January 27, 2023

Mr. Dan Fish
Leader, Environmental and Safety
Great River Energy HERC Services

Re: **Solid Waste Composition Analyses – Letter Report**

Dear Mr. Fish:

OVERVIEW

Per the Purchase Order #75769 with Great River Energy HERC Services, LLC. (GRE), Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) completed a solid waste fractional, proximate, ultimate, and heating value analyses (Study) for the Hennepin Energy Recovery Center (HERC Facility). Provided below is the letter report describing the Study methodology, the detailed results from the analyses, statistical interpretation of these results, and overall conclusions.

METHODOLOGY

Objective

The objective of the Study is to gather data consistent with Minnesota Rule 7007.0501 Subpart 2(A) requiring a solid waste fractional, proximate, ultimate, and heating value analysis for the solid waste operating permit for the HERC Facility. The proposed methodology represents a defensible means to complete the analysis based on the use of proven field and testing methodologies. The methodology developed is consistent with ASTM Designation: D5231-92 (2016); Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste (ASTM Standard).

Review of Facility Transaction Data

A written request for information was forwarded to HERC staff to gather and analyze facility transaction records. The data forwarded was reviewed to assess the historical quantities of solid waste received, number and frequency of vehicles depositing solid waste at the HERC Facility, and generator types of solid waste received at the HERC Facility. HERC staff provided three, non-consecutive weeks of daily transaction data including waste quantities, waste type, vehicle number, time of day for individual transactions, and other related information. In addition, GRE staff provided weekly summaries for each of the three weeks of data. This data was analyzed to develop the sampling methodology to provide representative and statistically sound results.

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Materials Sampling Methodology

The ASTM Standard identified above provides the basis for developing the materials sampling methodology. The materials sampling methodology includes a series of steps including the selection of the vehicles for sampling and obtaining the sample of materials for sorting from each of the selected vehicles. The key to this methodology hinges upon minimizing any bias that may enter the process of selecting vehicles and the materials to sample.

Based on our review of the HERC facility transaction data and the applicable ASTM standard, we developed the sampling plan depicted below in Table 1.

Table 1: Sampling Plan

Day of The Week	Daily Percentage of Total Solid Waste Quantities Received (Average)	Number of Collection Vehicles Depositing Materials (Average)	Representative Number of Samples	Adjusted Number of Samples
Monday	21.4%	235	7	7
Tuesday	19.4%	228	6	6
Wednesday	18.9%	234	6	6
Thursday	17.9%	257	5	6
Friday	18.0%	219	5	5
Saturday	3.3%	80	1	0
Sunday	1.1%	32	0	0

The above reflects a similar quantity of materials received Monday through Friday with Saturday and Sunday representing days when smaller quantities of materials are received. We also calculated the average number of vehicles for each day of the week to assist in developing the sampling methodology. The proposed number of "representative" samples are proportional to the average quantities of materials received each day of the week for the overall materials received in a "normal" week. The representative number of samples was adjusted to reflect facility and staffing availability.

MSW is transported to HERC primarily via traditional rear and front load refuse collection vehicles, roll offs, transfer trailers, and other small commercial vehicles. Transfer trailers have a much greater capacity than traditional collection vehicles. As a result, we evaluated the transactional data to estimate the proportion of MSW received at the HERC Facility from transfer trailers to determine the scope of materials sampling preferred from the transfer trailers. Based on review of the transaction data, the estimated proportion of MSW received at the HERC Facility via transfer trailers was 17.5% for the identified timeframe as outlined in Table 2 below.

Table 2: MSW Hauling Vehicles Comparison			
	Number of Vehicles per Week[1]	Total MSW (Tons)[2]	Weighted Capacity (%)[3]
Front/Rear/Side Loaders	732	4,964	63.1%
Roll Offs	281	1,125	14.3%
Transfer Trailers	72	1,379	17.5%
Other	151	391	5.0%

1. Number of Vehicles per Week compiled from transactional data provided by HERC staff.
2. Total MSW compiled from transactional data provided by HERC staff.
3. Weighted capacity calculated from Total MSW per generator type.

Based on this estimate, the Project Team chose to stratify its sampling of materials to include samples from front/rear/side loaders, roll offs, transfer trailers and "other" collection vehicles. "Other" collection vehicles are defined as small commercial vehicles, excluding front/rear/side loaders, roll offs and transfer trailers. The Project Team selected 19 front/rear/side loaders, 4 roll offs, 5 transfer trailers and 2 "other" collection vehicles to sample using the "Nth truck" approach. Burns & McDonnell relied on both driver interviews and the sampling randomization inherent in the "Nth truck" approach to select vehicles to sample materials. The Nth truck approach is based on the number of samples required for the Study to yield statistically sound results and the number of vehicles expected at the facility each day that will be delivering solid waste.

A member of the waste sort crew interviewed the driver of the Nth trucks selected to determine the origin of the materials being hauled for disposal and confirm that the vehicles are delivering municipal solid waste. Then, individual samples were randomly selected from each selected load of MSW to be consistent with the ASTM Standard.

Overall, the primary steps of the methodology involved the following:

- Gained approval of the material categories from GRE staff and applicable MPCA representatives;
- Selected the applicable MSW collection vehicles to sample via the "Nth truck" approach as described above;
- Selected a random sample of MSW of at least 200 lbs. from the identified loads by coordinating with facility operational staff;
- Once each sample was selected, the materials were pre-sorted for any hazardous or infectious wastes; and
- Materials sorting team sampled and sorted a total of 30 samples into the agreed upon material categories during the week of November 7th.

The proposed material categories for this Study were similar to those used in the 2017 HERC Facility study to ensure compatibility for comparison purposes, with a few exceptions to provide

more detailed data related to food waste and bulk wastes. The material categories are provided below with the detailed material category definitions included as Attachment A:

- Paper – Newsprint
- Paper – OCC and Kraft bags
- Paper – Mixed Recyclable Paper
- Paper – Compostable Paper
- Paper – Non-recyclable Non-compostable paper
- Plastic – HDPE Bottles/Jars
- Plastic – PET Bottles/Jars
- Plastic – Polypropylene (PP)
- Plastic – Polystyrene (PS)
- Plastic – Film and Flexible Packaging
- Plastic – Other Plastics
- Metals – Aluminum Containers
- Metals – Ferrous Containers
- Metals – Other Ferrous
- Metals – Other Non-Ferrous
- Glass – Containers
- Glass – Non-Containers
- Organic Materials – Yard Waste
- Organic Materials – Food Waste (unpackaged)
- Organic Materials – Food Waste (packaged)
- Organic Materials – Wood Waste (untreated)
- Organic Materials – Wood Waste (treated)
- Organic Materials – Other
- Construction & Demolition – Shingles
- Construction & Demolition – Other
- Other – Batteries
- Other – Mercury Containing Lamps
- Other – Paint Containers
- Other – Hazardous Wastes
- Other – Household Appliances
- Other – Electronics
- Other – Bulky Wastes
- Other – Carpet
- Other – Textiles
- Other – Inorganics
- Other – Fines/Supermix

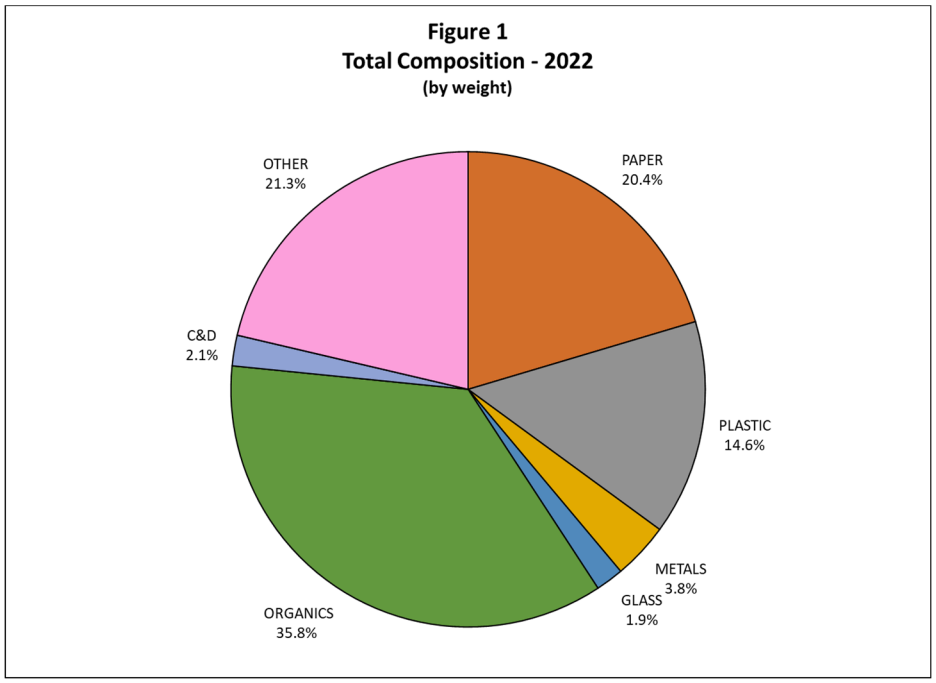
- Upon sorting the MSW materials into the designated containers by material category, the sorting crew weighed these materials for each of the samples and recorded the materials' weights per sample on designated data forms.
- Before discarding the materials, the sorting crew obtained grab samples of materials from each of the combustible fractions to create combustible composite samples.
- The composite samples were then transported to the designated laboratory for proximate, ultimate, and heating value analyses.

RESULTS

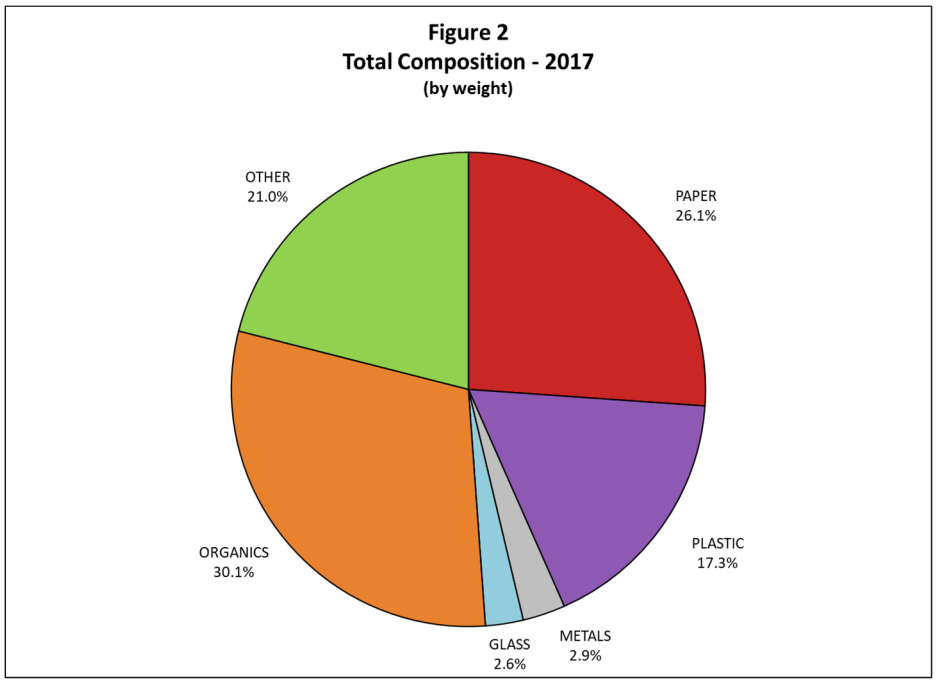
As specified in Minnesota Rule 7007.0501 Subpart 2(A)1, the results of the solid waste fractional analysis were characterized as percentages by weight. Per the Minnesota Pollution Control Agency (MPCA) rules, "at minimum, the material categories shall include paper, cardboard, plastic, ferrous and nonferrous metals, glass, organic, inorganic, recyclable, problem materials and household hazardous wastes, including mercury containing materials."

