WASTE COMPOSITION OF SPRINGHILL LANDFILL

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Prepared for:
WM Springhill Landfill

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EXECUTIVE SUMMARY

During the week of April 6th-10th, 2026, students from the University of Florida, Florida Polytechnic University, and Florida Atlantic University performed a waste composition study at the WM Springhill Landfill. This study was funded by the Florida Department of Environmental Protection (FDEP) through the Solid Waste Infrastructure for Recycling (SWIFR) grant[1]. The goals of this project were to: 1) provide Springhill Landfill with a current evaluation of municipal solid waste (MSW) originating from smaller counties; and 2) update FDEP's *WasteCalc* tool. *WasteCalc* relies on current waste composition studies to estimate the material composition of MSW for each of Florida's 67 counties.

Throughout the study week, 40 samples were sorted, with waste originating from residences and businesses in Calhoun, Franklin, Holmes, Jaskson, and Washington Counties. Approximately 200-pound samples of MSW were obtained from randomly selected inbound trucks, and the waste was manually sorted into 33 different categories by undergraduate researchers from the SWIFR team. After the samples were sorted, the contents of each category were weighed and discarded. The mass-based composition of each sample was calculated, then averaged across the 40 samples to determine the overall composition of the waste stream. The results found "Other Papers" to be the largest component at 18.9%. Typical contents placed into this category include polycoated aseptic containers, food service containers, composite materials, boxboard, paper towels, and other non-recyclable paper. The results of the WM Springhill Landfill composition study will be integrated into *WasteCalc* to provide more accurate and representative results for the counties of interest, as well as other similar counties in Florida.

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1. INTRODUCTION

WM owns and operates the Springhill Landfill in Jackson County, Florida. The landfill primarily serves as a disposal area for Northwest Florida, with Okaloosa and Leon Counties producing more than half the waste received in 2025. Some out-of-state waste is accepted from Alabama as well. The existing *WasteCalc* model was most recently updated in 2019 and has limited waste composition data from low-density counties in Florida. This study therefore aimed to address the data gap by characterizing MSW from smaller counties that utilize the Springhill Landfill for disposal, including Calhoun, Franklin, Holmes, Jaskson, and Washington Counties.

Figure 1 shows the counties of interest included in the study. These five counties have a combined population of 122,993 as of 2024, and a relatively low population density of less than 100 people per square mile each[2]. Therefore, waste from these counties originates from a rural population, with some larger cities and towns throughout the service area. Calhoun, Holmes, Jackson, and Washington Counties use private waste collection companies for both residential and commercial garbage. Franklin County transports commingled waste to the Springhill Landfill via a compactor from a transfer station.

Figure 1 – Counties Included in the Waste Composition Study

2. METHODOLOGY

2.1 Preparation

ASTM D5231-92: *Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste*[3] was followed for development of the sampling plan and protocol. Experience from previous waste composition studies conducted by the researchers suggested that 40 samples could reasonably be selected and sorted over the course of a weeklong waste composition study. The original intent was to obtain 8 samples per county such that each was equally represented; however, fewer trucks were available from Holmes County than anticipated. Therefore, 6 samples were collected from trucks servicing Holmes County, and the remaining samples were re-allocated to Jackson and Washington Counties, as seen in **Table 1**.

Beyond county of origin, the sampling plan also accounted for waste originating from commercial and residential sources. For this study's purpose, commercial waste included businesses and multifamily residences (e.g., apartment complexes, condominiums). Residential waste included curbside collection from single-family homes, as well as waste from county collection centers. It was assumed that the commercial and residential waste from Franklin County was adequately mixed at the transfer station prior to arrival at the Springhill Landfill. Open-top roll-offs and "mom-and-pop" haulers disposing of C&D debris or other bulky wastes were excluded from this study due to the difficulty of manually sorting this material.

Table 1 – Samples Selected for the Waste Composition Study

	Commercial	Residential	Mixed	**Total**
Calhoun	1	7	0	**8**
Franklin	0	0	8	**8**
Holmes	3	3	0	**6**
Jackson	3	6	0	**9**
Washington	6	3	0	**9**
Total	**13**	**19**	**8**	**40**

2.2 Sampling Method

During the composition study, scale house attendants identified samples of interest through inbound customer accounts and driver interviews. The attendants notified operators on the landfill when these vehicles were approaching the working face, and drivers were instructed to back into a designated area where the samples could be safely obtained. Once the trucks were emptied, student researchers randomly selected material from the load and placed the waste samples into 96-gallon rolling carts, as seen in **Figure 2**. The rolling carts were weighed in the sorting area to ensure that the contents totaled approximately 200 pounds per sample and labeled based on the type of waste (i.e., commercial, residential, mixed) and county of origin.

