

## **Waste Composition Study Summary of 2013-2014 Results**

Presented to:



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## 1 INTRODUCTION

In April 2013, Prince William County of Virginia contracted with SCS Engineers (SCS) to conduct a two-season composition analysis of residential and commercial waste generated and collected in Prince William County, Virginia. The primary objectives of the study are to estimate types and quantities of recyclable and compostable waste components in the residential waste stream.

The basis for this waste characterization consists of two week-long sampling events: the first was conducted in the Fall (November 2013) and the second was conducted in the Spring (May 2014). 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 stream.

Appendix A contains forms used to record data and Appendix B presents the Health and Safety Plan that was in effect during field activities. This report presents the results of the field efforts for the both seasons.

## 2 METHODS

This section summarizes methods used to characterize the waste stream disposed of at the Prince William County Landfill (PWCLF). Fall sampling was conducted from November 4 through November 8, 2013 and Spring sampling was conducted from May 5 to May 9. Waste characterization activities were performed by manually sorting samples from municipal solid waste (MSW) into distinct waste categories.

### WASTE SAMPLING

Waste sorting was performed at the Prince William County Landfill during the operating hours of the facility. Each day the drivers of trash collection vehicles were interviewed to determine the load's contents and suitability for sampling. If the load was selected for sampling, drivers were directed to dump their waste loads into a designated area at the working face. A front-end loader supplied by the County randomly gathered a sample from each target load (approximately 200 pounds) for classification (sorting). Two important procedural factors were considered:

- The target vehicle selected for sampling contained MSW that was representative of the type of waste typically generated in that sector (commercial, residential, or multi-family); and
- The process of acquiring the waste sample did not, in itself, alter the apparent MSW composition.

Given the limited size of the data set (10 samples sorted per day), it was important that simple random sampling and the potential for unrepresentative data were avoided. Unrepresentative data includes commercial waste or community events that generate atypical or seasonal waste. The driver was directed to discharge the load in a designated area at the working face. The sort sample was subsequently obtained via a front-end loader as follows:

1. The refuse vehicle dumped its load onto the designated area at the working face. This area had sufficient room to allow the front-end loader to grab a sample from the refuse.
2. A front-end loader grabbed a refuse sample from a random section of the dumped load.
3. The front-end loader carried the sample to the area near sort crew and deposited it into 30-gallon trash cans. The trash cans were weighed and set aside until 200 lbs had been selected for characterization.

One sample was visually characterized (the contents were estimated visually rather than manually weighing the categories) because of the bulky items contained. This sample was a commercial load that was nearly 100% carpet and carpet padding.

### NUMBER OF SAMPLES

50 samples were collected and characterized during each of the two seasonal field activities. A total of 50 commercial samples, 40 residential samples, and 10 multi-family samples were

collected and characterized (100 samples total). The number of samples for each sector was based on estimates of waste tonnages from each sector.

## WASTE SORTING

The sorting and weighing program for samples entailed the use of one sorting crew and an SCS Crew Supervisor. During each day of fieldwork, waste loads were screened by interviewing the driver. 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 1** 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 A). Measurements were made to the nearest 0.05 pounds.
4. After each waste category had been recorded, the trash was disposed of in a roll-off container provided by the County. The recyclables were diverted to a separate recycling trailer, also provided by the County.

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, and other safety equipment. The Health and Safety Plan is presented in Appendix B.

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 1** details the material categories for the waste sorting activities.

**Exhibit 1. Description of Waste Categories**

<b>Major Waste Types</b>	<b>Waste Component Categories</b>	<b>Examples</b>
<b>Paper</b>	Recyclable Corrugated Cardboard	Packing/shipping boxes
	Paperboard	Cereal/Soda Boxes
	Newspaper/Print	Daily, weekly newspapers
	White Office Paper	High grade white copy paper or letterhead
	Glossy/Magazines	Magazines periodicals, journals
	Phone Books	Phone number listings
	Other Recyclable Paper	Junk mail, notebook paper, colored copy paper
	Aseptic/Polycoated	Milk/Juice Boxes/Cartons, wax coated boxes
	Non-Recyclable Paper	Tissues, napkins, any paper not categorized
<b>Plastic</b>	HDPE (#2) Bottles	Milk, Detergent
	PET (#1) Bottles	Soda, Water Bottles
	Tubs/Trays/Flower Pots	#1, #2, #5 Tubs and Trays
	Rigid Plastics	Plastic toys, items without a #
	Film	Garbage bags
	Plastic Shopping Bags	Grocery bags
	Plastic Bottle (#3-#7)	#3 through #7 bottles, excluding #6
	Polystyrene (#6)	Expanded and non expanded polystyrene
<b>Metal</b>	Bi-Metal/Steel Cans	Ferrous cans generally used to contain food
	Other Ferrous	Ferrous metals, not otherwise classified
	Aluminum Cans	Soda, beer cans
	Other Aluminum	Aluminum tins and foils
	Other Non-Ferrous	Non-Ferrous scrap metals
<b>Organic</b>	Vegetative Food	Celery, orange/banana peels, plant based food
	Other Food	Non-plant based food
	Pet Waste	Kitty litter, dog cleanup bags
	Fines	Items less than ¼" by ¼"
	Wood	Lumber, treated and untreated
	Pallets	Wooden shipping pallets
	Other Organics	Organic items not otherwise classified
<b>Other</b>	Carpet	Carpet rolls and padding
	Mattresses	Box springs and mattresses
	Diapers	Adult and child diapers
<b>Textiles</b>	Textiles	Clothing, rugs, blankets

<b>Major Waste Types</b>	<b>Waste Component Categories</b>	<b>Examples</b>
<b>Glass</b>	Glass Bottles and Jars	Containers used for food/beverages, any color
<b>Yard Waste</b>	Grass	Grass clippings
	Leaves	Leaves, pine needles
	Brush	Small sticks and hedge trimmings
	Other Yard Waste	Potting soil, dirt, stumps
<b>Electronics</b>	Electronics	Electronic appliances, e-waste
<b>C&amp;D Debris</b>	C&D Debris	Concrete, drywall, roofing, etc.
	Vinyl siding	Vinyl building siding boards
<b>Household Hazardous Waste</b>	Paint	Oil based paints
	Automotive Fluids	Oil, antifreeze, brake fluid
	Batteries	Lead-acid, lithium, rechargeable batteries
	Other HHW	HHW not characterized above
<b>Other</b>	Miscellaneous Other Materials	Non-recyclable materials not otherwise categorized

### 3 SUMMARY OF RESULTS

One hundred samples were collected during the sampling events. 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 County's true waste composition (i.e., the proportion of each waste component present in the waste collected in the County). 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).

