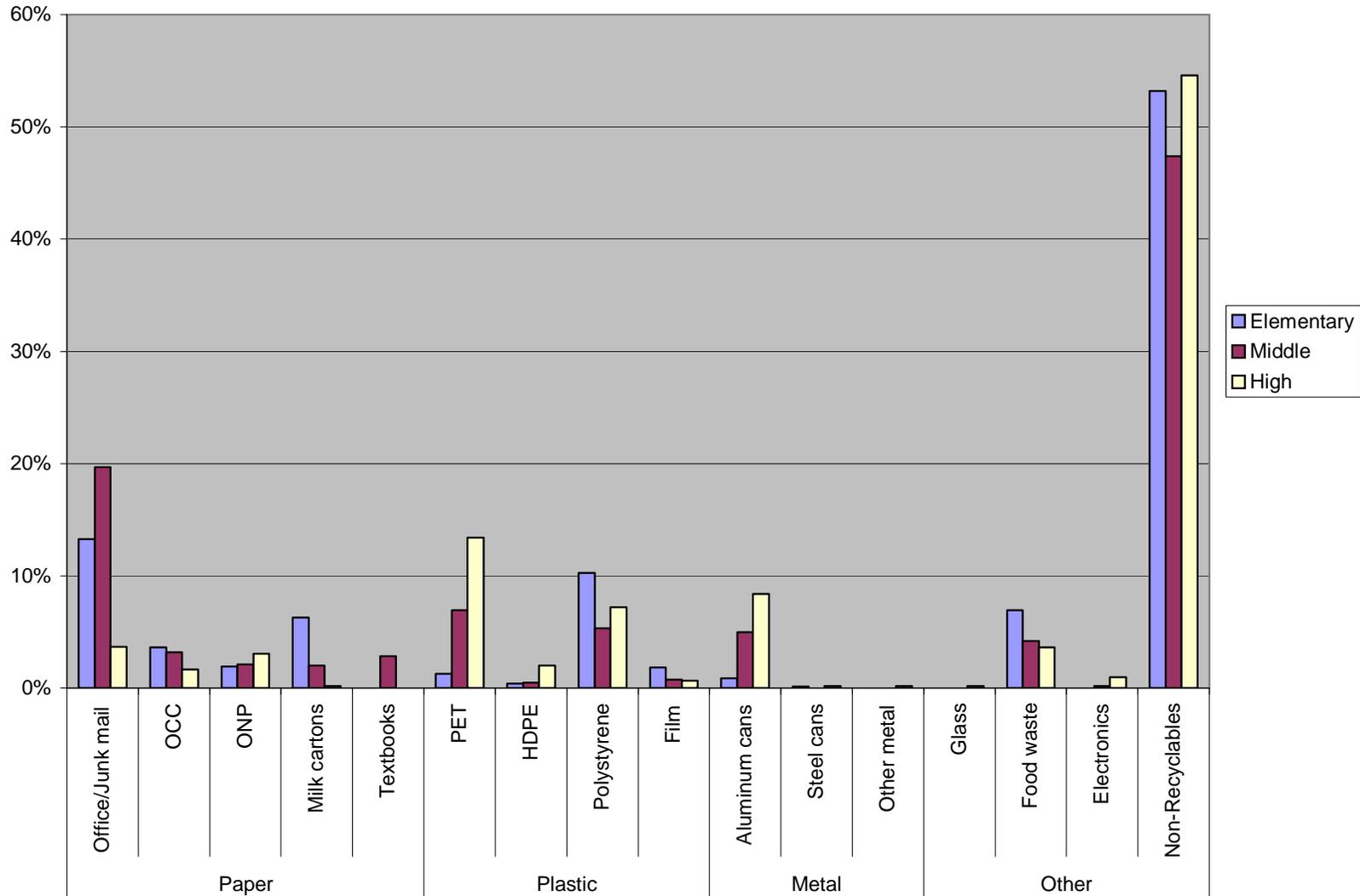
Table 2
Density Factors Used to Convert Volume to Weight

Waste Component		Lbs./yd ³	Tons/yd ³
Paper	Office paper/Junk mail	150	0.08
	Corrugated cardboard	100	0.05
	Newspaper	430	0.22
	Milk cartons	48	0.02
	Textbooks	420	0.21
Plastic	PET	35	0.02
	HDPE	24	0.01
	Polystyrene	30	0.02
	Film	84	0.04
Metal	Aluminum cans	62	0.03
	Steel cans	150	0.08
	Other metal	540	0.27
Glass		600	0.30
Food waste		490	0.25
Electronics		300	0.15
Non-recyclables		220	0.11

Figures 7 and 8 show a comparison of the waste composition for the three types of schools, by volume and by weight.