The data from the 30 samples were statistically analyzed to identify the mean (by weight) and the upper and lower confidence intervals for each primary and secondary material type. First, results were developed for the composition data gathered for the MSW delivered via traditional front/rear/side loaders, roll offs, transfer trailers, and "other" collection vehicles. These results were then combined to calculate the total composition by weighting the four generator type results based on the respective proportion of estimated quantities delivered to the HERC Facility. The individual data sheets are included as Attachment B.

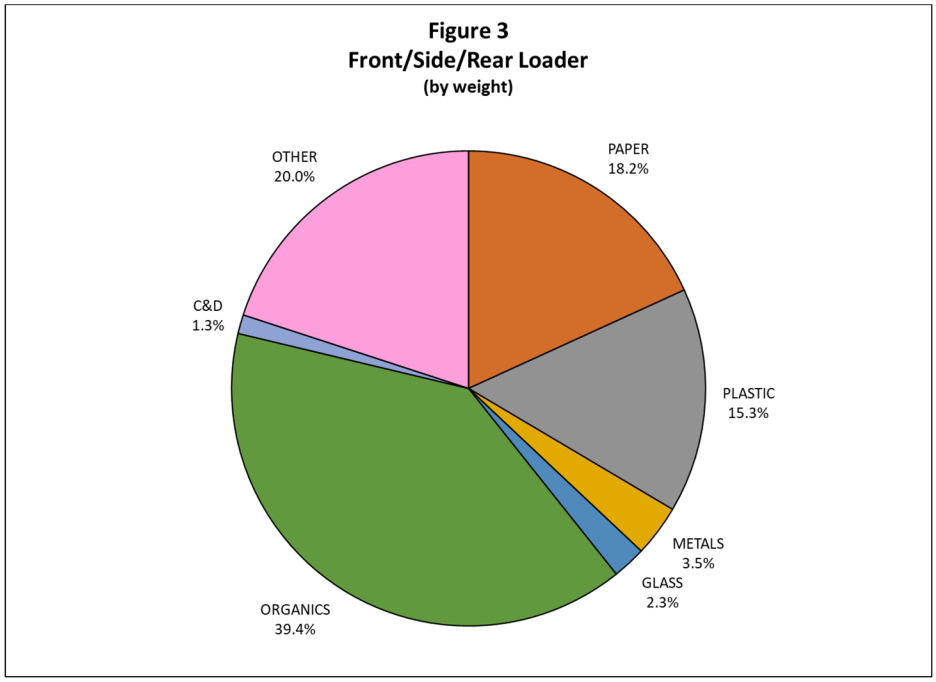
The overall results (by weight) for the primary material categories for the total composition are provided in Figure 1.



The overall results (by weight) for the primary material categories for the total composition from the 2017 study are provided below in Figure 2. As reflected in the comparison of the results of the two studies, paper and plastics compose a smaller proportion and organics compose a larger proportion of the solid waste stream in 2022 compared to the results in 2017.



The overall results (by weight) for the primary material categories for front/rear/side loaders, roll offs, transfer trailers and "other" collection vehicles from the current study are provided below in Figures 3 through 6.



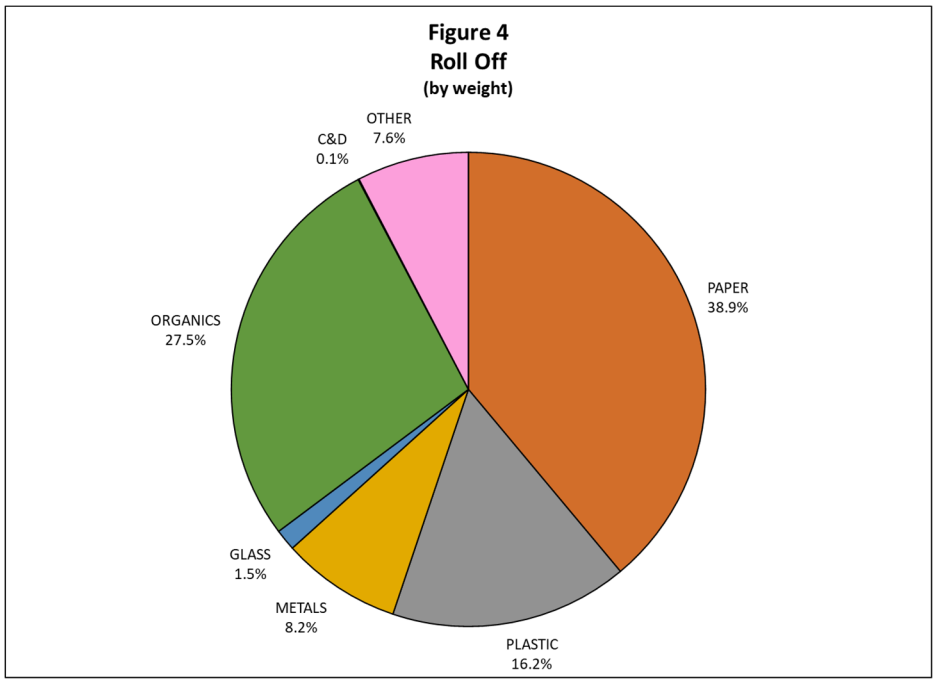


Figure 4
Roll Off
(by weight)
OTHER
7.6%
C&D
0.1%
PAPER
38.9%
ORGANICS
27.5%
GLASS
1.5%
METALS
8.2%
PLASTIC
16.2%

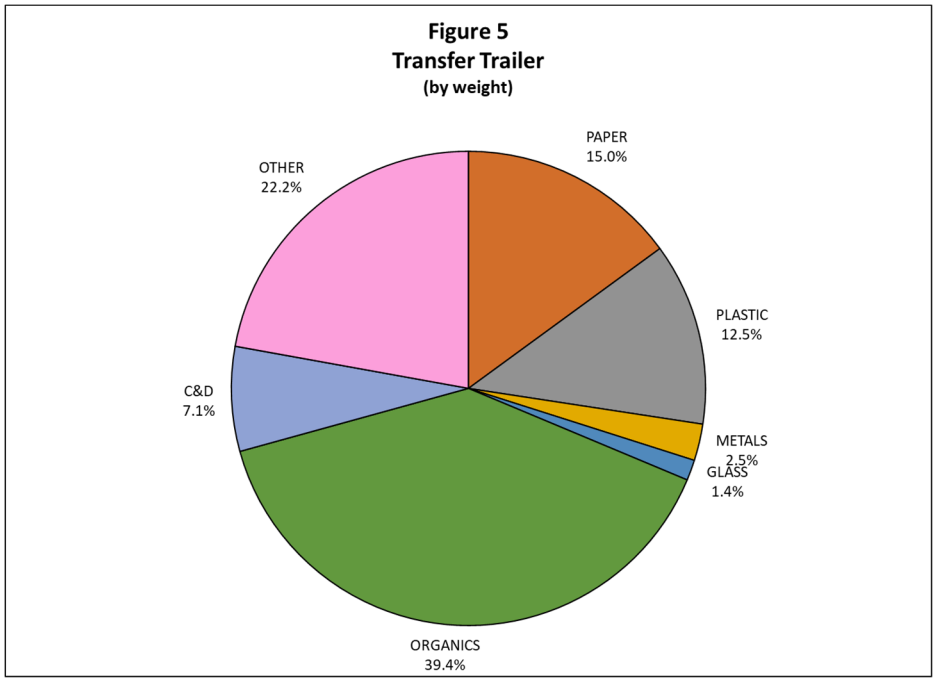
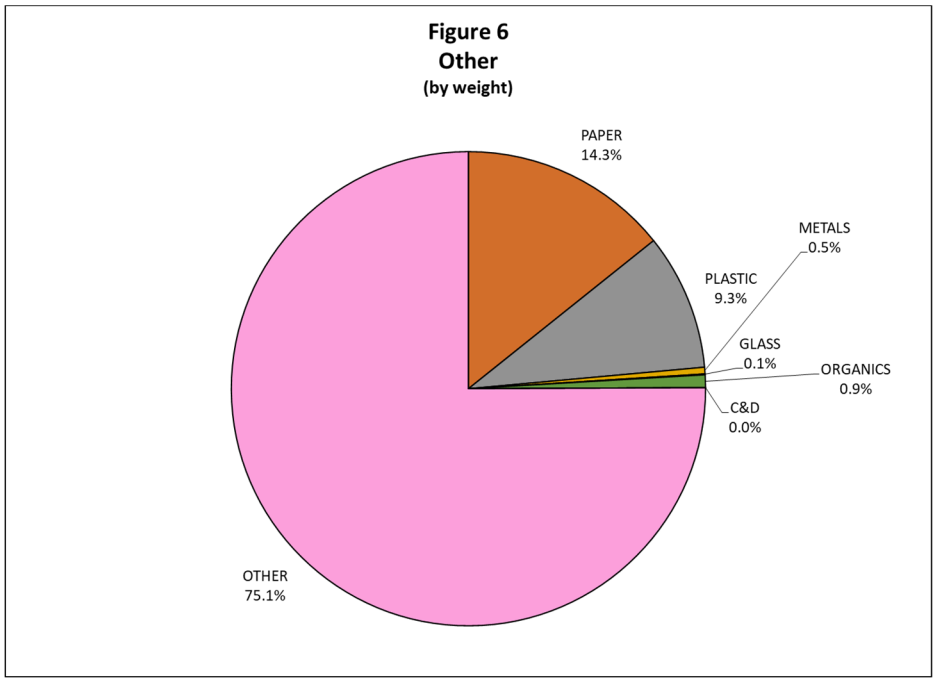


Figure 5
Transfer Trailer
(by weight)
PAPER
15.0%
OTHER
22.2%
PLASTIC
12.5%
C&D
7.1%
METALS
2.5%
GLASS
1.4%
ORGANICS
39.4%



The detailed results (by weight) for both the primary and secondary material categories for the total composition are provided below in Table 3.

Table 3: Total Composition (By Weight)				
			90% Conf. Int.	
		Mean	Upper Bound	Lower Bound
PAPER				
1	Newsprint	0.4%	0.7%	0.1%
2	Old Corrugated and Kraft bags	2.4%	4.2%	0.8%
3	Mixed Recycle Paper	5.7%	7.9%	3.6%
4	Compostable Paper	10.2%	14.2%	6.1%
5	Non-recyclable/Non-compostable paper	1.8%	3.4%	0.4%
Subtotal Paper		**20.4%**	**26.2%**	**14.6%**
PLASTIC				
6	HDPE Containers	0.7%	1.4%	0.0%
7	PET Containers	1.1%	1.5%	0.6%
8	Polypropylene (PP)	1.0%	1.5%	0.5%
9	Polystyrene (PS)	0.4%	0.6%	0.2%
10	Film and Flexible Packaging	4.5%	5.7%	3.2%
11	All Other Plastics	7.0%	8.7%	5.2%
Subtotal Plastic		**14.6%**	**17.7%**	**11.5%**

Table 3: Total Composition (By Weight)				
			90% Conf. Int.	
		Mean	Upper Bound	Lower Bound
METALS				
12	Aluminum Containers	0.6%	0.9%	0.3%
13	Ferrous Containers	0.5%	0.8%	0.2%
14	Other Ferrous	2.5%	5.3%	0.2%
15	Other Non-Ferrous	0.3%	0.5%	0.2%
Subtotal Metals		**3.8%**	**6.8%**	**1.1%**
GLASS				
16	Glass Containers	1.3%	2.1%	0.6%
17	Other (non-container) glass	0.6%	1.2%	0.1%
Subtotal Glass		**1.9%**	**2.8%**	**1.0%**
ORGANICS				
18	Yard Waste	4.2%	7.2%	1.4%
19	Food Waste (unpackaged)	11.8%	16.2%	7.3%
20	Food Waste (packaged)	8.4%	12.4%	4.6%
21	Wood Waste (untreated)	4.0%	8.6%	0.3%
22	Wood Waste (treated)	1.8%	4.0%	0.0%
23	Other Organic Materials	5.5%	7.8%	3.2%
Subtotal Organics		**35.8%**	**41.7%**	**29.8%**
C&D				
24	Shingles	0.9%	2.8%	0.0%
25	Other C&D	1.2%	3.0%	0.0%
Subtotal C&D		**2.1%**	**5.7%**	**0.0%**
OTHER				
26	Batteries	0.1%	0.1%	0.0%
27	Mercury Containing Lamps	0.0%	0.0%	0.0%
28	Paint Containers	0.0%	0.1%	0.0%
29	Hazardous Wastes	0.2%	0.3%	0.0%
30	Household Appliances	0.4%	0.8%	0.0%
31	Electronics	1.1%	3.4%	0.1%
32	Other Bulky Wastes	7.7%	14.3%	1.8%
33	Carpet	0.7%	1.4%	0.1%
34	Other Textiles (excludes carpet)	5.9%	9.3%	2.6%
35	Other Inorganics	2.2%	4.5%	0.4%
36	Fines/supermix	3.1%	3.7%	2.5%
Subtotal Other		**21.3%**	**27.7%**	**14.9%**

Statistical Interpretation

In evaluating the results, we recommend that both the mean and 90% confidence intervals be reviewed for the various categories. The 90% confidence interval is consistent with the ASTM standards and is considered the solid waste industry statistically accepted standard for similar type studies. A 90% confidence interval represents that there is a 90% level of confidence that the true population mean (i.e., if all the materials received at HERC were sorted) falls within the identified upper and lower intervals. The mean percentages by weight provide a definitive measure for characterizing the various materials in the solid waste stream. Because of the limited number of samples for each of the generator types, the mean and confidence interval results for the individual generator types should not be used independently from the overall total composition results.

