



Waste Characterization Study Summary of April 2014 Results



Wake County

Solid Waste Management Division

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1 INTRODUCTION

In April 2014, Wake County of North Carolina contracted with SCS Engineers (SCS) to conduct a waste characterization study of the waste stream generated by schools in Wake County. The primary objective of the study is to estimate the types and quantities of recyclable and compostable waste components in Elementary, Middle, and High School waste streams.

The basis for this waste characterization consists of a five-day sampling event which was conducted from April 21, 2014 through April 25, 2014 during which 40 waste samples were collected and sorted. The data will be used by the County to develop long-term waste management strategies and to evaluate the effectiveness of current recycling programs.

The remaining sections of this report are organized as follows:

- Section 2 describes field classification and sampling methods.
- Section 3 presents project data and results gathered from the study.
- Section 4 provides a breakdown of the most prevalent recyclable and compostable materials in the waste streams.

Appendix A contains the school waste collection routing plan, Appendix B contains forms used to record data during fieldwork, and Appendix C presents the Health and Safety Plan that was in effect during field activities.

2 METHODS

This section summarizes methods used to characterize the waste materials generated by the Wake County Public Schools. Sampling was conducted from April 21 through April 25, 2014. Waste characterization activities were performed by manually sorting samples from waste loads from targeted school classifications (Elementary, Middle, and High Schools) into distinct waste categories.

NUMBER OF SAMPLES

A total of 40 samples were collected and characterized during the April 2014 field activities from the following school levels:

- Elementary Schools: Twenty samples were collected from three routes
- Middle Schools: Ten samples were collected from two routes
- High Schools: Ten samples were collected two routes

WASTE COLLECTION ROUTING

The County coordinated collection of waste from schools with the contracted hauler, Waste Industries. The plan was to collect waste loads from a single school classification and by geography. **Exhibit 1** presents the waste collection routing and sampling plan.

WASTE SAMPLING

Waste sorting was performed at the South Wake Transfer Station adjacent to the South Wake Landfill during the operating hours of the facility. Each day Waste Industries routed a waste collection vehicle dedicated to Elementary, Middle, or High Schools. After collecting a load, the vehicle was directed to the South Wake Transfer Station. After discharging the waste load, SCS personnel gathered several samples from each target load (approximately 200 pounds per sample) for classification (sorting). Two important procedural factors were considered:

- The target vehicle selected for sampling contained the type of waste typically generated in that school classification; and
- The process of acquiring the waste sample did not, in itself, alter the apparent waste composition.

Given the limited size of the data set (40 samples total), it was important that simple random sampling and the potential for unrepresentative data were avoided. Unrepresentative data includes events that generate atypical or seasonal waste such as school closings and holidays.

Exhibit 1. Waste Collection Routes and Number of Samples

School Classification	Routes	Schools		Number of Samples
High School	North	Knightdale High Enloe High Millbrook High Wake Forest High	Wakefield High Sanderson High Leesville High	5
	South	Southeast Raleigh High Athens Drive High Apex High	Fuquay-Varina High Middle Creek High	5
Middle School	North	Moore Square Museum Ligon Middle Carnage Middle East Garner Middle North Garner Middle	East Wake Middle East Millbrook Middle Durant Road Middle Carroll Middle	5
	South	Lufkin Road Middle Apex Middle Salem Middle East Cary Middle	Daniels Middle Martin Middle Centennial Middle Dillard Drive Middle	5
Elementary School	North	Fox Road Elementary Wildwood Forest Elementary Durant Road Elementary Millbrook Elementary North Ridge Elementary Baileywick Elementary	Lead Mine Elementary Green Elementary Jeffreys Grove Elementary York Elementary Hilburn Drive Elementary Stough Elementary	6
	South	Dillard Drive Elementary Yates Mill Elementary Swift Creek Elementary Farmington Woods Elementary Briarcliff Elementary	Baucom Elementary Salem Elementary Olive Chapel Elementary Apex Elementary Oak Grove Elementary Penny Road Elementary	7
	Central	Bugg Elementary Poe Elementary Fuller Elementary Hunter Elementary Conn Elementary Powell Elementary	Wiley Elementary Underwood Elementary Partnership Primary Olds Elementary Combs Elementary Joyner Elementary	7

WASTE SORTING

The sorting and weighing program for samples entailed the use of one sorting crew and an SCS Crew Supervisor. The basic procedures and objectives for sorting (as described below) were identical for each sample, each day. Sorting was performed as follows:

1. The sort crew transferred the refuse sample onto the sorting table until it was full and began sort activities. Large or heavy waste items, such as bags of yard waste, were torn open, examined and then placed directly into the appropriate waste container for subsequent weighing.
2. Plastic bags of refuse were opened and sort crew members manually segregated each item of waste, according to categories defined in **Exhibit 2** and placed it in the appropriate waste container. These steps were repeated until the whole sample was sorted.
3. At the completion of sorting, the waste containers were moved to the scale where a representative of SCS weighed each category and recorded the net weight on the Sort Data Sheet (**Appendix B**). Measurements were made to the nearest 0.02 pounds.
4. After each waste category had been recorded, the materials were placed back on the floor and transferred into a transfer trailer for disposal.

This four-step process was repeated until all of the day's samples taken at the site were characterized. Waste samples were maintained in as-disposed conditions (or as close to this as possible). Proper site layout and close supervision of sampling was maintained to avoid the need to repeatedly handle sampled wastes.

Members of the sorting crew were fully equipped with, high visibility vests, puncture resistant gloves, hard hats and other safety equipment. The Health and Safety Plan is presented in **Appendix C**.

Consistent with good practice in such sampling programs, efforts were made to minimize sampling bias or other impacts on the integrity of the database. To this end, field sampling had been coordinated to avoid holidays and other out of ordinary events.

Due to the County's expressed objective for this study to evaluate recycling programs, waste sorting activities targeted recyclable materials. **Exhibit 2** details the material categories for the waste sorting activities.

Exhibit 2. Description of Waste Categories

Major Waste Types	Waste Component Categories	Examples
Paper	Mixed Paper	Brochures, pamphlets, computer/copy paper, envelopes, manila folders, legal/notebook paper, NCR carbonless paper and checks, junk mail, colored paper, file folders, lined writing paper, and posters
	Newspaper	Newspaper (loose, tied or shredded)
	Corrugated Cardboard	Uncoated brown "cardboard" boxes with a wavy core. Includes clean pizza boxes
	Catalogs/Magazines	Magazines, catalogs, and other printed material on glossy and non-glossy paper
	Telephone Directories	Phone books, white and yellow pages
	Other Recyclable Paper	Paper not currently accepted by the school paper recycling contractor
	Textbooks	Hard and soft covered textbooks
	Aseptic Containers	Gable top milk cartons and juice boxes
Plastics	#2 HDPE Containers	Clear/natural and pigmented bottles or containers coded HDPE #2 such as milk jugs, and detergent bottles
	#1 PET Containers	Clear and colored bottles or containers coded PET #1 such as soda bottles and water bottles
	#6 Polystyrene	Styrofoam plates and trays, cups and items that can successfully be recycled together
	Film	Grocery bags, garbage bags, plastic sheeting, saran wrap, and visqueen
Metal	Aluminum Cans	Aluminum soft drink cans
	Tin/Steel Cans	Food containers and aerosol cans
	Other Metals	Aluminum tins and foils, and other scrap metal
Glass	Glass Containers	Clear, brown, and green glass bottles and jars
Textiles	Textiles	Clothing, rags, and rugs
Compostable Organics	Vegetative Food	Fruits and vegetables, bread, plant based foods
	Non-Vegetative Food	Meats, dairy, and liquids
	Compostable Paper	Tissues, napkins, paper plates and cups, food contaminated paper
	Yard Waste	Grass trimmings, leaves, sticks, and brush
Electronics	Electronics	All electronic devices
C&D Debris	C&D Debris	Sheetrock, carpet, furniture, insulation, rock, and soil
Other Waste	Non-Recyclable Waste	Materials not categorized above. Includes rigid plastics, plastic trays and tubs, diapers, fines, sweepings, and miscellaneous organics

3 SUMMARY OF RESULTS

Forty samples were collected during the sampling event. Data presented include mean percentages by weight, standard deviations, and statistical confidence intervals (95% confidence interval). Derivation of this data is as follows:

$$\text{Mean } (\bar{X}) = \sum_{i=1}^n x_i * \frac{1}{n};$$

$$\text{Standard Deviation } (s) = \sqrt{\frac{(n \sum x^2) - (\sum x)^2}{n(n-1)}}; \text{ and}$$

$$\text{Upper/Lower Confidence Interval Limits} = \bar{X} \pm \left[1.96 * \left(\frac{\sigma}{\sqrt{n}} \right) \right]$$

where: n = number of samples; and
x = sample percentage.

Waste samples are acquired to estimate the schools true waste composition (i.e., the proportion of each waste component present in the waste). The mean is the arithmetic average of all data and the standard deviation is a measure of the dispersion in the data. Together, the mean and standard deviation determine the confidence interval. A 95 percent confidence interval is said to contain the true proportion of a waste component with 95 percent confidence (i.e., similar studies will produce the same results 95 percent of the time).