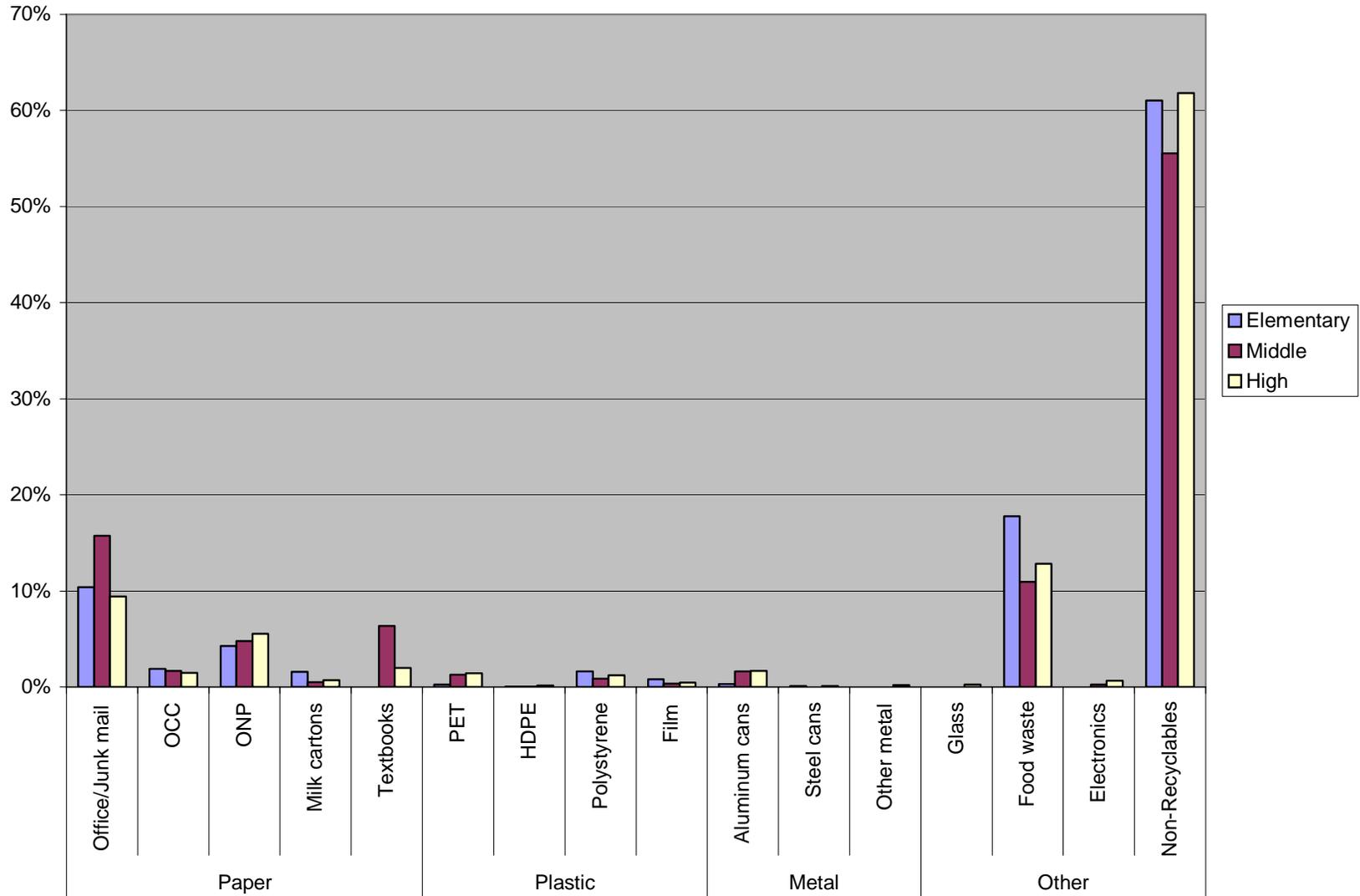
School Waste Composition Audits and Follow Up Interviews

Figure 7. Comparison of Waste Composition by School Type and by Volume



School Waste Composition Audits and Follow Up Interviews

Figure 8. Comparison of Waste Composition by School Type and Weight



School Waste Composition Audits and Follow Up Interviews

The waste compositions for the three types of schools were then aggregated and weighted appropriately by the number of elementary, middle, and high school students in all of Wake County to determine a projected composition of the WCPSS waste countywide. Figures 9-10 and Table 3 show this projected composition by volume and weight, respectively. "Non-Recyclables" are any items that would not be targeted through a school system recycling program, including: candy wrappers, fast food packaging, items made from multiple types of materials such as notebooks and binders, paper towels, textiles, rigid non-bottle plastic items such as plastic pots for plants, and project supplies such as wood used in drama and shop class projects.

Figure 9. Composition of Wake County School System Waste (by volume)

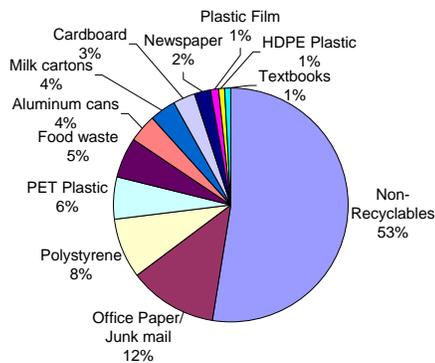


Figure 10. Composition of Wake County School System Waste (by weight)

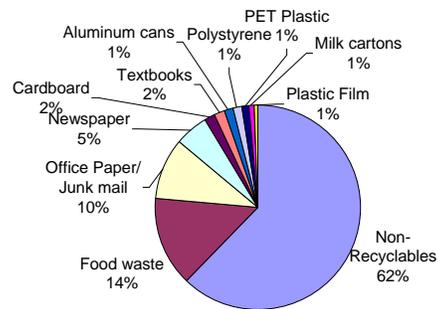


Table 3
Composition of Wake County School System Waste

Material Category	Percent by Volume	Percent by Weight
Non-recyclables	53%	62%
Office paper/junk mail	12%	10%
Polystyrene	8%	1%
PET plastic	6%	1%
Food waste	5%	14%
Aluminum cans	4%	1%
Milk cartons	4%	1%
Corrugated cardboard	3%	2%
Newspapers	2%	5%
HDPE plastic	1%	1%
Textbooks	1%	2%
Plastic film	N/A	1%

Impact of Extracurricular Activities on Waste Composition

Of the 13 schools audited, 2 elementary schools had before school programs, 1 middle and 5 elementary schools had both before and after school programs, and none of the high schools had any type of before or after school program. Schools with before and after school programs had more food packaging and food waste than schools without such programs. Schools with before school programs also had more milk cartons and polystyrene plates.

Schools that had sports events, such as soccer and football games, had a greater amount of beverage containers in their dumpsters than schools without such events, regardless of whether Igloos were on campus. It appeared that these items were not being captured through any of the audited schools' recycling programs. Whether those schools had more PET bottles or aluminum cans depended on the type of beverage containers (bottled or canned) that were sold in each school's concession contractor.

While some schools with recycling programs had less recyclable materials of certain types in their dumpsters during the audit period, these results were inconsistent. It does appear, however, that the high schools with News and Observer newspaper collection bins had less newspapers in their dumpsters. This was not true for the elementary and middle schools audited however.

Holiday celebrations result in holiday-related waste that may have varying effects on the waste stream. As a result of Halloween, occurring the weekend prior to the audit week, candy wrappers were prevalent in many of the audited schools' dumpsters.

Other Considerations Regarding Composition

In reviewing the composition data presented above, it is important to keep in mind that the composition of waste during the audit week presents a snapshot of waste composition, and that average composition over the course of the school year is likely to be different. The amount of recyclables in the waste stream, however, is likely to be relatively consistent, given the ongoing nature of the generation of these materials. However, at selected schools there were items in the dumpsters, such as the HVAC system filters found at one school, that would not appear in the waste stream on a daily basis and that affected the overall composition results.

On-Site Storage Space

While performing the visual waste audits, observations were also made regarding the availability of space for an additional dumpster or space for the storage of carts. Table 4 summarizes these results.

