Alameda County
2023-24 Waste Characterization Study

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StopWaste is a public agency governed by the Alameda County Waste Management Authority, the Alameda County Source Reduction and Recycling Board, and the Energy Council.

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ACKNOWLEDGMENTS

The SCS Engineers and our trusted partner Cascadia Consulting Group would like to thank StopWaste for their support and guidance throughout the execution of the 2023-24 Waste Characterization Study. Additionally, SCS Engineers could not have completed this study without the support of the staff at the ten facilities that participated in this study. Staff at these facilities provided detailed information on their waste acceptance data and made available equipment and staff resources to aid in obtaining and sorting samples. This included staff at the following sites:

- Aladdin Transfer Station, operated by Alameda County Industries
- Berkeley Transfer Station, operated by City of Berkeley
- California Waste Solutions Oakland Transfer Processing, operated by CWS
- Community Conservation Center, operated by CCC
- Davis Street Transfer Station, operated by Waste Management
- Fremont Recycling and Transfer Station, operated by BLT Enterprises
- Livermore Sanitation Recyclable Material Transload Facility, operated by Livermore Sanitation
- Pleasanton Transfer Station, operated by Pleasanton Garbage Service
- Tri-CED Community Recycling, operated by Tri-City Economic Development Corp
- Vasco Road Landfill, operated by Republic Services

1.0 EXECUTIVE SUMMARY

StopWaste conducts periodic waste characterization studies to understand better the types and quantities of materials disposed of in Alameda County. Using sampling techniques, this study was conducted in 2023 and 2024 and measured the composition of the waste stream by generating sector and material type. This study provides a valuable snapshot in time of the materials that comprise our waste stream and can contribute to priority setting and evaluation of progress towards goals. The study was designed to be comparable with previous countywide waste characterization studies conducted in 2017-18, 2008, 2000, 1995, and 1990 to facilitate tracking of waste disposal trends.

1.1 STUDY DESIGN

SCS communicated directly with franchised haulers and facilities to estimate the annual waste quantity disposed within Alameda County by sector. The annual Measure D reports for FY20-21 were used to verify and/or supplement information provided by haulers and facilities. Similar to the waste characterization studies conducted in 2000, 2008 and 2017-18, this study classified waste generated and disposed of in Alameda County as originating from the following sectors: 1) Single-Family Residential, 2) Multi-Family Residential, 3) Commercial, 4) Roll-Off Containers, and 5) Self-Haul. Unlike the previous studies, this study included sampling and sorting of source-separated recyclables (SSR) and source-separated organics (SSO) generated in residential and commercial sectors. Material Recovery Facility (MRF) Residuals were included in the 2017-18 study but excluded in 2023-24 study.

As shown in **Table 1,** the annual quantity of landfilled waste increased during the 2023-24 study compared to the 2017-18 study, despite a decreasing trend since 1990. However, the total tonnage of material disposed in 2023-24 across all three streams is still less than just the landfill stream in 1990. Landfilled waste generated by the Single-Family Residential and Commercial sectors showed a moderate increase. Roll-Off waste decreased slightly. Multi-Family waste decreased significantly for the 2023-24 study, although this could be due to changing collection practices at Multi-Family properties. Self-Haul waste increased substantially since the 2017-18 study.

Table 1. Reported In-County Waste Disposal Quantities

Waste Sector		1990	1995	2000	2008	2017-18	2023-24
Landfill Disposal (MSW)	Residential Single-Family	499,150	333,030	332,700	275,080	231,000	239,064
	Residential Multi-Family	A	112,090	122,870	132,080	103,000	63,132
	Commercial	666,300	264,530	354,400	237,320	195,000	220,221
	Roll-Off	264,500	339,250	406,470	273,420	167,000	157,434
	Self-Haul	428,550	465,560	336,240	269,210	296,000	450,232
	Subtotal MSW	**1,858,500**	**1,514,460**	**1,552,680**	**1,187,110**	**992,000**	**1,130,082**
SSR	Residential	B	B	B	B	B	139,065
	Commercial	B	B	B	B	B	54,523
	Subtotal SSR						**193,588**
SSO	Residential	B	B	B	B	B	202,838
	Commercial	B	B	B	B	B	48,898
	Subtotal SSO						**251,736**
Total Countywide		**1,858,500**	**1,514,460**	**1,552,680**	**1,187,110**	**992,000**	**1,631,207**

Note: A) Multi-family residential waste quantities included in commercial quantities for 1990.
B) SSR and SSO not quantified for prior years.

Manually sorted samples of municipal solid waste (MSW), SSR, and SSO and visually characterized Roll-Off and Self-Haul waste loads were sorted into distinct material classifications and types described in **Appendix A**.

1.2 METHODS

Fieldwork was completed at nine host facilities (five transfer stations, three recycling processing facilities, and one landfill) for 77 days over one year (between June 2023 and June 2024). SSR generated from Livermore was aggregated into separate residential and commercial transfer trailers at the Livermore Transload Facility (where, under their permit, waste materials cannot touch the ground) and sorted at the Aladdin Transfer Station. Manual sorting was used to characterize MSW, SSR, and SSO. Visual characterization of entire waste loads was used to characterize Roll-Off containers and Self-Haul waste.

679 samples of MSW, SSR, and SSO were manually sorted into 72 material types. **Table 2** summarizes the number of samples collected by sector from each jurisdiction.

Table 2. Number of Manually Sorted Samples By Waste Sector and Originating Jurisdiction

Jurisdiction	**MSW**			**SSR**			**SSO**	
	RES-SF	**RES-MF**	**COM**	**RES-SF**	**RES-MF**	**RES-MF**	**RES**	**COM**
Alameda	5	7	8	6		3	9	1
Albany	2		3	1		1	1	
Berkeley	7		23	10		9	7	3
Castro Valley SD	5	2	4	6		1	6	
Dublin				3		2	2	1
Emeryville		3	5	1		1		1
Fremont	21		44	10		9	19	1
Hayward	14	14	12			6	7	2
Livermore	10		15	8		3		
Newark	4		10					
Oakland	34	28	46	40	3	4	13	5
Oro Loma SD	14	12	9	6		2	8	1
Piedmont	*	*	*	*	*	*	*	*
Pleasanton	9		21				3	1
San Leandro	4	1	15	5		2	6	1
Union City	7		11	10				
Total	136	67	226	106	3	43	81	17
	429			132			98	
	679							

Note: MSW, SSR, and SSO generated in Piedmont is sent to out-of-county facilities; hence, their waste was not included in the sampling plan.

549 waste loads delivered in Roll-Off containers or Self-Haul loads were visually characterized into 72 material types. **Table 3** summarizes the number of Roll-Off and Self-Haul waste loads that were visually characterized from each jurisdiction.

Table 3. Number of Visually Characterized Waste Loads by Originating Jurisdiction

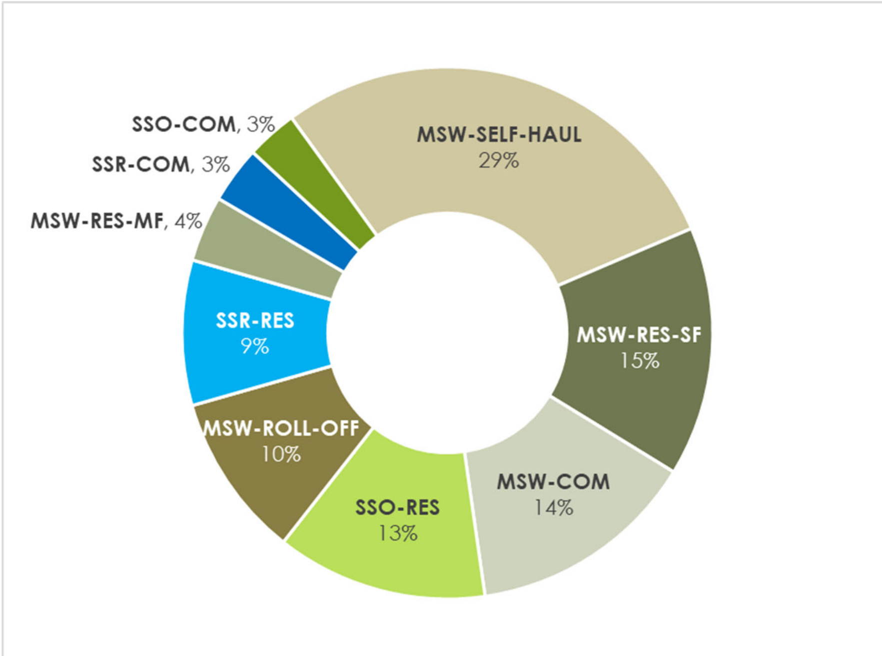
Jurisdiction	**ROLL-OFF**	**SELF-HAUL**
Alameda	6	17
Albany		
Berkeley	3	
Castro Valley SD	3	10
Dublin		
Emeryville	3	2
Fremont		1
Hayward	51	99
Livermore	29	1
Newark		
Oakland	28	183
Oro Loma SD	6	
Piedmont		3
Pleasanton		
San Leandro	13	85
Union City		
Total	142	401
	543	

1.3 RESULTS

Data gathered from field sampling of MSW, SSR, and SSO were summarized to develop waste composition estimates for the Residential and Commercial sectors and the overall countywide waste stream. Waste compositions were compared to the 2017-18 waste characterization study conducted for Alameda County as well as the 2021 CalRecycle Statewide Waste Characterization Study.

Figure 1 presents the distribution of the three waste streams by sector characterized for this study.

Figure 1. Distribution of Waste Streams and Sectors in 2023-24



Section 5 of this report provides a detailed waste composition and analysis for each of the nine sectors studied. The analysis for each sector also includes a listing of the top ten materials found in the highest proportions by weight. A comparison of the top ten materials by sector within each stream (MSW, SSR, and SSO) found several materials in common as described below:

- Residential and Commercial MSW – Of the top ten materials by weight found in the MSW stream, the Single-Family Residential, Multi-Family Residential, and Commercial sectors have the following seven materials in common:

    1. Mixed Residue
    2. Inedible Food
    3. Edible Food - Cooked/Baked/Prepared/Bakery/Dairy/Other
    4. Compostable Paper – Other
    5. Plastic Film – Other Film
    6. Diapers and Sanitary Products
    7. Treated Wood Waste

- Roll-Off and Self-Haul MSW – Of the top ten materials by weight found in the MSW stream, the Roll-Off and Self-Haul sectors have the following six materials in common:

    1. Mixed Residue
    2. Treated Wood Waste
    3. Uncoated Corrugated Cardboard
    4. Gypsum Boards
    5. Leaves and Grass
    6. Wood – Untreated Lumber

- **Residential and Commercial SSR** – Of the top ten materials by weight found in the SSR stream, the Residential and Commercial sectors have the following eight materials in common:

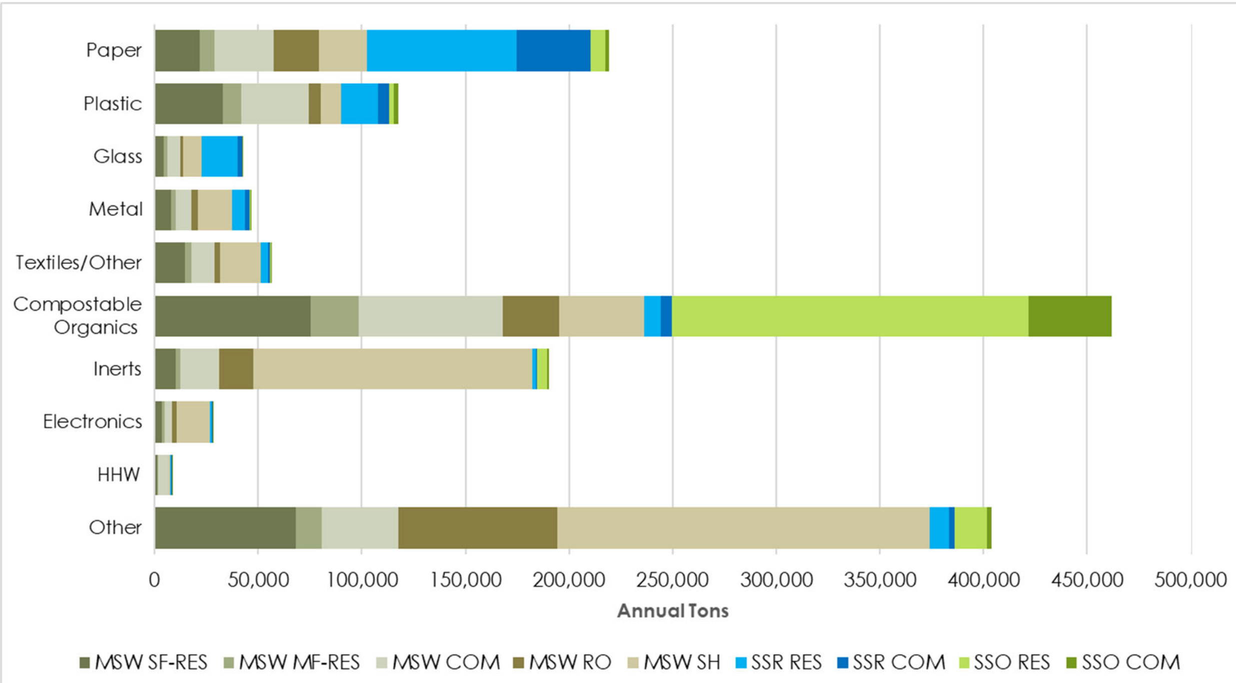
    1. Uncoated Corrugated Cardboard
    2. Recyclable Paper (no food/liquid contamination)
    3. Glass Bottles & Containers - Wine/Spirit
    4. Folding Cartons & Other Paperboard Packaging
    5. Mixed Residue/Other
    6. HDPE Containers
    7. Plastic Film - Other Film (includes Ziplock bags)
    8. Other Paper Bags/Kraft Paper

- **Residential and Commercial SSO** – Of the top ten materials by weight found in the SSO stream, the Residential and Commercial sectors have the following nine materials in common:

    1. Leaves and Grass
    2. Chips, Prunings, Trimmings, Branches, Stumps
    3. Inedible Food
    4. Edible Food - Produce
    5. Edible Food - Cooked/Baked/Prepared/Bakery/Dairy/Other
    6. Mixed Residue/Other
    7. Compostable Paper - Other
    8. Treated Wood Waste
    9. Wood - Untreated Lumber

Figure 2 presents the disposition by material group (in annual tons) of waste materials generated in Alameda County by waste stream and sector.

Figure 2. Disposition of Material Groups by Stream and Sector (Annual Tons)



The following sections present the composition of materials by material group for each of the waste streams (MSW, SSO, and SSR) and by sector.

1.3.1 Single-Family Residential MSW

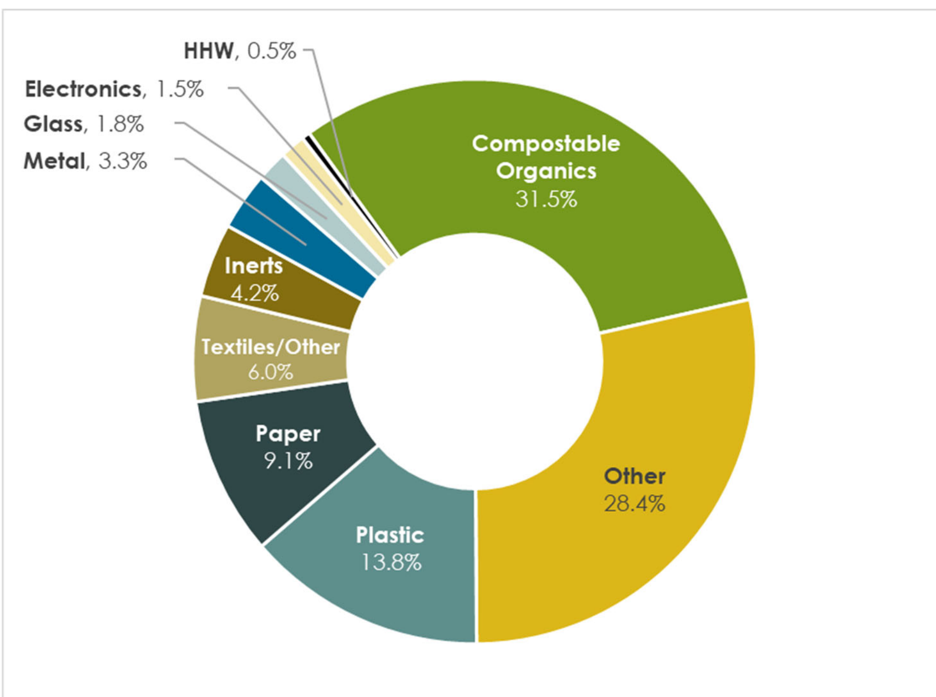
The composition of Single-Family Residential MSW by material group is presented in Table 4. The composition is based on manual sorting of 136 samples collected from multiple facilities representing multiple jurisdictions. Compostable Organics comprises the greatest portion of Single-Family waste destined for landfill disposal followed by Other and Plastic.