ELEMENTARY SCHOOLS WASTE COMPOSITION

Exhibit 3 and **Exhibit 4** presents a compilation of the twenty waste samples obtained and sorted from Elementary Schools. Based on these samples, the three largest components, by weight, of the elementary school waste stream are Non-Recyclable Waste (23.8 percent), Vegetative Food (20.1 percent), and Plastic Film (13.4 percent). Common recyclable materials (mixed paper and commingled materials) comprised approximately 24 percent of the waste stream. Compostable materials comprised approximately 38 percent of the waste stream.

Exhibit 3. Elementary School Waste Composition – All Routes

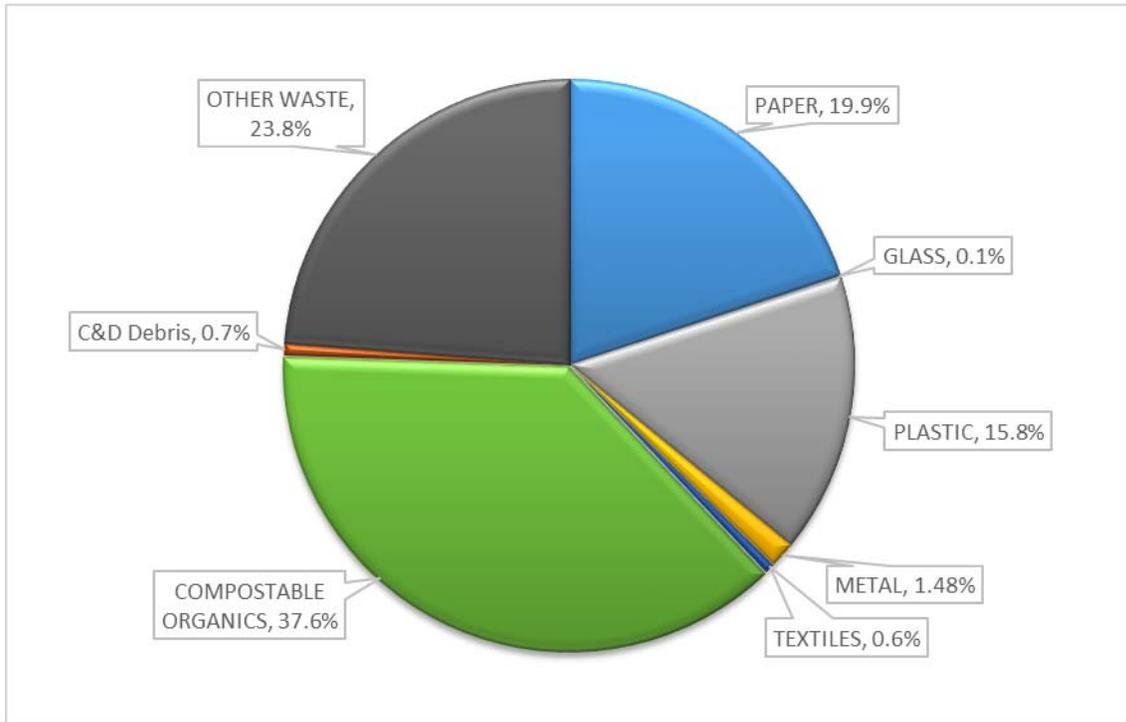


Exhibit 5 presents a side-by-side comparison of the three separate routes that collected waste from Elementary Schools. Mixed Paper is notably higher in the samples collected from the Raleigh Route.

Exhibit 4. Elementary School Waste Composition – All Routes

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits	
			Lower	Upper
PAPER				
Mixed Paper	5.4%	3.2%	4.0%	6.8%
Newspaper	<0.1%	0.4%	<0.1%	0.3%
Corrugated Cardboard	1.8%	1.1%	1.3%	2.2%
Catalogs/Magazines	0.7%	1.0%	0.3%	1.1%
Telephone Directories	<0.1%	<0.1%	<0.1%	<0.1%
Other Recyclable Paper	2.5%	1.7%	1.8%	3.3%
Textbooks	0.7%	1.3%	<0.1%	1.2%
Aseptic Containers	8.8%	2.7%	7.6%	10.0%
Total Paper	19.9%			
PLASTIC				
#2 HDPE Containers	0.1%	0.1%	<0.1%	0.2%
#1 PET Containers	1.3%	0.7%	1.1%	1.6%
#6 Polystyrene Foam	1.0%	0.6%	0.8%	1.3%
Plastic Film	13.4%	3.3%	11.9%	14.8%
Total Plastic	15.8%			
METAL				
Aluminum Cans	0.2%	0.1%	0.1%	0.2%
Tin/Steel Cans	0.2%	0.9%	<0.1%	0.6%
Other Metals	1.1%	2.3%	<0.1%	2.0%
Total Metal	1.5%			
GLASS				
Glass Containers	0.1%	0.2%	<0.1%	0.2%
TEXTILES				
Textiles	0.6%	0.6%	0.3%	0.8%
COMPOSTABLE ORGANICS				
Vegetative Food	20.1%	5.1%	17.8%	22.3%
Non-Vegetative Food	3.4%	1.9%	2.6%	4.3%
Compostable Paper	13.1%	6.0%	10.5%	15.8%
Yard Waste	1.0%	2.7%	<0.1%	2.1%
Total Compostable Organics	37.6%			
ELECTRONICS				
Electronics	<0.1%	<0.1%	<0.1%	<0.1%
C&D Debris				
C&D Debris	0.7%	0.8%	0.3%	1.0%
OTHER WASTE				
Non Recyclable Waste	23.8%	3.9%	22.1%	25.5%
TOTALS	100.0%			

Note: Composition based on 20 samples.

Exhibit 5. Elementary School Waste Composition by Route

	Elementary South	Elementary North	Elementary Raleigh
Material Components	Mean Composition		
PAPER			
Mixed Paper	4.1%	3.3%	8.5%
Newspaper	<0.1%	0.3%	<0.1%
Corrugated Cardboard	1.4%	1.8%	2.1%
Catalogs/Magazines	0.2%	1.3%	0.7%
Telephone Directories	<0.1%	<0.1%	<0.1%
Other Recyclable Paper	2.3%	2.9%	2.4%
Textbooks	0.3%	0.8%	0.9%
Aseptic Containers	10.7%	8.6%	7.0%
Total Paper	19.0%	19.0%	21.6%
PLASTIC			
#2 HDPE Containers	0.1%	<0.1%	<0.1%
#1 PET Containers	1.5%	1.0%	1.5%
#6 Polystyrene Foam	0.9%	0.7%	1.3%
Plastic Film	15.0%	14.7%	10.6%
Total Plastic	17.5%	16.5%	13.5%
METAL			
Aluminum Cans	0.2%	0.2%	0.1%
Tin/Steel Cans	0.7%	<0.1%	<0.1%
Other Metals	0.2%	0.5%	2.3%
Total Metal	1.1%	0.7%	2.5%
GLASS			
Glass Containers	<0.1%	0.2%	0.2%
TEXTILES			
Textiles	0.3%	0.9%	0.6%
COMPOSTABLE ORGANICS			
Vegetative Food	18.2%	19.9%	22.0%
Non-Vegetative Food	3.2%	3.5%	3.6%
Compostable Paper	14.9%	14.3%	10.4%
Yard Waste	1.2%	<0.1%	1.4%
Total Compostable Organics	37.6%	37.8%	37.5%
ELECTRONICS			
Electronics	<0.1%	<0.1%	<0.1%
C&D Debris			
C&D Debris	0.3%	1.3%	0.5%
OTHER WASTE			
Non Recyclable Waste	24.1%	23.6%	23.6%
TOTALS	100.0%	100.0%	100.0%

MIDDLE SCHOOL WASTE COMPOSITION

The routing plan for collecting waste from Middle Schools was based on geography. The intention was to collect waste from Middle Schools via two routes, southern and northern. SCS acquired five samples from the southern route; however, the northern route actually contained waste from Middle Schools located in both southern and northern routes. Five samples were acquired from the combined load.

Exhibit 6 and **Exhibit 7** presents a compilation of the ten waste samples obtained and sorted from both routes of Middle Schools. Based on these samples, the three largest components, by weight, of the waste stream are Non-Recyclable Waste (23.7 percent), Vegetative Food (17.1 percent), and Compostable Paper (12.9 percent). Common recyclable materials (mixed paper and commingled materials) made up approximately 26 percent of the waste stream. Compostable materials made up approximately 35 percent of the waste stream.