School Waste Composition Audits and Follow Up Interviews

**Table 4
Observations Regarding Storage Space for Recovered Materials**

School	Storage Space
Apex	Room for additional dumpster or carts at loading dock. Igloo already in use. (One 2-story building.)
Daniels	Igloo and N&O containers already on site. Room for additional dumpster. Dumpster was recommended over carts by staff interviewed. (Two 2-story buildings, two mobile units.)
Davis Drive	No dumpster space. Space is tight at loading dock. Carts would be best, however storage space is limited. (One 1-story building, 11 mobile units.)
Douglas	Igloo and N&O containers already on site. Room for additional dumpster. (One 1-story building, two mobile units.)
Durant Road	N&O container(s) already on site. Carts are preferable as school is very spread out. (One 1-story building, three mobile units.)
Fuquay-Varina	N&O container(s) already on site. Room for additional dumpster at loading dock, however carts may be preferable as classrooms are spread out. (Nine mobile units.)
Green	No room for additional dumpster, but sufficient room for storage of carts. (Two buildings, one of which is 2 stories, three mobile units.)
Green Hope	Igloo and N&O containers already on site, however carts would be preferable as school has multiple floors and is spread out (One 3-story building, fifteen mobile units).
Holly Springs	Igloo and N&O containers already on site. Room for additional dumpster. (One building, four mobile units.)
Leesville Road	No room for additional dumpster at loading dock. School is very spread out. Carts would be best. (Two 2-story buildings, fourteen mobile units.)
Sanderson	Room likely available for additional dumpster. Room is available for carts. (Two 2-story buildings.)
Timber Drive	Room for additional dumpster at the loading dock. (One 1-story building.)
Yates Mill	Room for additional dumpster. (One 1-story building.)

Note: Mobile units information from WCPSS websites and/or school staff.

Telephone Interview Results

As a follow-up to R. W. Beck's visual audit of waste composition in selected Wake County school dumpsters, R. W. Beck identified eight schools that appeared to have recycling programs for paper and possibly other materials. R. W. Beck attempted to interview representatives of the following schools to learn more about their apparent recycling programs:

- Apex Middle School
- Daniels Middle School
- Douglas Elementary School
- Durant Road Middle School

School Waste Composition Audits and Follow Up Interviews

- Green Hope High School
- Holly Springs Elementary School
- Leesville Road High School
- Yates Mill Elementary School

Of the eight schools listed above, six responded to our requests for information. Information requested included:

- Types of materials recycled;
- Containers used;
- Who delivers materials to final Igloo or other final container, and how;
- Extent to which the public utilizes Igloos (if at all);
- How education about the recycling program takes place;
- Interviewee's role in the program;
- How the school program could be improved;
- Portion of recyclables generated being captured; and
- Portion of classrooms and offices in the school participating in program.

R. W. Beck also asked the interviewees to provide information regarding the quantity of materials recovered; however no school was able to provide this information. Although only six schools were interviewed (in some cases, more than one individual at a school was queried, depending on the respondent's ability to answer all questions), some interesting and often common feedback was provided. These points are presented below, categorized by topic. Table 5 presents a summary description of the in-house recycling efforts (aside from OCC and cafeteria polystyrene and food cans recycling) underway at the audited schools, showing the interviewed schools with recycling programs in highlighted text. The types of materials recycled are listed as described by the interviewees.

Education

- In virtually all cases, education pertaining to the school recycling program was the responsibility of the teacher who is the program representative. The teacher's level of enthusiasm, time, and initiative therefore, has a large impact on the success of the program. It is therefore expected that education among the schools is inconsistent.
- If schools used curricula or educational materials to teach about recycling and environmental issues, they generally found this information themselves, through resources geared for children.
- It was suggested that educational materials be:
 - Short, concise, and require very little work on the part of the teacher;
 - Integrative – include concepts that the teachers have to teach anyway, such as math or reading.

School Waste Composition Audits and Follow Up Interviews

- Be illustrative in nature – particularly for the younger grades. One representative for example, made a poster by hot-gluing materials that can be recycled through the program to a piece of poster board, and hung it in the cafeteria.
- Even among program representatives, and as indicated by the descriptions of materials recycled, there was a lack of understanding as to what materials could be recovered. It is clear that specific information and documentation is required regarding:
 - Paper recycling – What can be included? White paper only? Construction paper?
 - Plastics recycling – What can be included? Bottles only? What about fruit cups and other single-serving snack containers?

In calling the schools, it was clear that the office staff knew very little about what was being recycled in their school. This brought into question whether office personnel were participating in the program.

School Waste Composition Audits and Follow Up Interviews

Table 5
Summary of Audited Schools in House Recycling Programs

School	Contact	Head Custodian	Paper Recycling?	Other Materials?	In-Class Containers	Transition Containers	External Containers	% of Targeted Materials Recovered	Who Moves Materials
Apex*	Tanya Scott	Therone Holiday	Yes – office/copy paper; construction paper, etc.	No	Usually cardboard boxes, some milk crates -- up to teacher	Media center four-wheeled cart w/shelves	Have Igloo	Unknown	Jr. Beta Club Members
Daniels	Joyce Steele	Cornelius Chapman	Yes – office/copy paper, magazines and junk mail; newspaper (through Raleigh N & O)	AL cans, printer cartridges, PET bottles	30-32-gallon barrels (without wheels)	Plastic bags for AL cans and PET bottles. Classroom paper items have no transitional containers. Magazines/junk mail in wheeled cart.	Have Igloo, N&O bins	80% of AL cans generated by adults outside cafeteria, break rooms; 75% of plastic bottles generated in class room, nearly all AL cans and PET generated in cafeteria/break rooms; 40-50% of white paper in class room, 100% in copy rooms. 80% of magazines and junk mail.	Primarily students, with some teacher assistance
Davis Drive		Joe Adams	No	No					
Douglas	Anne Sergeant	Tieu Nguyen	Yes	AL cans, glass, HDPE, PET bottles	18-gallon recycling bins purchased by school for \$5.00 each	NA	Have Igloo, N&O bins	90% of paper, 100% AL cans, 90-100% PET bottles	Third through fifth grade students