Typically, a single sample was selected per truck. However, to ensure that the sampling goal was met for the study, there were five trucks during the week where the researchers grabbed 2 samples per truck. The trucks with multiple samples were either

commercial trucks that service many businesses along their collection route, residential trucks that rarely passed through the landfill, or transfer trucks where commercial and residential waste is mixed at the transfer station. Therefore, it was assumed that the sampling plan was still representative of waste from the counties of interest.

Figure 2 - Example of Sample Collection

2.3 Sorting Method

The sorting table was staged on site to provide the researchers with a safe space to work away from landfill operations and vehicle traffic. Once it was confirmed that the samples weighed approximately 200 pounds each, a team of researchers emptied the carts onto a sorting table with a one-inch square mesh top, as shown in **Figure 3**. Any material which passed through the mesh was classified as “residuals” and remained unsorted; material remaining on top of the mesh was manually sorted into 33 material categories using the list in the *Material Categories* section of the appendix. The residuals were captured on a tarp and weighed separately (as seen in **Figure 4**). A lined bin was reserved for each of the material categories, and once the entire sample was sorted, the bin liners were removed, weighed, and disposed of (**Figure 5**). The mass of each material category was recorded on the sampling sheet in the appendix so the overall mass-based composition could be determined.

Figure 3 – Unloading Samples

Figure 4 – Unsorted “Residuals” Passed Through the 1-Inch Mesh

Figure 5 – Weighing of the 33 Material Categories

3. DATA AND RESULTS

3.1 Raw Data Collected

Raw data refers to the fact that this data is presented in the 33 categories decided upon by the SWIFR and WM Springhill Landfill teams. Each table in this section is color-coded to match the general category it falls under in *Section 3.2 Processed Data*. The percentages were based on the averages of the mass fraction for each category, and the equations used, as seen below, follow the ASTM D5231 method[3].

Equation 1 was used to determine the individual mass fraction of each category in a sample.

Equation 1

$$mf_i = \frac{w_i}{\sum_{i=1}^{j} w_i}$$

Where:

$mf_i = mass\ fraction\ of\ component\ i$
$w_i = weight\ of\ component\ i$
$j = number\ of\ components$

Then, the category mass fraction for all 40 samples was averaged to obtain a percentage, as seen in **Equation 2** and

Equation 3. Raw data from the waste sort is shown in **Table 2**. The mass fraction of the commercial samples, residential samples, and mixed waste samples (from Franklin County) were calculated and recorded.

Equation 2

$$\overline{mf}_i = \frac{1}{n}\sum_{k=1}^{n} mf_i$$

Equation 3

$$Category\ Percentage = \overline{mf}_i * 100$$

Where:

$\overline{mf}_i = mean\ mass\ fraction$

Table 2 - Raw Data Collected from the Springhill Landfill Waste Sort

WasteCalc Category	Material Category	Mass Percent			
		Total	Residential (n 19)	Commercial (n 13)	Mixed (n 8)
Newspaper	Newspaper	0.2%	0.3%	0.1%	0.2%
Corrugated Cardboard	Corrugated Cardboard (OCC)	5.2%	3.6%	6.3%	7.1%
Office Paper	High Grade Paper (Office Type)	2.7%	2.7%	2.4%	3.4%
Other Papers	Polycoated Aseptic Containers	3.2%	3.5%	3.0%	2.7%
	Boxboards	3.7%	4.2%	2.9%	4.1%
	Other Paper	12.0%	11.1%	14.0%	10.6%
Glass Packaging	Green	0.5%	0.5%	0.3%	1.1%
	Clear	2.4%	2.9%	1.4%	2.5%
	Brown	0.4%	0.4%	0.1%	1.1%
	Other Glass/Ceramics	0.5%	0.4%	0.7%	0.2%
Steel Cans	Steel/Tin Cans	1.7%	2.1%	1.3%	1.4%
Other Ferrous Metals	Other Ferrous Metals	0.7%	0.8%	0.5%	0.6%
Aluminum Cans	Aluminum Cans/Foil	2.1%	2.0%	1.7%	2.8%
Non-Ferrous Metals	Other Non-Ferrous Metals	0.8%	1.3%	0.5%	0.2%
Textiles	Clothing, Footwear, Other Textiles	6.4%	6.0%	6.3%	7.5%
Yard Trash	Yard Waste	2.1%	0.9%	3.7%	2.2%
Food Waste	Food Waste	16.5%	18.0%	14.9%	15.5%
Plastic Containers	#1 PET Bottles	2.6%	2.7%	2.3%	2.7%
	#2 HDPE Bottles	1.4%	1.5%	1.2%	1.5%
Other Plastics	#3-7 (Other Plastic Bottles)	0.3%	0.3%	0.3%	0.1%
	Expanded Polysturene	1.6%	1.6%	1.6%	1.6%
	Rigid Plastic (Food Service Plastics)	2.6%	2.6%	2.4%	2.8%
	Other Flexible Plastics	10.3%	9.4%	11.1%	11.4%
	Other Plastics	2.9%	3.4%	2.2%	2.6%
C&D	C&D Debris	1.8%	0.8%	2.1%	3.6%
Other Miscellaneous	Rubber and Leather	0.6%	1.0%	0.3%	0.3%
	Small Appliances/Electronics	1.6%	1.5%	2.1%	0.8%
	Hazardous Waste	0.2%	0.2%	0.2%	0.3%
	Lithium-Ion Battery Products	0.0%	0.1%	0.0%	0.1%
	Residuals	4.2%	4.0%	4.2%	4.5%
	Liquids	2.7%	3.1%	2.8%	1.5%
	Other Organics	5.2%	6.5%	5.0%	2.7%
	Other Miscellaneous	0.9%	0.6%	1.7%	0.4%