Exhibit 6. Middle School Waste Composition – All Routes

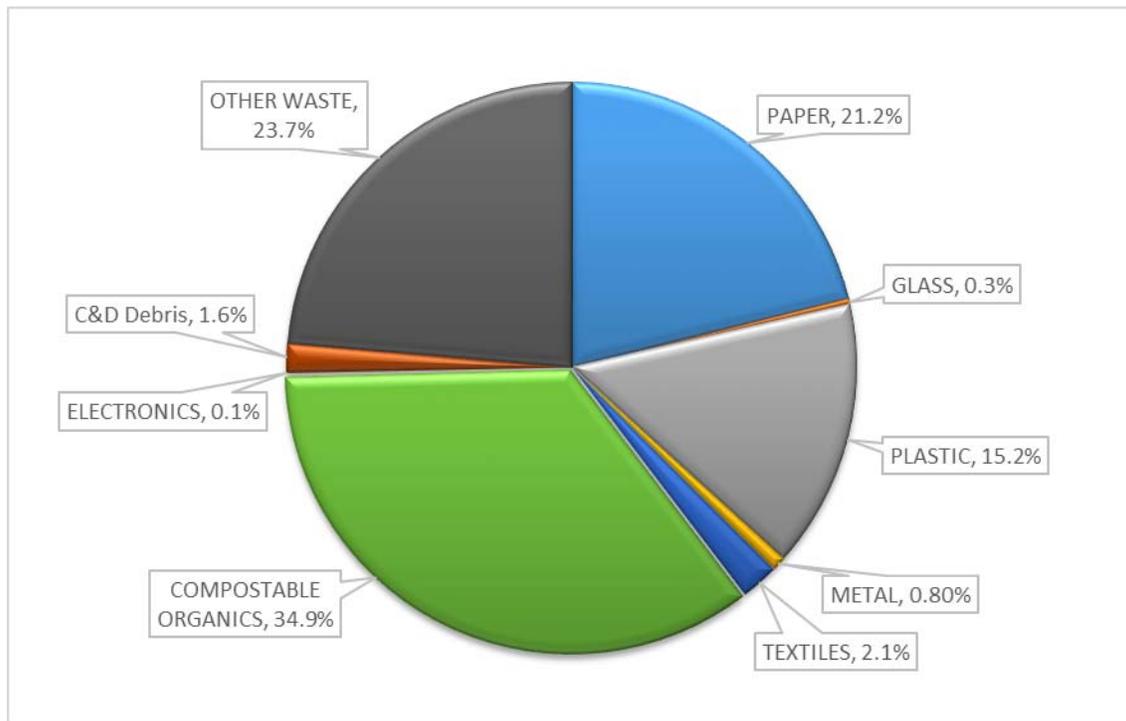


Exhibit 7. Middle School Waste Composition – All Routes

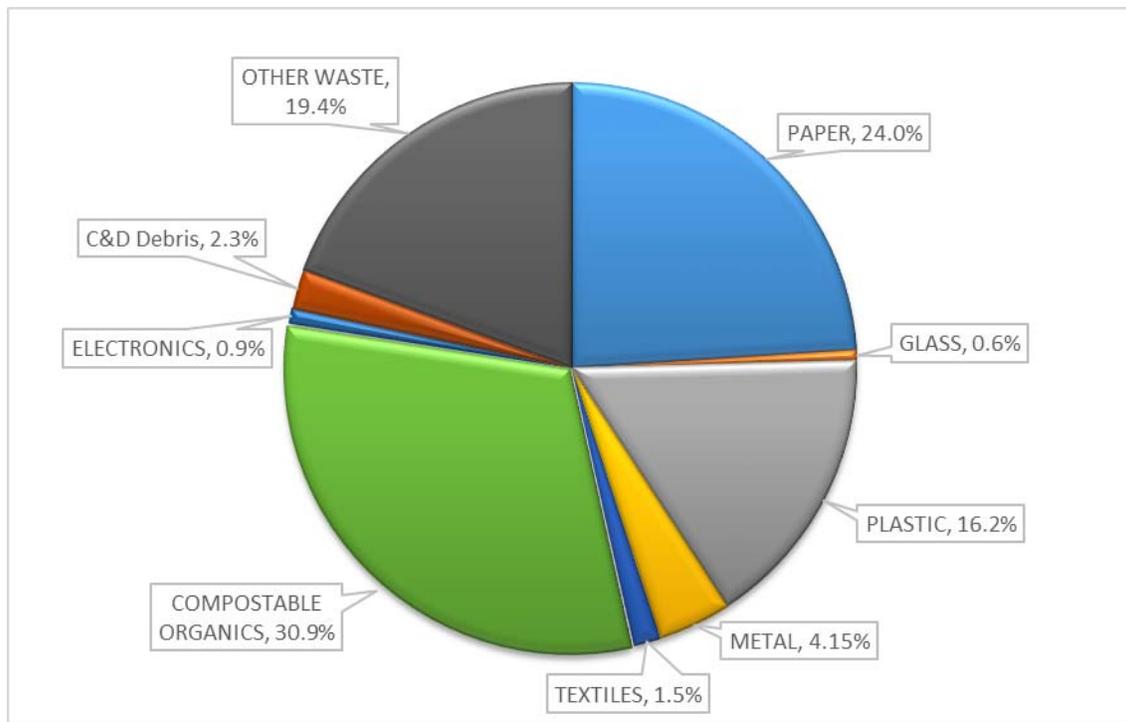
Material Components	Mean Composition	Standard Deviation	95% Confidence Limits	
			Lower	Upper
PAPER				
Mixed Paper	6.8%	4.2%	4.3%	9.4%
Newspaper	0.2%	0.3%	<0.1%	0.4%
Corrugated Cardboard	1.6%	1.8%	0.5%	2.8%
Catalogs/Magazines	0.4%	0.4%	0.1%	0.6%
Telephone Directories	<0.1%	<0.1%	<0.1%	<0.1%
Other Recyclable Paper	3.8%	1.8%	2.7%	4.9%
Textbooks	1.4%	1.4%	0.6%	2.3%
Aseptic Containers	6.9%	2.2%	5.5%	8.3%
Total Paper	21.2%			
PLASTIC				
#2 HDPE Containers	0.2%	0.2%	<0.1%	0.4%
#1 PET Containers	2.6%	1.0%	2.0%	3.2%
#6 Polystyrene Foam	0.8%	0.6%	0.5%	1.2%
Plastic Film	11.6%	2.3%	10.1%	13.0%
Total Plastic	15.2%			
METAL				
Aluminum Cans	0.3%	<0.1%	0.2%	0.3%
Tin/Steel Cans	<0.1%	<0.1%	<0.1%	<0.1%
Other Metals	0.5%	0.5%	0.2%	0.8%
Total Metal	0.8%			
GLASS				
Glass Containers	0.3%	0.5%	<0.1%	0.6%
TEXTILES				
Textiles	2.1%	2.0%	0.9%	3.4%
COMPOSTABLE ORGANICS				
Vegetative Food	17.1%	5.1%	13.9%	20.2%
Non-Vegetative Food	4.8%	1.7%	3.8%	5.9%
Compostable Paper	12.9%	3.9%	10.5%	15.3%
Yard Waste	0.1%	0.2%	<0.1%	0.2%
Total Compostable Organics	34.9%			
ELECTRONICS				
Electronics	0.1%	0.3%	<0.1%	0.3%
C&D Debris				
C&D Debris	1.6%	4.2%	<0.1%	4.2%
OTHER WASTE				
Non Recyclable Waste	23.7%	3.8%	21.3%	26.0%
TOTALS	100.0%			

Note: Composition based on 10 samples.

HIGH SCHOOLS WASTE COMPOSITION

Exhibit 8 and **Exhibit 9** presents a compilation of the five waste samples obtained and sorted from the north route of High Schools. This load was a mix of both cafeteria and classroom trash. Based on these samples, the three largest components, by weight, of the waste stream are Non-Recyclable Waste (19.4 percent), Compostable Paper (16.7 percent), and Vegetative Food (10.1 percent). Common recyclable materials (mixed paper and commingled materials) comprised approximately 36 percent of the waste stream. Compostable materials comprised approximately 31 percent of the waste stream. Waste collected from the south route of High Schools was determined to be mostly cafeteria trash and therefore unrepresentative of the overall High School waste stream.

Exhibit 8. High School Waste Composition – North Route Overall High School Waste Generated



**Exhibit 9. High School Waste Composition – North Route Overall
 High School Waste Generated**

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits	
			Lower	Upper
PAPER				
Mixed Paper	8.3%	3.3%	5.4%	11.2%
Newspaper	0.7%	1.0%	<0.1%	1.6%
Corrugated Cardboard	3.2%	2.9%	0.6%	5.7%
Catalogs/Magazines	2.5%	2.3%	0.5%	4.6%
Telephone Directories	<0.1%	<0.1%	<0.1%	<0.1%
Other Recyclable Paper	6.4%	6.0%	1.2%	11.7%
Textbooks	<0.1%	<0.1%	<0.1%	<0.1%
Aseptic Containers	2.8%	1.5%	1.5%	4.1%
Total Paper	24.0%			
PLASTIC				
#2 HDPE Containers	<0.1%	0.1%	<0.1%	0.2%
#1 PET Containers	4.1%	1.7%	2.6%	5.6%
#6 Polystyrene Foam	2.5%	1.8%	0.9%	4.1%
Plastic Film	9.6%	3.6%	6.5%	12.8%
Total Plastic	16.2%			
METAL				
Aluminum Cans	0.3%	<0.1%	0.3%	0.4%
Tin/Steel Cans	<0.1%	<0.1%	<0.1%	<0.1%
Other Metals	3.8%	3.2%	1.0%	6.6%
Total Metal	4.2%			
GLASS				
Glass Containers	0.6%	0.3%	0.3%	0.9%
TEXTILES				
Textiles	1.5%	1.5%	0.3%	2.8%
COMPOSTABLE ORGANICS				
Vegetative Food	10.1%	5.3%	5.4%	14.8%
Non-Vegetative Food	3.6%	2.8%	1.1%	6.1%
Compostable Paper	16.7%	2.3%	14.7%	18.8%
Yard Waste	0.5%	0.9%	<0.1%	1.4%
Total Compostable Organics	30.9%			
ELECTRONICS				
Electronics	0.9%	2.0%	<0.1%	2.6%
C&D Debris				
C&D Debris	2.3%	2.5%	<0.1%	4.5%
OTHER WASTE				
Non Recyclable Waste	19.4%	3.5%	16.4%	22.5%
TOTALS	100.0%			

Note: Composition based on 5 samples.