School Waste Composition Audits and Follow Up Interviews

School	Contact	Head Custodian	Paper Recycling?	Other Materials?	In-Class Containers	Transition Containers	External Containers	% of Targeted Materials Recovered	Who Moves Materials
Durant Road**	Cathy Stone	Glenn Moss (talked with Paula in office)	?	?		NA	Have Igloos		
Fuquay-Varina	Ray Newlin	Mae Smith	No	No			Want recycling		
Green	Jennifer Browndorf	Elvin Holden (talked with Ms. Walker)	No	No			Want recycling		
Green Hope	Carl Rush	Clayton Johnson	Yes	AL cans; HDPE, PET bottles	Copy paper boxes	Large wheeled carts	Have Igloo	80% of paper, 35% of plastic and AL cans	Environmental Club Members
Holly Springs	Mrs. Cardenas	Juanita Caltagirone	Yes – office/copy paper; newspaper (through Raleigh N & O)	No	Copy paper boxes	Three large (65-gallon) barrels; four-wheeled flat cart	Have Igloo, N&O bins	At least 80%	Students empty classroom boxes into three large barrels in main hallways (plus one for newspaper). Custodian empties into Igloo.
Leesville Road**	Dr. Dubay	Tu Trinh	?	?					
Sanderson		Loyd Bell (office) 881-4834	No	No					
Timber Drive	Ted Fillhart	Jackie Trice (talked with Diane Letterborough)	No	No					

School Waste Composition Audits and Follow Up Interviews

School	Contact	Head Custodian	Paper Recycling?	Other Materials?	In-Class Containers	Transition Containers	External Containers	% of Targeted Materials Recovered	Who Moves Materials
Yates Mill	Kim Grant	Mary Adams	Yes – office/copy paper; newspaper (through Raleigh N & O)	AL cans	Trays or mail bins (in lounge, near copy machines)	Bags	No containers on site, take to Cary High	90% of each material type	Students sort; faculty bag materials and take to Cary High Igloos.

* Highlighted rows reflect schools that were interviewed and determined to have recycling programs.

** Did not respond to requests for information.

Public Participation

In some schools the Igloos are open to public use, and in others they are not. One school's Igloos were once open to the public, but removed at a neighbor's request. This school currently only recovers internally generated paper, using a dumpster. In general, public participation in the program was thought to be beneficial only when a significant portion of the student body was living in rural areas where curbside collection of recyclables might not be available. Otherwise, most representatives agreed that it would be unlikely that residents would go out of their way to bring their recyclables to the school, rather than recycle them at the curb.

Containers

There is some variety in the types of containers and carts used. In most cases, the representatives did not think the Igloos themselves or the transitional containers or carts needed to be improved. Yates Mill Elementary does not have containers on-site, however. Materials are delivered to the Cary High School recycling containers. The school would like to have recycling on-site. Another school, Daniels Middle School, has two buildings, and that school's representative thinks the Igloos could be located in a more central, convenient location for both buildings.

Several representatives noted that they used copy paper boxes for in-class recycling, and that they thought sturdy, highly visible in-class containers would make the program more successful.

Range of Materials Recovered

All of the schools recovered paper, and most recovered newspaper through a program with the Raleigh News and Observer. As mentioned above in the Education subsection, many schools are not clear on what types of paper can be recovered in the program. Schools that did not recover aluminum cans and plastic bottles, particularly at the middle school and high school levels, thought that these items should indeed be recovered. In the elementary schools, these materials are generated primarily by the staff, and therefore recycling of these materials is often limited to the teacher lounges, despite the fact that containers particularly water bottles, also seem to be generated in the classroom. One representative noted that she would like to see chipboard and milk cartons added to the program.

Success of Programs

Most representatives thought that they did a fairly good job of recovering recyclables where it was convenient – in teacher lounges, cafeterias, and at the copy machines. It was more difficult to assess the success of in-class paper recycling, and it is expected that a greater degree of variance exists in in-classroom paper recovery, depending upon the enthusiasm of the individual teachers.

Several representatives noted that an increase in participation could be spurred by a recycling program that had meaningful results to students. Many schools participate in the Box Tops for Education program, and recycle ink cartridges through the Cartridges for Kids program. These programs provide a direct financial benefit to the students, so students, teachers, and parents are motivated to participate.

Who Moves Materials

In nearly all of the schools interviewed, the janitor's involvement in the school recycling programs was minimal or none. In general, teachers and students move the materials from the classroom to a transitional container, if used, and then to the Igloos. The exception to this was Holly Springs Elementary, where Igloos have been removed. The janitor, therefore, brings the paper to the dumpster after the students have deposited it into transitional carts. Children are supervised by adults when taking materials to the Igloos.

Recycling at Special Events

Several school representatives thought they could do a better job of recycling at special events, particularly those working in middle and high schools, where sporting events often result in the generation of aluminum cans and plastic bottles. Many elementary school level events seem to result in the generation of non-recyclable materials, such as wax-coated paper plates, napkins, and pizza boxes.

Preliminary Recommendations

As a result of completing the waste audits and subsequent interviews, R. W. Beck offers the following preliminary recommendations pertaining to the design of the pilot program and ultimately, the system wide program. As the pilot is implemented and more is learned, these recommendations may be modified.

- Collect mixed office paper in all three school grade levels.
- Collect PET bottles and aluminum cans at the high and middle schools, including collection of beverage containers from sporting and other special events. If beverage containers and paper are to be collected in the same container, as is currently being considered for the pilot, explore means of minimizing paper contamination resulting from fluids contained in the beverage containers (e.g., education, bagging of containers prior to placement with the paper, etc.)
- Continue the separate collection programs for ONP (sponsored by the News and Observer) and OCC.
- Continue the recycling program for polystyrene cafeteria trays and steel food cans as long as markets remain available. Assuming polystyrene tray recycling is continued, investigate inclusion of other expanded polystyrene waste items, such as drink cups, from the teacher break rooms and the school cafeterias.
- Provide collection containers (such as curbside recycling bins) in each classroom and other target materials generation sites as well as decals, signs and other educational materials.
- Use carts to collect and store recyclables, particularly in schools that have sprawling campuses and multiple floors.
- Give school personnel a choice in carts, based on storage space and usage needs.
- Rely primarily on teachers and students to handle the recyclable materials, while making the system as user friendly and simple as possible.