#### MSW COMPOSITION

##### Overall

**Exhibit 2** presents a side by side comparison of the fifty waste samples obtained and sorted from the multi-family, commercial, and residential sectors during each season. Based on these samples, the three largest components, by weight, of the overall waste stream are Vegetative Food (10.7 percent), Other Organics (7.8 percent), and Non-Recyclable Paper (7.3 percent). Common recyclable materials (mixed paper and commingled materials) through curbside pickup made up approximately 27 percent of the overall waste stream. Compostable materials such as Non-Recyclable Paper, Vegetative Food, Wood, and Yard Waste made up approximately 33 percent of the overall waste stream.

**Exhibit 2. Overall Waste Composition**

<b>Material Components</b>	<b>Fall Composition</b>	<b>Spring Composition</b>	<b>Overall Composition</b>
<b>PAPER</b>			
1 Recyclable Corrugated Cardboard	5.9%	7.0%	6.5%
2 Paperboard	2.1%	2.6%	2.4%
3 Newspaper/Print	1.8%	1.6%	1.7%
4 White Office Paper	1.1%	1.7%	1.4%
5 Glossy/Magazines	1.9%	0.7%	1.3%
6 Phone Books	<0.1%	<0.1%	<0.1%
7 Other Recyclable Paper	3.6%	2.4%	3.0%
8 Aseptic/Polycoated	1.7%	0.4%	1.1%
9 Non-Recyclable Paper	5.8%	8.7%	7.3%
<b>Total Paper</b>	<b>24.1%</b>	<b>25.2%</b>	<b>24.7%</b>
<b>PLASTIC</b>			
10 PET (#1) Bottles	1.9%	1.6%	1.7%
11 HDPE (#2) Bottles	0.9%	0.9%	0.9%
12 Other (#3-#7) Bottles	0.1%	<0.1%	<0.1%
13 Jars, Jugs, Tubs, Trays	2.0%	1.7%	1.8%
14 Plastic Film	6.3%	7.7%	7.0%
15 Shopping Bags	1.2%	0.9%	1.0%
16 Polystyrene	1.0%	1.4%	1.2%
17 Other Rigid Plastic	2.4%	1.8%	2.1%
<b>Total Plastic</b>	<b>15.9%</b>	<b>16.0%</b>	<b>16.0%</b>
<b>FOOD WASTE</b>			
18 Vegetative Food	8.3%	13.0%	10.7%
19 Other Food	4.7%	2.4%	3.5%
<b>Total Food Waste</b>	<b>13.0%</b>	<b>15.4%</b>	<b>14.2%</b>
<b>ORGANICS</b>			
20 Pet Waste	1.7%	0.6%	1.1%
21 Fines	2.7%	2.6%	2.7%
22 Wood	2.7%	2.6%	2.7%
23 Pallets	<0.1%	0.5%	0.2%
24 Other Organics	8.3%	7.3%	7.8%
25 Textiles	4.4%	5.2%	4.8%
<b>Total Organics</b>	<b>19.9%</b>	<b>18.8%</b>	<b>19.3%</b>
<b>YARD WASTE</b>			
26 Leaves	8.5%	2.7%	5.6%
27 Grass	1.8%	4.7%	3.2%
28 Brush	1.3%	1.3%	1.3%
29 Other Yard Waste	3.5%	3.3%	3.4%
<b>Total Yard Waste</b>	<b>15.1%</b>	<b>11.9%</b>	<b>13.5%</b>

Material Components	Fall Composition	Spring Composition	Overall Composition
<b>GLASS</b>			
30 Glass Bottles and Jars	2.0%	2.3%	2.1%
<b>METAL</b>			
31 Ferrous Cans	0.9%	0.6%	0.7%
32 Other Ferrous	1.0%	1.3%	1.1%
33 Aluminum Cans	0.5%	0.7%	0.6%
34 Aluminum Tins/Foil	0.4%	0.4%	0.4%
35 Other Non-Ferrous	<0.1%	<0.1%	<0.1%
<b>Total Metal</b>	<b>2.8%</b>	<b>3.0%</b>	<b>2.9%</b>
<b>OTHER</b>			
36 Carpet	1.8%	0.5%	1.2%
37 Mattresses	0.3%	<0.1%	0.2%
38 Diapers	2.0%	2.7%	2.3%
39 Other Materials	0.3%	0.7%	0.5%
<b>Total Other Waste</b>	<b>4.4%</b>	<b>4.0%</b>	<b>4.2%</b>
<b>ELECTRONICS</b>			
40 Electronics	1.2%	0.8%	1.0%
<b>C&amp;D</b>			
41 C&D Debris	1.5%	2.5%	2.0%
42 Vinyl Siding	<0.1%	<0.1%	<0.1%
<b>Total C&amp;D</b>	<b>1.5%</b>	<b>2.5%</b>	<b>2.0%</b>
<b>HOUSEHOLD HAZARDOUS WASTES</b>			
43 Paint	0.1%	<0.1%	<0.1%
44 Automotive Fluids	<0.1%	0.2%	<0.1%
45 Batteries	<0.1%	<0.1%	<0.1%
46 Other HHW	<0.1%	<0.1%	<0.1%
<b>Total HHW</b>	<b>0.1%</b>	<b>0.2%</b>	<b>0.2%</b>
<b>TOTALS</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Note: Composition based on 50 samples per season

### Residential

Exhibit 3 presents a side by side comparison of the forty waste samples obtained and sorted from the residential sector during each season. Based on these samples, the three largest components, by weight, of the overall residential waste stream are Leaves (11.7 percent), Vegetative Food (8.6 percent), and Other Organics (8.0 percent). Common recyclable materials (mixed paper and commingled materials) through curbside pickup made up approximately 23 percent of the waste stream. Compostable materials such as Non-Recyclable Paper, Vegetative Food, Wood, and Yard Waste made up approximately 41 percent of the waste stream.