OVERALL WASTE COMPOSITION

Exhibit 10 and **Exhibit 11** present a compilation of the thirty five waste samples obtained and sorted from Elementary, Middle, and High Schools. The first route of south High Schools (five samples) is omitted because these samples were composed mainly of cafeteria waste and believed to be unrepresentative of the actual High School waste stream. The composition of the northern High School route is assumed to represent the overall High School waste stream and is weighted 25 percent of the school waste stream. Elementary Schools represent 50 percent of the school waste stream and Middle Schools represent 25 percent of the school waste stream.

Based on these samples, the three largest components, by weight, of the overall school waste stream are Non-Recyclable Waste (22.7 percent), Vegetative Food (16.8 percent), and Compostable Paper (14.0 percent). Common recyclable materials (mixed paper and commingled materials) comprised approximately 29 percent of the waste stream. Compostable materials comprised approximately 35 percent of the waste stream.

Exhibit 10. Overall School Waste Composition

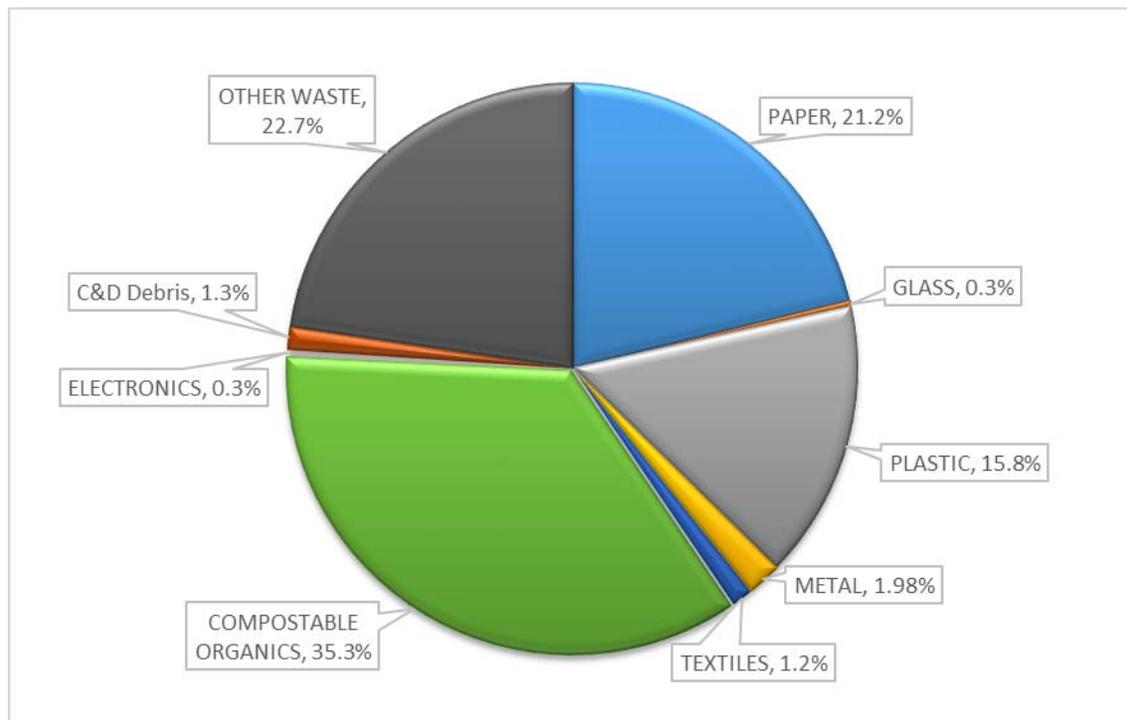


Exhibit 11. Overall School Waste Composition

Material Components	Mean Composition	Standard Deviation	95% Confidence Limits	
			Lower	Upper
PAPER				
Mixed Paper	6.5%	3.6%	5.4%	7.6%
Newspaper	0.3%	0.6%	0.1%	0.5%
Corrugated Cardboard	2.1%	1.9%	1.5%	2.7%
Catalogs/Magazines	1.1%	1.6%	0.6%	1.6%
Telephone Directories	<0.1%	<0.1%	<0.1%	<0.1%
Other Recyclable Paper	3.8%	3.5%	2.7%	4.9%
Textbooks	0.7%	1.2%	0.3%	1.1%
Aseptic Containers	6.8%	3.4%	5.8%	7.9%
Total Paper	21.2%			
PLASTIC				
#2 HDPE Containers	0.1%	0.2%	<0.1%	0.2%
#1 PET Containers	2.3%	1.5%	1.9%	2.8%
#6 Polystyrene Foam	1.3%	1.2%	1.0%	1.7%
Plastic Film	12.0%	3.4%	10.9%	13.0%
Total Plastic	15.8%			
METAL				
Aluminum Cans	0.2%	0.1%	0.2%	0.3%
Tin/Steel Cans	0.1%	0.6%	<0.1%	0.3%
Other Metals	1.6%	2.5%	0.8%	2.4%
Total Metal	2.0%			
GLASS				
Glass Containers	0.3%	0.4%	0.2%	0.4%
TEXTILES				
Textiles	1.2%	1.4%	0.8%	1.6%
COMPOSTABLE ORGANICS				
Vegetative Food	16.8%	6.4%	14.8%	18.8%
Non-Vegetative Food	3.8%	2.1%	3.2%	4.5%
Compostable Paper	14.0%	4.9%	12.5%	15.5%
Yard Waste	0.6%	1.9%	<0.1%	1.2%
Total Compostable Organics	35.3%			
ELECTRONICS				
Electronics	0.3%	1.0%	<0.1%	0.6%
C&D Debris				
C&D Debris	1.3%	2.5%	0.6%	2.1%
OTHER WASTE				
Non Recyclable Waste	22.7%	4.1%	21.4%	23.9%
TOTALS	100.0%			

Note: Composition based on 40 samples.

4 DIVERSION OPPORTUNITIES

A significant portion of the waste stream is compostable or recyclable. **Exhibit 12** details the materials included in the compostable, recyclable, and trash classifications used for this section. **Exhibit 13** shows which materials are currently accepted and collected for recycling.

Exhibit 12. Compostable, Recyclable, and Trash Classifications for Waste Materials

Compostable	Recyclable		Trash
Compostable Paper	Mixed Paper	HDPE Containers	Plastic Film C&D Debris Non-Recyclable Waste
Yard Waste	Newspaper	PET Containers	
Vegetative Food	Corrugated Cardboard	Polystyrene (#6) Foam	
Non-Vegetative Food	Catalogs/Magazines	Aluminum Cans	
	Telephone Directories	Tin/Steel Cans	
	Potentially Recyclable Paper	Other Metals	
	Textiles	Glass Containers	
	Aseptic Containers	Electronics	

Exhibit 13. Currently Collected Recyclable Materials

Cafeteria Recycling Collection Contract	Recycling Collection Contract
Stackable Polystyrene Trays	Catalogs
Aluminum Cans	Computer/Printer Paper
Steel/Bi-Metal Cans	Copy Paper (White and Colored)
#1 Bottles	Copy Paper Wrappers
#2 Bottles	Envelopes (With/Without Windows, White/Kraft)
Glass Containers	File Folders
	Junk Mail
	Letterhead/Bond Paper
	Magazines
	Newspaper
	Notebook Paper
	Pamphlets/Brochures
	Writing Paper

The largest diversion opportunities for Wake County Schools involve food waste composting and increasing the quantity and types of paper currently collected. **Exhibit 14** and **Exhibit 15** portray the overall waste composition by recyclable, compostable and trash materials. According to the waste characterization, approximately 64 percent of the waste stream is potentially recyclable or compostable.

RECYCLING

Paper

Over one-fifth of the waste stream disposed of by County schools is recyclable paper which includes:

- **Mixed Paper** (6.5 percent) – Greater in High School waste (8.3 percent) than in Middle School and Elementary School waste (6.8 and 5.4 percent, respectively).
- **Aseptic Containers** (6.8 percent) – Greater in Elementary and Middle School waste (8.8 and 6.9 percent, respectively) than in High School waste (2.8 percent).
- **Corrugated Cardboard** (2.1 percent) – Greater in High School waste (3.2 percent) than in Middle School and Elementary School waste (1.6 and 1.8 percent, respectively).
- **Catalogs/Magazines** (1.1 percent) – Greater in High School waste (2.5 percent) than in Middle School and Elementary School waste (0.4 and 0.7 percent, respectively).
- **Other Recyclable Paper** (3.8 percent) – Greater in High School waste (6.4 percent) than in Middle School and Elementary School waste (3.8 and 2.5 percent, respectively).