RAW DATA BY SCHOOL

Appendix A

		School #1					
School		Green Elementary					
Day, Date, & Time		Wednesday, Nov. 5, 2003, 8:05 A.M.					
Dumpster		Dumpster 1		Dumpster 2		Dumpster 3	
Location		behind school near					
Dimensions of dumpster	length (ft)	5.5					
	width (ft)	6.0					
	height (ft)	6.0					
Fullness level from top (in)		22					
Volume of dumpster	garbage (yd3)	4.89		0.00		0.00	
	container (yd3)	7.33		0.00		0.00	
		%	Volume	%	Volume	%	Volume
Paper	Office/Junk mail	10%	0.49		0		0
	OCC	5%	0.24		0		0
	ONP		0.00		0		0
	Milk cartons	3%	0.15		0		0
	Textbooks		0.00		0		0
Plastic	PET	1%	0.05		0		0
	HDPE		0.00		0		0
	Polystyrene	15%	0.73		0		0
	Film	2%	0.10		0		0
Metal	Aluminum cans	1%	0.05		0		0
	Steel cans		0.00		0		0
	Other metal		0.00		0		0
Glass		0.00		0		0	
Organics	Food	6%	0.29		0		0
	Yard waste		0.00		0		0
Electronics	Computers		0.00		0		0
	Monitors		0.00		0		0
	Other		0.00		0		0
Non-Recyclables		57%	2.79		0		0
Misc.	Ceiling tiles		0.00		0		0
	Pizza boxes		0.00		0		0
	Filters		0.00		0		0
	Chair		0.00		0		0
	Wood		0.00		0		0
	Styrofoam		0.00		0		0
	Other packing		0.00		0		0
TOTAL		100%	4.89	0%	0	0%	0

Comments

No room for a Dumpster
 Yes - room for carts - outside storage bay
 Non recyclables had a lot of fast food/snack containers - rigid plastics and paper towels

RAW DATA BY SCHOOL

School		Sanderson High School					
Day, Date, & Time		Wednesday, Nov. 5, 2003, 10:16 A.M.					
Dumpster		Dumpster 1		Dumpster 2		Dumpster 3	
Location		Service Area		Service Area		Service Area	
Dimensions of dumpster	length (ft)	6.0		6.0		6.0	
	width (ft)	6.0		6.0		6.0	
	height (ft)	5.5		5.5		5.5	
Fullness level from top (in)		24		66		42	
Volume of dumpster	garbage (yd3)	4.89		0.61		3.06	
	container (yd3)	7.33		7.33		7.33	
		%	Volume	%	Volume	%	Volume
Paper	Office/Junk mail	8%	0.39		0.00		0.00
	OCC	2%	0.10	19%	0.12	5%	0.15
	ONP	15%	0.73	3%	0.02	1%	0.03
	Milk cartons		0.00		0.00	2%	0.06
	Textbooks		0.00		0.00		0.00
Plastic	PET	10%	0.49	34%	0.21	18%	0.55
	HDPE	3%	0.15	20%	0.12		0.00
	Polystyrene	2%	0.10	3%	0.02	27%	0.83
	Film	1%	0.05		0.00	3%	0.09
Metal	Aluminum cans	1%	0.05		0.00	7%	0.21
	Steel cans		0.00		0.00	2%	0.06
	Other metal		0.00		0.00		0.00
Glass		0.00		0.00		0.00	
Organics	Food	5%	0.24	2%	0.01	10%	0.31
	Yard waste		0.00		0.00		0.00
Electronics	Computers		0.00		0.00		0.00
	Monitors		0.00		0.00		0.00
	Other		0.00		0.00		0.00
Non-Recyclables		52%	2.54	19%	0.12	15%	0.46
Misc.	Ceiling tiles	1%	0.05		0.00		0.00
	Pizza boxes		0.00		0.00	10%	0.31
	Filters		0.00		0.00		0.00
	Chair		0.00		0.00		0.00
	Wood		0.00		0.00		0.00
	Styrofoam		0.00		0.00		0.00
	Other packing		0.00		0.00		0.00
TOTAL		100%	4.89	100%	0.61	100%	3.06

Comments

Dumpster 1: Baby shower waste - Mostly classroom waste.
 Non-Recy= drink cups, paper towels, candy wrappers, wrapping paper, ream wrapper, food pack.
 Dumpster 2: Field trash from soccer game.
 Dumpster 3: Mostly cafeteria, misc waste was pizza boxes.

Appendix A

		School #3					
School		Leesville High School					
Day, Date, & Time		Wednesday, Nov. 5, 2003, 9:06 A.M.					
Dumpster		Dumpster 1		Dumpster 2		Dumpster 3	
Location		Walled area		Walled area			
Dimensions of dumpster	length (ft)	6.0		6.0			
	width (ft)	6.0		6.0			
	height (ft)	5.5		5.5			
Fullness level from top (in)		12		0			
Volume of dumpster	garbage (yd3)	6.11		7.33		0.00	
	container (yd3)	7.33		7.33		0.00	
		%		Volume		%	
		%		Volume		%	
Paper	Office/Junk mail	5%	0.31	5%	0.37		0
	OCC	1%	0.06		0.00		0
	ONP	1%	0.06	1%	0.07		0
	Milk cartons		0.00		0.00		0
	Textbooks		0.00		0.00		0
Plastic	PET	10%	0.61	15%	1.10		0
	HDPE		0.00	5%	0.37		0
	Polystyrene	3%	0.18	5%	0.37		0
	Film	1%	0.06		0.00		0
Metal	Aluminum cans	5%	0.31	5%	0.37		0
	Steel cans		0.00		0.00		0
	Other metal	1%	0.06		0.00		0
Glass		1%	0.06		0.00		0
Organics	Food	2%	0.12	5%	0.37		0
	Yard waste		0.00		0.00		0
Electronics	Computers	5%	0.31		0.00		0
	Monitors		0.00		0.00		0
	Other		0.00		0.00		0
Non-Recyclables		30%	1.83	49%	3.59		0
Misc.	Ceiling tiles		0.00		0.00		0
	Pizza boxes		0.00		0.00		0
	Filters	25%	1.53	10%	0.73		0
	Chair		0.00		0.00		0
	Wood	10%	0.61		0.00		0
	Styrofoam		0.00		0.00		0
	Other packing		0.00		0.00		0
TOTAL		100%	6.11	100%	7.33	0%	0

Comments

Classroom waste was very diverse but Non-recyclable paper. Dumpster 2 was so full, we could only look at bags on top, assumed black bags contained classroom waste.