3.2 Processed Data

Data presented in this section has been complied into more general groups, based on the 18 material categories in FDEP's *WasteCalc* tool. For example, the categories of "Other Paper", "Polycoated Aseptic Containers", and "Boxboards" were compiled into the general category "Other Paper". Presenting data in this manner provides a broad overview of the waste stream and allows for harmonization with the

existing *WasteCalc* tool. Processed data from the Springhill Landfill waste sort is shown in **Table 3** below. Graphical representations of each waste stream can be found in **Figure 6Figure 9**.

Table 3 - Processed Data from the Springhill Landfill Waste Sort

WasteCalc Category	Total	Mass Percent Residential (n 19)	Commercial (n 13)	Mixed (n 9)
Newspaper	0.2%	0.3%	0.1%	0.2%
Corrugated Cardboard	5.2%	3.6%	6.3%	7.1%
Office Paper	2.7%	2.7%	2.4%	3.4%
Other Papers	18.9%	18.8%	19.9%	17.3%
Glass Packaging	3.8%	4.2%	2.5%	4.9%
Steel Cans	1.7%	2.1%	1.3%	1.4%
Other Ferrous Metals	0.7%	0.8%	0.5%	0.6%
Aluminum Cans	2.1%	2.0%	1.7%	2.8%
Non-Ferrous Metals	0.8%	1.3%	0.5%	0.2%
Textiles	6.4%	6.0%	6.3%	7.5%
Yard Trash	2.1%	0.9%	3.7%	2.2%
Food Waste	16.5%	18.0%	14.9%	15.5%
Plastic Containers	4.0%	4.2%	3.5%	4.2%
Other Plastics	17.6%	17.2%	17.7%	18.5%
C&D	1.8%	0.8%	2.1%	3.6%
Other Miscellaneous	15.5%	17.0%	16.4%	10.5%