Other Materials

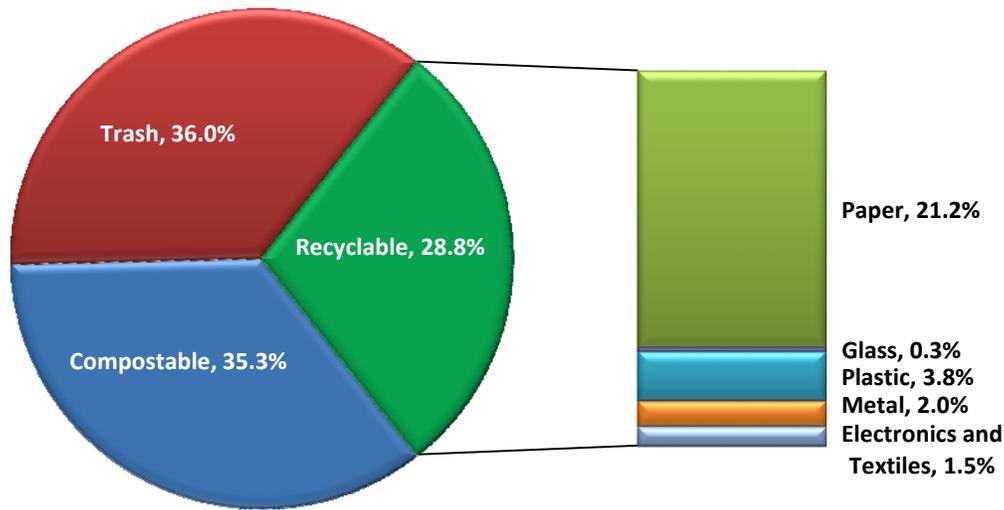
Other materials that could be diverted for recycling include plastic PET bottles which represent 2.3 percent of disposed waste. PET bottles are a higher portion of High School waste (4.1 percent) than Middle Schools and Elementary Schools (2.6 and 1.3 percent, respectively).

Plastic tubs, included in the “Non-Recyclable Waste” are frequently included in recycling programs around the country. Observations during fieldwork indicate that a significant portion of Non-Recyclable Waste included plastic tubs.

Recycling Collection

The current waste hauler does not accept paperboard and construction paper for recycling. These paper categories are included in Other Recyclable Paper category. Other items not accepted in the recycling program include plastic tubs and trays. The County should evaluate the market for these materials in the local area and work with a hauler to accept these materials if a local market exists.

Exhibit 14. Recycling Opportunities



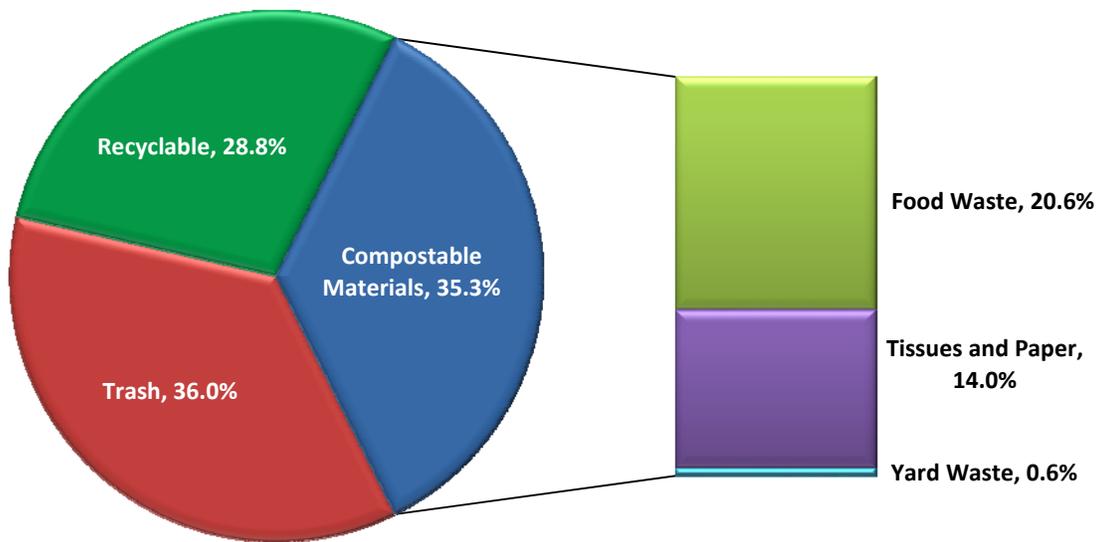
COMPOSTING

A pilot organics collection program is an option for diverting organics. The County would need to identify haulers, infrastructure needs, and markets for organic materials to assess the feasibility.

Over 35 percent of the waste stream disposed of by County schools is compostable materials which include:

- **Vegetative Food** (17.8 percent) – Greater in Elementary School waste (20.1 percent) than in Middle School and High School waste (17.1 and 10.1 percent, respectively).
- **Non-Vegetative Food** (3.9 percent) – The composition for Non-Vegetative Food was similar throughout the school system. It was observed during waste characterization that a significant portion of this waste was comprised of liquids drained from containers (water bottles and milk cartons).
- **Compostable Paper** (13.6 percent) – Greater in High School waste (16.7 percent) than in Middle School and Elementary School waste (12.9 and 13.1 percent, respectively).

Exhibit 15. Composting Opportunities



Appendix A
Waste Collection Routing Plan

Routes for School Waste Characterization Study

Monday, April 21	Tuesday, April 22	Wednesday, April 23	Thursday, April 24	Friday, April 25
LOAD 1: High School: South Route Southeast Raleigh High Athens Drive High Apex High Fuquay-Varina High Middle Creek High	LOAD 2: Middle Schools Moore Square Museum Ligon Middle Carnage Middle East Garner Middle North Garner Middle East Wake Middle East Millbrook Middle Durant Road Middle Carroll Middle Lufkin Road Middle Apex Middle Salem Middle East Cary Middle Daniels Middle Martin Middle Centennial Middle Dillard Drive Middle	LOAD 3: High School: North Route Knightdale High Enloe High Millbrook High Wake Forest High Wakefield High Sanderson High Leesville High LOAD 4: Elementary: Raleigh Route Bugg Elementary Poe Elementary Fuller Elementary Hunter Elementary Conn Elementary Powell Elementary Wiley Elementary Underwood Elementary Partnership Primary Olds Elementary Combs Elementary Joyner Elementary	LOAD 5: Middle School: South Route Lufkin Road Middle Apex Middle Salem Middle East Cary Middle Daniels Middle Martin Middle Centennial Middle Dillard Drive Middle LOAD 6: Elementary: North Route Fox Road Elementary Wildwood Forest Elementary Durant Road Elementary Millbrook Elementary North Ridge Elementary Baileywick Elementary Lead Mine Elementary Green Elementary Jeffreys Grove Elementary York Elementary Hilburn Drive Elementary Stough Elementary	LOAD 7: Elementary: South Route Dillard Drive Elementary Yates Mill Elementary Swift Creek Elementary Farmington Woods Elementary Briarcliff Elementary Baucom Elementary Salem Elementary Olive Chapel Elementary Apex Elementary Oak Grove Elementary Penny Road Elementary

Appendix B
Data Recording Forms

WAKE COUNTY SCHOOLS WASTE CHARACTERIZATION STUDY - Data Collection Sheet

Date: M T W TH F		Time: a.m. p.m.		
Sample Number:		Vehicle #:	Hauler:	
Collection Area:		Quadrant:	School Type: Elementary / Middle / High	
Major Waste Fractions	Waste Component Categories	Examples	WEIGHT (In Pounds)	
			Gross	Tare
Paper	Mixed Paper			
	Newspaper			
	Corrugated Cardboard			
	Catalogs/Magazines			
	Old Telephone Directories			
	Other Potentially Recyclable Paper			
	Compostable Paper			
	Textbooks			
	Aseptic Containers			
Plastic	HDPE Containers			
	PET Containers			
	Polystyrene (#6) Foam			
	Plastic Film			
Metal	Aluminum Cans			
	Tin/Steel Cans			
	Other Metals			
Glass	Glass Containers			
Organic	Yard Waste			
	Textiles			
	Vegetative Food Waste			
	Non-Veg Food Waste			
Electronics	Electronics			
C&D	C&D Debris			
Other	Non Recyclable Waste			
Comments:				

Appendix C
Health & Safety Plan

Site-Specific Health and Safety Plan

Wake County Schools Waste Characterization

Rev. 1 – February 25, 2014

REQUIRED APPROVAL			
SCS OSHC or designee:	Eric Andersen	Date:	2/25/14
SCS PM:	Josh DeGayner	Date:	2/25/14

Project No.:	02211010.01
Project Name:	Wake County Schools Waste Characterization
Site Address:	6300 Old Smithfield Road, Apex, NC
Client Contact:	Meghan O'Connor

EMERGENCY TELEPHONE NUMBERS	
Fire:	911 or (919)-856-6340 (non emergency)
Police:	911 or (919)-856-6900 (non-emergency)
Hospital	(919) 350-2300 (Wakemed Cary Hospital)
Ambulance:	911
WorkCare	1-800-455-6155
The directions and information on the nearest hospital are found on Page 3.	