RAW DATA BY SCHOOL

		School #4					
School		Timber Drive Elementary					
Day, Date, & Time		Tuesday, Nov. 4, 2003, 9:40 A.M.					
Dumpster		Dumpster 1	Dumpster 2	Dumpster 3			
Location		Loading dock					
Dimensions of dumpster	length (ft)	5.11					
	width (ft)	5.6					
	height (ft)	5.11					
Fullness level from top (in)		36					
Volume of dumpster	garbage (yd3)	2.24	0.00	0.00		0.00	
	container (yd3)	5.42	0.00	0.00		0.00	
		%	Volume	%	Volume	%	Volume
Paper	Office/Junk mail	20%	0.45		0		0
	OCC	1%	0.02		0		0
	ONP		0.00		0		0
	Milk cartons	9%	0.20		0		0
	Textbooks		0.00		0		0
Plastic	PET	2%	0.04		0		0
	HDPE		0.00		0		0
	Polystyrene	5%	0.11		0		0
	Film	1%	0.02		0		0
Metal	Aluminum cans	1%	0.02		0		0
	Steel cans		0.00		0		0
	Other metal		0.00		0		0
Glass		0.00		0		0	
Organics	Food	3%	0.07		0		0
	Yard waste		0.00		0		0
Electronics	Computers		0.00		0		0
	Monitors		0.00		0		0
	Other		0.00		0		0
Non-Recyclables		58%	1.30		0		0
Misc.	Ceiling tiles		0.00		0		0
	Pizza boxes		0.00		0		0
	Filters		0.00		0		0
	Chair		0.00		0		0
	Wood		0.00		0		0
	Styrofoam		0.00		0		0
	Other packing		0.00		0		0
TOTAL		100%	2.24	0%	0	0%	0

Comments

YMCA before and after school program.
Milk cartons used - breakfast
Some kids take food back to classrooms to eat.

Appendix A

		School #5					
School		Daniels Middle School					
Day, Date, & Time		Tuesday, Nov. 4, 2003, 10:30A.M.					
Dumpster		Dumpster 1		Dumpster 2		Dumpster 3	
Location		Parking lot		Parking lot		Left side	
Dimensions of dumpster	length (ft)	6.0		6.0		6.0	
	width (ft)	6.0		6.0		6.0	
	height (ft)	5.5		5.5		5.5	
Fullness level from top (in)		30		72		0	
Volume of dumpster	garbage (yd3)	4.28		0.00		7.33	
	container (yd3)	7.33		7.33		7.33	
		%		Volume		%	
		%		Volume		%	
Paper	Office/Junk mail	20%	0.86	0	0	40%	2.93
	OCC		0.00		0	3%	0.22
	ONP	4%	0.17		0		0.00
	Milk cartons	12%	0.51		0		0.00
	Textbooks		0.00		0	10%	0.73
Plastic	PET	5%	0.21		0	2%	0.15
	HDPE		0.00		0	1%	0.07
	Polystyrene	8%	0.34		0		0.00
	Film		0.00		0		0.00
Metal	Aluminum cans	4%	0.17		0	2%	0.15
	Steel cans		0.00		0		0.00
	Other metal		0.00		0		0.00
Glass		0.00		0		0.00	
Organics	Food	8%	0.34		0		0.00
	Yard waste		0.00		0		0.00
Electronics	Computers	1%	0.04		0		0.00
	Monitors		0.00		0		0.00
	Other		0.00		0		0.00
Non-Recyclables		38%	1.63		0	42%	3.08
Misc.	Ceiling tiles		0.00		0		0.00
	Pizza boxes		0.00		0		0.00
	Filters		0.00		0		0.00
	Chair		0.00		0		0.00
	Wood		0.00		0		0.00
	Styrofoam		0.00		0		0.00
	Other packing		0.00		0		0.00
TOTAL		100%	4.28	0%	0	100%	7.33

Comments

Dumpster 1: 1 printer
 No before or after school programs.
 Drink machines inside. Teachers recycle AL cans but not through igloos.
 Dumpster 3: looked like end of year or classroom moving.

RAW DATA BY SCHOOL

		School #6						
School		David Drive Elementary						
Day, Date, & Time		Tuesday, Nov. 4, 2003, 12:00P.M.						
Dumpster		Dumpster 1		Dumpster 2		Dumpster 3		
Location		Loading dock area		Loading dock area				
Dimensions of dumpster	length (ft)	6.0		6.0				
	width (ft)	6.0		6.0				
	height (ft)	5.5		5.5				
Fullness level from top (in)		72		30				
Volume of dumpster	garbage (yd3)	0.00		4.28		0.00		
	container (yd3)	7.33		7.33		0.00		
		%	Volume	%	Volume	%	Volume	
Paper	Office/Junk mail		0	20%	0.86		0	
	OCC		0	5%	0.21		0	
	ONP		0	2%	0.09		0	
	Milk cartons		0	10%	0.43		0	
	Textbooks		0		0.00		0	
Plastic	PET		0	1%	0.04		0	
	HDPE		0		0.00		0	
	Polystyrene		0	15%	0.64		0	
	Film		0		0.00		0	
Metal	Aluminum cans		0	1%	0.04		0	
	Steel cans		0		0.00		0	
	Other metal		0		0.00		0	
Glass		0		0.00		0		
Organics	Food		0	10%	0.43		0	
	Yard waste		0		0.00		0	
Electronics	Computers		0		0.00		0	
	Monitors		0		0.00		0	
	Other		0		0.00		0	
Non-Recyclables			0	36%	1.54		0	
Misc.	Ceiling tiles		0		0.00		0	
	Pizza boxes		0		0.00		0	
	Filters		0		0.00		0	
	Chair		0		0.00		0	
	Wood		0		0.00		0	
	Styrofoam		0		0.00		0	
	Other packing		0		0.00		0	
TOTAL			0%	0	100%	4.28	0%	0