Table 4. 2023-24 Single-Family Residential Waste Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Compostable Organics	75,200	31.5%	12.7%	29.7%	33.3%
Other	68,000	28.4%	10.9%	26.9%	30.0%
Plastic	32,900	13.8%	4.1%	13.2%	14.3%
Paper	21,700	9.1%	4.6%	8.4%	9.7%
Textiles/Other	14,400	6.0%	5.4%	5.3%	6.8%
Inerts	10,100	4.2%	7.3%	3.2%	5.3%
Metal	8,000	3.3%	3.9%	2.8%	3.9%
Glass	4,200	1.8%	1.3%	1.6%	2.0%
Electronics	3,500	1.5%	3.0%	1.0%	1.9%
HHW	1,100	0.5%	0.8%	0.4%	0.6%
Total	239,100				

Note: Waste composition based on 136 samples.

Figure 3. 2023-24 Single-Family Residential Waste Composition by Material Group



1.3.2 Multi-Family Residential MSW

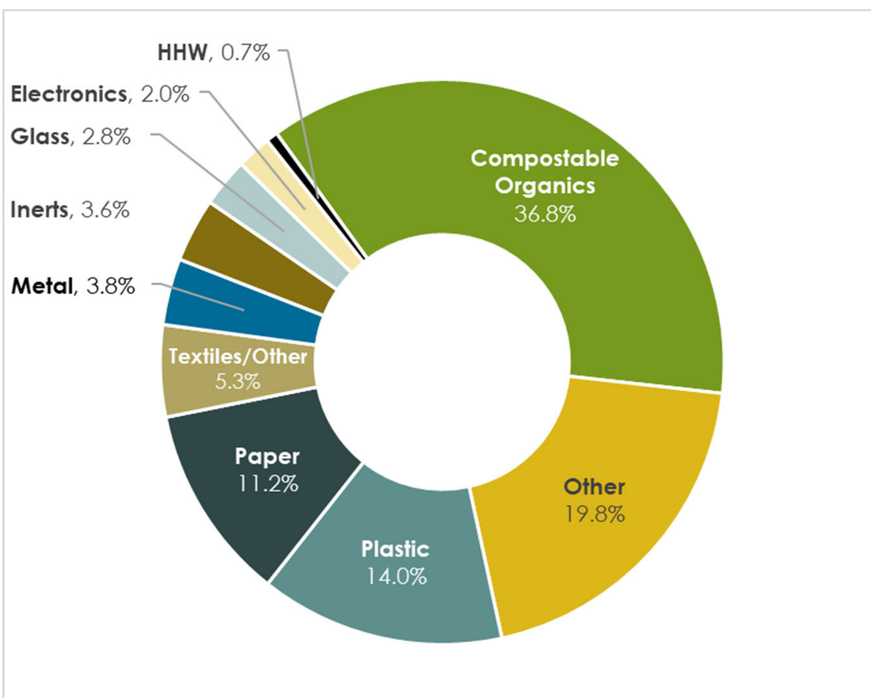
The composition of Multi-Family Residential MSW by material group is presented in Table 5. The composition is based on manual sorting of 67 samples collected from multiple facilities representing multiple jurisdictions. Compostable Organics comprises the greatest portion of Multi-Family waste destined for landfill disposal followed by Other and Plastic.

Table 5. 2023-24 Multi-Family Residential Waste Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Compostable Organics	23,200	36.8%	12.4%	34.3%	39.3%
Other	12,500	19.8%	10.2%	17.8%	21.9%
Plastic	8,900	14.0%	4.8%	13.1%	15.0%
Paper	7,100	11.2%	4.4%	10.4%	12.1%
Textiles/Other	3,300	5.3%	4.9%	4.3%	6.2%
Metal	2,400	3.8%	3.8%	3.0%	4.6%
Inerts	2,300	3.6%	5.1%	2.6%	4.7%
Glass	1,800	2.8%	1.9%	2.4%	3.2%
Electronics	1,200	2.0%	4.3%	1.1%	2.9%
HHW	400	0.7%	1.0%	0.5%	0.9%
Total	63,100				

Note: Waste composition based on 67 samples.

Figure 4. 2023-24 Multi-Family Residential Waste Composition by Material Group



1.3.3 Commercial MSW

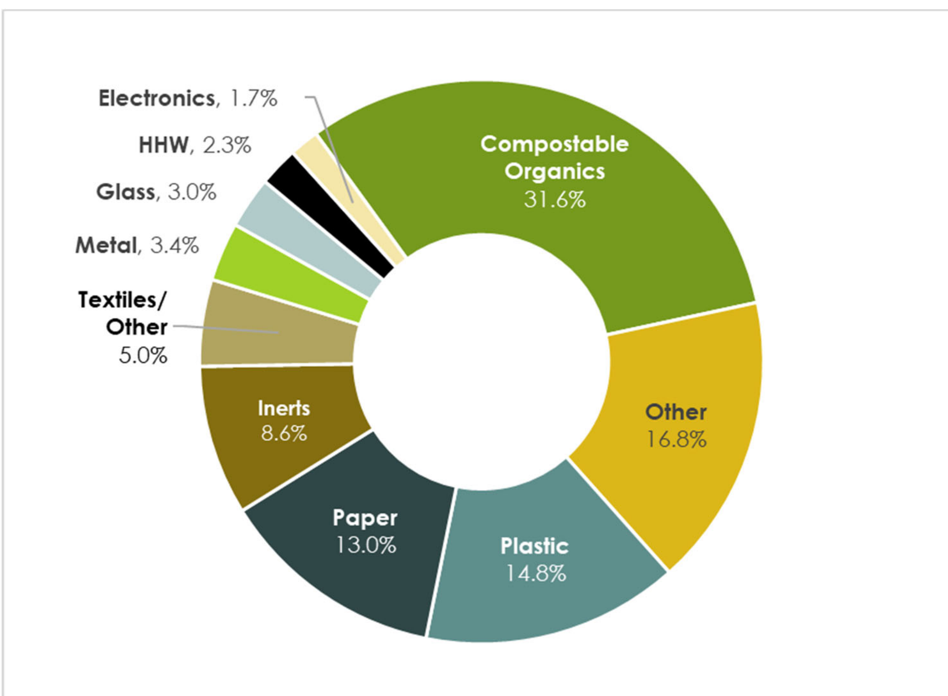
The composition of Commercial MSW by material group is presented in Table 6. The composition is based on manual sorting of 226 samples collected from multiple facilities representing multiple jurisdictions. Compostable Organics comprises the greatest portion of Commercial waste destined for landfill disposal followed by Other and Plastic.

Table 6. 2023-24 Commercial Waste Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Compostable Organics	69,600	31.6%	18.2%	29.6%	33.6%
Other	37,000	16.8%	12.2%	15.5%	18.1%
Plastic	32,500	14.8%	8.0%	13.9%	15.6%
Paper	28,600	13.0%	7.0%	12.2%	13.8%
Inerts	18,900	8.6%	15.9%	6.9%	10.3%
Textiles/Other	11,000	5.0%	5.9%	4.3%	5.6%
Metal	7,400	3.4%	4.8%	2.8%	3.9%
Glass	6,500	3.0%	7.1%	2.2%	3.7%
HHW	5,000	2.3%	7.9%	1.4%	3.1%
Electronics	3,700	1.7%	4.5%	1.2%	2.2%
Total	220,200				

Note: Waste composition based on 226 samples.

Figure 5. 2023-24 Commercial Waste Composition by Material Group



1.3.4 Roll-Off Container MSW

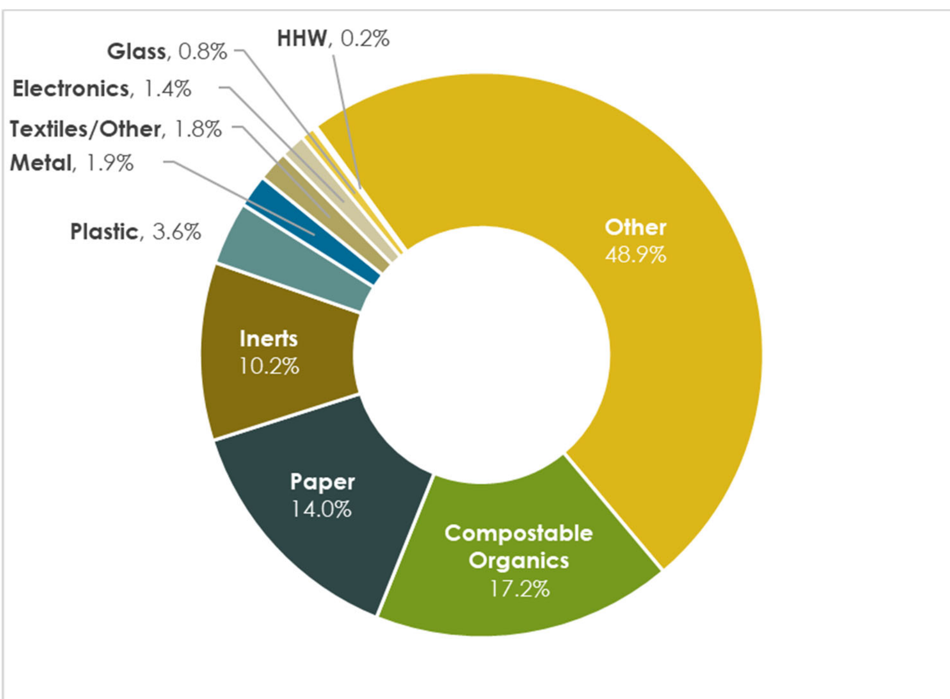
The composition of Roll-Off MSW by material group is presented in Table 7. The composition is based on visually characterizing 142 waste loads delivered in Roll-Off containers from multiple facilities representing multiple jurisdictions. Other comprises the greatest portion of Roll-Off waste destined for landfill disposal followed by Compostable Organics and Paper.

Table 7. 2023-24 Roll-Off Container Waste Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Other	76,900	48.9%	29.7%	44.8%	53.0%
Compostable Organics	27,100	17.2%	24.9%	13.8%	20.7%
Paper	22,100	14.0%	18.1%	11.5%	16.5%
Inerts	16,100	10.2%	21.4%	7.3%	13.2%
Plastic	5,700	3.6%	13.5%	1.8%	5.5%
Metal	3,000	1.9%	4.6%	1.2%	2.5%
Textiles/Other	2,800	1.8%	5.4%	1.0%	2.5%
Electronics	2,200	1.4%	5.5%	0.7%	2.2%
Glass	1,300	0.8%	4.2%	0.2%	1.4%
HHW	300	0.2%	2.8%	<0.1%	0.6%
Total	157,400				

Note: Waste composition based on 142 samples.

Figure 6. 2023-24 Roll-Off Waste Composition by Material Group



1.3.5 Self-Haul MSW

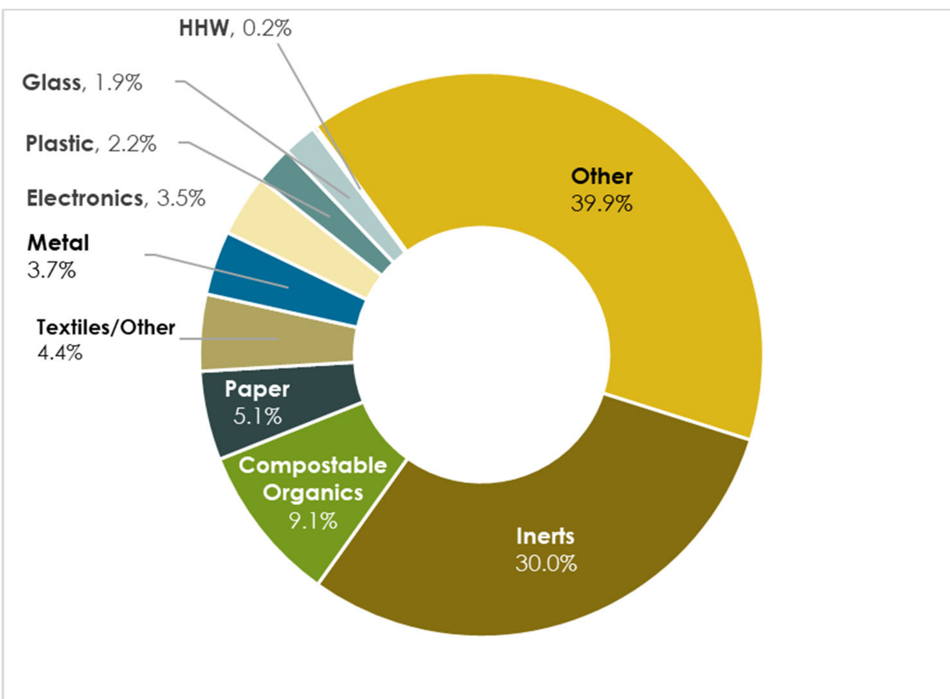
The composition of Self-Haul MSW by material group is presented in Table 8. The composition is based on visually characterizing 401 Self-Haul waste loads from multiple facilities representing multiple jurisdictions. Other comprises the greatest portion of Self-Haul waste destined for landfill disposal followed by Compostable Organics and Paper.

Table 8. 2023-24 Self-Haul Waste Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Other	179,600	39.9%	30.4%	37.4%	42.4%
Inerts	135,000	30.0%	31.9%	27.4%	32.6%
Compostable Organics	40,900	9.1%	22.0%	7.3%	10.9%
Paper	23,000	5.1%	13.4%	4.0%	6.2%
Textiles/Other	19,800	4.4%	16.0%	3.1%	5.7%
Metal	16,500	3.7%	9.4%	2.9%	4.4%
Electronics	15,900	3.5%	9.6%	2.7%	4.3%
Plastic	9,900	2.2%	13.0%	1.1%	3.3%
Glass	8,700	1.9%	10.4%	1.1%	2.8%
HHW	900	0.2%	3.1%	<0.1%	0.4%
Total	450,200				

Note: Waste composition based on 401 samples.

Figure 7. 2023-24 Self-Haul Waste Composition by Material Group



1.3.6 Residential Source Separated Recyclables (SSR)

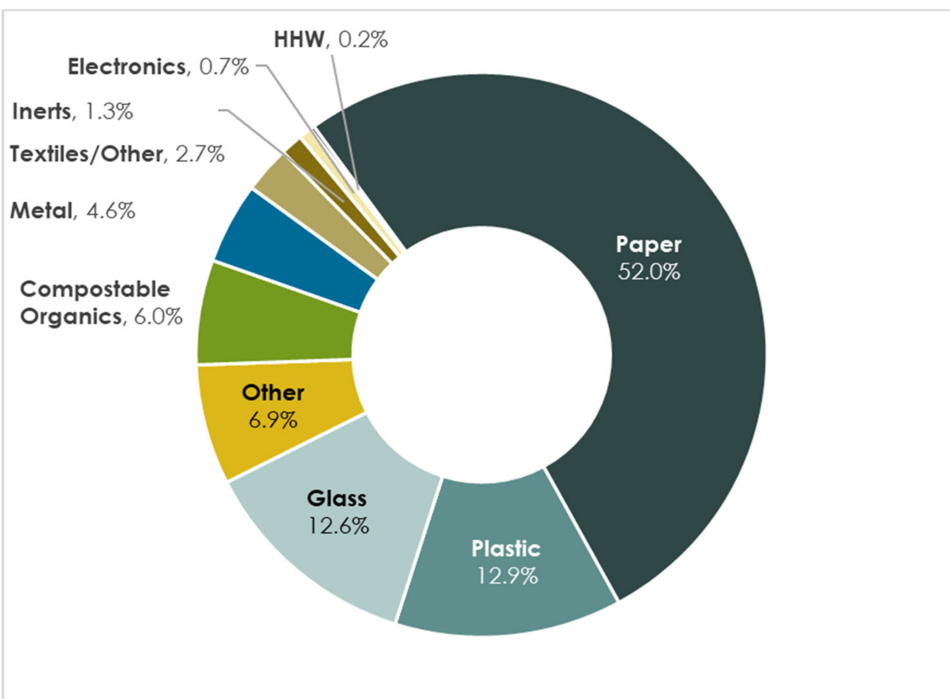
The composition of Residential SSR by material group is presented in Table 9. The composition is based on manually characterizing 109 Residential SSR samples from multiple facilities representing multiple jurisdictions. Paper comprises the greatest portion of Residential SSR followed by Plastic and Glass.