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Attachments

Attachment 1 – Job Task Safety Analysis and PPE Assessment Form

1 INTRODUCTION

At SCS, protection of human health and the environment is paramount. This Site-Specific Health and Safety Plan (SSHSP) provides information to identify hazards that may be present and/or introduced by project's activities onto SCS job sites, and details needed precautions that employees should follow to protect themselves. Tasks performed on site or during projects should be analyzed to determine if physical or chemical hazards requiring safeguards or additional Personal Protective Equipment (PPE) exist. This plan will be modified as necessary if any new hazards are identified during the project that require that additional safeguards be put in place. This plan is in the draft stage, approval will be gained from the SCS Office Safety and Health Coordinator prior to any field activities.

PROJECT ORGANIZATION

Project Manager:	Josh DeGayner	703-674-7653
Project Director:	Stacey Demers	703-471-6150
Client Representative:	Meghan O'Connor	919-856-5698

SCOPE OF WORK – WASTE CHARACTERIZATION

Waste characterization involves collecting field samples and sorting municipal solid waste into designated categories. The data that is generated from the field activities will be compiled and presented to Wake County.

There have been no reported serious or fatal incidents attributed specifically to the performance of waste characterization studies. However, accidents may occur due to the potential hazards associated with the presence of heavy equipment at the site, the components of the waste itself (potentially sharp objects, broken glass), climatic conditions, and carelessness. At waste processing facilities, combustion of the waste materials from refuse vehicles can present potential hazards.

The presence of heavy equipment in operation at the site (end loaders, graders, transfer station compactors, garbage trucks, etc.) presents potential hazards which can be avoided with the use of general common sense and staying visible. The equipment operators generally are involved in performing their tasks and may be unaware of the presence of other individuals within the immediate area. Personnel will be trained to be aware of the movement and location of equipment at all times. High-visibility safety vests will be required to be worn at all times.

The components of municipal solid waste present potential physical hazards. These include, but are not limited to, cuts from broken glass and sharp metal objects; splinters from pieces of wood; punctures from nails and other sharp objects; and scrapes and abrasions from the general handling of solid waste. There is also potential for exposure to household products, such as bleach, cleansers, and other toxic chemicals.

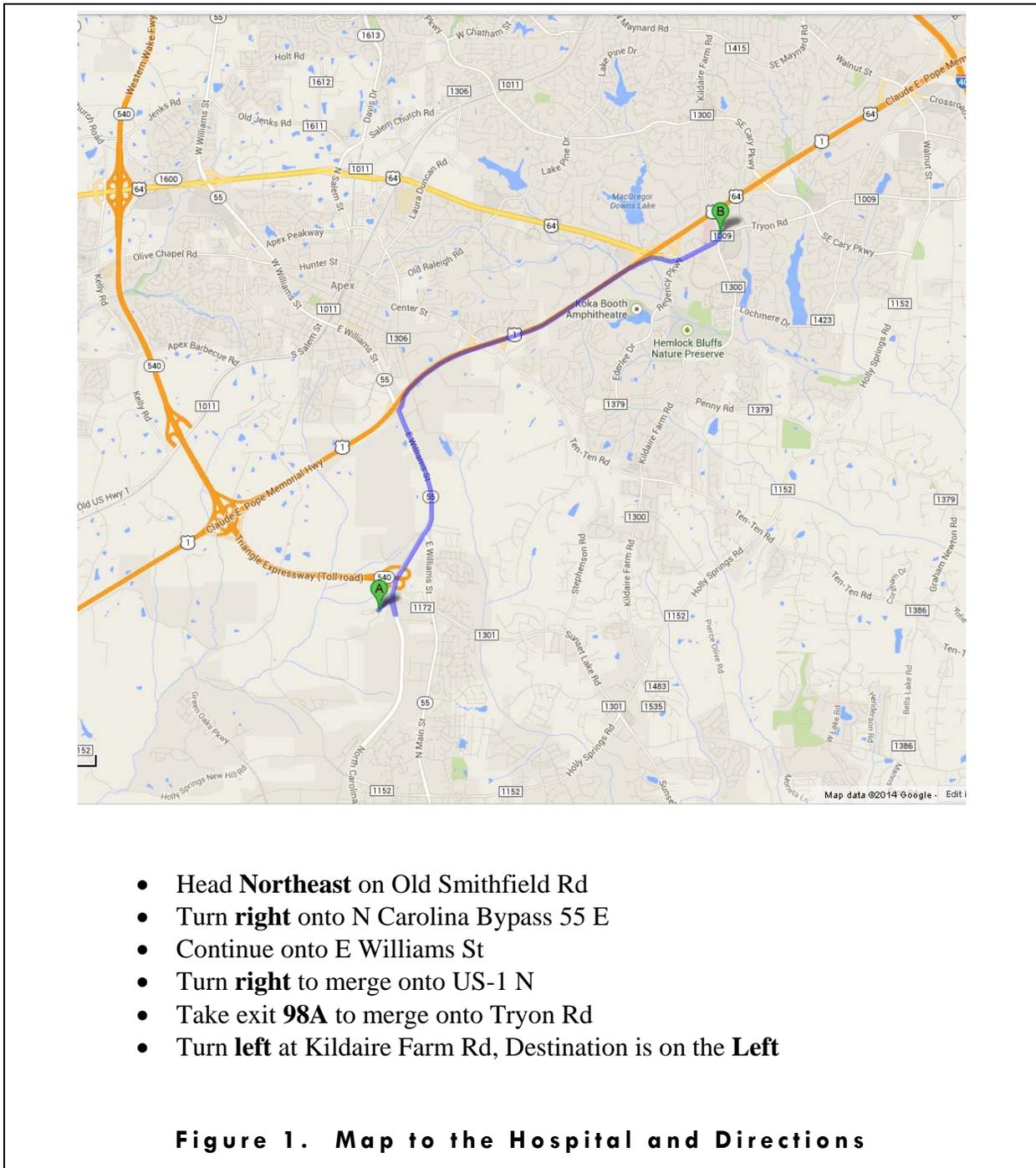
To alleviate the possibility of injury, caution should be employed at all times when physically handling the solid waste. Protective clothing, including gloves and safety glasses, should be worn at all times. If there is any question about the handling of a component of solid waste, the Crew Chief should be notified.

The waste characterization will be performed outdoors and not in a climate controlled area. Caution should be taken to avoid the possibility of heat stress due to protective clothing or weather, or frostbite in areas of extreme cold. Depending on temperature, portable heaters may be used to warm sorting personnel.

Refuse deposited at the Site can pose a potential fire hazard. Fires can be started through carelessness, sparks, or from "Hot Loads" handled at the refuse facilities. If fire or smoke is observed, County personnel should be notified immediately, all SCS personnel and subcontractors should leave the immediate area at once, and the local emergency fire department should be notified.

2 EMERGENCY RESPONSE AND MEDICAL TREATMENT PROCEDURES

EMERGENCY CONTACT AND NOTIFICATION INFORMATION



Nearest Hospital Address:

1900 Kildaire Farm Rd
Cary, NC 27518
(919) 350-2300

ACCIDENT OR INCIDENT REPORTING SYSTEM

In the event of an emergency at the site, project personnel should call 911 for emergency assistance. After the immediate emergency situation has been addressed by emergency personnel, SCS project personnel should call the SCS Project Manager and the Client Representative and inform them of the situation. The Project Manager should evaluate the nature of the emergency and direct project personnel actions from that point.

NOTIFICATION PROCEDURES FOR INCIDENTS (CLIENT, LOCAL, STATE, OR FEDERAL)

Site personnel should contact their supervisor immediately when an accident or injury occurs, and provide any needed information so that additional notifications can be determined and completed as needed.

METHODS TO SUMMON EMERGENCY RESPONSE TEAM

Emergency services can be summoned through 911, as this service is active in the area.

RESCUE AND MEDICAL TREATMENT REQUIREMENTS

Stop work authority should be exercised when an injury or accident occurs. The appropriate emergency agency should be contacted and first aid administered, if possible. If the injury is not life-threatening and does not require emergency response, contact WorkCare at (800) 455-6155. First aid kits and fire extinguishers are available in each SCS work truck.

3 SITE DESCRIPTION

LOCATION DESCRIPTION

The facility is located at 6300 Old Smithfield Road, in Apex, North Carolina. The work site is generally unused transfer station that will be used to complete this project.

4 GENERAL FIELD SAFETY PROCEDURES

General Standard Operating Procedures (SOPs) and additional SCS Health and Safety procedures and requirements are included in the current SCS Injury Illness Protection Program (IIPP) and on the SCS intranet. These documents are considered a part of this plan.

SCS team members will conduct themselves in a professional manner at all times. The following restrictions will also be observed by all SCS personnel and subcontractors to SCS.