Comments

Both dumpsters are back-to-back.
60 cafeteria, 30 classroom, 10 bathroom

Appendix A

		School #7					
School		Green Hope High School					
Day, Date, & Time		Monday, Nov. 3, 2003, 10:00 A.M.					
Dumpster		Dumpster 1		Dumpster 2		Dumpster 3	
Location							
Dimensions of dumpster	length (ft)	6.0		6.0			
	width (ft)	6.0		6.0			
	height (ft)	5.5		5.5			
Fullness level from top (in)		24		24			
Volume of dumpster	garbage (yd3)	4.89		4.89		0.00	
	container (yd3)	7.33		7.33		0.00	
		%		Volume		%	
		%		Volume		%	
Paper	Office/Junk mail	1%	0.05	1%	0.05		0
	OCC		0.00	2%	0.10		0
	ONP	1%	0.05		0.00		0
	Milk cartons		0.00		0.00		0
	Textbooks		0.00		0.00		0
Plastic	PET	16%	0.78	10%	0.49		0
	HDPE		0.00		0.00		0
	Polystyrene	6%	0.29	10%	0.49		0
	Film		0.00		0.00		0
Metal	Aluminum cans	30%	1.47	5%	0.24		0
	Steel cans		0.00		0.00		0
	Other metal		0.00		0.00		0
Glass		0.00		0.00		0	
Organics	Food		0.00	2%	0.10		0
	Yard waste		0.00		0.00		0
Electronics	Computers		0.00		0.00		0
	Monitors		0.00		0.00		0
	Other		0.00		0.00		0
Non-Recyclables		46%	2.25	70%	3.42		0
Misc.	Ceiling tiles		0.00		0.00		0
	Pizza boxes		0.00		0.00		0
	Filters		0.00		0.00		0
	Chair		0.00		0.00		0
	Wood		0.00		0.00		0
	Styrofoam		0.00		0.00		0
	Other packing		0.00		0.00		0
TOTAL		100%	4.89	100%	4.89	0%	0

Comments

Football game waste, Halloween time-lots of candy wrappers, evidence of parties

RAW DATA BY SCHOOL

		School #8					
School		Fuguay-Varina Elementary					
Day, Date, & Time		Tuesday, Nov. 4, 2003, 8:35 A.M.					
Dumpster		Dumpster 1	Dumpster 2		Dumpster 3		
Location		Loading area					
Dimensions of dumpster	length (ft)	6.0					
	width (ft)	6.0					
	height (ft)	5.5					
Fullness level from top (in)		42					
Volume of dumpster	garbage (yd3)	3.06		0.00		0.00	
	container (yd3)	7.33		0.00		0.00	
		%	Volume	%	Volume	%	Volume
Paper	Office/Junk mail	27%	0.83		0		0
	OCC	4%	0.12		0		0
	ONP	8%	0.24		0		0
	Milk cartons	1%	0.03		0		0
	Textbooks		0.00		0		0
Plastic	PET	1%	0.03		0		0
	HDPE		0.00		0		0
	Polystyrene	4%	0.12		0		0
	Film	4%	0.12		0		0
Metal	Aluminum cans		0.00		0		0
	Steel cans	1%	0.03		0		0
	Other metal		0.00		0		0
Glass		0.00		0		0	
Organics	Food	6%	0.18		0		0
	Yard waste		0.00		0		0
Electronics	Computers		0.00		0		0
	Monitors		0.00		0		0
	Other		0.00		0		0
Non-Recyclables		44%	1.34		0		0
Misc.	Ceiling tiles		0.00		0		0
	Pizza boxes		0.00		0		0
	Filters		0.00		0		0
	Chair		0.00		0		0
	Wood		0.00		0		0
	Styrofoam		0.00		0		0
	Other packing		0.00		0		0
TOTAL		100%	3.06	0%	0	0%	0

Comments

Halloween decorations.
lots of poly trashbags-clean-inside other trash bags

Appendix A

		School #9					
School		Apex Middle					
Day, Date, & Time		Monday, Nov. 3, 2003, 8:15 A.M.					
Dumpster		Dumpster 1		Dumpster 2		Dumpster 3	
Location							
Dimensions of dumpster	length (ft)	5.11		6.10			
	width (ft)	5.60		5.60			
	height (ft)	6.00		5.11			
Fullness level from top (in)		48		25			
Volume of dumpster	garbage (yd3)	1.38		4.26		0.00	
	container (yd3)	6.36		6.47		0.00	
		%		Volume		%	
		%		Volume		%	
Paper	Office/Junk mail	10%	0.14	12%	0.51		0
	OCC	2%	0.03	2%	0.09		0
	ONP	4%	0.06	2%	0.09		0
	Milk cartons		0.00		0.00		0
	Textbooks		0.00		0.00		0
Plastic	PET	1%	0.01	3%	0.13		0
	HDPE		0.00		0.00		0
	Polystyrene	15%	0.21	12%	0.51		0
	Film		0.00	2%	0.09		0
Metal	Aluminum cans	1%	0.01		0.00		0
	Steel cans		0.00		0.00		0
	Other metal		0.00		0.00		0
Glass		0.00		0.00		0	
Organics	Food	15%	0.21	6%	0.26		0
	Yard waste		0.00		0.00		0
Electronics	Computers		0.00		0.00		0
	Monitors		0.00		0.00		0
	Other		0.00		0.00		0
Non-Recyclables		52%	0.72	61%	2.60		0
Misc.	Ceiling tiles		0.00		0.00		0
	Pizza boxes		0.00		0.00		0
	Filters		0.00		0.00		0
	Chair		0.00		0.00		0
	Wood		0.00		0.00		0
	Styrofoam		0.00		0.00		0
	Other packing		0.00		0.00		0
TOTAL		100%	1.38	100%	4.26	0%	0

Comments

Dumpster 1: 50% cafeteria-polytrays, food, p towels, drinks
 30% classroom-office paper, drink, p towels, ONP, p cups
 20% breakroom-textiles, p towels, drink containers, foam cups
 Dumpster 2: Cafeteria incl. after school, work room,
 breakroom, less classrm. waste (60%), 2 bags hshld. garbage

RAW DATA BY SCHOOL

		School #10					
School		Durant Road Middle					
Day, Date, & Time		Thursday, Nov. 6, 2003					
Dumpster		Dumpster 1		Dumpster 2		Dumpster 3	
Location		Loading dock/Service		Loading dock/Service			
Dimensions of dumpster	length (ft)	6.00		6.00			
	width (ft)	6.00		6.00			
	height (ft)	5.50		5.50			
Fullness level from top (in)		42		18			
Volume of dumpster	garbage (yd3)	3.06		5.50		0.00	
	container (yd3)	7.33		7.33		0.00	
		%	Volume	%	Volume	%	Volume
Paper	Office/Junk mail	3%	0.09	10%	0.55		0
	OCC	7%	0.21	5%	0.28		0
	ONP	2%	0.06	3%	0.17		0
	Milk cartons		0.00		0.00		0
	Textbooks		0.00		0.00		0
Plastic	PET	15%	0.46	15%	0.83		0
	HDPE		0.00	1%	0.06		0
	Polystyrene	5%	0.15	3%	0.17		0
	Film		0.00	2%	0.11		0
Metal	Aluminum cans	13%	0.40	10%	0.55		0
	Steel cans		0.00		0.00		0
	Other metal		0.00		0.00		0
Glass		0.00		0.00		0	
Organics	Food		0.00	5%	0.28		0
	Yard waste		0.00		0.00		0
Electronics	Computers		0.00		0.00		0
	Monitors		0.00		0.00		0
	Other		0.00		0.00		0
Non-Recyclables		55%	1.68	46%	2.53		0
Misc.	Ceiling tiles		0.00		0.00		0
	Pizza boxes		0.00		0.00		0
	Filters		0.00		0.00		0
	Chair		0.00		0.00		0
	Wood		0.00		0.00		0
	Styrofoam		0.00		0.00		0
	Other packing		0.00		0.00		0
TOTAL		100%	3.06	100%	5.50	0%	0