Table 9. 2023-24 Residential SSR Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Paper	72,300	52.0%	12.3%	50.1%	54.0%
Plastic	17,900	12.9%	4.1%	12.2%	13.5%
Glass	17,600	12.6%	8.8%	11.3%	14.0%
Other	9,600	6.9%	4.9%	6.1%	7.7%
Compostable Organics	8,300	6.0%	1.9%	5.7%	6.3%
Metal	6,500	4.6%	3.0%	4.2%	5.1%
Textiles/Other	3,700	2.7%	3.7%	2.1%	3.3%
Inerts	1,800	1.3%	2.9%	0.8%	1.7%
Electronics	1,000	0.7%	1.8%	0.5%	1.0%
HHW	300	0.2%	0.6%	0.1%	0.3%
Total	139,100				

Note: Waste composition based on 109 samples.

Figure 8. 2023-24 Residential SSR Composition by Material Group



1.3.7 Commercial Source Separated Recyclables (SSR)

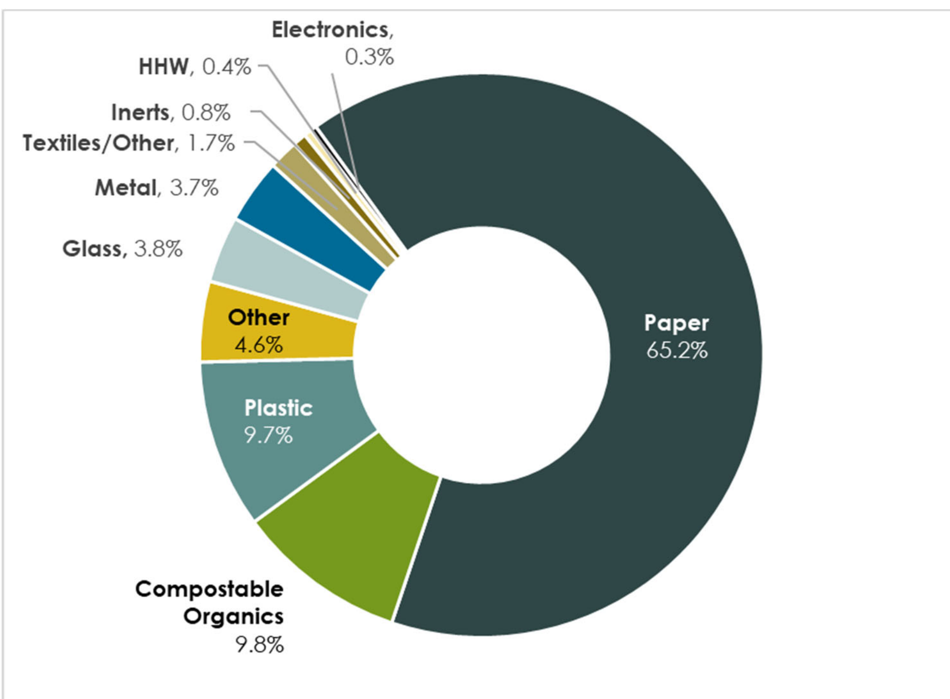
The composition of Commercial SSR by material group is presented in **Table 10.** The composition is based on manually characterizing 43 commercial SSR samples from multiple facilities representing multiple jurisdictions. Paper comprises the greatest portion of commercial SSR followed by Compostable Organics and Plastic.

Table 10. 2023-24 Commercial SSR Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Paper	35,500	65.2%	18.8%	60.5%	69.9%
Compostable Organics	5,300	9.8%	2.0%	9.3%	10.3%
Plastic	5,300	9.7%	5.2%	8.4%	11.0%
Other	2,500	4.6%	5.2%	3.3%	5.9%
Glass	2,100	3.8%	7.7%	1.9%	5.8%
Metal	2,000	3.7%	4.9%	2.5%	4.9%
Textiles/Other	900	1.7%	3.0%	1.0%	2.5%
Inerts	400	0.8%	2.6%	0.1%	1.4%
HHW	200	0.4%	1.9%	<0.1%	0.9%
Electronics	200	0.3%	1.4%	<0.1%	0.7%
Total	54,500				

Note: Waste composition based on 43 samples.

Figure 9. 2023-24 Commercial SSR Composition by Material Group



1.3.8 Residential Source Separated Organics (SSO)

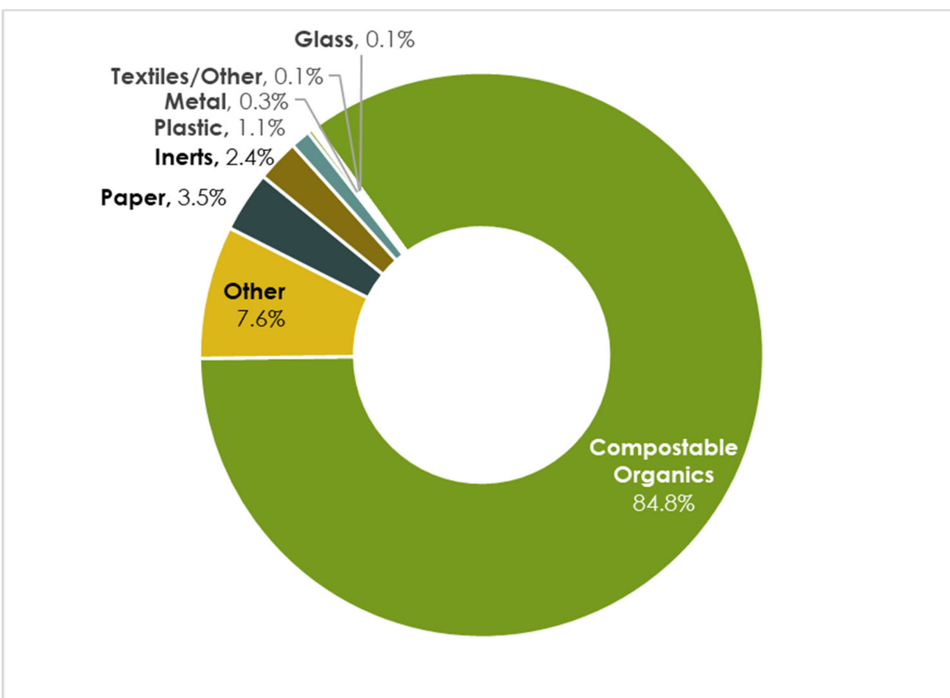
The composition of Residential SSO by material group is presented in Table 11. The composition is based on manually characterizing 81 residential SSO samples from multiple facilities representing multiple jurisdictions. Compostable Organics comprises the greatest portion of Residential SSO followed by Other and Paper.

Table 11. 2023-24 Residential SSO Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Compostable Organics	172,000	84.8%	<0.1%	84.8%	84.8%
Other	15,500	7.6%	<0.1%	7.6%	7.6%
Paper	7,000	3.5%	9.1%	1.8%	5.1%
Inerts	4,900	2.4%	<0.1%	2.4%	2.4%
Plastic	2,300	1.1%	1.2%	0.9%	1.4%
Metal	500	0.3%	1.4%	<0.1%	0.5%
Textiles/Other	300	0.1%	0.3%	<0.1%	0.2%
Glass	200	0.1%	0.4%	<0.1%	0.2%
Electronics	<100	<0.1%	11.8%	<0.1%	2.2%
HHW	<100	<0.1%	<0.1%	<0.1%	<0.1%
Total	202,800				

Note: Waste composition based on 81 samples.

Figure 10. 2023-24 Residential SSO Composition by Material Group



1.3.9 Commercial Source Separated Organics (SSO)

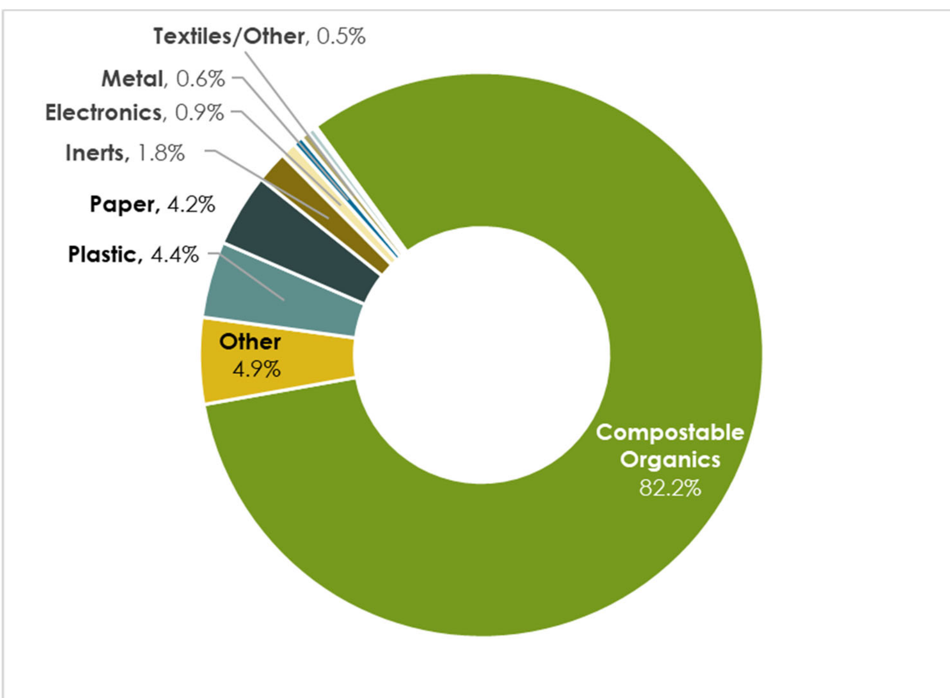
The composition of Commercial SSO by material group is presented in **Table 12**. The composition is based on manually characterizing 17 residential SSO samples from multiple facilities representing multiple jurisdictions. Compostable Organics comprises the greatest portion of commercial SSO followed by Other and Paper.

Table 12. 2023-24 Commercial SSO Composition by Material Group

Major Material Category	Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
				Lower	Upper
Compostable Organics	40,200	82.2%	<0.1%	82.2%	82.2%
Other	2,400	4.9%	<0.1%	4.9%	4.9%
Plastic	2,100	4.4%	5.4%	2.2%	6.5%
Paper	2,000	4.2%	3.8%	2.7%	5.7%
Inerts	900	1.8%	0.5%	1.6%	2.0%
Electronics	400	0.9%	7.2%	<0.1%	3.8%
Metal	300	0.6%	0.9%	0.2%	1.0%
Textiles/Other	200	0.5%	1.2%	<0.1%	0.9%
Glass	200	0.4%	0.6%	0.2%	0.6%
HHW	<100	0.2%	<0.1%	0.2%	0.2%
Total	48,900				

Note: Waste composition based on 17 samples.

Figure 11. 2023-24 Commercial SSO Composition by Material Group



1.3.10 Countywide

Figure 12 presents a comparison of the composition of the material groups from the nine sectors assessed for this study. Residential and Commercial MSW has high proportions of Compostable Organics, Other, and Plastic. Self-Haul MSW has high proportions of Other and Inerts. Roll-Off MSW has high proportions of Other and Compostable Organics. SSR has high proportions of Paper and Plastic and Compostable Organics. SSO is dominated by Compostable Organics.

Figure 12. 2023-24 Countywide Compositions by Material Group and Generating Sector

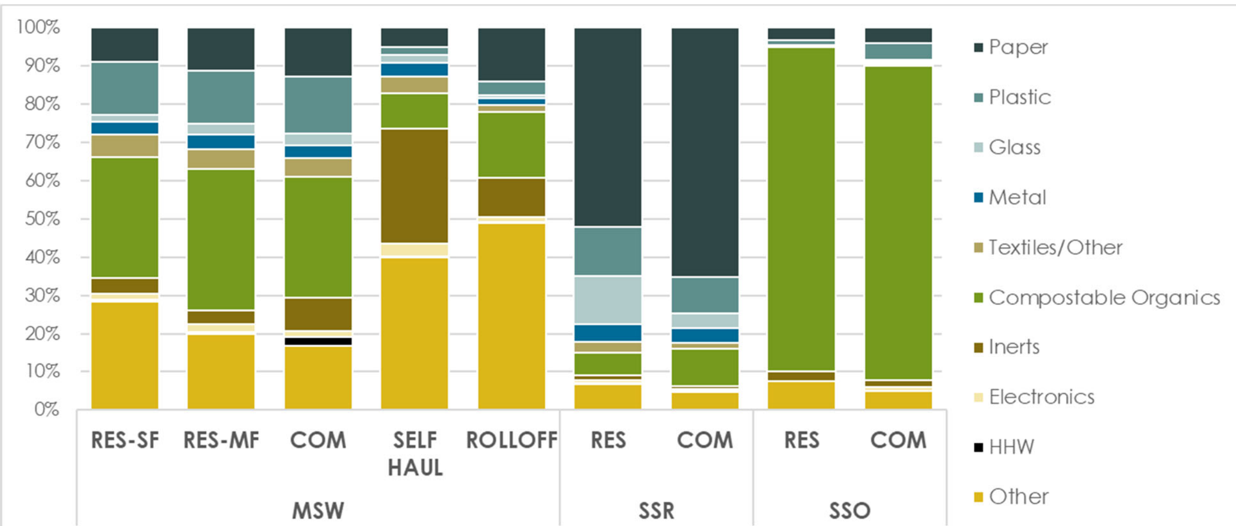
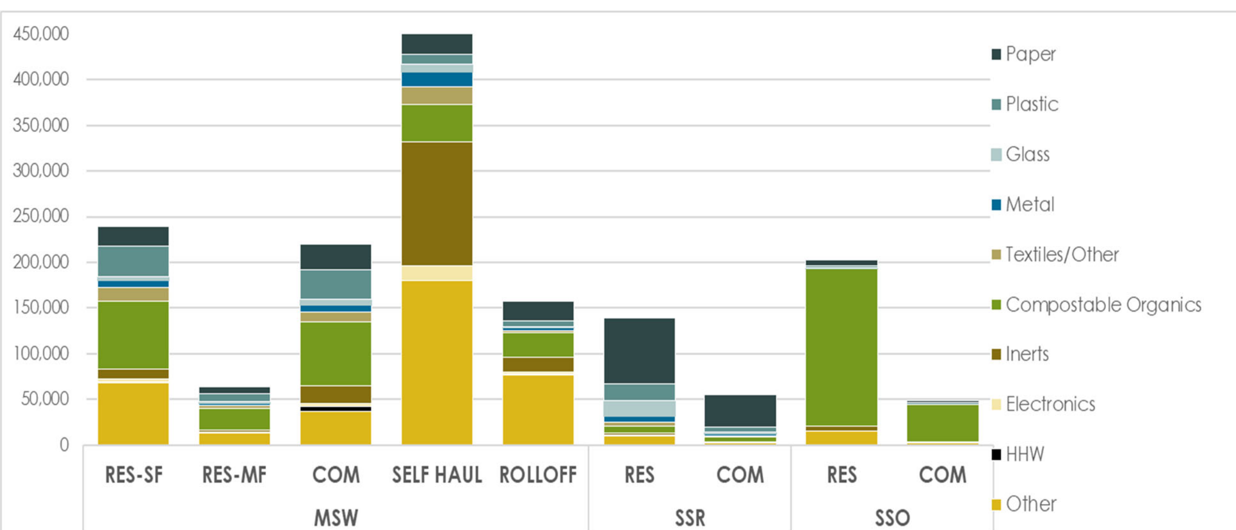


Figure 13 presents the annual tonnage generated by the nine sectors.

Figure 13. Annual Countywide Tonnage by Material Group and Generating Sector



2.0 INTRODUCTION

StopWaste conducts periodic waste characterization studies to understand better the types and quantities of materials disposed of in Alameda County. Using sampling techniques, this study measured the composition of the waste stream by generating sector, by disposition (landfill, recycled, composted), and material type. This study provides a valuable snapshot in time of the materials that comprise our waste stream and can contribute to priority setting and evaluation of progress towards goals.

The in-house programs was used to characterize waste from the Residential sector (both Single-Family and Multi-Family). The current 2023-24 study included field sampling of waste destined for landfill disposal from five generating sectors (Commercial, Single-Family Residential, Multi-Family Residential, Roll-Off, and Self-Haul), source-separated recyclables (SSR) from both the Residential and Commercial sectors, and source-separated organics (SSO) from both the Residential and Commercial sectors.