**Exhibit 3. Residential Waste Composition**

<b>Material Components</b>	<b>Fall Composition</b>	<b>Spring Composition</b>	<b>Overall Composition</b>
<b>PAPER</b>			
1 Recyclable Corrugated Cardboard	2.1%	3.2%	2.7%
2 Paperboard	2.1%	2.8%	2.4%
3 Newspaper/Print	2.1%	2.1%	2.1%
4 White Office Paper	1.0%	0.9%	1.0%
5 Glossy/Magazines	3.1%	1.0%	2.1%
6 Phone Books	<0.1%	<0.1%	<0.1%
7 Other Recyclable Paper	3.7%	2.0%	2.8%
8 Aseptic/Polycoated	1.4%	0.3%	0.8%
9 Non-Recyclable Paper	6.3%	7.4%	6.9%
<b>Total Paper</b>	<b>21.8%</b>	<b>19.8%</b>	<b>20.8%</b>
<b>PLASTIC</b>			
10 PET (#1) Bottles	1.8%	1.2%	1.5%
11 HDPE (#2) Bottles	1.0%	0.8%	0.9%
12 Other (#3-#7) Bottles	0.2%	<0.1%	0.1%
13 Jars, Jugs, Tubs, Trays	1.8%	2.0%	1.9%
14 Plastic Film	5.2%	5.8%	5.5%
15 Shopping Bags	1.3%	1.4%	1.4%
16 Polystyrene	0.9%	1.1%	1.0%
17 Other Rigid Plastic	1.8%	1.8%	1.8%
<b>Total Plastic</b>	<b>14.0%</b>	<b>14.2%</b>	<b>14.1%</b>
<b>FOOD WASTE</b>			
18 Vegetative Food	7.8%	9.3%	8.6%
19 Other Food	3.1%	1.2%	2.2%
<b>Total Food Waste</b>	<b>10.9%</b>	<b>10.6%</b>	<b>10.7%</b>
<b>ORGANICS</b>			
20 Pet Waste	1.8%	0.8%	1.3%
21 Fines	2.6%	3.1%	2.8%
22 Wood	2.6%	2.5%	2.6%
23 Pallets	<0.1%	<0.1%	<0.1%
24 Other Organics	7.9%	8.0%	8.0%
25 Textiles	4.0%	4.0%	4.0%
<b>Total Organics</b>	<b>19.0%</b>	<b>18.3%</b>	<b>18.6%</b>
<b>YARD WASTE</b>			
26 Leaves	20.0%	3.5%	11.7%
27 Grass	3.7%	11.6%	7.7%
28 Brush	1.4%	2.5%	1.9%
29 Other Yard Waste	1.1%	5.6%	3.3%
<b>Total Yard Waste</b>	<b>26.1%</b>	<b>23.2%</b>	<b>24.7%</b>

Material Components	Fall Composition	Spring Composition	Overall Composition
<b>GLASS</b>			
30 Glass Bottles and Jars	1.7%	1.9%	1.8%
<b>METAL</b>			
31 Ferrous Cans	1.1%	0.5%	0.8%
32 Other Ferrous	0.5%	1.3%	0.9%
33 Aluminum Cans	0.5%	0.5%	0.5%
34 Aluminum Tins/Foil	0.5%	0.6%	0.5%
35 Other Non-Ferrous	<0.1%	<0.1%	<0.1%
<b>Total Metal</b>	<b>2.7%</b>	<b>2.8%</b>	<b>2.7%</b>
<b>OTHER</b>			
36 Carpet	<0.1%	1.0%	0.5%
37 Mattresses	<0.1%	<0.1%	<0.1%
38 Diapers	2.1%	3.9%	3.0%
39 Other Materials	0.4%	0.4%	0.4%
<b>Total Other Waste</b>	<b>2.6%</b>	<b>5.3%</b>	<b>3.9%</b>
<b>ELECTRONICS</b>			
40 Electronics	0.6%	0.7%	0.7%
<b>C&amp;D</b>			
41 C&D Debris	0.7%	3.1%	1.9%
42 Vinyl Siding	<0.1%	<0.1%	<0.1%
<b>Total C&amp;D</b>	<b>0.7%</b>	<b>3.1%</b>	<b>1.9%</b>
<b>HOUSEHOLD HAZARDOUS WASTES</b>			
43 Paint	<0.1%	<0.1%	<0.1%
44 Automotive Fluids	<0.1%	0.2%	<0.1%
45 Batteries	<0.1%	<0.1%	<0.1%
46 Other HHW	<0.1%	<0.1%	<0.1%
<b>Total HHW</b>	<b>&lt;0.1%</b>	<b>0.2%</b>	<b>&lt;0.1%</b>
<b>TOTALS</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Note: Composition based on 20 samples per season

## Commercial

**Exhibit 4** presents a compilation of the twenty five waste samples obtained and sorted from the commercial sector each season. Based on these samples, the three largest components, by weight, of the residential waste stream are Vegetative Food (12.5 percent), Recyclable Corrugated Cardboard (9.4 percent), and Plastic Films (8.2 percent). Common recyclable materials (mixed paper and commingled materials) through curbside pickup made up approximately 29 percent of the waste stream. Compostable materials such as Non-Recyclable Paper, Vegetative Food, Wood, and Yard Waste made up approximately 28 percent of the waste stream.