CONCLUSIONS

In the context of the results for the solid waste fractional analysis (total composition) for the HERC Facility, we conclude the following:

- The proportion of paper composing MSW is decreasing, specifically OCC with a mean of 2.4%, compared to 5.0% in the 2017 HERC Facility Study;
- Hazardous wastes and mercury containing materials estimated to compose less than 1% of the waste stream by weight are consistent with previous studies;
- The organics category of food waste continues to grow as proportion of the waste stream composing approximately 36% of the waste stream by weight, compared to roughly 30% for the 2017 HERC Facility Study; and
- Plastics are estimated to compose less than 15% of the waste stream by weight, compared to roughly 17% for the 2017 HERC Facility Study.

PROXIMATE, ULTIMATE, AND HEATING VALUE ANALYSES

Methodology

Samples were taken from solid waste deposited at the HERC Facility for the completion of proximate, ultimate, and heating value analyses. The sorting crew collected grab samples of materials from the randomly selected MSW samples to create composite samples. These composite samples were placed in individual containers for transport to a qualified laboratory. The appropriate chain of custody measures were taken by staff prior to initiating the laboratory analyses. Proximate, ultimate, and heating value analyses were conducted on a total of five composite samples taken from the MSW received at the HERC Facility. All analyses were conducted per the applicable ASTM methods.

Results

A summary of the results is provided below in Table 4. The detailed results of the proximate and ultimate value analyses are provided as Attachment C. Overall, the parameters of the results reflect the level of variability usually found in similar solid waste analyses.

Table 4: Summary of Proximate and Ultimate Analyses		
	Units	Average
Moisture, Total	Weight %	34.28
Heating Value	BTU/lb.	5173.40

Moisture ranged from 17 to 54 percent with an average of approximately 34%. The average heating value (assumed HHV) was approximately 5173 Btu/lb as received. This value is slightly less than the previous study result of 6646 Btu/lb in 2017. However, refuse derived fuel typically has a reported heating value of approximately 4800 to 6400[1], thus an average heating value of 5173 for MSW appears consistent with "typical" MSW fuel. A robust statistical analysis of each of the tested parameters for all of the samples was not conducted for the purposes of this study.

Thank you for the opportunity to provide these services.

Sincerely,

Robert W. Craggs

Robert Craggs
Solid Waste and Resource Recovery Department Manager

Attachment A – Material Category Definitions
Attachment B – Waste Sort Data Sheets
Attachment C – Proximate and Ultimate Analyses

[1] Source: Energy Recovery Council (ERC)

Attachment A – Material Category Definitions

GRE HERC Services Waste Characterization Study

Material Categories' Definitions

Paper

Newsprint (ONP) – printed groundwood newsprint, including glossy advertisements and inserts typically found in newspapers.

Old Corrugated Cardboard (OCC) and Kraft Bags - cardboard with a wavy core and not contaminated with other materials such as wax or plastic coating. Includes Kraft (brown paper) bags.

Mixed Recyclable Paper – paper that is recyclable, including but not limited to high grade office paper, residential mixed paper, envelopes, magazines/catalogs, phone books, gable top aseptic containers/cartons. Does not include compostable or non-recyclable paper as defined below.

Compostable Paper - Paper products including BPI-certified paper food packaging, napkins, paper towels, tissues, paper plates, paper cups, and pizza boxes (excludes aseptic packaging and lined/coated paper.

Non-Recyclable/Non-Compostable Paper – Plastic or metal coated paper (excluding gable top and aseptic containers/cartons).
Examples:Wet food packaging, lined paper cups.

Key points:

If the sorter is 99% sure that the generator intended to reuse the paper in such a way that it became contaminated for recycling, put that paper into this category (e.g., paper used to dispose of chewing gum, paper sprayed with paint).

If it would take an effort to make the paper recyclable, put it into this category.

Plastic

HDPE Containers (Bottles/Jars) – natural and pigmented, high-density polyethylene bottles and jars

Key points:

Look for the label "2" on the bottom.

Examples:

Clear or colored bottles for dairy products, detergent, windshield fluid, motor oil, fabric softener, antifreeze, bleach.

PET Beverage Containers – clear and colored plastic beverage containers composed of polyethylene terephthalate.

Key points:

Look for the label "1" on the bottom.

PVC - #3 plastics such as cooking oil bottles, plumbing pipes, and a few other items.

Polypropylene - #5 plastics packaging including but not limited to yogurt cups/tubs

Polystyrene - #6 plastics packaging

Film and Flexible Packaging – clear or light-colored plastic bags, grocery bags, and film plastic used for stretch wrapping pallets or other products, shrink wrap.

All Other Plastics – anything plastic that is not identifiable as one of the categories above.

Examples:

Molded toys, clothes hangers, cleaning tools, plastic hoses, drinking straws, plastic cards.

Metals

Aluminum Beverage Containers – All beverage containers made from aluminum used for soft drinks, water, beer, fruit juice, sports drink, or other drinkable liquids.

Ferrous (Steel/Tin) Containers – Food and beverage cans and containers composed primarily of iron.

Other Ferrous Metal - all other non-container ferrous metal scrap (e.g. steel, brass, copper).

Other Non-Ferrous Metal – all other non-container, non-ferrous

Examples:

Clothes hangers, sheet metal products, pipes, metal scraps.

Glass

Glass Containers - clear, green, brown, and blue glass beverage containers (e.g. food containers).

Other (Non-Container) Glass – all glass that was not originally a food or beverage container, including plate glass, ceramics, glass plates, cooking utensils, ash trays, mirrors, and fragments.

Key points:

If the glass is broken and not 100% identifiable as food or beverage glass, it belongs in Non-Container Glass.

Organic Materials

Yard Waste – woody and non-woody plant material.

Food Waste – putrescibles such as food preparation waste, food scraps, spoiled food, kitchen wastes, waste parts from butchered animals, dead animals.

Food Waste (unpackaged) - putrescibles such as food preparation waste, food scraps, spoiled food, kitchen wastes, waste parts from butchered animals, dead animals.

Food Waste (packaged) – fully or partially commercially-packaged food waste.

Wood Waste (untreated) – lumber that is not treated.

Wood Waste (treated) – lumber that is green or brown treated such as railroad ties.

Other Organic Material – any organic material not classified by this category, including, cotton balls, feminine hygiene products, hair, etc.

Construction & Demolition

Shingles – includes asphalt shingles and tar roofing paper, excluding wood or metal roofing material.

Other Construction & Demolition – remodeling and new construction materials excluding OCC, wood, plastics, and metals which are captured in the other material categories.

Miscellaneous

Batteries – lead acid, all household (rechargeable and non-rechargeable), and button batteries.

Mercury Containing Lamps – CFLs and others identified as containing mercury.

Paint Containers – oil and latex paint.

Hazardous Wastes – other products characterized as toxic, corrosive, flammable, ignitable, radioactive, poisonous, or reactive. (e.g. solvents, pesticides, antifreeze)

Household Appliances – products or appliances with electric cord or battery power source, including but not limited to small kitchen and bathroom appliances (toasters, hair dryers, etc.), radios.

Electronics – laptops, computer monitors, televisions, printers, video games, cell phones, DVD players and other electronics.

Other Bulky Wastes – includes large, hard-to-handle items such as composite furniture, mattresses, box springs, and base components that are not defined in the other material categories.

Carpet – flooring material

Other Textiles – clothing, bedding, curtains, blankets, and other cloth material.

Other Inorganics – waste material originating from non-biological/industrial processes not identified by other categories listed above.

Fines/Supermix – residual material remaining after waste sorting, not identified by other categories listed above.

Attachment B – Waste Sort Data Sheets

TARE

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Nov. 7 – 11th 2022

Date 11/7/22 Day: Mon Time:_____ Sample #_____ Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): _____

Materials	Weights (Start)			Weights (End)	Totals
Paper					
1) Newsprint	5.4			5.4	
2) Old Corrugated and Kraft bags	15.6			15.6	
3) Mixed recyclable paper	8.3			8.3	
4) Compostable paper	15.5			15.4	
5) Non-recyclable/non-compostable	8.4			8.4	
Plastics					
6) HDPE Containers	8.6			8.7	
7) PET Containers	8.9			8.9	
8) Polypropylene (PP)	5.3			5.3	
9) Polystyrene (PS)	5.6			5.6	
10) Film and flexible packaging	8.8			8.9	
11) All other plastics	15.4			15.3	
Metals					
12) Aluminum Containers	1.6			1.6	
13) Ferrous Containers	2.3			2.3	
14) Other Ferrous	2.4			2.4	
15) Other Non-Ferrous	1.6			1.6	
Glass					
16) Glass Containers	5.2			5.2	
17) Other (non-container) glass	5.5			5.5	
Organics					
18) Yard waste	8.3			8.3	
19) Food waste (unpackaged)	2.3			2.3	
20) Food waste (packaged)	2.3			2.3	
21) Wood waste (untreated)	5.7			5.6	
22) Wood waste (treated)	5.6			5.6	
23) Other Organic Materials	5.8			5.8	
C&D					
24) Shingles	—				
25) Other C&D	8.3			8.3	

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Start

End

Materials	Weights				Totals
Other					
26) Batteries					
27) Mercury Containing Lamps					
28) Paint Containers					
29) Hazardous Wastes					
30) Household appliances					
31) Electronics	0.				
32) Other Bulky wastes					
33) Carpet					
34) Other Textiles	8.4			8.4	
35) Other Inorganics	5.7			5.7	
36) Fines/supermix	2.3				
Totals					

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/7/22 Day: Mon Time:_____ Sample # 1 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other Mixed

Comments (unique aspects of the sample): Three Clean Out

Materials	Weights				Totals
Paper					
1) Newsprint	(0.1)				
2) Old Corrugated and Kraft bags	(6.5)	19.4			
3) Mixed recyclable paper	27.7				
4) Compostable paper	15.6				
5) Non-recyclable/non-compostable	—				
Plastics					
6) HDPE Containers	9.8				
7) PET Containers	9.4				
8) Polypropylene (PP)	5.6				
9) Polystyrene (PS)	—				
10) Film and flexible packaging	11.3				
11) All other plastics	36.0				
Metals					
12) Aluminum Containers	1.9				
13) Ferrous Containers	(0.1)				
14) Other Ferrous	3.4				
15) Other Non-Ferrous	—				
Glass					
16) Glass Containers	(0.2)				
17) Other (non-container) glass	(0.1)				
Organics					
18) Yard waste	—				
19) Food waste (unpackaged)	(0.1)				
20) Food waste (packaged)	5.5				
21) Wood waste (untreated)	6.0				
22) Wood waste (treated)	—				
23) Other Organic Materials	6.1				
C&D					
24) Shingles	—				
25) Other C&D	—				

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.4				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	0.1				
30) Household appliances	—				
31) Electronics	2.0				
32) Other Bulky wastes	6.6	21.5	48.4	9.4	
33) Carpet	—				
34) Other Textiles	35.5	15.6			
35) Other Inorganics	19.7				
36) Fines/supermix	0				
Totals					

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/7/22 Day: Mon. Time: 10:43 AM Sample # 2 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other South Mn. Read.