The 2023-24 study utilizes similar field methods that were used in previous studies. The objectives of the 2023-24 Waste Characterization Study were to:

1. Quantify the flow of materials within Alameda County, including landfill, organics, and recyclables.
2. Identify materials in the landfill, recyclable, and organics streams that most commonly lead to contamination, compromise the quality of recyclables or organics, are most problematic for facilities to sort, or that have inconsistent markets, leading to sorted materials ultimately winding up in landfills.
3. Provide data and analyses to measure possible impacts of current programs, providing comparability with previous studies conducted by the Agency.
4. Provide data and analyses that allow the Alameda County Waste Management Authority to readily use and/or adapt and apply the data to local conditions.
5. Identify waste streams and materials to be targeted for future waste reduction programs.
6. Be consistent with California statutory and regulatory requirements for performing waste characterization studies, understanding that material types may be condensed for the Alameda County study as compared to the state study.
7. Meet the standards for SB 1383 organics capacity planning.

This study was completed by SCS and its subcontractor Cascadia Consulting Group with the assistance of StopWaste and the staff at each of the host facilities.

2.1 COMPARISON WITH PRIOR WASTE CHARACTERIZATION STUDIES

As stated above, one of the important guiding principles for this study was to mirror previous waste characterization studies to facilitate the comparison of results and to track trends and how the disposed waste stream in Alameda County is changing. This section summarizes the similarities and differences between the 2023-24 study and methods of conducting fieldwork used in previous waste characterization studies.

2.1.1 Similarities

- **Waste Generating Sectors:** As in prior studies, the 2023-24 study separately analyzed the composition of five waste generation sectors: Single-Family Residential, Multi-Family Residential, Commercial, Roll-Off, and Self-Haul loads. This report presents a waste composition summary for each sector in addition to an overall countywide waste characterization profile.
- **In-County Waste:** Like previous studies, the 2023-24 study targeted waste both generated and disposed of at facilities in Alameda County. Waste imported or exported out of the county was not included due to the serious logistical obstacles in trying to capture this waste for sampling.
- **Disposal Facilities:** Fieldwork for the 2023-24 waste characterization study was conducted at most of the same disposal facilities as the 2017-18 study (Aladdin Transfer Station, Berkeley Transfer Station, Davis Street Transfer Station, Fremont Transfer Station, Pleasanton Transfer Station, and Vasco Road Landfill). Facilities added for the 2023-24 study included Community Conservation Center, California Waste Solutions Transfer/Processing, and Tri-Ced Community Recycling. Waste from Livermore was segregated by sector (Residential vs. Commercial) and delivered by transfer trailer to Aladdin Transfer Station where it was sampled and sorted.
- **Characterization Methods:** Similar to previous studies, the 2023-24 waste characterization study acquired 200-pound samples from targeted collection vehicles and hand-sorted the sample into material types. Roll-Off containers and Self-Haul waste loads were visually characterized using similar methods as the 2017-18 waste characterization study.
- **Number of MSW Samples:** The 2023-24 study characterized roughly the same number of samples for MSW from each of the five generating sectors as the 2017-18 study. The 2017-18 waste characterization study collected and manually sorted 250 Commercial waste samples and visually characterized 274 Roll-Off waste loads and 463 Self-Haul waste loads. The 2023-24 waste characterization study collected and manually sorted 226 Commercial waste samples, 136 Single-Family Residential samples, 67 Multi-Family Residential samples, and visually characterized 142 Roll-Off container waste loads and 401 Self-Haul waste loads.

2.1.2 Differences

A number of changes were made to the study design from 2017-18 to expand the analysis of waste generation in the County.

- **Material Categories:** The 2017-18 waste characterization study categorized waste into 30 material types for the Commercial MSW, Roll-Off, and Self-Haul sectors. The current 2023-24 study increased the number of material types to 72. A comparison of material categories in the 2023-24 study to the material categories in the 2017-18 study is presented below.
- **Use of Data from In-House Programs:** The 2017-18 waste characterization study utilized data from the Benchmark Study to characterize both Single-Family and Multi-Family Residential waste sectors. By design, the Benchmark Study focused just on materials collected in residential curbside programs; therefore, only five categories were sampled: Recyclable Materials, Plant Debris, Food Scraps, Food Soiled Paper, and Other. A brief summary of the Benchmark Study is included in **Appendix D.** The 2023-24 study used field sampling and sorting to characterize the Residential waste stream (both from Single-Family and Multi-

Family) into the same 72 material categories as the Commercial, Roll-Off, and Self-Haul sectors.

- **SSR and SSO Samples:** The 2023-24 study characterized samples of SSR and SSO from both Residential and Commercial sources. SSR and SSO were not sampled in the 2017-18 study (or any previous studies).
- **Exclusion of MRF Residuals:** MRF residuals were characterized in the 2017-18 study but excluded in the 2023-34 study.
- **Number of Seasonal Sampling Events:** The current 2023-24 study conducted field sampling over 77 days over a year (between June 2023 and June 2024). The 2017-18 study included two seasonal sampling events, late summer and early winter.
- **Secondary Sorting:** The 2023-24 study included secondary sorting of six material types to further understand the types of items in MSW, SSR, and SSO. The five material types targeted for secondary sorting include 1) Paper/Fiber Food Service Ware, 2) Non-Wine/Spirit Glass Bottles and Containers, 3) Tin/Steel Cans, 4) Plastic Containers, 5) Edible Food - Cooked/Baked/Prepared Perishable Items/Bakery/Dairy/Other and 6) Bioplastics. Secondary sorting was conducted on 103 MSW samples, 38 SSR samples, and 15 SSO samples.

2.2 REPORT ORGANIZATION

The remainder of this report provides the results of the 2023-24 study as well as the methods used to obtain the data contained in this report. The report is organized in the following sections:

- **Study Design:** This section contains information on waste quantities by sector and material classifications and types, and host facilities.
- **Field Methods:** This section describes the field schedule and sampling and sorting protocols (both manual sorting and visual characterization).
- **Results:** Provides detailed results about the composition of waste disposed of in Alameda County. Waste composition estimates are presented graphically as well as in tables for a more detailed presentation of the data. Results are compared to previous studies and the CalRecycle Statewide Waste Characterization Study in 2021.
- **Appendices:** The appendices include supplemental materials relevant to the 2023-24 study.

3.0 STUDY DESIGN

3.1 ANNUAL WASTE QUANTITY

SCS communicated directly with franchised haulers and facilities to estimate the annual waste quantity disposed within Alameda County by sector for calendar year 2022 (the most recent annual information available). The annual Measure D reports for FY20-21 were used to verify and/or supplement information provided by haulers and facilities. Similar to the waste characterization studies conducted in 2000, 2008 and 2017-18, this study classified waste generated and disposed of in Alameda County as originating from the following sectors: 1) Single-Family Residential, 2) Multi-Family Residential, 3) Commercial, 4) Roll-Off Containers, and 5) Self-Haul. Unlike the previous studies, this study included sampling and sorting source-separated recyclables (SSR) and source-separated organics (SSO) generated in the Residential and Commercial sectors. MRF Residuals were included in the 2017-18 study but excluded in 2023-24 study.

Waste haulers generally track the waste quantities collected through their franchised agreements by sector. However, some waste from Multi-Family properties is collected in waste loads from Single-Family households and others combined with Commercial businesses. Additionally, facility representatives provided the quantity of self-haul waste delivered to their facility for landfill disposal.

As shown in **Table 13,** the annual quantity of landfilled waste increased during the 2023-24 study compared to the 2017-18 study, despite a decreasing trend since 1990. However, the total tonnage of material disposed in 2023-24 across all three streams is still less than just the landfill stream in 1990. Landfilled waste generated by the Single-Family Residential and Commercial sectors showed a moderate increase. Roll-Off waste decreased slightly. Multi-Family waste decreased significantly for the 2023-24 study, although this could be due to changing collection practices at Multi-Family properties. Self-Haul waste increased substantially since the 2017-18 study.

Table 13. Reported In-County Waste Disposal Quantities

Waste Sector		**1990**	**1995**	**2000**	**2008**	**2017-18**	**2023-24**
Landfill Disposal (MSW)	Residential Single-Family	499,150	333,030	332,700	275,080	231,000	239,064
	Residential Multi-Family	A	112,090	122,870	132,080	103,000	63,132
	Commercial	666,300	264,530	354,400	237,320	195,000	220,221
	Roll-Off	264,500	339,250	406,470	273,420	167,000	157,434
	Self-Haul	428,550	465,560	336,240	269,210	296,000	450,232
	Subtotal MSW	**1,858,500**	**1,514,460**	**1,552,680**	**1,187,110**	**992,000**	**1,130,082**
SSR	Residential	B	B	B	B	B	139,065
	Commercial	B	B	B	B	B	54,523
	Subtotal SSR						**193,588**
SSO	Residential	B	B	B	B	B	202,838
	Commercial	B	B	B	B	B	48,898
	Subtotal SSO						**251,736**
Total Countywide		**1,858,500**	**1,514,460**	**1,552,680**	**1,187,110**	**992,000**	**1,631,207**

Note: A) Multi-Family residential waste quantities included in commercial quantities for 1990.
B) SSR and SSO not quantified for prior years.

Manually sorted samples of municipal solid waste (MSW), SSR, and SSO and visually characterized Roll-Off and Self-Haul waste loads were sorted into distinct material classifications and types described in **Appendix A.**

3.2 SAMPLING PROTOCOL

Fieldwork was completed at nine host facilities (five transfer stations, three recycling processing facilities, and one landfill) for 77 days over one year (between June 2023 and June 2024). SSR generated from Livermore was aggregated into separate Residential and Commercial transfer trailers at the Livermore Transload Facility (where, as stipulated in their permit, waste materials cannot touch the ground) and sorted at the Aladdin Transfer Station. Manual sorting was used to characterize MSW, SSR, and SSO. Visual characterization of entire waste loads was used to characterize Roll-Off containers and Self-Haul waste.

679 samples of MSW, SSR, and SSO were manually sorted into 72 material types. **Table 14** summarizes the number of samples collected by sector from each jurisdiction.

Table 14. Number of Manually Sorted Samples By Waste Sector and Originating Jurisdiction

Jurisdiction	**MSW**			**SSR**			**SSO**	
	RES-SF	**RES-MF**	**COM**	**RES-SF**	**RES-MF**	**RES-MF**	**RES**	**COM**
Alameda	5	7	8	6		3	9	1
Albany	2		3	1		1	1	
Berkeley	7		23	10		9	7	3
Castro Valley SD	5	2	4	6		1	6	
Dublin				3		2	2	1
Emeryville		3	5	1		1		1
Fremont	21		44	10		9	19	1
Hayward	14	14	12			6	7	2
Livermore	10		15	8		3		
Newark	4		10					
Oakland	34	28	46	40	3	4	13	5
Oro Loma SD	14	12	9	6		2	8	1
Piedmont	*	*	*	*	*	*	*	*
Pleasanton	9		21				3	1
San Leandro	4	1	15	5		2	6	1
Union City	7		11	10				
Total	136	67	226	106	3	43	81	17
	429			132			98	
	679							

Note: MSW, SSR, and SSO generated in Piedmont is sent to out-of-county facilities; hence, their waste was not included in the sampling plan.

549 waste loads delivered in Roll-Off containers or Self-Hauled were visually characterized into 72 material types. **Table 15** summarizes the number of Roll-Off and Self-Haul loads that were visually characterized from each jurisdiction.

Table 15. Number of Visually Characterized Waste Loads by Originating Jurisdiction

Jurisdiction	ROLL-OFF	SELF-HAUL
Alameda	6	17
Albany		
Berkeley	3	
Castro Valley SD	3	10
Dublin		
Emeryville	3	2
Fremont		1
Hayward	51	99
Livermore	29	1
Newark		
Oakland	28	183
Oro Loma SD	6	
Piedmont		3
Pleasanton		
San Leandro	13	85
Union City		
Total	142	401
	543	

4.0 FIELD METHODS

Fieldwork at each host facility was scheduled in order to sample and sort waste for a typical week and as such avoided special events, rain, or other activities that could impact the normal waste received at a facility. **Table 16** summarizes the fieldwork schedule for the fieldwork.

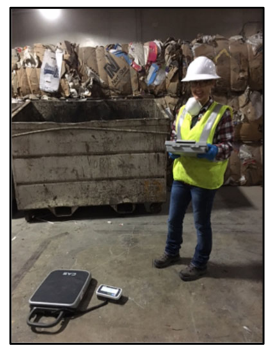
Table 16. Waste Characterization Fieldwork Schedule

Facility	Fieldwork Dates
Aladdin Transfer Station	July 26 – 28, 2023 January 22 – 24, 2024
Berkeley Transfer Station	July 25, 2023 July 27 – 28, 2023 January 31, 2024
CWS Transfer/Processing	October 30 – November 2, 2023
Community Conservation Center	July 24, 2023
Davis Street Transfer Station	June 19 – 23, 2023 June 25 - 30, 2023 July 17 – 21, 2023 October 23 – November 3, 2023 December 4 – 8, 2023

Facility	Fieldwork Dates
Fremont Transfer Station	July 24 – 28, 2023 January 22 – 26, 2024
Vasco Landfill	July 24 – 25, 2023 February 1 – 2, 2024
Pleasanton Transfer Station	July 26, 2023 January 29 – 30, 2024
Tri-Ced Community Recycling	February 2, 2024

4.1 EQUIPMENT

The equipment used to carry out the fieldwork at each of the host facilities was either the same or similar throughout the project. Equipment used to carry out this study is as follows:



Scale, PPE, and Data Sheet

- **Containers** – Numerous trash containers of varying sizes were used for weighing waste samples and placement of sorted waste components. Each container was tare-weighted at the start of each new field sampling and sorting event.

- **Sort Table** – The sort table was a piece of plywood that was impermeable and capable of supporting waste samples. The plywood was mounted on sawhorses about four feet from the ground.

- **Scales** – Factory-calibrated scales were used to weigh waste samples and sorted waste components; scales recorded weight to the nearest 0.01 pound.

- **Personnel Protective Equipment (PPE)** – Protecting the health and safety of all project staff was the number one priority of the project. Field staff were required to wear steel/composite toe shoes or boots, safety glasses, reflective safety vests, and puncture resistant gloves at all times when participating in fieldwork. Additional safety equipment was made available for personal comfort including ear plugs, dust masks, and coveralls.

- **Data Forms** – SCS created a separate data collection form called a Sort Data Sheet for each waste sample hand-sorted and a Visual Data Sheet for each visually characterized waste sample (**Appendix B**). The forms contained fields to capture information on the waste sample, including the waste generating sector and hauler information and was used to record waste component weights.

4.2 SAMPLE SELECTION

The integrity of this project started with selecting the right samples for characterization at nine host facilities that received materials targeted for study by the County. SCS employed a number of procedures and quality control measures to confirm that the samples obtained for sorting were representative of the targeted waste streams disposed of at each of the host facilities.

SCS appointed a Sampling Manager (from SCS staff) to oversee selection and collection of each waste sample. This individual utilized the site-specific sampling plan to identify which trucks to stop for further waste screening. The Sampling Manager monitored trucks entering each facility. Based on the sampling plan, the Sampling Manager randomly stopped trucks and interviewed the driver to obtain details on the waste contained in the vehicle and the jurisdiction of origin. SCS staff worked closely with operators at the host facilities to identify trucks to collect sample loads, direct trucks to the sorting location, confirm their origin, and adhere to safe working conditions.

If the sample met the criteria for sampling and sorting, the Sampling Manager would direct the driver of the truck to a designated area where the entire waste load would be discharged. The SCS Sampling Manager would then visually inspect the waste to confirm the waste load should be sampled. In most instances, only one waste sample was obtained from each truck originating from a targeted jurisdiction. In some cases, two samples were taken from the same truck when not enough waste samples for a particular day could be obtained from unique waste vehicles.

4.2.1 Sample Gathering

At the direction of the Sampling Manager, samples were collected in one of two ways:

1) The vehicle driver would discharge a portion of the waste collected in the truck on the ground next to the sorting location; or
2) The vehicle driver would discharge the entire load of waste materials from the truck and a host facility heavy equipment operator would obtain a sample of waste from a randomly selected "section" of the waste pile[1] that would be transported to the sorting area.