**Exhibit 4. Commercial Waste Composition**

<b>Material Components</b>	<b>Fall Composition</b>	<b>Spring Composition</b>	<b>Overall Composition</b>
<b>PAPER</b>			
1 Recyclable Corrugated Cardboard	8.6%	10.3%	9.4%
2 Paperboard	1.9%	2.3%	2.1%
3 Newspaper/Print	1.6%	1.2%	1.4%
4 White Office Paper	1.1%	2.3%	1.7%
5 Glossy/Magazines	0.9%	0.6%	0.7%
6 Phone Books	0.1%	<0.1%	<0.1%
7 Other Recyclable Paper	3.5%	2.5%	3.0%
8 Aseptic/Polycoated	2.2%	0.6%	1.4%
9 Non-Recyclable Paper	5.5%	9.5%	7.5%
<b>Total Paper</b>	<b>25.3%</b>	<b>29.2%</b>	<b>27.2%</b>
<b>PLASTIC</b>			
10 PET (#1) Bottles	2.0%	1.6%	1.8%
11 HDPE (#2) Bottles	0.8%	0.9%	0.8%
12 Other (#3-#7) Bottles	<0.1%	<0.1%	<0.1%
13 Jars, Jugs, Tubs, Trays	2.2%	1.4%	1.8%
14 Plastic Film	7.2%	9.3%	8.2%
15 Shopping Bags	1.1%	0.4%	0.8%
16 Polystyrene	1.2%	1.6%	1.4%
17 Other Rigid Plastic	3.0%	1.7%	2.3%
<b>Total Plastic</b>	<b>17.5%</b>	<b>16.9%</b>	<b>17.2%</b>
<b>FOOD WASTE</b>			
18 Vegetative Food	8.7%	16.3%	12.5%
19 Other Food	6.2%	3.6%	4.9%
<b>Total Food Waste</b>	<b>14.9%</b>	<b>19.9%</b>	<b>17.4%</b>
<b>ORGANICS</b>			
20 Pet Waste	1.6%	0.2%	0.9%
21 Fines	2.8%	2.3%	2.5%
22 Wood	2.7%	2.6%	2.6%
23 Pallets	<0.1%	0.9%	0.5%
24 Other Organics	8.1%	6.7%	7.4%
25 Textiles	4.1%	6.2%	5.2%
<b>Total Organics</b>	<b>19.3%</b>	<b>18.8%</b>	<b>19.1%</b>
<b>YARD WASTE</b>			
26 Leaves	0.9%	2.5%	1.7%
27 Grass	0.2%	<0.1%	0.1%
28 Brush	1.4%	0.6%	1.0%
29 Other Yard Waste	6.0%	1.8%	3.9%
<b>Total Yard Waste</b>	<b>8.6%</b>	<b>5.0%</b>	<b>6.8%</b>

Material Components	Fall Composition	Spring Composition	Overall Composition
<b>GLASS</b>			
30 Glass Bottles and Jars	1.7%	2.5%	2.1%
<b>METAL</b>			
31 Ferrous Cans	0.7%	0.6%	0.6%
32 Other Ferrous	1.4%	1.4%	1.4%
33 Aluminum Cans	0.4%	1.0%	0.7%
34 Aluminum Tins/Foil	0.3%	0.3%	0.3%
35 Other Non-Ferrous	<0.1%	<0.1%	<0.1%
<b>Total Metal</b>	<b>2.8%</b>	<b>3.2%</b>	<b>3.0%</b>
<b>OTHER</b>			
36 Carpet	3.6%	0.2%	1.9%
37 Mattresses	0.7%	<0.1%	0.3%
38 Diapers	1.2%	0.7%	1.0%
39 Other Materials	<0.1%	0.6%	0.3%
<b>Total Other Waste</b>	<b>5.4%</b>	<b>1.6%</b>	<b>3.5%</b>
<b>ELECTRONICS</b>			
40 Electronics	1.8%	0.8%	1.3%
<b>C&amp;D</b>			
41 C&D Debris	2.3%	2.0%	2.2%
42 Vinyl Siding	<0.1%	<0.1%	<0.1%
<b>Total C&amp;D</b>	<b>2.3%</b>	<b>2.0%</b>	<b>2.2%</b>
<b>HOUSEHOLD HAZARDOUS WASTES</b>			
43 Paint	0.3%	<0.1%	0.1%
44 Automotive Fluids	<0.1%	<0.1%	<0.1%
45 Batteries	<0.1%	<0.1%	<0.1%
46 Other HHW	<0.1%	<0.1%	<0.1%
<b>Total HHW</b>	<b>0.3%</b>	<b>0.1%</b>	<b>0.2%</b>
<b>TOTALS</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Note: Composition based on 25 samples per season

### Multi-Family

Exhibit 5 presents a compilation of the five samples obtained and sorted from the multi-family sector each season. Based on these samples, the three largest components, by weight, of the residential waste stream are Vegetative Food (9.8 percent), Other Organics (9.0 percent), and Non-Recyclable Paper (7.6 percent). Common recyclable materials (mixed paper and commingled materials) through curbside pickup made up approximately 32 percent of the waste stream. Compostable materials such as Non-Recyclable Paper, Vegetative Food, Wood, and Yard Waste made up approximately 23 percent of the waste stream.

**Exhibit 5. Multi-Family Waste Composition**

<b>Material Components</b>	<b>Fall Composition</b>	<b>Spring Composition</b>	<b>Overall Composition</b>
<b>PAPER</b>			
1 Recyclable Corrugated Cardboard	7.9%	5.7%	6.8%
2 Paperboard	3.3%	3.3%	3.3%
3 Newspaper/Print	2.0%	1.3%	1.7%
4 White Office Paper	1.5%	2.1%	1.8%
5 Glossy/Magazines	2.1%	0.4%	1.2%
6 Phone Books	<0.1%	0.6%	0.3%
7 Other Recyclable Paper	4.3%	3.5%	3.9%
8 Aseptic/Polycoated	1.1%	<0.1%	0.6%
9 Non-Recyclable Paper	5.5%	9.6%	7.6%
<b>Total Paper</b>	<b>27.7%</b>	<b>26.6%</b>	<b>27.1%</b>
<b>PLASTIC</b>			
10 PET (#1) Bottles	2.0%	3.0%	2.5%
11 HDPE (#2) Bottles	1.3%	1.3%	1.3%
12 Other (#3-#7) Bottles	0.2%	<0.1%	<0.1%
13 Jars, Jugs, Tubs, Trays	1.7%	2.0%	1.9%
14 Plastic Film	6.4%	7.4%	6.9%
15 Shopping Bags	1.4%	0.8%	1.1%
16 Polystyrene	0.8%	1.7%	1.3%
17 Other Rigid Plastic	2.1%	2.4%	2.2%
<b>Total Plastic</b>	<b>16.0%</b>	<b>18.5%</b>	<b>17.3%</b>
<b>FOOD WASTE</b>			
18 Vegetative Food	8.2%	11.4%	9.8%
19 Other Food	4.1%	0.9%	2.5%
<b>Total Food Waste</b>	<b>12.3%</b>	<b>12.2%</b>	<b>12.3%</b>
<b>ORGANICS</b>			
20 Pet Waste	1.6%	2.0%	1.8%
21 Fines	3.0%	2.5%	2.8%
22 Wood	3.3%	3.1%	3.2%
23 Pallets	<0.1%	<0.1%	<0.1%
24 Other Organics	10.2%	7.8%	9.0%
25 Textiles	7.9%	5.0%	6.5%
<b>Total Organics</b>	<b>26.0%</b>	<b>20.3%</b>	<b>23.2%</b>
<b>YARD WASTE</b>			
26 Leaves	0.6%	<0.1%	0.3%
27 Grass	2.3%	<0.1%	1.2%
28 Brush	0.2%	<0.1%	0.1%
29 Other Yard Waste	<0.1%	1.2%	0.6%
<b>Total Yard Waste</b>	<b>3.1%</b>	<b>1.2%</b>	<b>2.1%</b>