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	7.2				
2) Old Corrugated and Kraft bags	20.1				
3) Mixed recyclable paper	31.9				
4) Compostable paper	39.7				
5) Non-recyclable/non-compostable	10.2				
Plastics					
6) HDPE Containers	9.0				
7) PET Containers	9.9				
8) Polypropylene (PP)	6.8				
9) Polystyrene (PS)	6.6				
10) Film and flexible packaging	14.6	13.9			
11) All other plastics	29.6	29.5			
Metals					
12) Aluminum Containers	1.7				
13) Ferrous Containers	3.3				
14) Other Ferrous	6.4				
15) Other Non-Ferrous	2.8				
Glass					
16) Glass Containers	9.1				
17) Other (non-container) glass	12.1				
Organics					
18) Yard waste Pumpkins	18.9	~~49.5~~	0.1		
19) Food waste (unpackaged)	9.6	27.4	12.7		
20) Food waste (packaged)	15.6	10.2			
21) Wood waste (untreated)	6.0				
22) Wood waste (treated)	5.6				
23) Other Organic Materials	8.9				
C&D					
24) Shingles	—				
25) Other C&D	—				

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.2				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	0.1				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	20.3				
35) Other Inorganics	6.4				
36) Fines/supermix	13.2				
Totals					

Good — 95%
other plastic — 2%
Non Other paper — 3%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/7/22 Day: Mon Time: 11:38AM Sample # 3 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comm. Minneapolis Walters

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint					
2) Old Corrugated and Kraft bags	18.5				
3) Mixed recyclable paper	12.0				
4) Compostable paper	16.7				
5) Non-recyclable/non-compostable	—				
Plastics					
6) HDPE Containers	—				
7) PET Containers	—				
8) Polypropylene (PP)	5.3				
9) Polystyrene (PS)	5.7				
10) Film and flexible packaging	13.2				
11) All other plastics	12.8	15.8			
Metals					
12) Aluminum Containers	0.1				
13) Ferrous Containers		0.1			
14) Other Ferrous	2.8	5.4			
15) Other Non-Ferrous	—				
Glass					
16) Glass Containers	—				
17) Other (non-container) glass	—				
Organics					
18) Yard waste	—				
19) Food waste (unpackaged)	—				
20) Food waste (packaged)	—				
21) Wood waste (untreated)	87.1				
22) Wood waste (treated)	—				
23) Other Organic Materials	0.1				
C&D					
24) Shingles	—				
25) Other C&D	—				

10
55
95
20
10
48
240
96.0

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.1				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics					
32) Other Bulky wastes	96.0 Air compressor				
33) Carpet	—				
34) Other Textiles		13.0			
35) Other Inorganics	30.9				
36) Fines/supermix	—				
Totals					

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/7/22 Day: Mon Time: 12:23 AM Sample # 4 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): Road. Scott Edwards - Bloomington

Materials	Weights				Totals
Paper					
1) Newsprint	0.2				
2) Old Corrugated and Kraft bags	30.6				
3) Mixed recyclable paper	21.9				
4) Compostable paper	32.9				
5) Non-recyclable/non-compostable	10.7				
Plastics					
6) HDPE Containers	9.5				
7) PET Containers	9.7				
8) Polypropylene (PP)	5.8				
9) Polystyrene (PS)	6.1				
10) Film and flexible packaging	19.1				
11) All other plastics	2.0	34.3			
Metals					
12) Aluminum Containers	1.8				
13) Ferrous Containers	3.3				
14) Other Ferrous	3.1				
15) Other Non-Ferrous	2.8				
Glass					
16) Glass Containers	—				
17) Other (non-container) glass	6.6				
Organics					
18) Yard waste	29.5	10.2			
19) Food waste (unpackaged)	8.7	17.3			
20) Food waste (packaged)	18.3	9.2			
21) Wood waste (untreated)	14.3				
22) Wood waste (treated)	5.6				
23) Other Organic Materials	21.1				
C&D					
24) Shingles	—				
25) Other C&D					

45
80
85
70
155
40
195

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	—				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	0.5				
30) Household appliances	5.4				
31) Electronics	2.8				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	21.9				
35) Other Inorganics	7.6				
36) Fines/supermix	9.6				
Totals					

food — 90%
Non paper — 5%
other plastic — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date ~~11/7/22~~ 11/7/22 Day: ~~1:48 P.M.~~ Mon Time: 1:48 P.M. Sample # 5 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): Homeless Camp - Specialty Truck

Clean City

Materials	Weights				Totals
Paper					
1) Newsprint	—				
2) Old Corrugated and Kraft bags	17.5				
3) Mixed recyclable paper	12.4				
4) Compostable paper	21.1				
5) Non-recyclable/non-compostable	10.4				
Plastics					
6) HDPE Containers	9.7				
7) PET Containers	11.8				
8) Polypropylene (PP)	5.8				
9) Polystyrene (PS)	5.7				
10) Film and flexible packaging	13.8				
11) All other plastics	21.5				
Metals					
12) Aluminum Containers	2.5				
13) Ferrous Containers	4.4				
14) Other Ferrous	3.4				
15) Other Non-Ferrous	1.8				
Glass					
16) Glass Containers	7.3				
17) Other (non-container) glass	—				
Organics					
18) Yard waste	25.2	0.1			
19) Food waste (unpackaged)	11.0				
20) Food waste (packaged)	4.5	9.7			
21) Wood waste (untreated)	30.2	5.7			
22) Wood waste (treated)	40.1	5.5			
23) Other Organic Materials		12.0			
C&D					
24) Shingles	—				
25) Other C&D	—				

10
15
55
14 8
80
220

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	—				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	0.1				
31) Electronics					
32) Other Bulky wastes		40.0 MATTRESS			
33) Carpet	7.7	5.4			
34) Other Textiles	14.5				
35) Other Inorganics	8.5				
36) Fines/supermix	6.8				
Totals					

food 90%
Undrg (dirt) 5%
other plastic 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/7/22 Day: Mon Time: 2:58 P.M. Sample # 6 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): Read, Bloomington

Materials	Weights				Totals
Paper					
1) Newsprint	5.8				
2) Old Corrugated and Kraft bags	21.6				
3) Mixed recyclable paper	21.2				
4) Compostable paper	38.0				
5) Non-recyclable/non-compostable	9.3				
Plastics					
6) HDPE Containers	9.7				
7) PET Containers	10.5				
8) Polypropylene (PP)	6.2				
9) Polystyrene (PS)	6.6				
10) Film and flexible packaging	20.1				
11) All other plastics	28.9				
Metals					
12) Aluminum Containers	2.2				
13) Ferrous Containers	3.7				
14) Other Ferrous	3.5				
15) Other Non-Ferrous	2.2				
Glass					
16) Glass Containers	9.5				
17) Other (non-container) glass	5.8				
Organics					
18) Yard waste	18.3	14.3			
19) Food waste (unpackaged)	16.0	6.0			
20) Food waste (packaged)	16.5	9.8	10.6	12.9	7.4
21) Wood waste (untreated)	11.4				
22) Wood waste (treated)	5.9				
23) Other Organic Materials	18.2				
C&D					
24) Shingles	—				
25) Other C&D	—				

Someone Cleaned Out their food cupboards & fridge!!

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.4				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	5.9 Variety of Stuff				
30) Household appliances					
31) Electronics	2.2				
32) Other Bulky wastes					
33) Carpet	2.7				
34) Other Textiles	31.9				
35) Other Inorganics	—				
36) Fines/supermix	8.9				
Totals					

Food - 60%
OmOrg - 40%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/7/22 Day: Mon Time: 3:39 P.M. Sample # 7 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): Robinsdale Road.

Materials	Weights				Totals
Paper					
1) Newsprint	nil				
2) Old Corrugated and Kraft bags	21.1				
3) Mixed recyclable paper	18.9				
4) Compostable paper	28.3				
5) Non-recyclable/non-compostable	9.9				
Plastics					
6) HDPE Containers	10.3				
7) PET Containers	11.4				
8) Polypropylene (PP)	6.7				
9) Polystyrene (PS)	6.5				
10) Film and flexible packaging	18.4				
11) All other plastics	49.7	28.3			
Metals					
12) Aluminum Containers	2.5				
13) Ferrous Containers	3.5				
14) Other Ferrous	2.7				
15) Other Non-Ferrous	2.0				
Glass					
16) Glass Containers	9.8				
17) Other (non-container) glass	—				
Organics					
18) Yard waste	0.2				
19) Food waste (unpackaged)	21.0	9.3			
20) Food waste (packaged)	12.7	8.4			
21) Wood waste (untreated)	10.2	6.1			
22) Wood waste (treated)	—	5.6			
23) Other Organic Materials	16.9				
C&D					
24) Shingles	—				
25) Other C&D	—				

35
70
105
55
160
40
200

50
30
80
25
105
35
140

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.1				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics					
32) Other Bulky wastes	40.2	9.7			
33) Carpet	—				
34) Other Textiles	13.3				
35) Other Inorganics	0.1				
36) Fines/supermix	9.9				
Totals					

~~5~~ 90% food
5% Other paper Non Recy.
5% " plastic

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/8/22 Day: TUESDAY Time: 7:44 A.M. Sample # 8 Ticket #_____ St Louis Park

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): Comm, Golden Valley

Materials	Weights				Totals
Paper					
1) Newsprint	10.5				
2) Old Corrugated and Kraft bags	22.2				
3) Mixed recyclable paper	22.7				
4) Compostable paper	41.4				
5) Non-recyclable/non-compostable	14.3				
Plastics					
6) HDPE Containers	9.1				
7) PET Containers	12.1				
8) Polypropylene (PP)	7.6				
9) Polystyrene (PS)	6.7				
10) Film and flexible packaging	20.9	12.1			
11) All other plastics	35.3				
Metals					
12) Aluminum Containers	2.9	1.8			
13) Ferrous Containers	2.7				
14) Other Ferrous	8.0	4.6	3.5		
15) Other Non-Ferrous	1.9				
Glass					
16) Glass Containers	5.5				
17) Other (non-container) glass	—				
Organics					
18) Yard waste	10.5				
19) Food waste (unpackaged)	ALREADY	17.2	8.7		
20) Food waste (packaged)	ALREADY	9.3	4.2		
21) Wood waste (untreated)	5.8				
22) Wood waste (treated)	50.7	50.7			
23) Other Organic Materials	24.2				
C&D					
24) Shingles	—				
25) Other C&D					

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.1				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances					
31) Electronics	3.8				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	11.0				
35) Other Inorganics	—				
36) Fines/supermix	14.5				
Totals	—				

Food - 85%
Non Recy. paper - 5%
Unorg - 10%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 1/8/22 Day: TUE Time: 9:14 AM Sample # 9 Ticket #_____