220-pound sample

The waste sample would be placed in tared 32-gallon trash containers and the weight of the sample would be recorded. Consistent with ASTM International's Standard Test Method of Characterizing Unprocessed Solid Waste,[2] each sample was weighed until approximately 220 pounds of waste materials were obtained. Each waste sample was labeled with the sector and originating jurisdiction.

4.2.2 Manual Sorting

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

1. The sort crew transferred approximately 220 pounds of refuse onto the sorting table and began sort activities. Large or heavy waste items, such as bags of yard waste, were torn open, examined and then placed directly into the appropriate waste container for subsequent weighing.

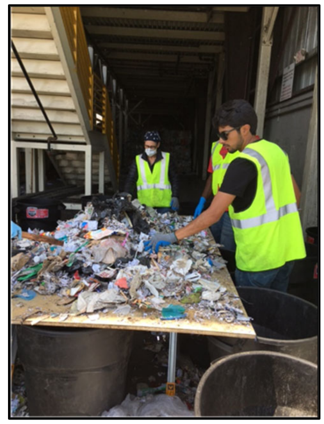
[1] The waste pile was visually divided into six sections (1-6) and samples were obtained from a randomly selected section.

[2] ASTM International: Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste; D 5231-92 (reapproved 2003)

2. Plastic bags of refuse were opened and sort crew members manually segregated each material item, according to categories defined in **Appendix A,** and placed the material into the appropriate waste container. These steps were repeated until the entire sample was sorted.

3. At the completion of sorting each waste sample, the waste containers with the sorted materials were moved to the scale where SCS staff weighed each container and recorded the net weight on the Sort Data Sheet. Measurements were made to the nearest 0.01 pounds.

4. After the weight of each waste category had been recorded, the waste was piled near the sorting area for transport to the disposal area.



Sorting crew

This four-step process was repeated until all of the day's waste samples were characterized. Waste samples were maintained in as-disposed condition or as close to this as possible until the actual sorting began. Proper site layout and close supervision of sampling was maintained to avoid the need to repeatedly handle waste materials.

Members of the sorting crew were fully equipped with high visibility vests, puncture/cut resistant gloves, safety glasses, and Tyvek suits.

Consistent with good practice in waste sampling programs, efforts were made to minimize sampling bias or other impacts on the integrity of the database.

4.2.3 Visual Characterization

A number of host facilities receive a significant amount of material from Roll-Off containers and Self-Haul vehicles. These materials are not conducive to manual sorting and obtaining a 220-pound sample of this material would skew the waste characterization results due to the size and weight of much of this material. As a result, this material was visually characterized.

Green Waste

The SCS Sampling Manager would select visual loads to characterize and conduct interviews with the drivers to confirm the origin of the sample. When a load was identified for sampling and characterization, the driver would be directed to a separate area near the working face/disposal area to discharge the entire load. The driver would be directed to spread the load out as much as possible so a complete and comprehensive visual inspection could be performed. The SCS Sampling Manager would walk around the entire discharged waste load and make notes on the materials present in the sample. Based on each material's volume, the SCS Sampling Manager would estimate the percent composition of each of the material components in the sample. For each sample visually characterized, the volumes were converted to weights using volume-to-weight conversion factors maintained by CalRecycle on its website (**Appendix C**).

5.0 RESULTS

This section provides the detailed results of the 2023-24 Countywide Waste Characterization Study. The results presented in this section include the composition for the individual waste sectors and the overall countywide waste stream; and comparisons to previous waste characterization studies conducted for Alameda County as well as the 2021 CalRecycle Statewide Waste Characterization Study.

Results presented for 2023-24 herein are based on field sampling, which involved manually sorting and visual characterization of waste destined for landfill disposal (MSW), SSR, and SSO into 72 material types. Field sampling was conducted between June 2023 and June 2024 at multiple facilities:

- MSW - 429 samples were acquired and sorted for this study: 226 from Commercial loads, 136 from Single-Family Residential loads, and 67 from Multi-Family Residential loads.
- SSR – 152 samples were acquired and sorted for this study: 43 from Commercial loads and 109 from Residential loads.
- SSO – 98 samples were acquired and sorted for this study: 17 from Commercial loads and 81 from Residential loads.
- Self-Haul Waste - 401 loads were visually characterized.
- Roll-Off Waste - 142 containers were visually characterized.

Consistent with previous studies, the composition of each waste sector is presented individually and then combined proportionately for an overall countywide waste composition.

Waste sector compositions developed for this study are then compared to results from previous waste characterization studies completed for Alameda County, where applicable. The 2023-24 waste compositions are also compared to the most recent statewide waste characterization completed by CalRecycle in 2021.

5.1 SINGLE-FAMILY RESIDENTIAL MSW

5.1.1 2023-24 Waste Composition

Single-Family homes in Alameda County generate about 239,100 tons of waste for landfill disposal annually. **Figure 14** below presents the Single-Family Residential MSW stream by material group.

Figure 14. Single-Family Residential Waste Composition by Material Group

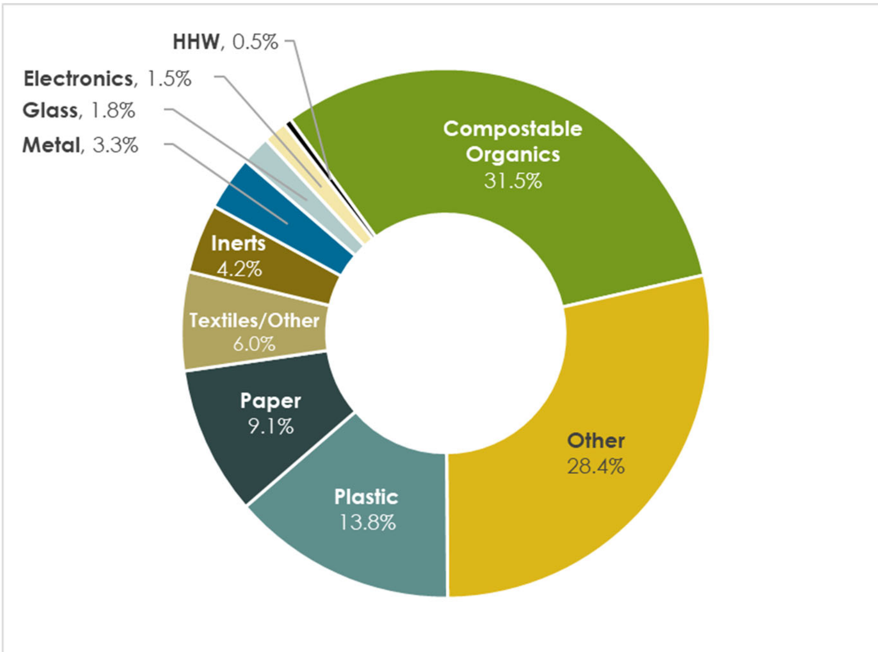


Table 17 presents the ten materials with the highest proportions of Single-Family Residential MSW, representing in total 67.4 percent. **Table 18** presents a detailed composition of Single-Family Residential MSW based on 136 manually sorted waste samples.

Table 17. Top 10 Materials Represented in Single-Family MSW

Material		Proportion
1	Mixed Residue/Other	19.5%
2	Inedible Food	13.2%
3	Diapers and Sanitary Products	7.9%
4	Compostable Paper - Other	6.8%
5	Plastic Film - Other Film (includes Ziplock bags)	5.9%
6	Edible Food - Cooked/Baked/Prepared/Bakery/Dairy/Other	4.7%
7	Treated Wood Waste	2.6%
8	Other Textiles/Other	2.3%
9	Cloth and Clothing	2.3%
10	Paper/Fiber Food Service Ware	2.1%
	Total	**67.4%**

Table 18. Detailed Single-Family Residential Waste Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Paper			**21,700**	**9.1%**	**4.6%**	**8.4%**	**9.7%**
Uncoated Corrugated Cardboard			2,900	1.2%	3.3%	<0.1%	3.1%
Paper Grocery Bags			800	0.3%	0.4%	0.3%	0.4%
Other Paper Bags/Kraft Paper			1,100	0.5%	0.6%	0.4%	0.5%
Recyclable Paper (no food/liquid contam)			5,000	2.1%	2.1%	1.8%	2.4%
Folding Cartons & Other Paperboard Pkg			3,600	1.5%	0.7%	1.4%	1.6%
Other Paper/Fiber - Packaging			1,200	0.5%	0.4%	0.4%	0.5%
Aseptic Cartons			400	0.2%	0.2%	0.1%	0.2%
Gable-top Cartons			300	0.1%	0.2%	0.1%	0.2%
Paper/Fiber Food Service Ware			5,000	2.1%	1.2%	1.9%	2.3%
Remainder/Composite Paper			1,400	0.6%	1.3%	0.4%	0.8%
Plastic			**32,900**	**13.8%**	**4.1%**	**13.2%**	**14.3%**
	Containers	PETE Containers	2,100	0.9%	0.5%	0.8%	0.9%
	Containers	PETE Thermoform Containers	800	0.3%	0.4%	0.3%	0.4%
	Containers	HDPE Containers	1,000	0.4%	0.3%	0.4%	0.5%
	Containers	PP #5 Containers	3,400	1.4%	0.9%	1.3%	1.6%
	Containers	Other Plastic Containers (3, 4, 6, 7)	1,500	0.6%	0.7%	0.5%	0.7%
	Bags	Grocery/Merchandise	600	0.2%	0.8%	0.1%	0.3%
	Bags	"Reusable"	1,600	0.7%	0.5%	0.6%	0.7%
	Bags	Compostable	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Produce (pre-checkout)	300	0.1%	0.1%	0.1%	0.1%
	Film	Flexible Plastic Pouches	200	<0.1%	0.2%	<0.1%	0.1%
	Film	Other Film (inc Ziplock bags)	14,200	5.9%	2.3%	5.6%	6.3%
		Plastic Cutlery	300	0.1%	0.3%	<0.1%	0.1%
		Durable Plastic Items	4,300	1.8%	2.2%	1.5%	2.1%
		Other	2,600	1.1%	1.3%	0.9%	1.3%
Glass			**4,200**	**1.8%**	**1.3%**	**1.6%**	**2.0%**
	Bottles & Containers	Non Wine/Spirit - CRV	900	0.4%	0.7%	0.3%	0.5%
	Bottles & Containers	Non Wine/Spirit - Non CRV	1,500	0.6%	0.7%	0.5%	0.7%
	Bottles & Containers	Wine/Spirit	1,100	0.5%	0.7%	0.4%	0.6%
Other			700	0.3%	0.4%	0.2%	0.4%
Metal			**8,000**	**3.3%**	**3.9%**	**2.8%**	**3.9%**
Tin/Steel Cans			1,400	0.6%	0.5%	0.5%	0.6%
Aluminum Cans - CRV			500	0.2%	0.2%	0.2%	0.2%
Aluminum Cans - Non CRV			300	0.1%	0.2%	0.1%	0.1%
Other Ferrous			3,900	1.6%	3.6%	1.1%	2.2%
Other Non-Ferrous			1,900	0.8%	1.0%	0.7%	0.9%
Textiles/Other			**14,400**	**6.0%**	**5.4%**	**5.3%**	**6.8%**
Cloth and Clothing			5,500	2.3%	2.6%	1.9%	2.7%
Shoes, Purses, Belts			1,800	0.8%	1.3%	0.6%	0.9%
Carpet			1,600	0.6%	1.9%	0.4%	0.9%
Other			5,600	2.3%	3.7%	1.8%	2.9%

Table 18 (continued). Detailed Single-Family Residential Waste Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Compostable Organics			**75,200**	**31.5%**	**12.7%**	**29.7%**	**33.3%**
Leaves and Grass			1,100	0.5%	1.4%	0.3%	0.7%
Chips, Prunings, Trimmings, Branches, Stumps			1,000	0.4%	1.2%	0.2%	0.6%
Food	Edible	Produce	3,700	1.6%	1.5%	1.3%	1.9%
Food	Edible	Meat	2,200	0.9%	1.3%	0.6%	1.2%
Food	Edible	Cooked/Baked/Prepared/Bakery/Dairy	11,200	4.7%	3.9%	4.4%	5.0%
Food	Edible	Packaged/Non-Perishable/Shelf stable	4,600	1.9%	2.0%	1.6%	2.2%
Food	Inedible		31,500	13.2%	7.9%	12.9%	13.5%
Compostable Paper	Packaging		400	0.2%	0.2%	0.1%	0.2%
Compostable Paper	Pizza Boxes		400	0.2%	0.7%	<0.1%	0.3%
Compostable Paper	Other		16,300	6.8%	3.2%	6.4%	7.3%
Wood	Untreated Lumber		2,800	1.2%	6.4%	0.3%	2.1%
Wood	Pallets		<100	<0.1%	0.2%	<0.1%	<0.1%
Inerts			**10,100**	**4.2%**	**7.3%**	**3.2%**	**5.3%**
Crushable Inerts			3,300	1.4%	3.3%	0.9%	1.9%
Gypsum Boards			600	0.3%	1.4%	<0.1%	0.5%
Treated Wood Waste			6,200	2.6%	5.8%	1.8%	3.4%
Electronics			**3,500**	**1.5%**	**3.0%**	**1.0%**	**1.9%**
Major Appliances			200	<0.1%	0.9%	<0.1%	0.2%
Brown Goods			2,000	0.8%	2.6%	0.4%	1.2%
Computer Related Electronics			300	0.1%	0.8%	<0.1%	0.2%
Other Small Consumer			1,000	0.4%	1.1%	0.3%	0.6%
HHW			**1,100**	**0.5%**	**0.8%**	**0.4%**	**0.6%**
Paint			<100	<0.1%	0.3%	<0.1%	<0.1%
Used Oil			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries			200	<0.1%	0.2%	<0.1%	0.1%
Mercury-Containing Items - Not Lamps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED			<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps			800	0.3%	0.7%	0.2%	0.4%
Other			**68,000**	**28.4%**	**10.9%**	**26.9%**	**30.0%**
Tires			<100	<0.1%	0.1%	<0.1%	<0.1%
Latex gloves			400	0.1%	0.3%	0.1%	0.2%
Expanded Polystyrene			800	0.4%	1.1%	0.2%	0.5%
Bioplastics			<100	<0.1%	<0.1%	<0.1%	<0.1%
Manure			<100	<0.1%	<0.1%	<0.1%	<0.1%
Asphalt Roofing			300	0.1%	1.0%	<0.1%	0.2%
Stranglers & Tanglers (hoses, rubber, etc.)			800	0.3%	1.3%	0.1%	0.5%
Diapers and Sanitary Products			19,000	7.9%	5.4%	7.2%	8.7%
Mixed Residue/Other			46,700	19.5%	10.8%	18.0%	21.0%
TOTAL			**239,100**	**100.0%**			

Note: Waste composition based on 136 samples.

5.1.2 Comparison to Previous Studies

Table 19 provides a summary comparison of the Single-Family waste composition derived from previous waste characterization studies conducted since 1995. To facilitate a historical comparison, material types were converted to one of five classifications from the 2017-18 study which used the Benchmark Study.

The Benchmark Study sampled individual carts rather than acquire 200-pound samples from waste collection vehicles, as specified in ASTM D5231-92(2016) - Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste. Different sampling methods combined with different material categories compromises a direct comparison of the 2023-24 study to the 2017-18 study. Table 19 is presented for informational purposes.

Table 19. Historical Single-Family Residential Waste Composition

Material Components	Single Family Residential				
	1995	2000	2008	2017-18	2023-24
Recyclable	25.4%	24.9%	10.6%	6.1%	11.6%
Plant Debris	12.9%	5.1%	2.7%	0.6%	0.9%
Food Scraps	21.2%	23.5%	32.8%	14.6%	22.2%
Food Soiled Paper	NA	NA	17.5%	16.0%	7.2%
Other	40.5%	46.5%	36.4%	62.6%	58.1%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Number of samples per study:	298	260	333	2,605 *	136

* Number of carts sampled from StopWaste in-house Benchmark Study.

As shown in Figure 15, recyclable and compostable materials have generally declined since 1995, although recyclable materials and food scraps have increased since the 2017-18 study. Food soiled paper has decreased significantly.