- Working while under the influence of intoxicants, narcotics, or controlled substances is prohibited.
- Smoking anywhere on site is prohibited.
- Loose clothing will not be worn on-site. Long hair will be worn up inside a hat.
- Eating, drinking, chewing gum, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited on-site, unless in designated break areas.
- No personnel will be admitted to the site without the proper safety equipment, clearance or other approval.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the Site Manager, will be immediately dismissed from the site.
- No unapproved work clothes or equipment will be allowed on-site.
- Prescription drugs should not be taken by personnel where the potential for contact with toxic substances exist. Use must be specifically approved by a qualified physician.
- Work areas will be established based on prevailing site conditions and are subject to change. Personnel should check with the Site Manager for current and appropriate procedures regularly.
- Contact with contaminated or potentially contaminated material should be avoided. Whenever possible, do not walk through puddles, mud, or any discolored ground surface. Do not kneel on the ground. Do not lean, sit or place equipment on drums, containers, or vehicles.
- Due caution will be observed when proceeding on foot through open areas. Personnel will remain near the sorting area and avoid high-traffic areas.
- Any medical emergency supersedes routine safety requirements.

APPLICABLE STANDARD OPERATING PROCEDURES (SOPS) AND PROGRAMS

The following SOPs are incorporated by reference and available on the SCS intranet.

	SOP Number and Name		SOP Number and Name
X	01 - General Code of Safe Work Practices	X	22 - Safe Procedures for Working with Sites That Contain Hydrogen Sulfide
X	04 - JTSA and PPE Assessment Procedures	X	24 - Avoidance of Slips, Trips, and Falls
	05 - Work Permits	X	25 - Avoidance and Prevention of Heat and Cold Stress, and Other Weather-Related Hazards
X	06 - Forklift and Heavy Machinery Operations		26 - All-Terrain Vehicles and Watercraft
	07 - Compressed Air and Compressed Gas Cylinders		27 - OSHA and Other Regulatory Inspections
	08 - Drilling and Well Installation Procedures		
	09 - Electrical Safety		Appendix Letter and Program Name
	10 - Fall Protection	X	B - Hazard Communication
X	11 - Fire Extinguishers		C - HAZWOPER
	12 - Hand and Power Tools		D - Exposure Assessment
	13 - Working Safely with Ladders	X	E - PPE Other Than Respiratory Protection
	14 - Landfill Leachate and Condensate Safe Procedures	X	F - Respiratory Protection
	15 - Lockout and Tagout	X	G - Motor Vehicle and Fleet Safety
	17 - Materials Use and Handling		H - Hearing Conservation
	18 - Polyethylene (PE) Pipe Work Safe Procedures	X	I - Bloodborne Pathogens
X	19 - Site Sanitation Procedures		J - Excavation and Construction Earthwork Program
	20 - Safe Work Practices for Scaffolds		K - Confined Space Entry
X	21 - Safe Procedures for Biological Hazards (Snakes, Insects, Vegetation, Bacteria)		L - Ergonomics Program

JOB TASK SAFETY ANALYSIS (JTSA) AND PPE ASSESSMENT

JTSAs for activities performed at this site have been completed as indicated below and are included as **Attachment 1**. A completed JTSA is required for all work tasks performed at the site. **JTSAs are designed to identify steps which involve potential hazards to employees and should be reviewed and understood (and signed providing evidence of understanding) before performing any task at the site. If additional steps or hazards are present, the JTSA should be revised (and the revision signed by all affected staff) to indicate that all items have been appropriately addressed and are understood before proceeding with the task.**

Unless identified in an attached Job Task Safety Analysis (JTSA) form, all project tasks are anticipated to only require **Level D** PPE, as defined by the Occupational Safety and Health Administration (OSHA).

SCS field personnel (including subcontractors) will be informed in the use of safety equipment and will be required to wear protective clothing appropriate for the tasks in which they will be involved.

Extra equipment will be located on-site. This equipment will include the following items:

- Tyvek Coverall Suits
- Gloves (nitrile and HexArmor: SharpsMaster II)
- High Visibility Safety Vests
- Eye Protection
- Ear Protection
- Hard Hats
- First Aid Kit

Sufficient water for personal use will be brought on-site daily.

SAFE OBSERVATIONS

The SCS SAFE Observation Checklist will be used by field and project personnel. The goal is for SCS staff to make at least one (1) documented observation per quarter during site activities.

OTHER INSPECTION PROCEDURES

Periodic site inspections may be made by the Project Supervisor, Project Manager, and Regional Compliance Auditor or Safety Specialist. There is also the potential for the client or regulatory agencies to visit and inspect the site. SCS personnel are to perform tasks in compliance with all contractual, regulatory, and company requirements at all times.

SITE CONTROL

SCS and its subcontractors will be restricted in site usage to the area designated for sorting samples on the work site. Temporary access will be allowed to washroom facilities in the case of an emergency. A front end loader will transport samples from the working face to the sorting area. **Under no circumstances will SCS employees or subcontractors enter other buildings and areas of the work site. SCS employees and subcontractors will remain in the area designated for sorting samples.**

Our clients are responsible for providing SCS employees with safe site access, which includes sites that are free of threats from transients or other aggressive people or animals. If an SCS employee encounters an aggressive person or animal, they should withdraw from the site and contact the Site Representative and their SCS supervisor. The Site Owner is responsible for removing the threats, and SCS employees should not take any affirmative action of their own.

DECONTAMINATION PROCEDURES

The risks of illness due to ingestion of diseased or decomposing materials from the work site are significant. To minimize these risks, all personnel should remove and store the outer layer of their protective clothing (i.e., coveralls, gloves, hard hat, etc.) on-site. Hands, face, and fingernails should be thoroughly washed, or scrubbed, with soap and water prior to engaging in any activity likely to transmit materials encountered on-site into the mouth. If waste materials come in contact with the skin, that crew member will be temporarily excused to thoroughly wash the affected area with soap and water. A hand washing station will be rented by SCS, or will be provided by job site safety personnel.

HANDLING OF HAZARDOUS WASTE MATERIALS

Hazardous materials will be avoided during sample selection. If hazardous materials are encountered during the waste sorting activities, they will be segregated from the normal waste and recycling streams and put in separate containers. The contents of these containers will be reported to County personnel and properly disposed of.

Caution will be taken when handling mercury-containing wastes such as fluorescent light bulbs. Care will be taken to not break the glass bulb, and to avoid samples with excess amounts of fluorescent light bulbs. Gloves and Tyvek suits will provide skin protection from mercury compounds.

Extreme care will be taken when handling and disposing of hazardous materials. If subcontractors encounter any material that may be considered hazardous, they will be instructed to report it to the Site Manager immediately.

HOUSEKEEPING REQUIREMENTS

A portable toilet will be staged near the sorting area. Hand sanitizer and soap will be made available to assist with decontamination. The designated break area will be located away from the sorting area.

5 SITE HAZARDS

Chemical and Physical Agent Hazards

The following chemical and physical hazards should be considered before performing any task or work at the site. The analysis will depend on a thorough understanding of the site's physical characteristics and the task(s) being performed.

Toxic Compounds: Non-Methane Organic Compounds (NMOCs), as well as inorganic toxic contaminants such as mercury, and sometimes even radioactive contaminants such as tritium, may be present on a site. NMOCs include such toxic compounds as benzene, toluene, chloroform, vinyl chloride, carbon tetrachloride, and trichloroethane, which, although commonly less than 1 percent by weight, are hazardous. These potential hazards should be evaluated on a case-by-case basis. Additional precautions will be established as needed.

Poisons: Pesticides, cleaners, or other toxic materials of various types may be present in the waste stream. Avoid contact with these items. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Flammables: Fuel such as gasoline and diesel may be present in the waste stream. Additionally, paint thinners or other flammable materials may be present in the waste. The primary risk associated with these materials is fire. Keep all ignition sources away from flammable materials. Do not smoke, unless in designated areas. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Oxidizers: Fertilizers, pool chemicals, chlorine, or other oxidizers may be present in the waste stream. These materials may be in use at water treatment plants or in the waste at the site. The primary risk from oxidizers is an increased fire potential. Keep fire and fuel or oil away from oxidizers. Do not smoke, unless in designated areas. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Corrosives: Acidic and caustic materials may be present in the waste stream. These materials may be in use at water treatment plants or in the waste at the site. The primary risk from corrosives is damage to the skin or eyes. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Physical Hazards

The following physical hazards should be considered before performing any task or work at the Site. Depending on the task(s) being performed, any or all of these hazards may be present.

Heavy Equipment: Compactors, bull dozers, loaders, track hoes, forklifts and large trucks, and other vehicles may be present at the Site. Loud noise and limited visibility can increase the threat of being run over or crushed by these vehicles. Wear high-visibility vests (recommend Class III) and coordinate with vehicle operators when working in the vicinity of these pieces of equipment. Heavy equipment hazards are especially present at or near the working face. SCS and its subcontracts will remain in the area designated for sorting samples, and avoid high traffic areas and areas where heavy equipment operates.

Heat-Related Injuries: Elevated body temperatures can cause serious injury or death. Working outdoors or in the sun increases the chance of heat-related injuries. This hazard is especially critical when PPE (such as coveralls or rain gear) is worn, since heat from the body becomes trapped inside clothing. Personnel should drink plenty of liquids and take breaks as needed. The following describes the various effects of heat-related injuries.