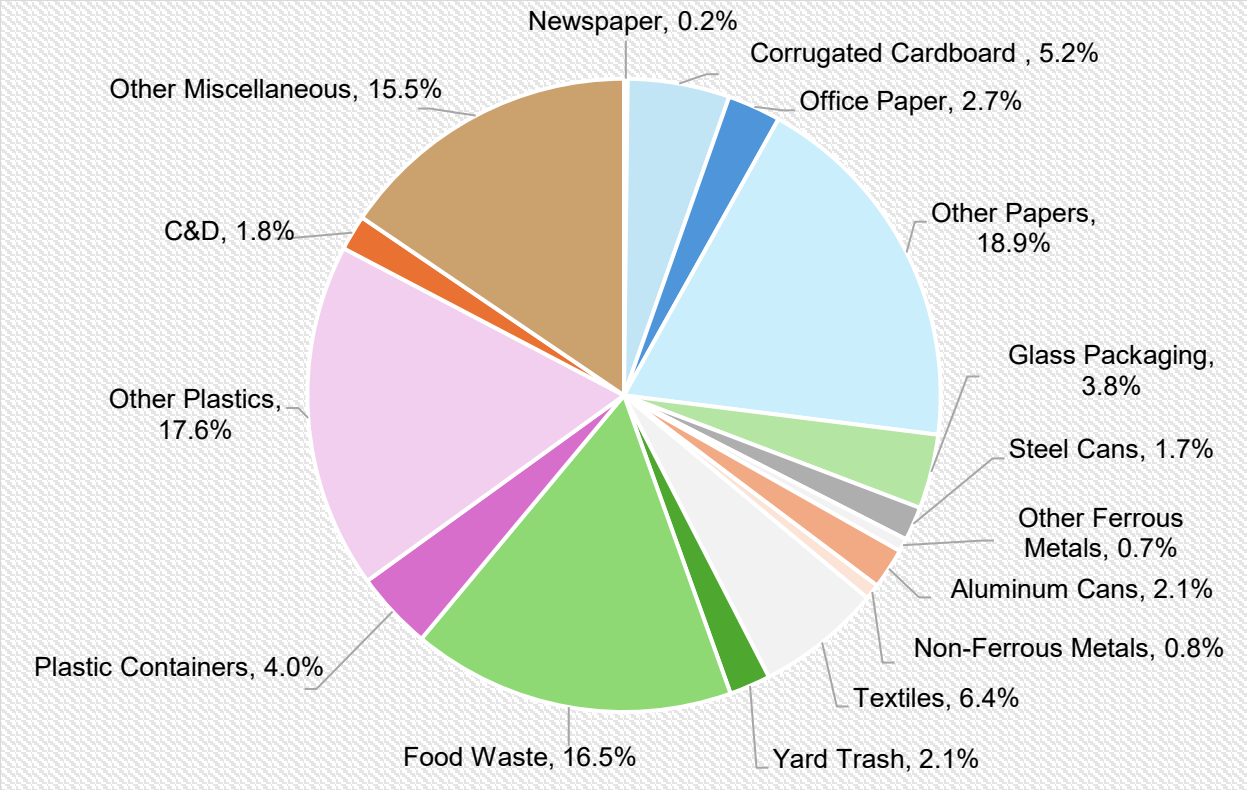

Figure 6 – Total Waste Composition

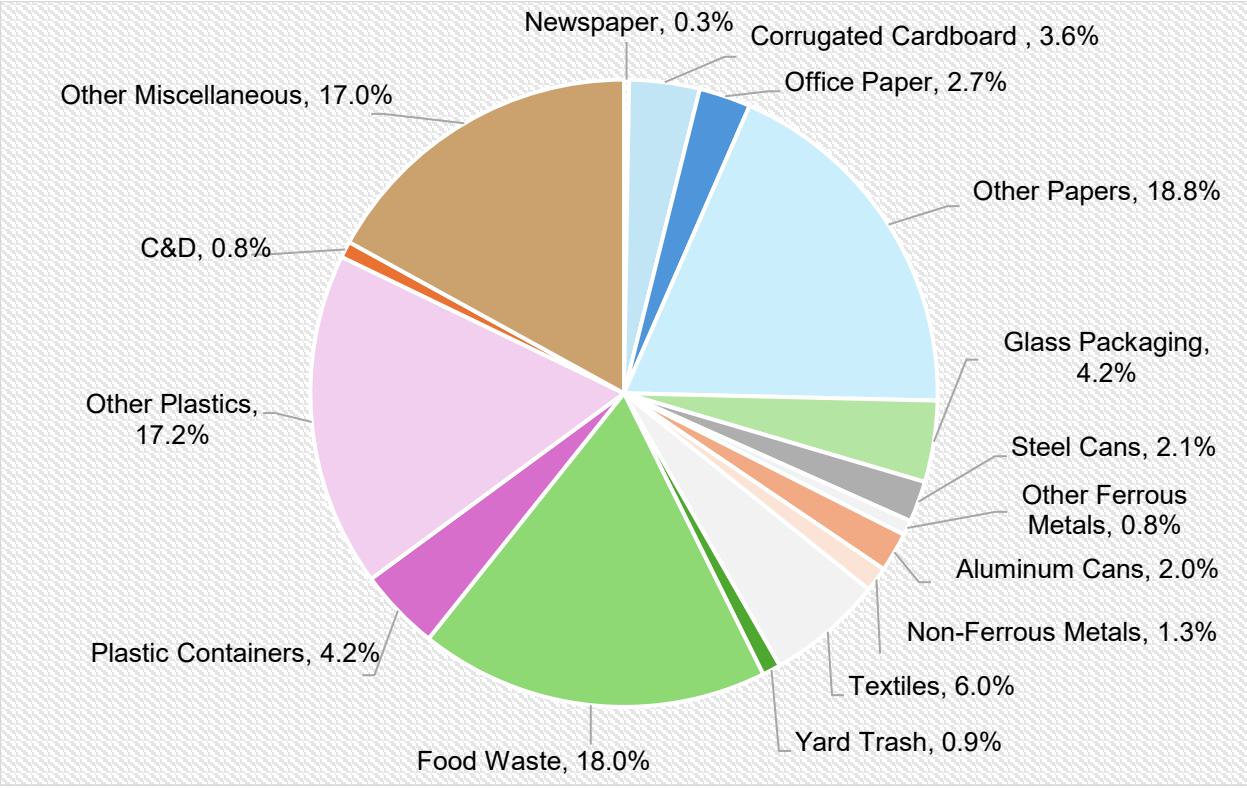

Figure 7 - Residential Waste Composition

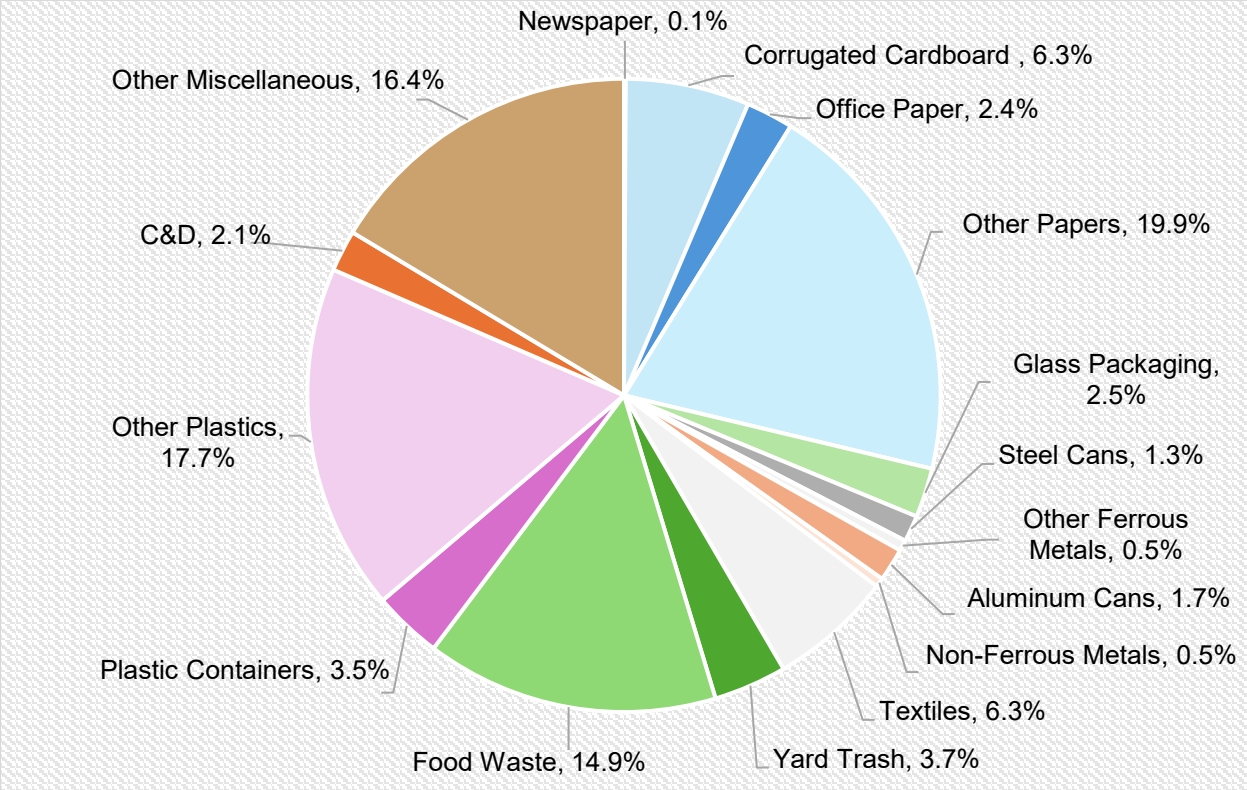

Figure 8 – Commercial Waste Composition

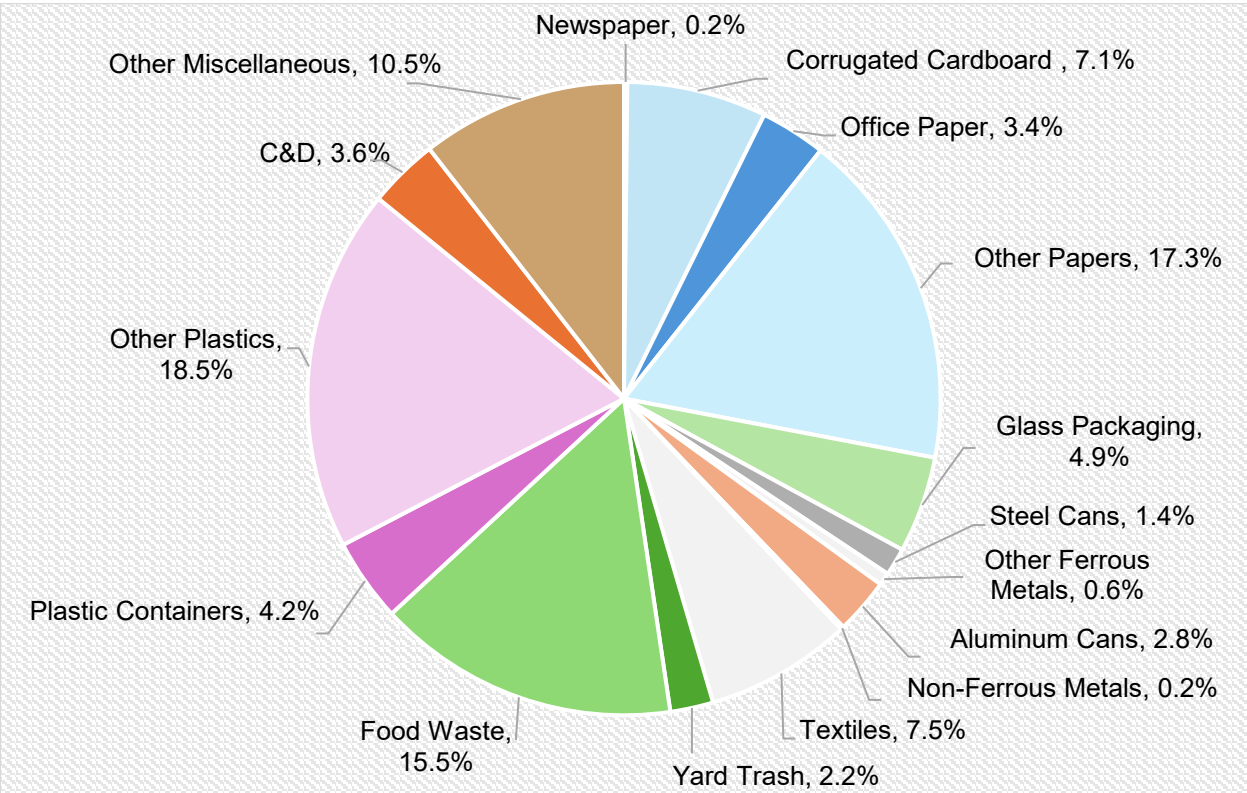

Figure 9 - Mixed Waste Composition (from Franklin County)

The largest component of the overall waste stream from the study was “Other Papers” at 18.9%. This includes polycoated aseptic containers, food service containers, composite materials, boxboard, paper towels, or other non-recyclable paper. In the US Environmental Protection Agency’s (EPA) Advancing Sustainable Material Management: 2018 Fact Sheet, the highest component of US MSW landfilled in 2018 was “Food” at 24.1%, followed by “Plastics”, and then “Paper & Paperboard” at 11.8%[4]. The results of the waste sort at the Springhill Landfill are consistent with these findings, as “Other Paper”, “Other Plastics” and “Food Waste” were the three largest components. The two smallest components in this study were “Newspaper” and “Non-Ferrous Metals” at 0.2% and 0.7% respectively. Recyclable materials, including glass, aluminum cans, steel cans, plastic bottles, corrugated boxes, newspaper, and office paper sum to approximately 19.7% of the overall MSW stream.

4. CONCLUSION

Results of the waste composition study at Springhill Landfill can now be incorporated into the *WasteCalc* program that’s used in the statewide annual solid waste and recycling reports. *WasteCalc* is an online tool created by FDEP and outside contractors that allow any county in Florida to input information about the amount of waste landfilled, recycled, and combusted[5]. Currently, many counties in Florida have not had recent or any waste composition studies conducted. When this occurs, *WasteCalc* generates material composition percentages based on counties that are similar in population density. However, it is important to conduct waste composition studies throughout Florida so *WasteCalc* can provide the counties with more accurate and representative information. The data obtained in this study will provide more accurate results for counties like Calhoun, Franklin, Holmes, Jackson, and Washington.