Figure 15. Single-family Residential Waste Composition Since 1995

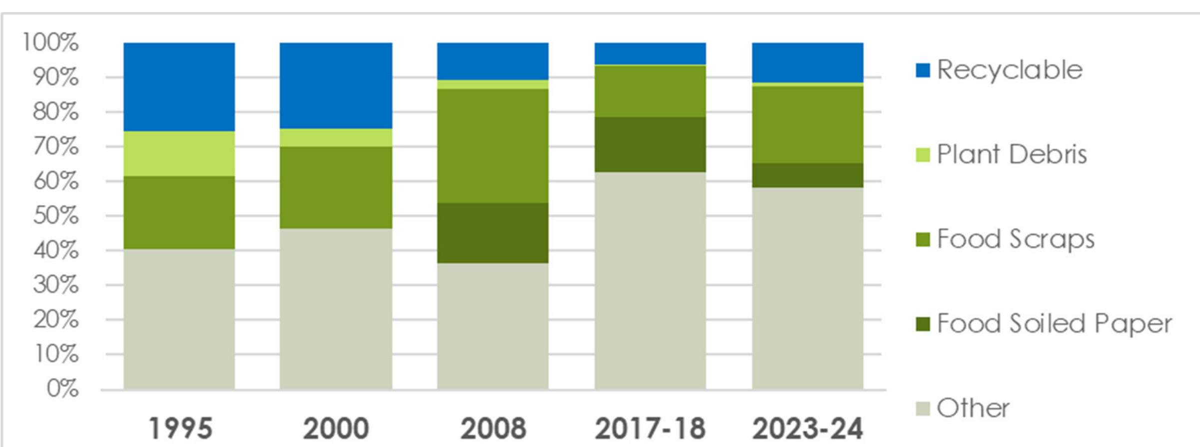


Table 20 provides a summary comparison of the annual waste tonnages by material type disposed of by Single-Family residences for each of the study years. Similar to the composition, the tonnage of recyclable materials and food scraps have increased since the 2017-18 study.

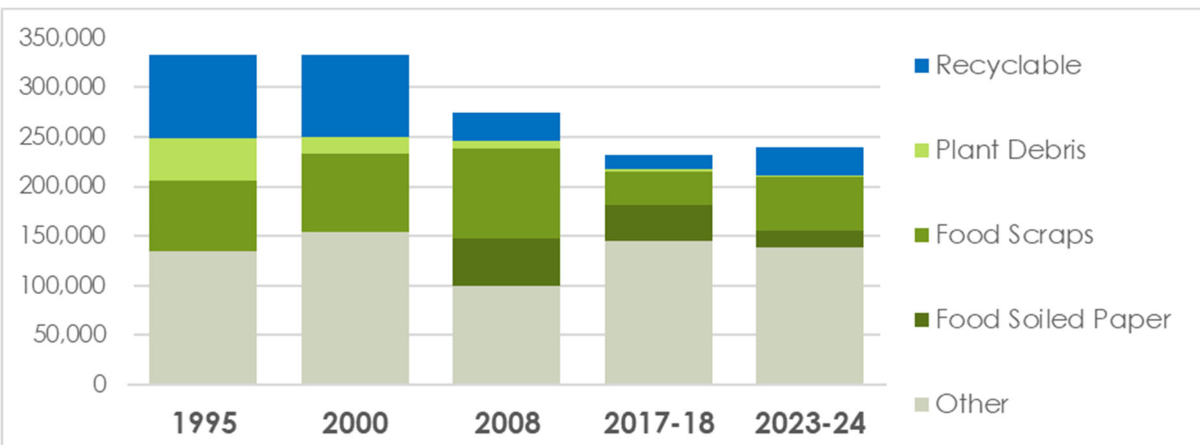
Table 20. Historical Annual Single-Family Residential Waste Tonnage

Material Components	Single Family Residential				
	1995	2000	2008	2017-18	2023-24
Recyclable	84,600	82,800	29,200	14,200	27,800
Plant Debris	43,000	17,000	7,400	1,500	2,100
Food Scraps	70,600	78,200	90,200	33,800	53,100
Food Soiled Paper	NA	NA	48,100	37,000	17,100
Other	134,900	154,700	100,100	144,600	138,900
TOTAL	**333,000**	**332,700**	**275,100**	**231,000**	**239,000**

Note: Annual waste quantities rouned to nearest 100 tons.

As shown in **Figure 16**, recyclable materials and food scraps have increased since the 2017-18 study.

Figure 16. Annual Single-Family Residential Waste Tonnage



5.1.3 Comparison to 2021 California Statewide Waste Characterization

Table 21 provides a summary comparison of the 2023-24 Alameda County Single-Family Residential MSW composition to the 2021 CalRecycle statewide Single-Family Residential MSW composition. Statistically significant differences between the 2023-24 study and the 2021 studies are indicated when there is no overlap of the 90 percent confidence intervals and are noted as:

- "+" when the material proportion is greater for Alameda County than California statewide.
- "-" when the material proportion is lower for Alameda County than California statewide.

Table 21. Single-Family Residential Waste Composition: 2023-24 Alameda County vs. 2021 CalRecycle

Material Components			Alameda County 2023-24				CalRecycle 2021		
			Mean		90% Confidence Limits		Mean	90% Confidence Limits	
	Alameda County 2023-24	CalRecycle 2021	Composition		Lower	Upper	Composition	Lower	Upper
Paper			**9.1%**	-	**8.4%**	**9.7%**	**12.4%**	**11.8%**	**12.9%**
	Uncoated Corrugated Cardboard	Corrugated Cardboard	1.2%		0.7%	1.7%	1.8%	1.4%	2.2%
	Paper Grocery Bags	Paper Grocery Bags	0.3%	+	0.3%	0.4%	0.1%	<0.1%	0.1%
	Other Paper Bags/Kraft Paper	Other Paper Bags/Kraft Paper	0.5%		0.4%	0.5%	0.6%	0.5%	0.6%
	Recyclable Paper (no food/liquid contam)	Newspapers/Newspaper Inserts White Office-type Paper and Mail Magazines and Catalogs Other Recyclable Paper	2.1%	-	1.8%	2.4%	3.2%	3.0%	3.5%
	Folding Cartons & Other Paperboard Pkg	Folding Cartons and Other Paperboard Packaging	1.5%		1.4%	1.6%	1.7%	1.6%	1.8%
	Other Paper/Fiber - Packaging	Other Paper/Fiber - Packaging	0.5%	-	0.4%	0.5%	0.8%	0.7%	0.9%
	Aseptic Cartons	Aseptic Containers	0.2%		0.1%	0.2%	0.1%	0.1%	0.1%
	Gable-top Cartons	Gable-top Cartons	0.1%		0.1%	0.2%	0.2%	0.1%	0.2%
	Paper/Fiber Food Service Ware	Paper/Fiber Food Service Ware	2.1%	-	1.9%	2.3%	3.5%	3.3%	3.8%
	Remainder/Composite Paper	Remainder/Composite Paper	0.6%		0.4%	0.8%	0.4%	0.3%	0.5%
Plastic			**12.8%**		**12.3%**	**13.4%**	**13.3%**	**12.8%**	**13.7%**
Containers	PETE Containers	PETE Beverage Containers - CRV PETE Bottles and Jars - Non-CRV	0.9%	-	0.8%	0.9%	1.1%	1.0%	1.1%
Containers	PETE Thermoform Containers	*Included in "Other Plastic Packaging"*	*		*	*	*	*	*
Containers	HDPE Containers	HDPE Beverage Containers - CRV HDPE Bottles and Jars - Non-CRV	0.4%	-	0.4%	0.5%	0.7%	0.6%	0.7%
Containers	PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Other Plastic Packaging	3.5%	-	3.3%	3.7%	4.7%	4.5%	5.0%
Bags	Grocery/Merchandise	Plastic Grocery and Other Merchandise Bags	0.2%		0.1%	0.3%	1.1%	1.0%	1.2%
Bags	"Reusable"	*Included in "Mixed Residue"*	*		*	*	*	*	*
Bags	Compostable	*Included in "Mixed Residue"*	*		*	*	*	*	*
Bags	Produce (pre-checkout)	*Included in "Mixed Residue"*	*		*	*	*	*	*
Film	Flexible Plastic Pouches	Flexible Plastic Pouches	<0.1%	+	<0.1%	0.1%	<0.1%	<0.1%	<0.1%
Film	Other Film (inc Ziplock bags)	Film Products- Non-Packaging Non-Bag Commercial and Industrial Packaging Film Other Film Bags and Plastic Mailing Pouches Plastic Trash Bags	5.9%	+	5.6%	6.3%	3.2%	3.0%	3.5%
	Plastic Cutlery	*Included in "Rigid Plastic Food Service Ware"*	*		*	*	*	*	*
	Durable Plastic Items	Durable Plastic Items	1.8%	+	1.5%	2.1%	1.2%	1.0%	1.4%
	Other	Remainder/Composite Plastic	1.1%		0.9%	1.3%	1.2%	1.1%	1.4%

Material Components: Alameda County 2023-24	Material Components: CalRecycle 2021	Alameda County 2023-24 Mean Composition		Alameda County 2023-24 90% Confidence Limits Lower	Alameda County 2023-24 90% Confidence Limits Upper	CalRecycle 2021 Mean Composition	CalRecycle 2021 90% Confidence Limits Lower	CalRecycle 2021 90% Confidence Limits Upper
Glass		**1.8%**	-	**1.6%**	**1.9%**	**2.7%**	**2.5%**	**2.9%**
Bottles & Containers – Non Wine/Spirit - CRV	Clear Glass Bottles and Containers - CRV Green Glass Bottles and Containers - CRV Brown Glass Bottles and Containers - CRV	1.5%	-	1.3%	1.6%	2.3%	2.1%	2.6%
Bottles & Containers – Non Wine/Spirit - Non CRV	Clear Glass Bottles and Containers - Non-CRV Green and Brown Glass Bottles and Containers - Non-CRV							
Bottles & Containers – Wine/Spirit	*Included in Glass Bottles & Containers*							
Bottles & Containers – *Inc in Bottles & Containers*	Other Colored Glass Bottles and Containers							
Other	Remainder/Composite Glass	0.3%		0.2%	0.4%	0.3%	0.3%	0.4%
Metal		**3.3%**		**2.8%**	**3.9%**	**2.9%**	**2.6%**	**3.2%**
Tin/Steel Cans	Tin/Steel Cans	0.6%		0.5%	0.6%	0.8%	0.7%	0.8%
Aluminum Cans - CRV	Aluminum Cans - CRV	0.2%		0.2%	0.2%	0.3%	0.3%	0.4%
Aluminum Cans - Non CRV	Aluminum Cans - Non-CRV	0.1%		0.1%	0.1%	0.2%	0.1%	0.2%
Other Ferrous	Other Ferrous	1.6%		1.1%	2.2%	1.0%	0.8%	1.3%
Other Non-Ferrous	Other Non-Ferrous	0.8%		0.7%	0.9%	0.6%	0.6%	0.7%
Textiles/Other		**3.7%**		**3.2%**	**4.2%**	**4.5%**	**4.1%**	**5.0%**
Cloth and Clothing	Textiles - Cloth and Clothing	2.3%	-	1.9%	2.7%	3.3%	2.9%	3.7%
Shoes, Purses, Belts	Textiles - Shoes, Purses, Belts	0.8%		0.6%	0.9%	0.6%	0.5%	0.8%
Carpet	Carpet	0.6%		0.4%	0.9%	0.6%	0.3%	0.8%
Other	*Included in "Mixed Residue"*	*		*	*	*	*	*
Compostable Organics		**31.5%**		**29.8%**	**33.1%**	**29.3%**	**27.7%**	**30.9%**
Leaves and Grass	Leaves and Grass	0.5%	-	0.3%	0.7%	2.3%	1.5%	3.2%
Chips, Prunings, Trimmings, Branches, Stumps	Prunings and Trimmings Branches and Stumps	0.4%	-	0.2%	0.6%	2.6%	1.7%	3.4%
Food – Edible – Produce	Food - Potentially Donatable - Vegetative Food - Not Donatable - Non-meat	9.1%	-	8.4%	9.7%	13.3%	12.3%	15.0%
Food – Edible – Meat	Food - Potentially Donatable - Meat Food - Not Donatable - Meat							
Food – Edible – Cooked/Baked/Prepared/ Bakery/ Dairy/Other	Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items							
Food – Edible – Packaged/Non-Perishable/ Shelf stable	Food - Potentially Donatable - Packaged Non-perishable							
Food – Inedible	Food - Inedible	13.2%	+	12.0%	14.3%	4.1%	3.7%	4.5%
Compostable Paper – Packaging	*Included in Other Compostable Paper*	7.2%		6.7%	7.6%	6.1%	5.7%	6.9%
Compostable Paper – Pizza Boxes	*Included in Other Compostable Paper*							
Compostable Paper – Other	Other Compostable Paper							
Wood – Untreated Lumber	Clean Dimensional Lumber Clean Engineered Wood	1.2%		0.3%	2.1%	0.9%	0.7%	1.2%
Wood – Pallets	Clean Pallets and Crates	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%

Material Components		Alameda County 2023-24				CalRecycle 2021		
		Mean		90% Confidence Limits		Mean	90% Confidence Limits	
Alameda County 2023-24	CalRecycle 2021	Composition		Lower	Upper	Composition	Lower	Upper
Inerts		**4.2%**		**3.3%**	**5.2%**	**2.7%**	**1.9%**	**3.4%**
Crushable Inerts	Concrete Rock, Soil and Fines	1.4%		0.9%	1.9%	1.3%	0.7%	1.9%
Gypsum Boards	Gypsum Board	0.3%		<0.1%	0.5%	0.1%	<0.1%	0.2%
Treated Wood Waste	Treated/Painted/Stained Wood	2.6%	+	1.8%	3.4%	1.3%	0.9%	1.7%
Electronics		**1.5%**		**1.0%**	**1.9%**	**0.7%**	**0.5%**	**1.0%**
Major Appliances	Major Appliances	<0.1%		<0.1%	0.2%	<0.1%	<0.1%	<0.1%
Brown Goods	Large Equipment	0.8%	+	0.4%	1.2%	0.2%	<0.1%	0.3%
Computer Related Electronics	Covered Video Display Devices	0.1%		<0.1%	0.2%	<0.1%	<0.1%	<0.1%
Other Small Consumer	Consumer Electronics and Small Equipment	0.4%		0.3%	0.6%	0.5%	0.3%	0.7%
HHW		**0.1%**		**<0.1%**	**0.2%**	**0.2%**	**0.1%**	**0.4%**
Paint	Paint	<0.1%		<0.1%	<0.1%	0.1%	<0.1%	0.2%
Used Oil	Used Oil	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries	Lead-acid (automotive) batteries	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	0.1%
Other batteries	Other batteries	<0.1%	+	<0.1%	0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - No Lamps	*Included in "Mixed Residue"*	*		*	*	*	*	*
Lamps - Fluorescent and LED	*Included in "Mixed Residue"*	*		*	*	*	*	*
Medical Waste/Sharps	*Included in "Mixed Residue"*	*		*	*	*	*	*
Other		**32.0%**		**28.5%**	**35.5%**	**31.3%**	**29.3%**	**33.3%**
Tires	Tires	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Latex gloves	*Included in "Personal Protective Eqipment (PPE)*	*		*	*	*	*	*
Expanded Polystyrene	Expanded Polystyrene Packaging	0.4%		0.2%	0.5%	0.3%	0.2%	0.3%
Bioplastics	*Included in "Mixed Residue"*	*		*	*	*	*	*
Manure	Manures	<0.1%	-	<0.1%	<0.1%	1.5%	0.1%	2.9%
Asphalt Roofing	Asphalt Roofing	0.1%		<0.1%	0.2%	0.1%	<0.1%	0.2%
Stranglers & Tanglers (hoses, rubber, etc.)	*Included in "Mixed Residue"*	*		*	*	*	*	*
Diapers and Sanitary Products	Diapers & Sanitary Products	7.9%	+	7.2%	8.7%	5.4%	4.8%	6.1%
Mixed Residue/Other	Remainder/Composite Metal Other Recyclable Wood Remainder/Composite Organic Remainder/Composite Inerts and Other Mattresses and Foundations Bulky Items Remainder/Composite Special Waste Personal Protective Equipment (PPE) Solar Panels Miscellaneous Inorganics Rigid Plastic Food Service Ware One-Pound or Less Propane Gas Cylinders Pharmaceuticals Remainder/Composite Household Hazardous Mixed Residue	23.6%		22.0%	25.2%	24.0%	22.7%	25.2%
TOTAL		**100.0%**				**100.0%**		
Note: Number of Samples for each study:		136				153		

5.2 MULTI-FAMILY RESIDENTIAL MSW

5.2.1 2023-24 Waste Composition

Multi-Family properties in Alameda County generate about 63,100 tons of waste for landfill disposal annually. **Figure 17** below presents the Multi-Family Residential MSW stream by material group.