Category: Front/Side/Rear Loader; (Roll Off); Transfer Tractor/Trailer; Other

Mixed Contents

Comments (unique aspects of the sample): _____ Contaminated

Materials	Weights				Totals
Paper					
1) Newsprint					
2) Old Corrugated and Kraft bags	15.2	10.3	20.1		
3) Mixed recyclable paper	15.6	8.8	18.9		
4) Compostable paper		27.8			
5) Non-recyclable/non-compostable	12.9	18.1			
Plastics					
6) HDPE Containers	0.1				
7) PET Containers	10.7				
8) Polypropylene (PP)	6.0				
9) Polystyrene (PS)	5.9	0.1			
10) Film and flexible packaging	13.2	14.6			
11) All other plastics	30.0				
Metals					
12) Aluminum Containers	2.3				
13) Ferrous Containers		5.6	3.1		
14) Other Ferrous Stainless Steel	39.1	2.8			
15) Other Non-Ferrous	1.7				
Glass					
16) Glass Containers	0.5				
17) Other (non-container) glass	—				
Organics					
18) Yard waste	—				
19) Food waste (unpackaged)	5.7				
20) Food waste (packaged)	4.7				
21) Wood waste (untreated)	20.5	5.7			
22) Wood waste (treated)	6.4	0.1			
23) Other Organic Materials	9.3	0.2			
C&D					
24) Shingles					
25) Other C&D					

10.9 + 5.7 = 5.7

25 + 20 + 20 = 85

155 + 15 = 170 − 15 = 155

5 + 75 = 80 + 60 = 140 + 90 = 235

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.1				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics					
32) Other Bulky wastes	24.7				
33) Carpet	—				
34) Other Textiles	13.0				
35) Other Inorganics	5.9				
36) Fines/supermix	4.5				
Totals					

ferrous Shavings 97%
other paper – 1%
other plastic – 2%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/8/22 Day: Tue Time: 9:54 A.M. Sample # 10 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other Minneapolis Comm

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	—				
2) Old Corrugated and Kraft bags	16.5				
3) Mixed recyclable paper	20.0				
4) Compostable paper	25.7				
5) Non-recyclable/non-compostable	0.2				
Plastics					
6) HDPE Containers	0.1				
7) PET Containers	9.4				
8) Polypropylene (PP)	8.9	7.9			
9) Polystyrene (PS)	—				
10) Film and flexible packaging	17.5				
11) All other plastics	20.8				
Metals					
12) Aluminum Containers	2.2				
13) Ferrous Containers	3.3				
14) Other Ferrous	~~2.7~~	2.7			
15) Other Non-Ferrous	2.7				
Glass					
16) Glass Containers	24.3				
17) Other (non-container) glass	8.4				
Organics					
18) Yard waste	7.2 Leaves	15.4 pumpkin			
19) Food waste (unpackaged)	9.5	33.1	~~15.7~~ 14.0	12.3	19.2 13.7 + 27.7
20) Food waste (packaged)	8.0				
21) Wood waste (untreated)	5.8				
22) Wood waste (treated)	~~5.8~~				
23) Other Organic Materials	9.0				
C&D					
24) Shingles	—				
25) Other C&D					

47.7

18.3 15.2 33.1

55 45 100 45 145 20 21 5

2.5 2.0 8.3 27.7

Wet and heavy i food - appears from a restaurant

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	—				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	—				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	15.6				
35) Other Inorganics	—				
36) Fines/supermix	9.7				
Totals					

food 100% - Mostly Coffee grounds

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/8/22 Day: Tue Time: 11:06 Sample # 11 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other Minneapolis Comm.

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	8.5				
2) Old Corrugated and Kraft bags	22.5				
3) Mixed recyclable paper	23.4				
4) Compostable paper	39.0				
5) Non-recyclable/non-compostable	10.5				
Plastics					
6) HDPE Containers	10.3				
7) PET Containers	12.0				
8) Polypropylene (PP)	9.0				
9) Polystyrene (PS)	7.2				
10) Film and flexible packaging	16.3	1.7	17.9		
11) All other plastics	—		30.4		
Metals					
12) Aluminum Containers	3.5	2.7			
13) Ferrous Containers		3.6			
14) Other Ferrous	47.7	2.7			
15) Other Non-Ferrous		2.8			
Glass					
16) Glass Containers	8.9				
17) Other (non-container) glass	—				
Organics					
18) Yard waste	Pumpkins				
19) Food waste (unpackaged)	22.0				
20) Food waste (packaged)	13.3	7.4			
21) Wood waste (untreated)	—				
22) Wood waste (treated)	0.1				
23) Other Organic Materials	14.9				
C&D					
24) Shingles	—				
25) Other C&D					

50
30
45
125
65
190
215
45
170
76

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	(0.0)				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	—				
32) Other Bulky wastes					
33) Carpet	—				
34) Other Textiles	25.9				
35) Other Inorganics	7.1				
36) Fines/supermix	14.3				
Totals					

Food ——— 90%
Non Recy. Paper — 5%
Other Plastic — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/8/22 Day: Tue Time: 12:36 PM Sample # 12 Ticket # _____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other Read. Bloomington

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	5.9				
2) Old Corrugated and Kraft bags	17.3				
3) Mixed recyclable paper	15.9				
4) Compostable paper	35.4				
5) Non-recyclable/non-compostable	9.1				
Plastics					
6) HDPE Containers	9.3				
7) PET Containers	10.6				
8) Polypropylene (PP)	6.6				
9) Polystyrene (PS)	5.9				
10) Film and flexible packaging	15.4				
11) All other plastics	26.6				
Metals					
12) Aluminum Containers	2.3				
13) Ferrous Containers	3.3				
14) Other Ferrous	Less than 0.1				
15) Other Non-Ferrous	1.9				
Glass					
16) Glass Containers	7.7				
17) Other (non-container) glass	5.7				
Organics					
18) Yard waste Pumpkins	89.0	12.1			
19) Food waste (unpackaged)	16.5	8.3			
20) Food waste (packaged)	11.3	8.5			
21) Wood waste (untreated)	6.2				
22) Wood waste (treated)	5.7				
23) Other Organic Materials	28.4				
C&D					
24) Shingles					
25) Other C&D	46.5				

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	—				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	1.2				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	25.7				
35) Other Inorganics	27.0	28.9			
36) Fines/supermix	10.2				
Totals					

good — 85%
non paper — 5%
non plastic — 10%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/8/22 Day: Tuesday Time: 2:58 P.M. Sample # 13 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

St Louis Park Resd.

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	8.6				
2) Old Corrugated and Kraft bags	18.0				
3) Mixed recyclable paper	18.2				
4) Compostable paper	46.1				
5) Non-recyclable/non-compostable	10.7				
Plastics					
6) HDPE Containers	6.8				
7) PET Containers	10.5				
8) Polypropylene (PP)	7.1				
9) Polystyrene (PS)	5.7				
10) Film and flexible packaging	17.1				
11) All other plastics	30.1				
Metals					
12) Aluminum Containers	2.2				
13) Ferrous Containers	3.8				
14) Other Ferrous	6.2				
15) Other Non-Ferrous	2.7				
Glass					
16) Glass Containers	7.8				
17) Other (non-container) glass	8.5				
Organics					
18) Yard waste	4.2	9.6			
19) Food waste (unpackaged)	21.1	9.4	19.6		
20) Food waste (packaged)	15.1	10.9	8.5	11.1	
21) Wood waste (untreated)	10.0				
22) Wood waste (treated)		5.9			
23) Other Organic Materials	14.9 Dog Poop!		18.1		
C&D					
24) Shingles					
25) Other C&D	0.3				

75
65
140
65
20

Heavy in food

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	(0.1)				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	4.4				
31) Electronics	—				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	19.0				
35) Other Inorganics	12.2				
36) Fines/supermix	14.2				
Totals					

Food — 90%

Non Paper — 5%

Non Plastic — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/9/22 Day: Wed. Time: 7:45A.M Sample # 14 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; (Transfer Tractor/Trailer) Other

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	8.2				
2) Old Corrugated and Kraft bags	25.9				
3) Mixed recyclable paper	23.4				
4) Compostable paper	40.4				
5) Non-recyclable/non-compostable	9.6				
Plastics					
6) HDPE Containers	9.7				
7) PET Containers	10.7				
8) Polypropylene (PP)	7.3				
9) Polystyrene (PS)	6.2				
10) Film and flexible packaging	19.0				
11) All other plastics	(8.5)	33.6			
Metals					
12) Aluminum Containers	2.7				
13) Ferrous Containers	3.3				
14) Other Ferrous	—				
15) Other Non-Ferrous	2.7				
Glass					
16) Glass Containers	11.9				
17) Other (non-container) glass	(0.1)				
Organics					
18) Yard waste	(1.7)				
19) Food waste (unpackaged)	21.5	15.9	16.6	(2.8) Pumpkin	
20) Food waste (packaged)	~~16.~~ 16.7		~~16.6~~		
21) Wood waste (untreated)	~~44.5~~	(44.5)	13.3		
22) Wood waste (treated)	(0.1)				
23) Other Organic Materials	23.0				
C&D					
24) Shingles	—				
25) Other C&D	—				

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.1				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	4.1				
31) Electronics	11.2				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	16.2				
35) Other Inorganics	0.1				
36) Fines/supermix	10.6				
Totals					

food ——— 50%
OmOrg (Dirt) — 40%
non Paper ——— 5%
non Plastic ——— 5%

4.1

5.5

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/9/22 Day: Wed Time: 7:02 A.M Sample # 15 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; (Transfer Tractor/Trailer); Other

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	6.1				
2) Old Corrugated and Kraft bags	(1.1)				
3) Mixed recyclable paper	13.9				
4) Compostable paper	34.4				
5) Non-recyclable/non-compostable	8.9				
Plastics					
6) HDPE Containers	8.9				
7) PET Containers	9.3				
8) Polypropylene (PP)	5.6				
9) Polystyrene (PS)	6.3				
10) Film and flexible packaging	14.6				
11) All other plastics	22.2				
Metals					
12) Aluminum Containers	1.7				
13) Ferrous Containers	—				
14) Other Ferrous	(3.2)				
15) Other Non-Ferrous	2.2				
Glass					
16) Glass Containers	7.3				
17) Other (non-container) glass	—				
Organics					
18) Yard waste	(36.8) pumpkins		18.9		
19) Food waste (unpackaged)	13.9				
20) Food waste (packaged)	9.6				
21) Wood waste (untreated)	Less than (0.1)				
22) Wood waste (treated)	(2.3)	(0.1)			
23) Other Organic Materials	~~(20.0) Cardboard~~		6.9		
C&D					
24) Shingles	(37.4)	(16.2)			
25) Other C&D	29.4				

The shingles + C&D appeared to come from a roofing tear off.