5. REFERENCES

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(2) B.E.B.R. - Bureau of Economic and Business Research. *Florida Estimates of Population 2024*. https://bebr.ufl.edu/florida-estimates-of-population-2024/ (accessed 2025-12-16).

(3) ASTM International. *ASTM D5231-92: Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste*. https://store.astm.org/d5231-92r16.html.

(4) US EPA, O. *Advancing Sustainable Materials Management: Facts and Figures Report*. https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/advancing-sustainable-materials-management (accessed 2025-12-16).

(5) Florida Department of Environmental Protection. *Waste Calc Introduction*. https://prodapps.dep.state.fl.us/wastecalc/ (accessed 2025-12-16).

APPENDIX

Material Categories

	Category	Detailed Description
1	Newspaper	High cellulose content, high photo degradation paper
2	Corrugated Cardboard (OCC)	Corrugated cardboard packaging (e.g., Amazon boxes)
3	High Grade Paper (Office Type)	Manila envelopes, note cards, printer paper, tablets with binding, mail envelopes without a plastic window
4	Polycoated Aseptic Containers	Bleached and unbleached paperboard coated with HDPE used as food/beverage containers (e.g., ice cream cartons, milk cartons, juice boxes) as well as Takeout containers and cups with a waxy coating; does NOT include pizza boxes.
5	Boxboards	Cereal boxes, egg cartons (not coated with wax, plastic or metal).
6	Other Paper	Paper towels, paper plates, waxed paper, tissues, and other papers that are soiled with food during use (e.g., pizza boxes); brown paper bags and kraft paper; junk mail, carbonless paper, envelopes with and without windows, toilet paper cores and other mixed recyclable papers; magazines, phone books, glossy paper; any other containers composed mostly of paper with other materials attached (e.g., pringles cans, gum wrappers, tissue boxes, mail envelopes with a plastic window); anything that does not fall into the above categories.
7	#1 PET Bottles	Clear and colored bottles with necks
8	#2 HDPE Bottles	Milk, beverages, water bottles, liquid detergent bottles, some hair care bottles and cleaning products bottles with necks and other products with necks
9	#3-#7 (Other Plastic Bottles)	#3-#7 plastic bottles with necks
10	Expanded Polystyrene	Polystyrene drink cups, food containers, and styrofoam products such as packaging peanuts and blocks
11	Rigid Plastic (Food Service Plastics)	Plates, bowls, takeout clamshells, salad trays, microwave trays, utensils, takeout cups and lids, straws and stirrers, wide mouth cups and tubs (without a neck) and lids (e.g., solo cups; yogurt or sour cream containers; fruit clamshells)
12	Other Flexible Plastic	Bags intended to contain produce, bread, newspapers and sandwiches (e.g., Ziploc bags); shopping bags used to transport merchandise from the place of purchase, given out by the store; films that contain multiple layers of film or other materials that have been fused together (e.g. potato chip bags, food wrappers such as candy-bar wrappers, metalized film); photographic negatives, shower curtains, mailing pouches, bank bags, x-ray film
13	Other Plastics	Plastic such as toys, toothbrushes, vinyl hose, and lawn furniture; items are predominately plastic with other materials attached such as disposable razors, pens, lighters, toys, and binders; anything that does not fall into the above categories. Includes flexible packaging contaminated such that it cannot be sorted
14	Green Glass	Green glass bottles, containers, and green cullet (broken glass pieces)
15	Clear Glass	Clear glass bottles, containers, and clear cullet (glass pieces); mirrors, glassware, crystal, Pyrex and corning ware, laminated curved glass such as windshields, flat auto, clear or tinted window, door, shelf, tabletops
16	Brown Glass	Brown glass bottles, containers, and brown cullet (broken glass pieces)
17	Other Glass/Ceramics	Glass not otherwise classified, ceramics, structural ceramics like pottery and porcelain, and engineered ceramics such as refractory and abrasive materials.
18	Aluminum Cans/Foil	Cans and bi metal cans (nonmagnetic); food containers, trays, pie tins, and foil pieces