Figure 17. Multi-Family Residential Waste Composition

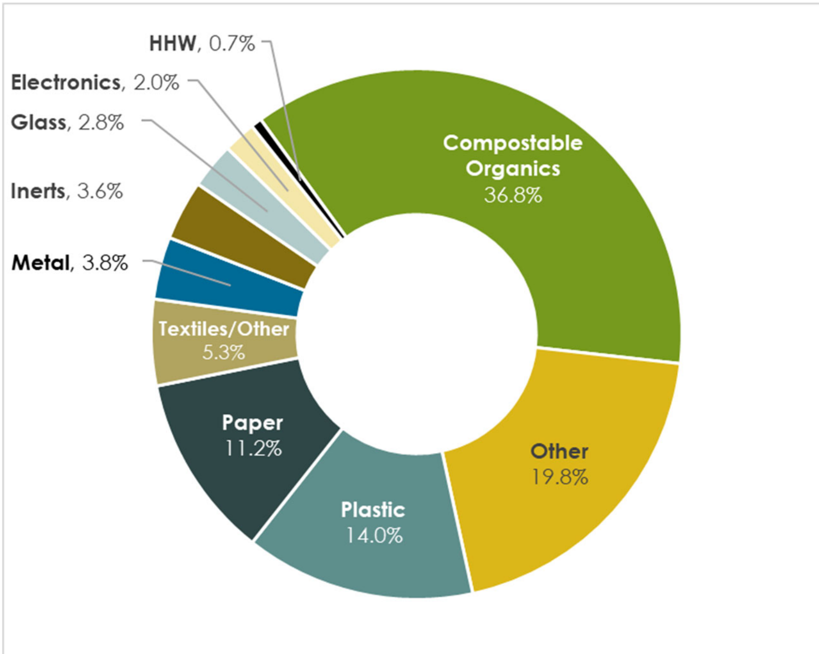


Table 22 presents the ten materials with the highest proportions of Multi-Family Residential MSW, representing in total 64.3 percent. **Table 23** presents a detailed composition of Multi-Family Residential MSW based on 67 manually sorted waste samples.

Table 22. Top 10 Materials Represented in Multi-Family MSW

Material		**Proportion**
1	Inedible Food	13.3%
2	Mixed Residue/Other	12.7%
3	Edible Food - Cooked/Baked/Prepared/Bakery/Dairy/Other	8.8%
4	Compostable Paper - Other	7.0%
5	Diapers and Sanitary Products	6.1%
6	Plastic Film - Other Film (includes Ziplock bags)	6.1%
7	Edible Food - Produce	2.6%
8	Treated Wood Waste	2.6%
9	Cloth and Clothing	2.6%
10	Paper/Fiber Food Service Ware	2.4%
	Total	**64.3%**

Table 23. Detailed Multi-Family Residential Waste Composition

Material Components		Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Paper		**7,100**	**11.2%**	**4.4%**	**10.4%**	**12.1%**
	Uncoated Corrugated Cardboard	1,300	2.0%	2.6%	<0.1%	22.0%
	Paper Grocery Bags	200	0.3%	0.4%	0.3%	0.4%
	Other Paper Bags/Kraft Paper	300	0.5%	0.4%	0.4%	0.6%
	Recyclable Paper (no food/liquid contam)	1,500	2.4%	1.6%	2.1%	2.8%
	Folding Cartons & Other Paperboard Pkg	1,300	2.1%	1.0%	1.9%	2.2%
	Other Paper/Fiber - Packaging	300	0.5%	0.4%	0.4%	0.6%
	Aseptic Cartons	100	0.2%	0.3%	0.1%	0.3%
	Gable-top Cartons	100	0.2%	0.3%	0.1%	0.3%
	Paper/Fiber Food Service Ware	1,500	2.4%	1.6%	2.1%	2.8%
	Remainder/Composite Paper	300	0.5%	1.0%	0.3%	0.7%
Plastic		**8,900**	**14.0%**	**4.8%**	**13.1%**	**15.0%**
Containers	PETE Containers	800	1.3%	0.6%	1.2%	1.4%
Containers	PETE Thermoform Containers	100	0.2%	0.3%	0.2%	0.3%
Containers	HDPE Containers	400	0.7%	0.6%	0.6%	0.8%
Containers	PP #5 Containers	800	1.2%	0.6%	1.1%	1.3%
Containers	Other Plastic Containers (3, 4, 6, 7)	400	0.6%	0.4%	0.6%	0.7%
Bags	Grocery/Merchandise	100	0.2%	0.1%	0.1%	0.2%
Bags	"Reusable"	500	0.9%	0.4%	0.8%	0.9%
Bags	Compostable	<100	<0.1%	<0.1%	<0.1%	<0.1%
Bags	Produce (pre-checkout)	<100	0.1%	0.2%	<0.1%	0.1%
Film	Flexible Plastic Pouches	<100	<0.1%	0.1%	<0.1%	<0.1%
Film	Other Film (inc Ziplock bags)	3,800	6.1%	2.7%	5.5%	6.6%
	Plastic Cutlery	<100	0.1%	0.1%	0.1%	0.2%
	Durable Plastic Items	800	1.2%	1.5%	0.9%	1.5%
	Other	800	1.3%	1.9%	0.9%	1.7%
Glass		**1,800**	**2.8%**	**1.9%**	**2.4%**	**3.2%**
Bottles & Containers	Non Wine/Spirit - CRV	500	0.7%	0.9%	0.6%	0.9%
Bottles & Containers	Non Wine/Spirit - Non CRV	600	0.9%	1.2%	0.7%	1.2%
Bottles & Containers	Wine/Spirit	600	0.9%	1.0%	0.7%	1.1%
	Other	100	0.2%	0.3%	0.1%	0.3%
Metal		**2,400**	**3.8%**	**3.8%**	**3.0%**	**4.6%**
	Tin/Steel Cans	500	0.8%	0.6%	0.7%	0.9%
	Aluminum Cans - CRV	200	0.3%	0.2%	0.3%	0.4%
	Aluminum Cans - Non CRV	<100	<0.1%	0.2%	<0.1%	0.1%
	Other Ferrous	1,100	1.7%	3.8%	1.0%	2.5%
	Other Non-Ferrous	600	0.9%	1.3%	0.6%	1.1%
Textiles/Other		**3,300**	**5.3%**	**4.9%**	**4.3%**	**6.2%**
	Cloth and Clothing	1,600	2.6%	2.8%	2.0%	3.1%
	Shoes, Purses, Belts	500	0.9%	1.3%	0.6%	1.1%
	Carpet	200	0.3%	1.4%	<0.1%	0.6%
	Other	1,000	1.5%	2.7%	1.0%	2.1%

Table 23 (continued). Detailed Multi-Family Residential Waste Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Compostable Organics			**23,200**	**36.8%**	**12.4%**	**34.3%**	**39.3%**
Leaves and Grass			500	0.7%	3.0%	0.1%	1.3%
Chips, Prunings, Trimmings, Branches, Stumps			300	0.5%	1.1%	0.2%	0.7%
Food	Edible	Produce	1,700	2.6%	3.1%	1.8%	3.5%
Food	Edible	Meat	300	0.5%	0.6%	0.3%	0.7%
Food	Edible	Cooked/Baked/Prepared/Bakery/Dairy	5,500	8.8%	5.6%	7.1%	10.4%
Food	Edible	Packaged/Non-Perishable/Shelf stable	1,400	2.3%	2.0%	1.7%	2.8%
Food	Inedible		8,400	13.3%	9.0%	10.7%	15.9%
Compostable Paper	Packaging		200	0.3%	0.3%	0.2%	0.3%
Compostable Paper	Pizza Boxes		100	0.2%	0.3%	0.1%	0.2%
Compostable Paper	Other		4,400	7.0%	3.3%	6.3%	7.7%
Wood	Untreated Lumber		500	0.7%	1.9%	0.3%	1.1%
Wood	Pallets		<100	<0.1%	<0.1%	<0.1%	<0.1%
Inerts			**2,300**	**3.6%**	**5.1%**	**2.6%**	**4.7%**
Crushable Inerts			500	0.8%	2.3%	0.3%	1.2%
Gypsum Boards			200	0.3%	1.4%	<0.1%	0.6%
Treated Wood Waste			1,600	2.6%	4.8%	1.6%	3.6%
Electronics			**1,200**	**2.0%**	**4.3%**	**1.1%**	**2.9%**
Major Appliances			200	0.3%	1.9%	<0.1%	0.7%
Brown Goods			600	0.9%	3.0%	0.3%	1.5%
Computer Related Electronics			100	0.2%	0.7%	<0.1%	0.3%
Other Small Consumer			300	0.6%	1.7%	0.2%	0.9%
HHW			**400**	**0.7%**	**1.0%**	**0.5%**	**0.9%**
Paint			100	0.2%	0.9%	<0.1%	0.4%
Used Oil			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED			<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps			300	0.4%	0.6%	0.3%	0.5%
Other			**12,500**	**19.8%**	**10.2%**	**17.8%**	**21.9%**
Tires			<100	<0.1%	<0.1%	<0.1%	<0.1%
Latex gloves			200	0.3%	0.4%	0.2%	0.4%
Expanded Polystyrene			<100	0.2%	0.2%	0.1%	0.2%
Bioplastics			<100	<0.1%	0.1%	<0.1%	<0.1%
Manure			<100	<0.1%	<0.1%	<0.1%	<0.1%
Asphalt Roofing			200	0.3%	2.3%	<0.1%	0.8%
Stranglers & Tanglers (hoses, rubber, etc.)			<100	0.1%	0.2%	<0.1%	0.2%
Diapers and Sanitary Products			3,900	6.1%	5.4%	5.1%	7.2%
Mixed Residue/Other			8,000	12.7%	9.0%	11.0%	14.5%
TOTAL			**63,100**	**100.0%**			

Note: Waste composition based on 67 samples.

5.2.2 Comparison to Previous Studies

Table 24 provides a summary comparison of the Multi-Family MSW composition derived from previous waste characterization studies conducted since 1995. To facilitate a historical comparison, material types were converted to one of five classifications from the 2017-18 study which used the Benchmark Study.

The Benchmark Study sampled individual carts rather than acquire 200-pound samples from waste collection vehicles, as specified in ASTM D5231-92(2016) - Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste. Different sampling methods combined with different material categories compromises a direct comparison of the 2023-24 study to the 2017-18 study. **Table 24** is presented for informational purposes.

Table 24. Historical Multi-Family Residential Waste Composition

Material Components	Multi-Family Residential				
	1995	2000	2008	2017-18	2023-24
Recyclable	29.1%	26.0%	14.6%	8.3%	15.2%
Plant Debris	8.0%	7.0%	3.7%	0.9%	1.2%
Food Scraps	16.7%	20.9%	25.9%	10.3%	27.4%
Food Soiled Paper	NA	NA	17.1%	15.8%	7.4%
Other	46.2%	46.1%	38.7%	64.7%	48.8%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Number of samples per study:	105	121	202	274 *	67

* Number of carts sampled from StopWaste in-house Benchmark Study.

As shown in **Figure 18**, recyclable and compostable materials have generally declined since 1995, although recyclable materials and food scraps have increased since the 2017-18 study for Multi-Family Residential waste. Food soiled paper has decreased significantly.

Figure 18. Multi-Family Residential Waste Composition Since 1995

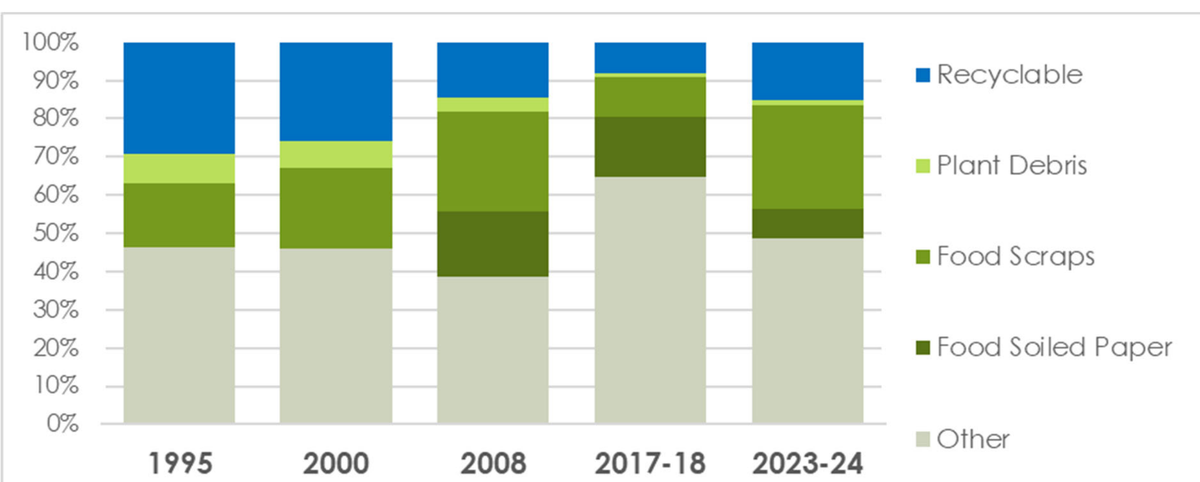


Table 25 provides a summary comparison of the annual waste tonnages by material type disposed of by Multi-Family residences for each of the study years. Contrary to the composition results, the decrease in waste generated from the Multi-Family sector shows only a modest increase in recyclable tonnage since the 2017-18 study. Similar to the composition, the tonnage of food scraps has increased since the 2017-18 study.

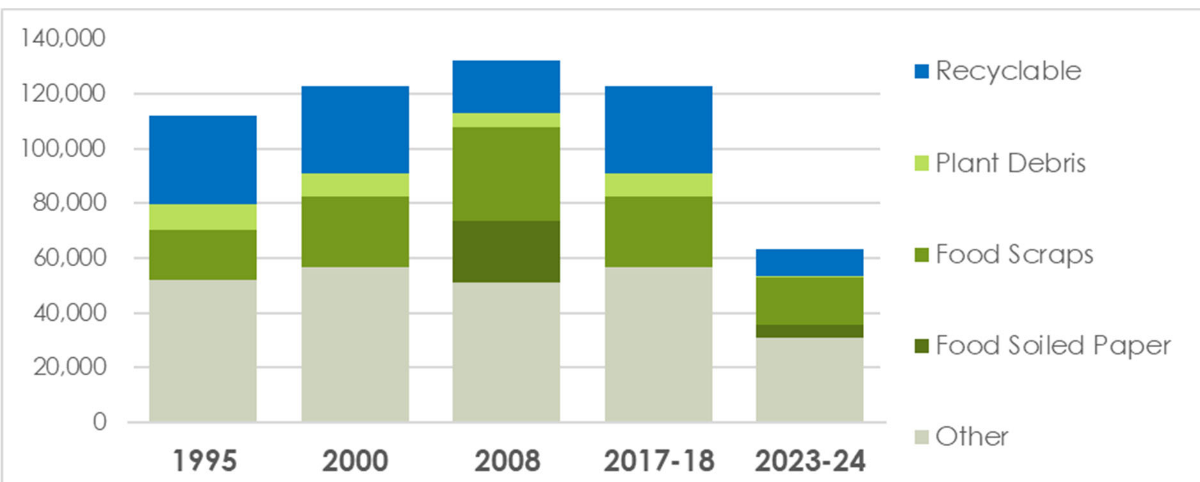
Table 25. Historical Annual Multi-Family Residential Waste Tonnage

Material Components	Multi-Family Residential				
	1995	2000	2008	2017-18	2023-24
Recyclable	32,600	31,900	19,300	8,500	9,600
Plant Debris	9,000	8,600	4,900	1,000	700
Food Scraps	18,700	25,700	34,200	10,600	17,300
Food Soiled Paper	NA	NA	22,600	16,300	4,700
Other	51,800	56,600	51,100	66,700	30,800
TOTAL	**112,100**	**122,900**	**132,100**	**103,000**	**63,100**

Note: Annual waste quantities rouned to nearest 100 tons.

As shown in **Figure 19**, recyclable and compostable materials have declined in relative proportions since 2008 for the Multi-Family sector. The proportion of food scraps decreased for the first time for this study.

Figure 19. Annual Multi-Family Residential Waste Tonnage



5.2.3 Comparison to 2021 California Statewide Waste Characterization

Table 26 provides a summary comparison of the 2023-24 Alameda County Multi-Family MSW composition to the 2021 CalRecycle statewide Multi-Family MSW composition. Because the 2021 CalRecycle statewide report did not present a standard deviation or 90 percent confidence intervals for materials in the Multi-Family waste stream, the "+" and "-" indicate where the 2017-18 material proportions fall outside the 90 percent confidence limits for the 2023-24 study, which may not be statistically significant.