Material Components	Fall Composition	Spring Composition	Overall Composition
<b>GLASS</b>			
30 Glass Bottles and Jars	5.1%	2.6%	3.8%
<b>METAL</b>			
31 Ferrous Cans	1.0%	0.8%	0.9%
32 Other Ferrous	0.5%	1.2%	0.9%
33 Aluminum Cans	1.0%	0.6%	0.8%
34 Aluminum Tins/Foil	0.6%	0.4%	0.5%
35 Other Non-Ferrous	0.2%	<0.1%	0.1%
<b>Total Metal</b>	<b>3.3%</b>	<b>3.1%</b>	<b>3.2%</b>
<b>OTHER</b>			
36 Carpet	<0.1%	<0.1%	<0.1%
37 Mattresses	<0.1%	<0.1%	<0.1%
38 Diapers	5.1%	7.8%	6.4%
39 Other Materials	1.2%	3.0%	2.1%
<b>Total Other Waste</b>	<b>6.3%</b>	<b>10.8%</b>	<b>8.6%</b>
<b>ELECTRONICS</b>			
40 Electronics	0.3%	0.7%	0.5%
<b>C&amp;D</b>			
41 C&D Debris	<0.1%	3.0%	1.5%
42 Vinyl Siding	<0.1%	<0.1%	<0.1%
<b>Total C&amp;D</b>	<b>&lt;0.1%</b>	<b>3.0%</b>	<b>1.5%</b>
<b>HOUSEHOLD HAZARDOUS WASTES</b>			
43 Paint	<0.1%	<0.1%	<0.1%
44 Automotive Fluids	<0.1%	0.8%	0.4%
45 Batteries	<0.1%	<0.1%	<0.1%
46 Other HHW	<0.1%	<0.1%	<0.1%
<b>Total HHW</b>	<b>&lt;0.1%</b>	<b>0.8%</b>	<b>0.4%</b>
<b>TOTALS</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Note: Composition based on 5 samples per season

## 4 DIVERSION OPPORTUNITIES

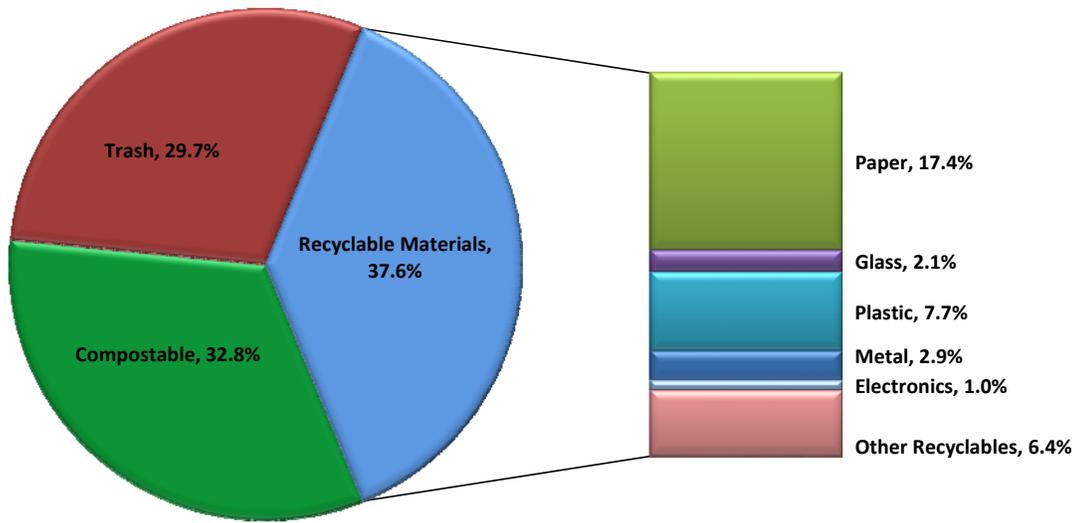
A significant portion of the waste stream is compostable or recyclable. Some materials, such as Polystyrene, are considered trash because these materials do not currently have markets for recycling or composting. Plastic Films are considered trash because a large portion of them are garbage bags used to contain refuse. Brush is considered recyclable because it is used to make mulch. **Exhibit 6** details the materials included in the compostable, recyclable, and trash classifications used for this section.

**Exhibit 6. Compostable, Recyclable, and Trash Classifications for Waste Materials**

Compostable	Recyclable		Trash
Non-Recyclable Paper	Recyclable Corrugated	PET (#1) Bottles	Plastic Film
Vegetative Food	Cardboard	HDPE (#2) Bottles	Polystyrene
Leaves	Paperboard	Other (#3-#7) Bottles	Other Food
Grass	Newspaper/Print	Jars, Jugs, Tubs, Trays	Pet Waste
Other Yard Waste	White Office Paper	Plastic Shopping Bags	Fines
Wood	Glossy/Magazines	Ferrous Cans	Other Organics
	Phone Books	Other Ferrous	Carpet
	Other Recyclable Paper	Aluminum Cans	Mattresses
	Aseptic/Polycoated	Aluminum Tins/Foil	Diapers
	Electronics	Other Non-Ferrous	Other Materials
	Glass Bottles and Jars	Textiles	C&D Debris
	Brush	Automotive Fluids	Vinyl Siding
	Pallets	Batteries	Paint
	Other Rigid Plastic		Other HHW