19	Steel/Tin Cans	Tin and steel food, pet food, and other containers, including bi-metal cans mostly of steel; does NOT include aluminum
20	Other Ferrous Metals	Ferrous and alloyed ferrous scrap metals that a magnet will adhere to
21	Other Non-Ferrous	Non-ferrous metal scrap such a brass, copper, or other non-magnetic metal; includes aluminum products such as window frames and cookware
22	Yard Waste	Grass clippings, twigs, branches, leaves, etc.
23	Food Waste	Food preparation wastes, food scraps, spoiled food
24	Other Organics	Combustible materials including wax, bar soap, cigarette butts, feminine hygiene products, disposable diapers, vacuum cleaner bag contents, leather, briquettes, and fireplace, burn barrel, and fire-pit ash, and other organic material not classified elsewhere. As well as animal carcasses not resulting from food storage or preparation, animal wastes, and kitty litter
25	C&D Debris	Includes asphalt roofing shingles, gypsum wallboard, rocks, concrete, and bricks; clean wood (e.g., 2 x 4's and 2 x 6's and sheets of plywood, strand board, and particleboard)
26	Rubber and Leather	Rubber gloves; finished products and scrap materials made of natural and synthetic rubber, such as bathmats, inner tubes, rubber hoses, and foam rubber and leather items
27	Clothing, Footwear, Other Textiles	Shoes, tennis shoes, fabric materials and clothing including natural and synthetic textiles such as cotton, wool, silk, woven nylon, rayon, and polyester; includes non-rag stock grade textiles such as heavy linens and draperies (e.g., pillows, blankets, towels, sheets)
28	Small appliances/ Electronics	Toasters, stereos, other small appliances and electronic equipment (non-refrigerant); computer related electronics (e.g., Laptops, monitors, printers, mouse, stereos) and personal portable products (e.g., cell phones, chargers, camcorders, gaming devices, cameras)
29	Hazardous Waste	Automotive products and fluids (e.g., oil filter, motor oil/diesel oil, and containers contaminated with oil), paints and solvents, pesticides, herbicides and fungicides, household cleaners, lead acid batteries and other types of batteries (excluding lithium-ion), mercury containing products (e.g., fluorescent bulbs, barometers, thermostat switches, thermometers, car switches, blood pressure cuffs), cathode ray tubes (large monitors)pharmaceuticals, hypodermic needles, needle covers, medical tubing, articles contaminated with red (blood) colored substances, and medical device packaging
30	Lithium-Ion Battery Products	Products which contain lithium-ion batteries, such as cell phones, tablets, laptops, electric scooters and hoverboards, e-cigarettes, handheld power tools, rechargeable power banks, and rechargeable headphones
31	Residuals	Unsorted materials which pass through the 2” x 2” mesh table
32	Liquids	Bottled liquids
33	Other Miscellaneous	Other objects that do not fit into a previous described category

Example Sampling Sheet

Sample #	
Date and Time Pulled:	
Date Sorted:	
Hauler:	
Hauler Truck #:	
Truck Weight (inbound):	
Truck Weight (outbound):	
Total Sample Weight (lbs):	
Description of Sample:	
Waste Stream (commercial or residential):	
Origin of Waste (incorporated or unincorporated):	

Notes
Any bulky items or white goods? Approximate area of collection: Notes/observations from driver about load:

Example Data Collection Sheet

Category	Material		Weight (lbs)	Category	Material		Weight (lbs)
Newspaper	1	Newspaper		Plastic Containers	18	#1 PET Bottles	
Corrugated Cardboard	2	Corrugated Cardboard (OCC)			19	#2 HDPE Bottles	
Office Paper	3	High Grade Paper (Office Type)		Other Plastics	20	#3-7 (Other Plastic Bottles)	
Other Papers	4	Polycoated Aseptic Containers			21	Expanded Polystyrene	
	5	Boxboards			22	Rigid Plastic (Food Service Plastics)	
	6	Other Paper			23	Other Flexible Plastics	
Glass Packaging	7	Green			24	Other Plastics	
	8	Clear		C&D	25	C&D Debris	
	9	Brown		Other Miscellaneous	26	Rubber and Leather	
	10	Other Glass/Ceramics			27	Small Appliances/Electronic	
Steel Cans	11	Steel/Tin Cans			28	Hazardous Waste	
Other Ferrous Metals	12	Other Ferrous Metals			29	Lithium-Ion Battery Products	
Aluminum Cans	13	Aluminum Cans/Foil			30	Residuals	
Non-Ferrous Metals	14	Other Non-Ferrous			31	Liquids	
Textiles	15	Clothing, Footwear, Other Textiles			32	Other Organics	
Yard Trash	16	Yard Waste			33	Other Miscellaneous	
Food Waste	17	Food Waste					