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	—				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	—				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	—				
35) Other Inorganics	12.5	(6.6)			
36) Fines/supermix	9.8				
Totals					

Shingles - 70% -
food - 30%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/9/22 Day: WED. Time: 9:09 A.M. Sample # 16 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): ~~Rear~~ Mixed Minneapolis

Materials	Weights				Totals
Paper					
1) Newsprint	—				
2) Old Corrugated and Kraft bags	17.7				
3) Mixed recyclable paper	22.0				
4) Compostable paper	36.8				
5) Non-recyclable/non-compostable	12.7				
Plastics					
6) HDPE Containers	10.1				
7) PET Containers	9.9				
8) Polypropylene (PP)	8.2				
9) Polystyrene (PS)	6.7				
10) Film and flexible packaging	15.7	16.1			
11) All other plastics	35.4				
Metals					
12) Aluminum Containers	3.9				
13) Ferrous Containers	2.5				
14) Other Ferrous	4.3				
15) Other Non-Ferrous	3.2				
Glass					
16) Glass Containers	9.2				
17) Other (non-container) glass	7.3				
Organics					
18) Yard waste	8.6	(1.5) Pumpkin			
19) Food waste (unpackaged)	20.3	19.2			
20) Food waste (packaged)	9.1 9.9	8.6	12.0	7.8	10.3
21) Wood waste (untreated)					
22) Wood waste (treated)		5.9			
23) Other Organic Materials	(20.4) Bag	Doo Doo!	29.0		
C&D					
24) Shingles	—				
25) Other C&D	11.5				

60 20 80 50 13 0 6 190 90 230

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	(0.6)				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	(0.6) Exp. Medicine				
30) Household appliances					
31) Electronics	(0.3)				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	15.1				
35) Other Inorganics	8.7				
36) Fines/supermix	13.0				
Totals					

Food — 90%
Non Paper — 5%
Non Plastic — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/9/22 Day: Wed. Time: 10:11 A.M. Sample # 17 Ticket # _____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): Minneapolis Caleffi Recd. 54 lb

Materials	Weights				Totals
Paper					
1) Newsprint	5.7				
2) Old Corrugated and Kraft bags	16.8				
3) Mixed recyclable paper	—				
4) Compostable paper	41.5				
5) Non-recyclable/non-compostable	10.4				
Plastics					
6) HDPE Containers	32.0	9.1			
7) PET Containers	10.3				
8) Polypropylene (PP)	7.5				
9) Polystyrene (PS)	6.0				
10) Film and flexible packaging	18.1				
11) All other plastics	41.7				
Metals					
12) Aluminum Containers	1.7				
13) Ferrous Containers	3.1				
14) Other Ferrous	—	5.8			
15) Other Non-Ferrous	2.4				
Glass					
16) Glass Containers	6.5				
17) Other (non-container) glass	7.0				
Organics					
18) Yard waste	(17 pumpkin				
19) Food waste (unpackaged)	18.8	22.7			
20) Food waste (packaged)	14.1	7.7	10.0		
21) Wood waste (untreated)	6.3				
22) Wood waste (treated)					
23) Other Organic Materials	28.9	5.8			
C&D					
24) Shingles	—				
25) Other C&D	—				

WET + HEAVY

Light Rain

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.4				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	12.7				
31) Electronics	0.5				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	19.9				
35) Other Inorganics	15.7				
36) Fines/supermix	11.5				
Totals					

Food — 90%
other non plastic — 5%
other non paper — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/9/22 Day: WED Time: 11:06 A.M Sample # 18 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

MSP Airport Term. 1 Mech 5

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	6.9				
2) Old Corrugated and Kraft bags	20.9				
3) Mixed recyclable paper	17.4				
4) Compostable paper	47.9	48.3			
5) Non-recyclable/non-compostable	9.4				
Plastics					
6) HDPE Containers	9.0				
7) PET Containers	13.3	12.1			
8) Polypropylene (PP)	8.4	8.9	8.6		
9) Polystyrene (PS)	6.0				
10) Film and flexible packaging	16.4	13.7	13.6	16.7	
11) All other plastics	28.3				
Metals					
12) Aluminum Containers	~~2.8 3.0~~	5.2			
13) Ferrous Containers	2.9				
14) Other Ferrous	2.5				
15) Other Non-Ferrous	2.5				
Glass					
16) Glass Containers	7.5				
17) Other (non-container) glass	5.7				
Organics					
18) Yard waste					
19) Food waste (unpackaged)	12.4				
20) Food waste (packaged)	13.6	12.9	13.6	18.7	
21) Wood waste (untreated)	~~13~~ 5.8				
22) Wood waste (treated)	6.1				
23) Other Organic Materials	18.2				
C&D					
24) Shingles					
25) Other C&D	0.6 sand paper				

Lots of waste - Rolls of toilet paper - full bottles of water - new in package ear buds

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	—				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	2.7				
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	14.5				
35) Other Inorganics	—				
36) Fines/supermix	8.2				
Totals					

good - 95%
Non Plastic — 2%
Non Paper — 3%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/9/22 Day: WED Time: 11:41 A.M Sample # 19 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): St Anthony Road

Materials	Weights				Totals
Paper					
1) Newsprint	—				
2) Old Corrugated and Kraft bags	19.4				
3) Mixed recyclable paper	12.4				
4) Compostable paper	47.6				
5) Non-recyclable/non-compostable	11.1				
Plastics					
6) HDPE Containers	0.1				
7) PET Containers	9.2				
8) Polypropylene (PP)	7.6				
9) Polystyrene (PS)	6.5				
10) Film and flexible packaging	17.6				
11) All other plastics	25.3	7.0			
Metals					
12) Aluminum Containers	3.7				
13) Ferrous Containers	2.3				
14) Other Ferrous	2.6				
15) Other Non-Ferrous	2.6				
Glass					
16) Glass Containers	5.9				
17) Other (non-container) glass	—				
Organics					
18) Yard waste	33.4 - Peenplains		9.6		
19) Food waste (unpackaged)	17.9	10.9			
20) Food waste (packaged)	9.9	4.8			
21) Wood waste (untreated)	17.8				
22) Wood waste (treated)	11.3				
23) Other Organic Materials	10.6				
C&D					
24) Shingles					
25) Other C&D	12.8	0.6			

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.2				
27) Mercury Containing Lamps	—				
28) Paint Containers					
29) Hazardous Wastes	3.5 Pills				
30) Household appliances	—				
31) Electronics					
32) Other Bulky wastes	10.6	7.3	3.6		
33) Carpet					
34) Other Textiles	12.6				
35) Other Inorganics					
36) Fines/supermix	14.4				
Totals					

Food — 80%
Non paper — 10%
Non plastic — 10%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/10/22 Day: Thurs. Time: 6:45 A.M Sample # 20 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	6.5				
2) Old Corrugated and Kraft bags	16.7				
3) Mixed recyclable paper	16.1				
4) Compostable paper	36.1				
5) Non-recyclable/non-compostable	9.4				
Plastics					
6) HDPE Containers	10.4				
7) PET Containers	10.8				
8) Polypropylene (PP)	8.9				
9) Polystyrene (PS)	7.1				
10) Film and flexible packaging	17.9				
11) All other plastics	25.7				
Metals					
12) Aluminum Containers	2.5	2.2			
13) Ferrous Containers	—	3.0			
14) Other Ferrous	—	6.5			
15) Other Non-Ferrous	—	2.8			
Glass					
16) Glass Containers	6.3				
17) Other (non-container) glass	6.5				
Organics					
18) Yard waste	8.7				
19) Food waste (unpackaged)	12.0	12.3	26.2		
20) Food waste (packaged)	8.3				
21) Wood waste (untreated)	10.4				
22) Wood waste (treated)	—				
23) Other Organic Materials	26.8				
C&D					
24) Shingles	—				
25) Other C&D	—				

60
50
110
20
130
55
185
50
235

1
65
25
90
85
175

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.2				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	[illegible]	19.8	1.0		
32) Other Bulky wastes	49.6 toilet				
33) Carpet	—				
34) Other Textiles	19.3				
35) Other Inorganics	10.6				
36) Fines/supermix	10.4				
Totals					

food - 98%
Non plastic — 1%
Non paper — 1%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/10/22 Day: Thurs. Time: 7:00 AM. Sample # 21 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	6.3				
2) Old Corrugated and Kraft bags	0.2				
3) Mixed recyclable paper	17.6				
4) Compostable paper	37.4				
5) Non-recyclable/non-compostable	17.2				
Plastics					
6) HDPE Containers	9.3				
7) PET Containers	10.0				
8) Polypropylene (PP)	8.2				
9) Polystyrene (PS)	6.3				
10) Film and flexible packaging (heavy mix)	21.6				
11) All other plastics	24.6				
Metals					
12) Aluminum Containers	2.8				
13) Ferrous Containers	3.0				
14) Other Ferrous	3.0				
15) Other Non-Ferrous	2.1				
Glass					
16) Glass Containers	~~10~~ 8.1				
17) Other (non-container) glass	—				
Organics					
18) Yard waste		10.1			
19) Food waste (unpackaged) (Coffee grounds)	9.0	17.0			
20) Food waste (packaged)	9.9	13.7			
21) Wood waste (untreated)	6.3				
22) Wood waste (treated)	—				
23) Other Organic Materials	32.2				
C&D					
24) Shingles	—				
25) Other C&D	1.0				

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	—				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	—				
32) Other Bulky wastes	27.4				
33) Carpet	1.0				
34) Other Textiles	18.3				
35) Other Inorganics	—				
36) Fines/supermix	10.2				
Totals					

food — 98%
other Non Paper - 1%
other Non Plastic - 1%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/10/22 Day: Thurs Time: 9:20 AM Sample # 22 Ticket # _____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other Minneapolis Road

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	0.1				
2) Old Corrugated and Kraft bags	19.2				
3) Mixed recyclable paper	25.0				
4) Compostable paper	36.5				
5) Non-recyclable/non-compostable	10.8				
Plastics					
6) HDPE Containers	10.3				
7) PET Containers	11.9				
8) Polypropylene (PP)	8.2				
9) Polystyrene (PS)	6.3				
10) Film and flexible packaging	16.7				
11) All other plastics	~~36.8~~	36.8			
Metals					
12) Aluminum Containers	2.0				
13) Ferrous Containers	3.6				
14) Other Ferrous	2.9				
15) Other Non-Ferrous	4.1				
Glass					
16) Glass Containers	9.1				
17) Other (non-container) glass	6.7				
Organics					
18) Yard waste	9.1				
19) Food waste (unpackaged)	21.7	14.6			
20) Food waste (packaged)	13.4	15.4	8.0		
21) Wood waste (untreated)	7.5				
22) Wood waste (treated)	4.1	5.6			
23) Other Organic Materials	28.1				
C&D					
24) Shingles	—				
25) Other C&D	—				

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.1				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	0.1 ft 11s				
30) Household appliances	—				
31) Electronics	0.3	0.2			
32) Other Bulky wastes	—				
33) Carpet	—				
34) Other Textiles	27.3				
35) Other Inorganics	8.8				
36) Fines/supermix	11.5				
Totals					

food — 90%
mix paper — 5%
non plastics — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/10/22 Day: Thurs. Time: 10:31 A.M. Sample # 23 Ticket # _____

Category: (Front)/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

Burnside Road.

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	—				
2) Old Corrugated and Kraft bags	21.5				
3) Mixed recyclable paper	37.2 54.9				
4) Compostable paper					
5) Non-recyclable/non-compostable	15.8				
Plastics					
6) HDPE Containers	9.5				
7) PET Containers	11.0				
8) Polypropylene (PP)	7.2 6.5				
9) Polystyrene (PS)					
10) Film and flexible packaging	20.7	13.2			
11) All other plastics	27.8				
Metals					
12) Aluminum Containers	3.3	3.0			
13) Ferrous Containers	3.1				
14) Other Ferrous	3.1				
15) Other Non-Ferrous	2.0				
Glass					
16) Glass Containers	—				
17) Other (non-container) glass	—			^	
Organics					
18) Yard waste	—				
19) Food waste (unpackaged)	17.6	11.0			
20) Food waste (packaged)	13.7	11.3			
21) Wood waste (untreated)	5.9				
22) Wood waste (treated)	5.6				
23) Other Organic Materials	20.9				
C&D					
24) Shingles	—				
25) Other C&D	—				

Wet & Heavy

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.1				
27) Mercury Containing Lamps	—				
28) Paint Containers	4.1	0.7			
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	—				
32) Other Bulky wastes	—				
33) Carpet Large Rug Mat	12.9				
34) Other Textiles	23.5				
35) Other Inorganics	—				
36) Fines/supermix	13.6				
Totals					

Food — 90%
Non paper — 5%
Non plastic — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/10/22 Day: Thurs. Time: 12:01 P.M. Sample # 24 Ticket # _____

Category: Front/Side (Rear Loader) Roll Off; Transfer Tractor/Trailer; Other North Minneapolis

Comments (unique aspects of the sample): Resd.