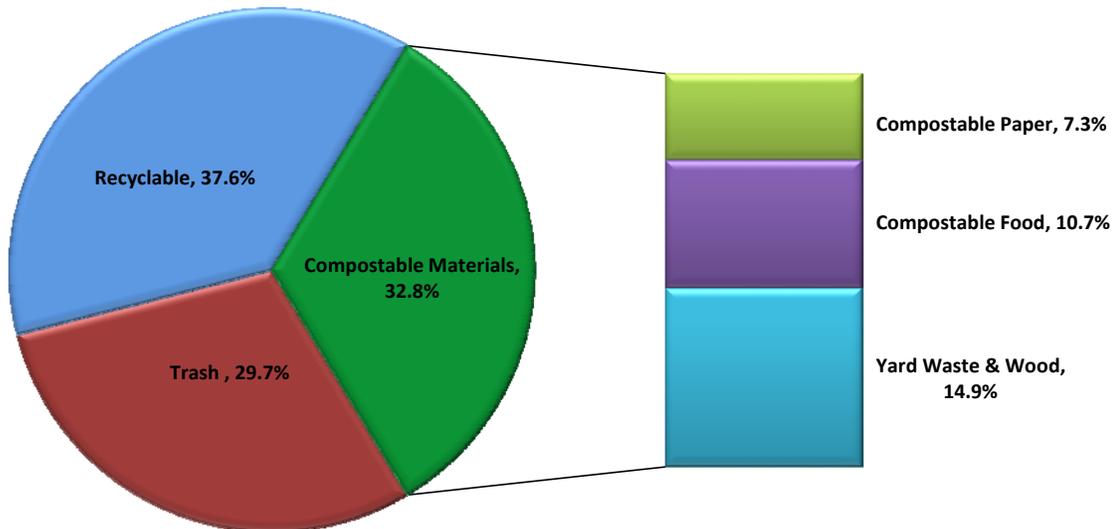
The largest diversion opportunities for Prince William County are diverting Yard Waste and capturing more recyclable paper. Yard Waste is most prevalent in the residential waste stream, while recyclable materials are more prevalent in the commercial waste stream. According to the data collected during both seasonal field efforts, the four material categories of Yard Waste made up approximately 15 percent of the overall waste stream. Recyclable paper categories made up 17 percent of the overall waste stream. It should be noted that if all of the Yard Waste was diverted from the county landfill, recyclable paper would make up an even greater proportion of the remaining waste stream. The largest subcomponents of recyclable paper were Recyclable Cardboard (6.5 percent) and Other Recyclable Paper (3.0 percent). Other Recyclable Paper is generally comprised of junk mail. **Exhibit 7** and **Exhibit 8** portray the waste composition by recyclable (with existing recycling markets and infrastructure), compostable and trash materials. According to the waste characterization, approximately 70 percent of the waste stream is considered recyclable or compostable. The following exhibits are based on the overall composition from the fifty samples collected during each of the seasonal field efforts (100 samples for the year).

### Exhibit 7. Recyclable Diversion Opportunities



Notes: Other Recyclables includes Textiles, Brush, Pallets, Automotive Fluids, and Batteries  
Categories may not sum to 100.0% due to rounding.

### Exhibit 8. Compostable Diversion Opportunities



Notes: Compostable Paper is comprised of Non-Recyclable Paper  
Compostable Food is comprised of Vegetative Food  
Yard Waste & Wood is comprised of Leaves, Grass, Other Yard Waste, and Wood (a small percentage of Wood is treated wood which is not considered compostable)  
Categories may not sum to 100.0% due to rounding.

## 5 COMPARISON TO PREVIOUS STUDIES

**Exhibit 9** presents a comparison of the overall waste compositions (commercial, single-family residential, and multi-family residential) in 1992 and 2014.

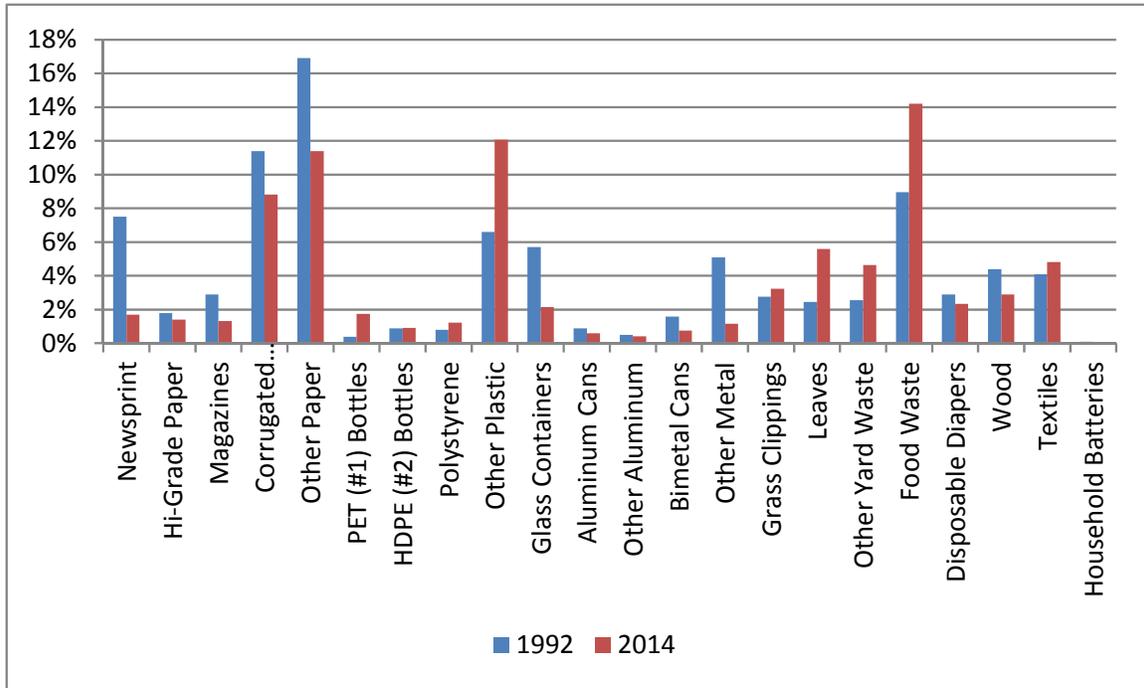
**Exhibit 9. Comparison of Overall Waste Compositions  
 1992 and 2014**