Heat Disorders and Health Effects:

- **Heat Stroke:** This disorder occurs when the body's system of temperature regulation (e.g., sweating and evaporation) fails and body temperature rises to critical levels. The condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a serious hazard, however. Primary signs and symptoms are confusion, irrational behavior, loss of consciousness, convulsions, a lack of sweating (usually), hot, dry skin, and an abnormally high body temperature. If a worker shows signs of possible heat stroke, call 911 to obtain **immediate** medical assistance. The worker should be placed in a shady area, and his or her outer clothing should be removed. The worker's skin should also be wetted and air movement around the body increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible--by mouth only if the worker is conscious. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment. Regardless of the worker's protests, **no** employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.
- **Heat Exhaustion:** The signs and symptoms of heat exhaustion include clammy skin, headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, heat exhaustion responds readily to prompt treatment. This condition, however, should not be dismissed lightly, for several reasons. One is that fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended. The victim could also be injured when he or she faints. While the signs and symptoms associated with heat exhaustion are similar to those of heat stroke, the notable difference (with heat

exhaustion) is clammy skin. Workers suffering from heat exhaustion should be removed from hot environments and given fluid replacement, by mouth only if the workers are conscious. They should also be encouraged to get adequate rest.

- **Heat Rashes:** The most common problem occurring in hot work environments is heat rash. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, the papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and papules may become infected if they are not treated. In most cases, heat rash will disappear when the affected individual returns to a cool environment.
- **Heat Fatigue:** One factor that predisposes individuals to heat fatigue is the lack of acclimatization. Use of a program of acclimatization and training for work in hot environments are advisable. The signs and symptoms of heat fatigue include impaired performance of skilled sensorimotor, high-concentration, or high-vigilance activities. The sole treatment available for heat fatigue is to remove heat stress and increase fluid replacement before a more serious heat-related condition develops.

Cold-Related Injuries: In winter weather conditions, there is a potential for injury from cold, including dehydration, frostbite, heavy shivering, excessive fatigue, drowsiness, irritability, and euphoria. If workers show these symptoms, work should cease and affected personnel rest in heated buildings or vehicles.

Inclement weather/ lightning – Blizzards, flash floods, fog, tornados, and other meteorological events may or may not be predictable, and may require immediate response for survival. SCS personnel should use sound judgment concerning significant weather threats, including a stop work authority if necessary. Some weather events may restrict visibility which can present a driving hazard. Gusts of wind may physically knock a worker off a ledge or piece of equipment (e.g., ladder). The danger of lightning strike is increased when working on an elevated surface. Lightning can strike miles ahead of a storm when no rain is present. All field work should be stopped immediately when lightning is visible or thunder is audible. All personnel should seek shelter inside a building or vehicle. Do not take shelter near tall objects such as power lines, trees, antennas, or the flare stack. Work should not resume until lightning is no longer visible and thunder cannot be heard.

Biological Hazards

Rodents, poisonous insects, snakes, other animals and/or plants are a natural part of any ecosystem. They are sometimes difficult to eliminate or avoid on some sites because of the location. Employees should be aware of the potential for encountering these types of animals and plants. Where possible, nesting places should be removed or access to them should be limited. If several infestations occur, remedies should be discussed with a supervisor and the client (see **SCS IIPP, SOP-21**, for precautions and treatment for biological hazards). The following could be encountered in performance of the operation, maintenance, and monitoring functions of a project:

Hantavirus: Infection typically occurs by the inhalation of tiny airborne droplets of fresh or dried rodent excretions. Transmission to humans may also occur through direct contact with rodents or rodent-contaminated materials, and ingestion of contaminated food or water is also a possible route of transmission. Sweeping or “shaking out” rodent-contaminated materials should be avoided unless performed using respiratory protection. The early symptoms of hantavirus disease are flu-like (fever, chills, muscle aches). For a very short period of time, the infected person starts to feel better. Then, within 1 to 2 days, he or she may develop shortness of breath. The disease gets worse quickly and leads to respiratory failure, a condition known as Hantavirus Pulmonary Syndrome (HPS). About half of all HPS patients experience these symptoms, which usually occur 1 to 5 weeks from contracting the illness.

Snakes: Timber rattlesnakes and copperheads are poisonous snakes that are known to inhabit Virginia. Not all rattlesnakes give audible warning before they strike. Extra caution should be taken if tools or other materials are dropped in highly vegetated areas, around rocks, into stockpiles of pipe or other objects, or when walking through highly vegetated areas where visibility (of the ground) is limited. The most active times for rattlesnakes are morning, late afternoon, and early evening; however, encounters could happen at any time of the day. Walking loudly, shuffling feet, or making noise while working is recommended.

Bloodborn Pathogens: Human blood can contain harmful viruses such as the Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV). Contact with affected blood, as well as materials contaminated by this blood, can result in transmitting viruses and the life-threatening conditions they cause.

SCS has adopted a Bloodborne Pathogen Exposure Control Plan to protect employees who may come into contact with blood, or materials contaminated with blood, during the performance of tasks. Although the program is intended to comply with OSHA’s Bloodborne Pathogens Standard, 29 CFR 1910.1030, the primary purpose for adopting the plan is to help employees avoid bloodborne pathogens at work.

When an employee is involved in an exposure incident, it must be reported in accordance with the Health and Safety Injury and Illness Prevention Plan. All employees involved in an exposure incident will be offered post-exposure evaluation and follow-up, in accordance with the OSHA standard. Follow-up will include:

- Documentation of the route of exposure and the circumstances related to the incident.
- If possible, identification of the source individual and, if possible, the status of the source individual. The blood of the source individual will be tested (after consent is obtained) for HIV/HBV infectivity.
- Results of testing of the source individual will be made available to the exposed employee, along with applicable laws and regulations concerning disclosure of the identity and infectivity of the source individual.
- The employee will be offered the option of having blood collected for testing of that employee’s HIV/HBV serological status. The blood sample will be preserved for at

least 90 days to allow the employee to decide if the blood should be tested for HIV serological status. However, if the employee decides, prior to that time, that testing will be conducted, the appropriate action can be taken and the blood sample discarded.

- The employee will be offered post-exposure counseling in accordance with current recommendations of the U.S. Public Health Service.
- The employee will be given appropriate counseling concerning precautions to take during the period after the exposure incident. The employee will also be given information regarding potential illnesses and procedures for reporting related symptoms to appropriate personnel.

Attachment 1 – Job Task Safety Analysis and PPE Assessment Form

**JOB TASK SAFETY ANALYSIS AND PPE ASSESSMENT FORM-
JTSA-ES- 16- WASTE SORT**

Job Task Safety Analysis Form-01				
Task Type (Check all that Apply)	Solid Waste	Task Description (include an estimate of task duration in hrs/day) 5 days of field activities, generally 8-10 hours per day.		Location or Project: Wake County Schools Waste Characterization
				Date Revised: 8/30/12
				Project #/Revision #: 02213101.08
Analysis Team Member	Position Title		Reviewed by	Position Title
Josh DeGayner	Crew Chief		John Tabella	OHSC
Justin Watson	Field Support			
Special Training Required		Bloodborne pathogens training		
Applicable SAFE Checklist(s): Specify type and category number		Environmental Services/Solid Waste Checklist		

This form is the certification that the hazard assessment has been performed for the workplace as required by 29 CFR 1910.132.

Job Task Step	Potential Environmental and Personnel Hazards ¹	Critical Actions	PPE Required
1. Drive to site, set up sorting table and containers.	Heavy lifting Slips/trips/falls Vehicle traffic	<ul style="list-style-type: none"> • Check in w/facility • Ensure work area is secured/isolated • Use buddy system • Employ safe lifting behaviors • Stretch/warm-up 	Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Leather outer glove Respiratory: None Hearing: None Eye/Face: Safety glasses
2. Collect solid waste samples	Heavy lifting Vehicle/HE traffic Slips/trips/falls Medical/bio waste Sharps Chemical exposures	<ul style="list-style-type: none"> • Use buddy system • Stay visible • Use safe lifting • Set up away from traffic • Avoid Heavy EQ traffic 	Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Puncture Resistant Gloves Eye/Face: Safety glasses
3. Hand-sort solid waste materials on the sorting table. (At the Recycling Center)	Heavy lifting Vehicle/HE traffic Slips/trips/falls Medical/bio waste Sharps Chemical exposures Stress/hygiene concerns	<ul style="list-style-type: none"> • Use buddy system • Stay visible • Use safe lifting • Set up away from traffic • Brush trash (vs digging) • Wash hands freq. • Stay hydrated • Shift breaks 	Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Puncture Resistant Gloves Respiratory: Dust mask (optional) Hearing: Earplugs (optional) Eye/Face: Safety glasses
4. Cleanup and Decontaminate	Heavy lifting Slips/trips/falls Vehicle traffic	<ul style="list-style-type: none"> • Ensure work area is secured/isolated • Use buddy system • Employ safe lifting behaviors • Stretch/warm-up • Decontaminate PPE 	Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Leather outer glove Respiratory: Dust mask (optional) Hearing: None Eye/Face: Safety glasses

Job Task Step	Potential Environmental and Personnel Hazards ¹	Critical Actions	PPE Required
5. Demob	Vehicle/HE traffic	<ul style="list-style-type: none"> Check out w/facility 	Head: None Body: High Visibility Vest Foot: Steel--toe ANSI boots Hand: None Respiratory: None Hearing: None Eye/Face: None
End of JTSA Form			