Materials	Weights				Totals
Paper					
1) Newsprint	—				
2) Old Corrugated and Kraft bags	17.3				
3) Mixed recyclable paper	20.8				
4) Compostable paper	30.5				
5) Non-recyclable/non-compostable	9.7				
Plastics					
6) HDPE Containers	9.4				
7) PET Containers	13.5				
8) Polypropylene (PP)	7.3				
9) Polystyrene (PS)	7.1				
10) Film and flexible packaging	15.9				
11) All other plastics	25.3				
Metals					
12) Aluminum Containers	2.8				
13) Ferrous Containers	2.9				
14) Other Ferrous	2.7				
15) Other Non-Ferrous	2.2				
Glass					
16) Glass Containers	9.6				
17) Other (non-container) glass	(0.1)				
Organics					
18) Yard waste	—				
19) Food waste (unpackaged)	11.8	13.3			
20) Food waste (packaged)	10.3	10.7			
21) Wood waste (untreated)	5.9				
22) Wood waste (treated)	5.6				
23) Other Organic Materials	31.8				
C&D					
24) Shingles	—				
25) Other C&D	—				

WET & HEAVY

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	—				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	2.1				
32) Other Bulky wastes	—				
33) Carpet	13.8 Large Rug 45.8				
34) Other Textiles	34.3				
35) Other Inorganics	—				
36) Fines/supermix	9.7				
Totals					

food — 90%

Non Paper — 5%

Non Plastic — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/10/22 Day: Thurs Time: 12:36 Sample # 25 Ticket #_____

Category: Front/Side/Rear Loader; (Roll Off); Transfer Tractor/Trailer; Other

Comments (unique aspects of the sample): Mayo Hospital

Materials	Weights				Totals	
Paper						
1) Newsprint	(0.2)					
2) Old Corrugated and Kraft bags	22.0					
3) Mixed recyclable paper	41.9					
4) Compostable paper	46.2					
5) Non-recyclable/non-compostable	10.7					
Plastics						
6) HDPE Containers	10.5					
7) PET Containers	14.0					
8) Polypropylene (PP)	7.4	7.8				
9) Polystyrene (PS)	6.2					
10) Film and flexible packaging	15.0	17.3				
11) All other plastics	26.8					
Metals						
12) Aluminum Containers	3.2	3.1				
13) Ferrous Containers	5.2					
14) Other Ferrous	3.4	(5.5)	(NONE)	(6.3)		
15) Other Non-Ferrous	1.6					
Glass						
16) Glass Containers	2.2	11.3				
17) Other (non-container) glass	—					
Organics						
18) Yard waste	—					
19) Food waste (unpackaged)	14.6	large block of cheese	all jerky	(2.1)	17.3	
20) Food waste (packaged)	(17.0)	(20.3)	9.5	10.6	13.7	16.4
21) Wood waste (untreated)						
22) Wood waste (treated)	7.3					
23) Other Organic Materials	7.2					
C&D						
24) Shingles	—					
25) Other C&D	—					

Lot of food waste in sample -

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.6				
27) Mercury Containing Lamps	—				
28) Paint Containers	—				
29) Hazardous Wastes	—				
30) Household appliances	—				
31) Electronics	—				
32) Other Bulky wastes	10.6 Office Chair				
33) Carpet	—				
34) Other Textiles	12.2				
35) Other Inorganics	0.2				
36) Fines/supermix	6.8				
Totals					

Food — 90%
Non Paper — 5%
Non plastic — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/11/22 Day: Friday Time: 6:50 AM. Sample # 26 Ticket #_____

Category: Front/Side/Rear Loader; Roll Off; (Transfer Tractor/Trailer;) Other

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint					
2) Old Corrugated and Kraft bags	22.6				
3) Mixed recyclable paper	16.7				
4) Compostable paper	17.4				
5) Non-recyclable/non-compostable	10.2				
Plastics					
6) HDPE Containers	9.0				
7) PET Containers	11.1				
8) Polypropylene (PP)	7.5				
9) Polystyrene (PS)	8.3				
10) Film and flexible packaging	15.4				
11) All other plastics	35.3				
Metals					
12) Aluminum Containers		2.5			
13) Ferrous Containers		2.4			
14) Other Ferrous	(9.4)	2.6			
15) Other Non-Ferrous		2.1			
Glass					
16) Glass Containers	7.9				
17) Other (non-container) glass	5.6				
Organics					
18) Yard waste	(21.5) Pumpkins		10.8		
19) Food waste (unpackaged)	7.5	12.0			
20) Food waste (packaged)		6.7	4.8		
21) Wood waste (untreated)	(35.0)	5.8			
22) Wood waste (treated)	(14.9)	5.7			
23) Other Organic Materials		15.7			
C&D					
24) Shingles					
25) Other C&D					

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.5				
27) Mercury Containing Lamps					
28) Paint Containers					
29) Hazardous Wastes	Other Plastic				
30) Household appliances					
31) Electronics	1.4				
32) Other Bulky wastes					
33) Carpet	5.4 Small Rugs				
34) Other Textiles	35.9	23.3			
35) Other Inorganics	11.4				
36) Fines/supermix	8.5				
Totals					

Food — 90%
Other Non paper — 5%
Other Non Plastic 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/11/22 Day: Friday Time: 8:16 A.M. Sample # 27 Ticket # _____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other coming from Shaffer Kensington Co

Comments (unique aspects of the sample): Junk Masters

Materials	Weights				Totals
Paper					
1) Newsprint					
2) Old Corrugated and Kraft bags	1.2	26.2	0.4		
3) Mixed recyclable paper	15.8	9.2	0.7		
4) Compostable paper					
5) Non-recyclable/non-compostable					
Plastics					
6) HDPE Containers					
7) PET Containers					
8) Polypropylene (PP)					
9) Polystyrene (PS)					
10) Film and flexible packaging	11.2				
11) All other plastics	13.3	2.9	1.2		✓
Metals					
12) Aluminum Containers					
13) Ferrous Containers	0.2				
14) Other Ferrous	0.6				
15) Other Non-Ferrous					
Glass					
16) Glass Containers					
17) Other (non-container) glass					
Organics					
18) Yard waste					
19) Food waste (unpackaged)					
20) Food waste (packaged)					
21) Wood waste (untreated)	1.8				
22) Wood waste (treated)	0.1				
23) Other Organic Materials					
C&D					
24) Shingles					
25) Other C&D					

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries					
27) Mercury Containing Lamps					
28) Paint Containers					
29) Hazardous Wastes					
30) Household appliances					
31) Electronics	17.9	5.8	0.1		
32) Other Bulky wastes	7.7	32.3	26.1	41.2	
33) Carpet					
34) Other Textiles	29.4	0.8	1.7		
35) Other Inorganics	2.6				
36) Fines/supermix					
Totals					

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/11/22 Day: FRIDAY Time: 9:16 A.M. Sample # 28 Ticket #_____

Category: (Front/Side/Rear Loader); Roll Off; Transfer Tractor/Trailer; Other Minneapolis Comm.

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	6.7				
2) Old Corrugated and Kraft bags	16.3				
3) Mixed recyclable paper	16.7				
4) Compostable paper	55.6 – Very wet + heavy with food!!				
5) Non-recyclable/non-compostable	9.8				
Plastics					
6) HDPE Containers	11.4				
7) PET Containers	15.5				
8) Polypropylene (PP)	8.0				
9) Polystyrene (PS)	7.5				
10) Film and flexible packaging	24.0				
11) All other plastics	23.2				
Metals					
12) Aluminum Containers	3.2				
13) Ferrous Containers		2.8			
14) Other Ferrous	4.8	2.9			
15) Other Non-Ferrous		3.5			
Glass					
16) Glass Containers					
17) Other (non-container) glass	21.4				
Organics					
18) Yard waste	8.6				
19) Food waste (unpackaged)	8.5	12.4	17.1	20.3	
20) Food waste (packaged)	11.1	5.7			
21) Wood waste (untreated)	2.1				
22) Wood waste (treated)	0.1				
23) Other Organic Materials	13.3				
C&D					
24) Shingles					
25) Other C&D					

15
75
90
80
170

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries					
27) Mercury Containing Lamps					
28) Paint Containers					
29) Hazardous Wastes	(0.1) – 2	Novalog	Flex PEN	Prefilled	Syringe
30) Household appliances					
31) Electronics					
32) Other Bulky wastes	(12.7)	Part of	Stove		
33) Carpet					
34) Other Textiles					
35) Other Inorganics	15.5	(0.3)			
36) Fines/supermix					
Totals					

food – 100%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/11/22 Day: Friday Time: 10:06 A.M. Sample # 29 Ticket # _____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other Apt Mixed Comm

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint		7.3			
2) Old Corrugated and Kraft bags	4.0	18.5			
3) Mixed recyclable paper	21.7				
4) Compostable paper		39.0	42.4	41.7	
5) Non-recyclable/non-compostable	30.2 dirt filters	9.9			
Plastics					
6) HDPE Containers	9.3				
7) PET Containers	15.3				
8) Polypropylene (PP)	7.7	6.0			
9) Polystyrene (PS)	6.4	6.8			
10) Film and flexible packaging	14.1	12.0			
11) All other plastics	24.7	19.5			
Metals					
12) Aluminum Containers	2.2 2.8	1.5			
13) Ferrous Containers					
14) Other Ferrous	3.1				
15) Other Non-Ferrous	1.7				
Glass					
16) Glass Containers	6.0				
17) Other (non-container) glass	8.1				
Organics					
18) Yard waste					
19) Food waste (unpackaged)	11.3 coffee grounds	9.9	9.9		
20) Food waste (packaged)	6.9	9.4	7.4	8.2	
21) Wood waste (untreated)					
22) Wood waste (treated)	5.6				
23) Other Organic Materials	6.1				
C&D					
24) Shingles					
25) Other C&D					

35 35 70 30 100

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries	0.1				
27) Mercury Containing Lamps					
28) Paint Containers					
29) Hazardous Wastes					
30) Household appliances					
31) Electronics	0.8				
32) Other Bulky wastes					
33) Carpet					
34) Other Textiles	8.6				
35) Other Inorganics					
36) Fines/supermix	7.8				
Totals					

lbs of coffee grounds

Food — 90%

Other Non Paper — 5%

Other Non Plastic — 5%

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Date 11/11/22 Day: Friday Time: 11:49 AM Sample # 30 Ticket # _____

Category: Front/Side/Rear Loader; Roll Off; Transfer Tractor/Trailer; Other

North side Hauling Minneapolis Road.

Comments (unique aspects of the sample): _____

Materials	Weights				Totals
Paper					
1) Newsprint	7.5				
2) Old Corrugated and Kraft bags	19.0				
3) Mixed recyclable paper	32.4				
4) Compostable paper	42.4				
5) Non-recyclable/non-compostable	11.1				
Plastics					
6) HDPE Containers	9.6				
7) PET Containers	15.2				
8) Polypropylene (PP)	7.4				
9) Polystyrene (PS)	8.3				
10) Film and flexible packaging	22.4				
11) All other plastics	31.6				
Metals					
12) Aluminum Containers	2.6				
13) Ferrous Containers	4.5				
14) Other Ferrous	3.7				
15) Other Non-Ferrous	2.9				
Glass					
16) Glass Containers	11.1				
17) Other (non-container) glass	6.6				
Organics					
18) Yard waste	8.5				
19) Food waste (unpackaged)	25.5	15.3			
20) Food waste (packaged)	12.8	12.4			
21) Wood waste (untreated)	(0.2)				
22) Wood waste (treated)	5.6				
23) Other Organic Materials	14.6	(0.4)			
C&D					
24) Shingles					
25) Other C&D					

3.1
2.1
1.0

Getting Colder!!!

AMEN! Last one!

GRE HERC Services Waste Characterization Study
Sample Data Sheet

Materials	Weights				Totals
Other					
26) Batteries					
27) Mercury Containing Lamps					
28) Paint Containers	1.0				
29) Hazardous Wastes	0.6 Pills				
30) Household appliances					
31) Electronics					
32) Other Bulky wastes	18.4 Chairs				
33) Carpet			1.7 Small Carpet pieces		
34) Other Textiles	24.1				
35) Other Inorganics	8.6				
36) Fines/supermix	11.9				
Totals					

Food — 80%
Non paper — 10%
Non Plastic — 10%

Attachment C –Proximate and Ultimate Analyses

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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

Workorder: GRE HERC Services Waste Study (5581) **Client:** Burns & McDonnell Waste Consult
Account #: 50287

Bob Craggs
Burns & McDonnell
8201 Norman Center Drive
Suite 500
Bloomington, MN 55437

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

Stacy Zander

Stacy Zander, Bismarck Assistant Lab Manager Bismarck, ND

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Workorder: GRE HERC Services Waste Study (5581) **Client:** Burns & McDonnell Waste Consult

Workorder Summary

Workorder Comments

All glass and metal have been removed from the sample prior to analysis.