Material Components	1992	2014
<b>PAPER</b>		
Newsprint	7.5%	1.7%
Hi-Grade Paper	1.8%	1.4%
Magazines	2.9%	1.3%
Corrugated Coardboard/Kraft	11.4%	8.8%
Other Paper	16.9%	11.4%
<b>Total Paper</b>	<b>40.5%</b>	<b>24.7%</b>
<b>PLASTIC</b>		
PET (#1) Bottles	0.4%	1.7%
HDPE (#2) Bottles	0.9%	0.9%
Polystyrene	0.8%	1.2%
Other Plastic	6.6%	12.1%
<b>Total Plastic</b>	<b>8.7%</b>	<b>16.0%</b>
<b>GLASS CONTAINERS</b>	<b>5.7%</b>	<b>2.1%</b>
<b>METAL</b>		
Aluminum Cans	0.9%	0.6%
Other Aluminum	0.5%	0.4%
Tin-Steel and Bimetal Cans	1.6%	0.7%
Other Metal	5.1%	1.2%
<b>Total Metal</b>	<b>8.1%</b>	<b>2.9%</b>
<b>YARD WASTE</b>		
Grass Clippings	2.8%	3.2%
Leaves	2.5%	5.6%
Other Yard Waste	2.6%	4.6%
<b>Total Yard Waste</b>	<b>7.8%</b>	<b>13.5%</b>
<b>OTHER</b>		
Food Waste	9.0%	14.2%
Disposable Diapers	2.9%	2.3%
Wood	4.4%	2.9%
Textiles/Rubber/Leather	4.1%	4.8%
Household Batteries	0.1%	<0.1%
Fines	3.4%	2.7%
Other	5.4%	13.9%
<b>Total Other</b>	<b>29.2%</b>	<b>40.9%</b>
<b>TOTALS</b>	<b>100.0%</b>	<b>100.0%</b>

Note: Composition based 50 samples.

Even though the waste categories were not entirely the same in 2014 as they were in 1992, useful comparisons can still be made. **Exhibit 10** presents a comparison of individual waste categories.

**Exhibit 10. Comparison of Waste Component Proportions  
 1992 and 2014**



The largest components by weight of the waste stream in 1992 were Other Paper (17 percent), Corrugated Cardboard (11 percent), and Food Waste (9 percent). The largest components of the waste stream in 2014 are Food Waste (14 percent), Other Plastic (12 percent), and Other Paper (11 percent).

Recycling programs have decreased the proportion of recyclable materials in the waste stream since 1992. There has been a significant reduction in the proportion of metals in the waste stream since 1992, from 8.1 percent in 1992 to 2.9 percent in 2014. Similarly, the proportion of glass containers has decreased from 5.7 percent in 1992 to 2.1 percent in 2014. Paper has decreased from 40.5 percent of the waste stream in 1992 to just under 25 percent in 2014.

The proportion of plastics in the waste stream has almost doubled since 1992, from 8.7 percent to 16.0 percent in 2014. There has been a significant increase in the use of plastic packaging since 1992 so there is much more plastic in the waste stream. Because plastic is a lightweight material, small increases of plastic in the waste composition represent significant volumes of plastic materials.

**Appendix A**  
**Data Recording Forms**

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PRINCE WILLIAM COUNTY WASTE CHARACTERIZATION STUDY - NOVEMBER 2013				
Date:		M T W TH F	Time: Quadrant:	
Sample #:		Vehicle #:	Hauler:	Sector: Residential / Commerical
Major Waste Fractions	Waste Component Categories	Examples	WEIGHT (In Pounds)	
			Gross	Tare
<b>Paper</b>	Recyclable Corrugated Cardboard	Packing/shipping boxes		
	Paperboard	Cereal/Soda Boxes		
	Newspaper/Print	Daily, weekly newspapers		
	White Office Paper	High grade white copy paper or letterhead		
	Glossy/Magazines	Magazines periodicals, journals		
	Phone Books	Phone number listings		
	Other Recyclable Paper	Junk mail, notebook paper, colored copy		
	Aseptic/Polycoated	Milk/Juice Boxes/Cartons, wax coated boxes		
	Non-Recyclable Paper	Tissues, napkins, any paper not categorized		
<b>Plastic</b>	PET (#1) Bottles	Water, Soda		
	HDPE (#2) Bottles	Milk, Detergent		
	Other (#3-#7) Bottles	Prescriptions		
	Jars, Jugs, Tubs, Trays	Yogurt, Butter, flower pots		
	Plastic Film	garbage bags		
	Shopping Bags	grocery store bags		
	Polystyrene	Expanded or regular clamshells, cutlery, cups		
	Other Rigid Plastic	Buckets, storage totes, furniture, toys		
<b>Organics</b>	Vegetative Food	fruits, vegetables		
	Other Food	meats, dairy		
	Pet Waste	kitty litter		
	Fines	Items less than 1/4 inch		
	Wood	Lumber		
	Pallets	shipping pallets		
	Other Organics	Organics not otherwise classified		
<b>Textiles</b>	Textiles	clothing, rugs, blankets		
<b>Yard Waste</b>	Leaves	Foliage		
	Grass	Lawn clippings		
	Brush	Branches		
	Other Yard Waste	potting soil, dirt, stumps		

<b>Glass</b>	Glass Bottles/Jars	Beer, wine		
<b>Metal</b>	Ferrous Cans	used to contain food		
	Other Ferrous	ferrous metals		
	Aluminum Cans	soda, beer cans		
	Aluminum Tins/Foil	tins and foils		
	Other Non-Ferrous	non-ferrous scrap metals		
<b>Other</b>	Carpet	carpet rolls and padding		
	Mattresses	box springs and mattresses		
	Diapers	adult and child diapers		
<b>Electronics</b>	Electronics	Cell phones, radios		
<b>C&amp;D Debris</b>	C&D Debris	concrete, dry wall, roofing		
	Vinyl Siding	vinyl siding		
<b>Household Hazardous Waste</b>	Paint	latex paints		
	Automotive Fluids	Lubricants, oil		
	Batteries	rechargeable batteries		
	Other HHW	poisons, pesticides		
<b>Other</b>	Other Materials	materials not otherwise classified		

Comments:

**Appendix B**  
**Health & Safety Plan**

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## Site-Specific Health and Safety Plan

### Prince William County Waste Characterization

Rev. 1 – November 1, 2013

REQUIRED APPROVAL			
SCS OSHC or designee:	Eric Andersen	Date:	11/1/13
SCS PM:	Josh DeGayner	Date:	11/1/13

Project No.:	02212052.08
Project Name:	Prince William County Waste Composition Study
Site Address:	14811 Dumfries Rd, Manassas, VA 20112
Client Contact:	Scott Macdonald

EMERGENCY TELEPHONE NUMBERS	
Fire:	911 or 703-792-6810 (non emergency)
Police:	911 or 703-792-6500 (non-emergency)
Hospital	703-369-8000 (Prince William 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	703-471-6150
Project Director:	Stacey Demers	703-471-6150
Client Representative:	Scott MacDonald	703-906-2335

## 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 Prince William 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 Landfills, combustion of the waste materials at the working face or in "Hot Loads" 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.