Comments

Recycling cart in back near dumpster - mixed and office
 Dumpster 2: Chair

Appendix A

		School #11					
School		Holly Springs Elementary					
Day, Date, & Time		Thursday, Nov, 6, 2003, 7:00 A.M.					
Dumpster		Dumpster 1	Dumpster 2		Dumpster 3		
Location		Service Area					
Dimensions of dumpster	length (ft)	5.50					
	width (ft)	6.00					
	height (ft)	6.00					
Fullness level from top (in)		36					
Volume of dumpster	garbage (yd3)	3.33	0.00		0.00		
	container (yd3)	7.33	0.00		0.00		
		%	Volume	%	Volume	%	Volume
Paper	Office/Junk mail	5%	0.17		0		0
	OCC	10%	0.33		0		0
	ONP		0.00		0		0
	Milk cartons	5%	0.17		0		0
	Textbooks		0.00		0		0
Plastic	PET	5%	0.17		0		0
	HDPE	3%	0.10		0		0
	Polystyrene	4%	0.13		0		0
	Film	7%	0.23		0		0
Metal	Aluminum cans	2%	0.07		0		0
	Steel cans		0.00		0		0
	Other metal		0.00		0		0
Glass		0.00		0		0	
Organics	Food	5%	0.17		0		0
	Yard waste		0.00		0		0
Electronics	Computers		0.00		0		0
	Monitors		0.00		0		0
	Other		0.00		0		0
Non-Recyclables		54%	1.80		0		0
Misc.	Ceiling tiles		0.00		0		0
	Pizza boxes		0.00		0		0
	Filters		0.00		0		0
	Chair		0.00		0		0
	Wood		0.00		0		0
	Styrofoam		0.00		0		0
	Other packing		0.00		0		0
TOTAL		100%	3.33	0%	0	0%	0

Comments

Fairly homogenous
 1/3 cafeteria, 1/3 calssroom, 1/3 bathroom
 Lots of paper towels

RAW DATA BY SCHOOL

		School #12					
School		Yates Mill Elementary					
Day, Date, & Time		Thursday, Nov. 6, 2003, 8:00 A.M.					
Dumpster		Dumpster 1	Dumpster 2		Dumpster 3		
Location		Service Area					
Dimensions of dumpster	length (ft)	6.00					
	width (ft)	6.00					
	height (ft)	5.50					
Fullness level from top (in)		22					
Volume of dumpster	garbage (yd3)	5.09		0.00		0.00	
	container (yd3)	7.33		0.00		0.00	
		%	Volume	%	Volume	%	Volume
Paper	Office/Junk mail	10%	0.51		0		0
	OCC		0.00		0		0
	ONP	2%	0.10		0		0
	Milk cartons	10%	0.51		0		0
	Textbooks		0.00		0		0
Plastic	PET		0.00		0		0
	HDPE		0.00		0		0
	Polystyrene	15%	0.76		0		0
	Film		0.00		0		0
Metal	Aluminum cans	1%	0.05		0		0
	Steel cans		0.00		0		0
	Other metal		0.00		0		0
Glass		0.00		0		0	
Organics	Food	7%	0.36		0		0
	Yard waste		0.00		0		0
Electronics	Computers		0.00		0		0
	Monitors		0.00		0		0
	Other		0.00		0		0
Non-Recyclables		55%	2.80		0		0
Misc.	Ceiling tiles		0.00		0		0
	Pizza boxes		0.00		0		0
	Filters		0.00		0		0
	Chair		0.00		0		0
	Wood		0.00		0		0
	Styrofoam		0.00		0		0
	Other packing		0.00		0		0
TOTAL		100%	5.09	0%	0	0%	0

Comments

Cafeteria waste w/ paper towels, paper food trays, milk cartons
Classroom waste w/ lots of craft, construction paper

Appendix A

		School #13					
School		Mary P. Douglas Elementary					
Day, Date, & Time		Thursday, Nov. 6, 2003					
Dumpster		Dumpster 1	Dumpster 2		Dumpster 3		
Location		Side					
Dimensions of dumpster	length (ft)	6.00					
	width (ft)	6.00					
	height (ft)	5.50					
Fullness level from top (in)		42					
Volume of dumpster	garbage (yd3)	3.06		0.00		0.00	
	container (yd3)	7.33		0.00		0.00	
		%	Volume	%	Volume	%	Volume
Paper	Office/Junk mail	5%	0.15		0		0
	OCC		0.00		0		0
	ONP	2%	0.06		0		0
	Milk cartons	5%	0.15		0		0
	Textbooks		0.00		0		0
Plastic	PET		0.00		0		0
	HDPE		0.00		0		0
	Polystyrene	5%	0.15		0		0
	Film		0.00		0		0
Metal	Aluminum cans		0.00		0		0
	Steel cans		0.00		0		0
	Other metal		0.00		0		0
Glass		0.00		0		0	
Organics	Food	10%	0.31		0		0
	Yard waste		0.00		0		0
Electronics	Computers		0.00		0		0
	Monitors		0.00		0		0
	Other		0.00		0		0
Non-Recyclables		73%	2.23		0		0
Misc.	Ceiling tiles		0.00		0		0
	Pizza boxes		0.00		0		0
	Filters		0.00		0		0
	Chair		0.00		0		0
	Wood		0.00		0		0
	Styrofoam		0.00		0		0
	Other packing		0.00		0		0
TOTAL		100%	3.06	0%	0	0%	0

Comments

Strong recycling program. Igloos in parking lot.
 3rd, 4th and 5th graders form recycling committee w/ Ms. Sergeant.
 Each classroom has a bin for collection. Recycling Committee separates everything in bins and put into igloos.