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Workorder: GRE HERC Services Waste Study (5581) **Client:** Burns & McDonnell Waste Consult

Analytical Results

Lab ID:	5581001	**Date Collected:**	11/10/2022 13:55	**Matrix:**	RD
Sample ID:	MSW Sample #1	**Date Received:**	11/16/2022 09:43	**Collector:**	Client

*** PROXIMATE ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	24.22	wt. %		
Air Dry Moisture	22.84	wt. %		
Oven Dry Moisture	1.79	wt. %		
Ash	6.89	wt. %	9.09	wt. %
Volatile Matter	64.77	wt. %	85.47	wt. %
Fixed Carbon	4.12	wt. %	5.44	wt. %
BTU/lb	6548	BTU/lb	8641	BTU/lb
Total Sulfur	0.03	wt. %	0.04	wt. %

ULTIMATE

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	24.22	wt. %		
Air Dry Moisture	22.84	wt. %		
Oven Dry Moisture	1.79	wt. %		
Ash	6.89	wt. %	9.09	wt. %
Carbon	37.68	wt. %	49.72	wt. %
Hydrogen	8.06	wt. %	7.06	wt. %
Nitrogen	0.25	wt. %	0.33	wt. %
Total Sulfur	0.03	wt. %	0.04	wt. %
Oxygen by Difference	47.09	wt. %	33.76	wt. %

*** SULFUR FORMS ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Sulfur	0.03	wt. %	0.04	wt. %

*** ASH FUSION ***

ANALYTE	REDUCING	OXIDIZING

*** MINERAL ANALYSIS OF ASH ***

ANALYTE	DRY BASIS

*** MISCELLANEOUS ***

ANALYTE	AS RECEIVED		DRY BASIS
Hydrogen Less Water	5.35	wt. %	
Oxygen Less Water	25.58	wt. %	

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Workorder: GRE HERC Services Waste Study (5581) **Client:** Burns & McDonnell Waste Consult

Analytical Results

Lab ID: 5581002 **Date Collected:** 11/10/2022 14:00 **Matrix:** RD
Sample ID: MSW Sample #2 **Date Received:** 11/16/2022 09:43 **Collector:** Client

*** PROXIMATE ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	16.96	wt. %		
Air Dry Moisture	14.56	wt. %		
Oven Dry Moisture	2.81	wt. %		
Ash	6.53	wt. %	7.86	wt. %
Volatile Matter	71.39	wt. %	85.97	wt. %
Fixed Carbon	5.12	wt. %	6.17	wt. %
BTU/lb	5510	BTU/lb	6635	BTU/lb
Total Sulfur	0.03	wt. %	0.04	wt. %

ULTIMATE

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	16.96	wt. %		
Air Dry Moisture	14.56	wt. %		
Oven Dry Moisture	2.81	wt. %		
Ash	6.53	wt. %	7.86	wt. %
Carbon	37.41	wt. %	45.06	wt. %
Hydrogen	6.97	wt. %	6.11	wt. %
Nitrogen	0.35	wt. %	0.43	wt. %
Total Sulfur	0.03	wt. %	0.04	wt. %
Oxygen by Difference	48.70	wt. %	40.51	wt. %

*** SULFUR FORMS ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Sulfur	0.03	wt. %	0.04	wt. %

*** ASH FUSION ***

ANALYTE	REDUCING	OXIDIZING

*** MINERAL ANALYSIS OF ASH ***

ANALYTE	DRY BASIS

*** MISCELLANEOUS ***

ANALYTE	AS RECEIVED		DRY BASIS
Hydrogen Less Water	5.07	wt. %	
Oxygen Less Water	33.64	wt. %	

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Workorder: GRE HERC Services Waste Study (5581) **Client:** Burns & McDonnell Waste Consult

Analytical Results

Lab ID: 5581003 **Date Collected:** 11/10/2022 14:02 **Matrix:** RD
Sample ID: MSW Sample #3 **Date Received:** 11/16/2022 09:43 **Collector:** Client

*** PROXIMATE ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	33.62	wt. %		
Air Dry Moisture	32.08	wt. %		
Oven Dry Moisture	2.27	wt. %		
Ash	1.70	wt. %	2.57	wt. %
Volatile Matter	61.81	wt. %	93.13	wt. %
Fixed Carbon	2.86	wt. %	4.30	wt. %
BTU/lb	6524	BTU/lb	9828	BTU/lb
Total Sulfur	0.02	wt. %	0.03	wt. %

ULTIMATE

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	33.62	wt. %		
Air Dry Moisture	32.08	wt. %		
Oven Dry Moisture	2.27	wt. %		
Ash	1.70	wt. %	2.57	wt. %
Carbon	41.50	wt. %	62.52	wt. %
Hydrogen	10.11	wt. %	9.56	wt. %
Nitrogen	0.43	wt. %	0.64	wt. %
Total Sulfur	0.02	wt. %	0.03	wt. %
Oxygen by Difference	46.24	wt. %	24.68	wt. %

*** SULFUR FORMS ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Sulfur	0.02	wt. %	0.03	wt. %

*** ASH FUSION ***

ANALYTE	REDUCING	OXIDIZING

*** MINERAL ANALYSIS OF ASH ***

ANALYTE	DRY BASIS

*** MISCELLANEOUS ***

ANALYTE	AS RECEIVED		DRY BASIS
Hydrogen Less Water	6.35	wt. %	
Oxygen Less Water	16.38	wt. %	

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Workorder: GRE HERC Services Waste Study (5581) **Client:** Burns & McDonnell Waste Consult

Analytical Results

Lab ID:	5581004	**Date Collected:**	11/10/2022 14:05	**Matrix:**	RD
Sample ID:	MSW Sample #4	**Date Received:**	11/16/2022 09:43	**Collector:**	Client

*** PROXIMATE ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	53.52	wt. %		
Air Dry Moisture	51.95	wt. %		
Oven Dry Moisture	3.27	wt. %		
Ash	2.21	wt. %	4.75	wt. %
Volatile Matter	41.31	wt. %	88.87	wt. %
Fixed Carbon	2.97	wt. %	6.38	wt. %
BTU/lb	3441	BTU/lb	7403	BTU/lb
Total Sulfur	0.04	wt. %	0.09	wt. %

ULTIMATE

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	53.52	wt. %		
Air Dry Moisture	51.95	wt. %		
Oven Dry Moisture	3.27	wt. %		
Ash	2.21	wt. %	4.75	wt. %
Carbon	22.08	wt. %	47.49	wt. %
Hydrogen	9.07	wt. %	6.62	wt. %
Nitrogen	0.39	wt. %	0.84	wt. %
Total Sulfur	0.04	wt. %	0.09	wt. %
Oxygen by Difference	66.22	wt. %	40.21	wt. %

*** SULFUR FORMS ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Sulfur	0.04	wt. %	0.09	wt. %

*** ASH FUSION ***

ANALYTE	REDUCING	OXIDIZING

*** MINERAL ANALYSIS OF ASH ***

ANALYTE	DRY BASIS

*** MISCELLANEOUS ***

ANALYTE	AS RECEIVED		DRY BASIS
Hydrogen Less Water	3.08	wt. %	
Oxygen Less Water	18.69	wt. %	

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Workorder: GRE HERC Services Waste Study (5581) **Client:** Burns & McDonnell Waste Consult

Analytical Results

Lab ID: 5581005 **Date Collected:** 11/10/2022 14:10 **Matrix:** RD
Sample ID: MSW Sample #5 **Date Received:** 11/16/2022 09:43 **Collector:** Client

*** PROXIMATE ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	43.10	wt. %		
Air Dry Moisture	40.87	wt. %		
Oven Dry Moisture	3.78	wt. %		
Ash	7.05	wt. %	12.40	wt. %
Volatile Matter	46.97	wt. %	82.55	wt. %
Fixed Carbon	2.87	wt. %	5.05	wt. %
BTU/lb	3844	BTU/lb	6757	BTU/lb
Total Sulfur	0.10	wt. %	0.18	wt. %

ULTIMATE

ANALYTE	AS RECEIVED		DRY BASIS	
Total Moisture	43.10	wt. %		
Air Dry Moisture	40.87	wt. %		
Oven Dry Moisture	3.78	wt. %		
Ash	7.05	wt. %	12.40	wt. %
Carbon	26.81	wt. %	47.11	wt. %
Hydrogen	8.49	wt. %	6.44	wt. %
Nitrogen	0.93	wt. %	1.63	wt. %
Total Sulfur	0.10	wt. %	0.18	wt. %
Oxygen by Difference	56.62	wt. %	32.24	wt. %

*** SULFUR FORMS ***

ANALYTE	AS RECEIVED		DRY BASIS	
Total Sulfur	0.10	wt. %	0.18	wt. %

*** ASH FUSION ***

ANALYTE	REDUCING	OXIDIZING

*** MINERAL ANALYSIS OF ASH ***

ANALYTE	DRY BASIS

*** MISCELLANEOUS ***

ANALYTE	AS RECEIVED		DRY BASIS
Hydrogen Less Water	3.66	wt. %	
Oxygen Less Water	18.35	wt. %	

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Workorder: GRE HERC Services Waste Study (5581) **Client:** Burns & McDonnell Waste Consult

Minnesota Valley Testing Laboratories, I
2616 East Broadway Avenue
Bismarck, ND 58501
Phone: (701) 258-9720
Toll Free: (800) 279-6885 Fax: (701) 258-9724

Burns & McDonnell Waste Consu
WO: 5581

ain of Custody Record
Page 1 of 1

Work Order #

Company Name and Address: Burns & McDonnell, 8201 Norman Center Drive, Suite 500, Bloomington, MN 55437	Account #:		Email: rwcraggs@burnsmcd.com, tmcammack@burnsmcd.com
	Phone #:	612-474-0559	
	Contact (Report to):	Bob Craggs	~~Bob Craggs~~
	Name of Samplers:	Bob Craggs, Trevor Cammack	~~Bob Craggs~~, ~~Trevor Cammack~~
Billing Address (indicate if different from above): Burns & McDonnell, 9400 Ward Parkway, Kansas City, MO 64114	Quote Number		Date Submitted: 11/10/2022
	Project Name/Number:	GRE HERC Services Waste Study	Purchase Order #:

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Time:	Temp:
1. Trevor Cammack	11/10/2022	1700	Ambient (cooler)		16Nov22	0943	Ambient
2.							

Comments: Sending 5 (five) grab samples of municipal solid waste from Hennepin County, MN waste-to-energy facility for proximate/ultimate analysis

Sample Information

Lab Use Only Lab Number	Sample ID	Sample Type	Date Sampled	Time Sampled	Analysis
001	MSW Sample #1	MSW	11/10/22	1355	Proximate/Ultimate
002	MSW Sample #2	MSW	11/10/22	1400	Proximate/Ultimate
003	MSW Sample #3	MSW	11/10/22	1402	Proximate/Ultimate
004	MSW Sample #4	MSW	11/10/22	1405	Proximate/Ultimate
005	MSW Sample #5	MSW	11/10/22	1410	Proximate/Ultimate

Enclosed are your containers for your sampling event. Completely fill and label containers appropriately for the analyses to be conducted. Complete chain of custody and submit with samples. For questions regarding individual parameter holding times, chemical and thermal preservation and sample volumes please refer to our sample preservation guide on our website at www.mvtl.com or by contacting customer service at 1-800-782-3557. If samples show signs of contamination, inadequate preservation or are in any way compromised you will be contacted as to whether to proceed with analysis or submit a new sample.

Please submit the top two copies with your samples. We will return the completed original with your results.