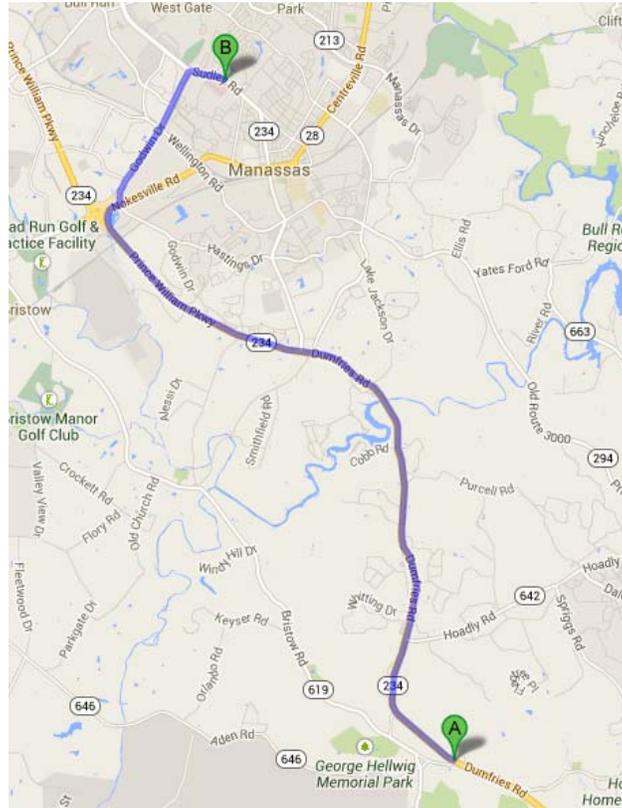
To alleviate the possibility of injury, caution should be employed at all times when physically handling the solid waste. Protective clothing, including gloves and safety glasses, should be worn at all times. If there is any question about the handling of a component of solid waste, the Crew Chief should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

Landfill gas (LFG) is produced by the anaerobic decomposition of organic waste materials placed in a landfill. LFG is typically composed of 50 to 60 percent methane, 40 to 50 percent carbon dioxide, and trace amounts of various other gases, including odorous and possible toxic compounds. At the Prince William County Landfill, the generation of LFG is not expected to be a concern.

Refuse deposited at the Landfill 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, Landfill 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



1. Head **northwest** from the Landfill (A) on **VA-234N/Dumfries Rd.** Continue to follow **VA-234N** for 10.0 miles.
2. Take the **VA-28N** ramp to Manassas for 0.3 miles.
3. Merge onto **Nokesville Road** for 0.1 miles.
4. Turn **left** onto **Godwin Drive** and continue for 2.1 miles.
5. Turn **right** onto **Sudley Road** and continue for 0.5 miles.
6. Prince William Hospital (B) will be on the **right**.

**Figure 1. Map to the Hospital and Directions**

**Nearest Hospital Address:**

**Prince William Hospital  
8700 Sudley Road  
Manassas, VA 20110  
703-369-8000**

## 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. Additional first aid or medical support is available at the site located in the main office building near the facility entrance.

# 3 SITE DESCRIPTION

## LOCATION DESCRIPTION

The facility is located at 14811 Dumfries Road, Manassas, Virginia. The site is generally used as a landfill and resource recovery facility. SCS will be conducting field work on the landfill near the working face.

# 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 such as the working face.
- 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		<b>Appendix Letter and Program Name</b>
	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:

- Dust Masks
- 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 Landfill. 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 Landfill. 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 Landfill 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 near 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 landfill. 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 are present at the Landfill. 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				
<b>Task Type (Check all that Apply)</b>	Solid Waste	<b>Task Description (include an estimate of task duration in hrs/day)</b>  5 days of field activities, generally 8-10 hours per day.		<b>Location or Project:</b> Prince William County Virginia Waste Characterization
				<b>Date Revised:</b> 8/30/12
				<b>Project #/Revision #:</b> 02212052.08
<b>Analysis Team Member</b>	<b>Position Title</b>		<b>Reviewed by</b>	<b>Position Title</b>
Josh DeGayner	Crew Chief		John Tabella	OHSC
Eric Andersen	Sampling Manager			
<b>Special Training Required</b>		Bloodborne pathogens training		
<b>Applicable SAFE Checklist(s): Specify type and category number</b>		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 <sup>1</sup>	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"> <li>• Check in w/facility</li> <li>• Ensure work area is secured/isolated</li> <li>• Use buddy system</li> <li>• Employ safe lifting behaviors</li> <li>• Stretch/warm-up</li> </ul>	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"> <li>• Use buddy system</li> <li>• Stay visible</li> <li>• Use safe lifting</li> <li>• Set up away from traffic</li> <li>• Avoid Heavy EQ traffic</li> </ul>	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"> <li>• Use buddy system</li> <li>• Stay visible</li> <li>• Use safe lifting</li> <li>• Set up away from traffic</li> <li>• Brush trash (vs digging)</li> <li>• Wash hands freq.</li> <li>• Stay hydrated</li> <li>• Shift breaks</li> </ul>	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"> <li>• Ensure work area is secured/isolated</li> <li>• Use buddy system</li> <li>• Employ safe lifting behaviors</li> <li>• Stretch/warm-up</li> <li>• Decontaminate PPE</li> </ul>	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 <sup>1</sup>	Critical Actions	PPE Required
5. Demob	Vehicle/HE traffic	<ul style="list-style-type: none"> <li>• Check out w/facility</li> </ul>	Head: None Body: High Visibility Vest Foot: Steel--toe ANSI boots Hand: None Respiratory: None Hearing: None Eye/Face: None
<b>End of JTSA Form</b>			