Table 26. Multi-Family Residential Waste Composition: 2023-24 Alameda County vs. 2021 CalRecycle

Material Components			Alameda County 2023-24				CalRecycle 2021		
			Mean		90% Confidence Limits		Mean	90% Confidence Limits	
	Alameda County 2023-24	CalRecycle 2021	Composition		Lower	Upper	Composition	Lower	Upper
Paper			**9.1%**	-	**8.2%**	**10.0%**	**13.3%**	**NR**	**NR**
	Uncoated Corrugated Cardboard	Corrugated Cardboard	1.2%	-	0.6%	1.9%	2.4%	NR	NR
	Paper Grocery Bags	Paper Grocery Bags	0.3%		0.2%	0.4%	0.3%	NR	NR
	Other Paper Bags/Kraft Paper	Other Paper Bags/Kraft Paper	0.5%		0.3%	0.6%	0.6%	NR	NR
	Recyclable Paper (no food/liquid contam)	Newspapers/Newspaper Inserts White Office-type Paper and Mail Magazines and Catalogs Other Recyclable Paper	2.1%	+	1.7%	2.5%	3.4%	NR	NR
	Folding Cartons & Other Paperboard Pkg	Folding Cartons and Other Paperboard Packaging	1.5%	-	1.3%	1.6%	1.9%	NR	NR
	Other Paper/Fiber - Packaging	Other Paper/Fiber - Packaging	0.5%	-	0.4%	0.6%	0.7%	NR	NR
	Aseptic Cartons	Aseptic Containers	0.2%		0.1%	0.2%	0.1%	NR	NR
	Gable-top Cartons	Gable-top Cartons	0.1%		0.1%	0.2%	0.2%	NR	NR
	Paper/Fiber Food Service Ware	Paper/Fiber Food Service Ware	2.1%	-	1.9%	2.3%	3.4%	NR	NR
	Remainder/Composite Paper	Remainder/Composite Paper	0.6%		0.3%	0.8%	0.3%	NR	NR
Plastic			**12.8%**		**12.1%**	**13.6%**	**12.7%**	**NR**	**NR**
Containers	PETE Containers	PETE Beverage Containers - CRV PETE Bottles and Jars - Non-CRV	0.9%	-	0.8%	1.0%	2.2%	NR	NR
Containers	PETE Thermoform Containers	*Included in "Other Plastic Packaging"*	*		*	*	*	*	*
Containers	HDPE Containers	HDPE Beverage Containers - CRV HDPE Bottles and Jars - Non-CRV	0.4%	+	0.3%	0.5%	1.0%	NR	NR
Containers	PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Other Plastic Packaging	3.5%	-	3.3%	3.7%	4.0%	NR	NR
Bags	Grocery/Merchandise	Plastic Grocery and Other Merchandise Bags	0.2%	-	<0.1%	0.4%	1.2%	NR	NR
Bags	"Reusable"	*Included in "Mixed Residue"*	*		*	*	*	*	*
Bags	Compostable	*Included in "Mixed Residue"*	*		*	*	*	*	*
Bags	Produce (pre-checkout)	*Included in "Mixed Residue"*	*		*	*	*	*	*
Film	Flexible Plastic Pouches	Flexible Plastic Pouches	<0.1%		<0.1%	0.1%	0.1%	NR	NR
Film	Other Film (inc Ziplock bags)	Film Products- Non-Packaging Non-Bag Commercial and Industrial Packaging Film Other Film Bags and Plastic Mailing Pouches Plastic Trash Bags	5.9%	+	5.5%	6.4%	2.1%	NR	NR
	Plastic Cutlery	*Included in "Rigid Plastic Food Service Ware"*	*		*	*	*	*	*
	Durable Plastic Items	Durable Plastic Items	1.8%	+	1.3%	2.2%	1.2%	NR	NR
	Other	Remainder/Composite Plastic	1.1%		0.8%	1.4%	0.9%	NR	NR

Material Components: Alameda County 2023-24	Material Components: CalRecycle 2021	Alameda County 2023-24 Mean Composition		Alameda County 2023-24 90% Confidence Limits Lower	Alameda County 2023-24 90% Confidence Limits Upper	CalRecycle 2021 Mean Composition	CalRecycle 2021 90% Confidence Limits Lower	CalRecycle 2021 90% Confidence Limits Upper
Glass		**1.8%**	-	**1.5%**	**2.0%**	**6.8%**	**NR**	**NR**
Bottles & Containers – Non Wine/Spirit - CRV	Clear Glass Bottles and Containers - CRV Green Glass Bottles and Containers - CRV Brown Glass Bottles and Containers - CRV	1.5%		1.2%	1.7%	6.0%	NR	NR
Bottles & Containers – Non Wine/Spirit - Non CRV	Clear Glass Bottles and Containers - Non-CRV Green and Brown Glass Bottles and Containers - Non-CRV							
Bottles & Containers – Wine/Spirit	*Included in Glass Bottles & Containers*							
Bottles & Containers – *Inc in Bottles & Containers*	Other Colored Glass Bottles and Containers							
Other	Remainder/Composite Glass	0.3%	-	0.2%	0.4%	0.8%	NR	NR
Metal		**3.3%**	+	**2.6%**	**4.1%**	**2.2%**	**NR**	**NR**
Tin/Steel Cans	Tin/Steel Cans	0.6%		0.5%	0.7%	0.6%	NR	NR
Aluminum Cans - CRV	Aluminum Cans - CRV	0.2%	-	0.2%	0.2%	0.4%	NR	NR
Aluminum Cans - Non CRV	Aluminum Cans - Non-CRV	0.1%		<0.1%	0.2%	0.1%	NR	NR
Other Ferrous	Other Ferrous	1.6%	+	0.9%	2.4%	0.7%	NR	NR
Other Non-Ferrous	Other Non-Ferrous	0.8%	+	0.6%	1.0%	0.4%	NR	NR
Textiles/Other		**3.7%**	-	**3.0%**	**4.4%**	**4.6%**	**NR**	**NR**
Cloth and Clothing	Textiles - Cloth and Clothing	2.3%	-	1.8%	2.8%	3.2%	NR	NR
Shoes, Purses, Belts	Textiles - Shoes, Purses, Belts	0.8%	-	0.5%	1.0%	1.3%	NR	NR
Carpet	Carpet	0.6%	+	0.3%	1.0%	0.1%	NR	NR
Other	*Included in "Mixed Residue"*	*		*	*	*	*	*
Compostable Organics		**31.5%**		**29.1%**	**33.8%**	**30.2%**	**NR**	**NR**
Leaves and Grass	Leaves and Grass	0.5%		0.2%	0.8%	0.5%	NR	NR
Chips, Prunings, Trimmings, Branches, Stump	Prunings and Trimmings Branches and Stumps	0.4%		0.2%	0.6%	0.2%	NR	NR
Food – Edible – Produce	Food - Potentially Donatable - Vegetative Food - Not Donatable - Non-meat	9.1%	+	8.1%	10.0%	20.1%	NR	NR
Food – Edible – Meat	Food - Potentially Donatable - Meat Food - Not Donatable - Meat							
Food – Edible – Cooked/Baked/Prepared/Bakery/Dairy/Other	Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items							
Food – Edible – Packaged/Non-Perishable/Shelf stable	Food - Potentially Donatable - Packaged Non-perishable							
Food – Inedible	Food - Inedible	13.2%	+	11.6%	14.8%	3.7%	NR	NR
Compostable Paper – Packaging	*Included in Other Compostable Paper*	7.2%	+	6.5%	7.8%	4.9%	NR	NR
Compostable Paper – Pizza Boxes	*Included in Other Compostable Paper*							
Compostable Paper – Other	Other Compostable Paper							
Wood – Untreated Lumber	Clean Dimensional Lumber Clean Engineered Wood	1.2%		<0.1%	2.5%	0.5%	NR	NR
Wood – Pallets	Clean Pallets and Crates	<0.1%	-	<0.1%	<0.1%	0.3%	NR	NR

Material Components		Alameda County 2023-24				CalRecycle 2021		
		Mean		90% Confidence Limits		Mean	90% Confidence Limits	
Alameda County 2023-24	**CalRecycle 2021**	**Composition**		**Lower**	**Upper**	**Composition**	**Lower**	**Upper**
Inerts		**4.2%**	+	**2.9%**	**5.6%**	**2.6%**	**NR**	**NR**
Crushable Inerts	Concrete Rock, Soil and Fines	1.4%	+	0.7%	2.0%	0.7%	NR	NR
Gypsum Boards	Gypsum Board	0.3%		<0.1%	0.5%	0.2%	NR	NR
Treated Wood Waste	Treated/Painted/Stained Wood	2.6%		1.4%	3.7%	1.7%	NR	NR
Electronics		**1.5%**		**0.8%**	**2.1%**	**1.9%**	**NR**	**NR**
Major Appliances	Major Appliances	<0.1%		<0.1%	0.2%	<0.1%	NR	NR
Brown Goods	Large Equipment	0.8%		0.3%	1.3%	0.5%	NR	NR
Computer Related Electronics	Covered Video Display Devices	0.1%		<0.1%	0.3%	0.3%	NR	NR
Other Small Consumer	Consumer Electronics and Small Equipment	0.4%	-	0.2%	0.6%	1.1%	NR	NR
HHW		**0.1%**		**<0.1%**	**0.2%**	**0.1%**	**NR**	**NR**
Paint	Paint	<0.1%		<0.1%	0.1%	0.1%	NR	NR
Used Oil	Used Oil	<0.1%		<0.1%	<0.1%	<0.1%	NR	NR
Lead-acid (automotive) batteries	Lead-acid (automotive) batteries	<0.1%		<0.1%	<0.1%	<0.1%	NR	NR
Other batteries	Other batteries	<0.1%	+	<0.1%	0.1%	<0.1%	NR	NR
Mercury-Containing Items - Not Lamps	*Included in "Mixed Residue"*	*		*	*	*	*	*
Lamps - Fluorescent and LED	*Included in "Mixed Residue"*	*		*	*	*	*	*
Medical Waste/Sharps	*Included in "Mixed Residue"*	*		*	*	*	*	*
Other		**32.0%**	+	**27.0%**	**37.0%**	**25.7%**	**NR**	**NR**
Tires	Tires	<0.1%	-	<0.1%	<0.1%	0.1%	NR	NR
Latex gloves	*Included in "Personal Protective Eqipment (PPE)*	*		*	*	*	*	*
Expanded Polystyrene	Expanded Polystyrene Packaging	0.4%		0.1%	0.6%	0.2%	NR	NR
Bioplastics	*Included in "Mixed Residue"*	*		*	*	*	*	*
Manure	Manures	<0.1%		<0.1%	<0.1%	<0.1%	NR	NR
Asphalt Roofing	Asphalt Roofing	0.1%		<0.1%	0.3%	0.2%	NR	NR
Stranglers & Tanglers (hoses, rubber, etc.)	*Included in "Mixed Residue"*	*		*	*	*	*	*
Diapers and Sanitary Products	Diapers & Sanitary Products	7.9%	+	6.9%	9.0%	4.4%	NR	NR
Mixed Residue/Other	Remainder/Composite Metal Other Recyclable Wood Remainder/Composite Organic Remainder/Composite Inerts and Other Mattresses and Foundations Bulky Items Remainder/Composite Special Waste Personal Protective Equipment (PPE) Solar Panels Miscellaneous Inorganics Rigid Plastic Food Service Ware One-Pound or Less Propane Gas Cylinders Pharmaceuticals Remainder/Composite Household Hazardous Mixed Residue	23.6%	+	21.3%	25.9%	20.8%	NR	NR
TOTAL		**100.0%**				**100%**		
Note: Number of Samples for each study:		67				50		

5.3 COMMERCIAL MSW

5.3.1 2023-24 Waste Composition

Commercial businesses and organizations in Alameda County generate about 220,200 tons of waste for landfill disposal annually. **Figure 20** presents the commercial MSW stream by material group.

Figure 20. Commercial Waste Composition by Material Group

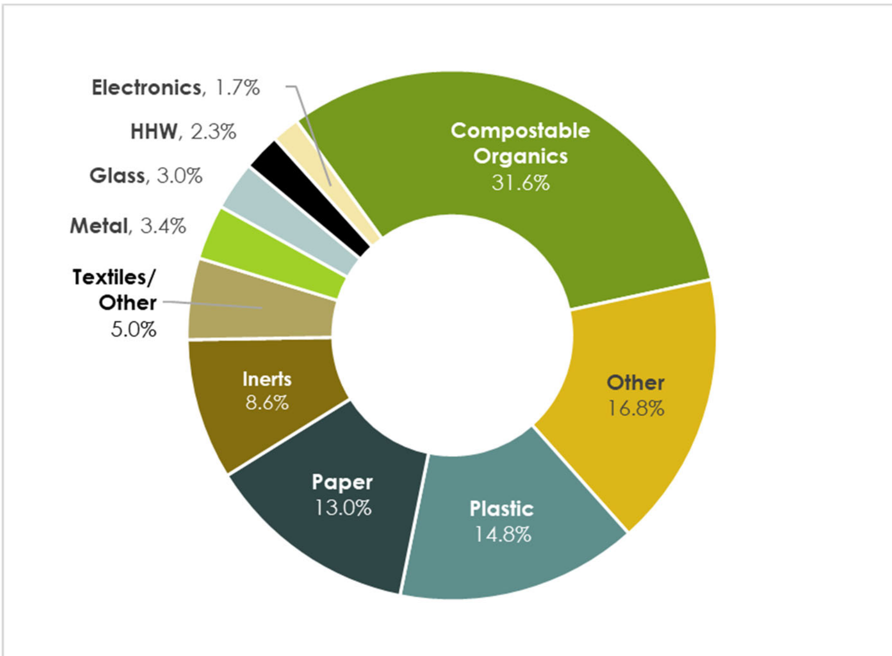


Table 27 presents the ten materials with the highest proportions of Commercial MSW, representing in total 55.0 percent. **Table 28** presents a detailed composition of Commercial MSW based on 226 manually sorted waste samples.

Table 27. Top 10 Materials Represented in Commercial MSW

Material		Proportion
1	Mixed Residue/Other	12.1%
2	Inedible Food	7.3%
3	Plastic Film - Other Film (includes Ziplock bags)	6.7%
4	Edible Food - Cooked/Baked/Prepared/Bakery/Dairy/Other	5.7%
5	Compostable Paper - Other	4.9%
6	Treated Wood Waste	4.7%
7	Uncoated Corrugated Cardboard	3.9%
8	Crushable Inerts	3.4%
9	Wood - Untreated Lumber	3.1%
10	Diapers and Sanitary Products	3.1%
	Total	**55.0%**

Table 28. Detailed Commercial Waste Composition

Material Components		Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Paper		**28,600**	**13.0%**	**7.0%**	**12.2%**	**13.8%**
	Uncoated Corrugated Cardboard	8,600	3.9%	3.3%	<0.1%	8.9%
	Paper Grocery Bags	500	0.2%	0.3%	0.2%	0.2%
	Other Paper Bags/Kraft Paper	1,100	0.5%	0.7%	0.4%	0.6%
	Recyclable Paper (no food/liquid contam)	5,900	2.7%	4.5%	2.2%	3.2%
	Folding Cartons & Other Paperboard Pkg	3,900	1.7%	1.3%	1.6%	1.9%
	Other Paper/Fiber - Packaging	1,700	0.8%	1.4%	0.6%	0.9%
	Aseptic Cartons	200	0.1%	0.2%	<0.1%	0.1%
	Gable-top Cartons	300	0.1%	0.3%	0.1%	0.2%
	Paper/Fiber Food Service Ware	3,900	1.8%	1.8%	1.6%	2.0%
	Remainder/Composite Paper	2,600	1.2%	2.3%	0.9%	1.5%
Plastic		**32,500**	**14.8%**	**8.0%**	**13.9%**	**15.6%**
Containers	PETE Containers	2,100	0.9%	0.8%	0.9%	1.0%
Containers	PETE Thermoform Containers	600	0.3%	0.5%	0.2%	0.3%
Containers	HDPE Containers	1,500	0.7%	0.8%	0.6%	0.8%
Containers	PP #5 Containers	2,200	1.0%	1.3%	0.9%	1.1%
Containers	Other Plastic Containers (3, 4, 6, 7)	1,200	0.6%	2.1%	0.3%	0.8%
Bags	Grocery/Merchandise	200	0.1%	0.1%	<0.1%	0.1%
Bags	"Reusable"	900	0.4%	0.4%	0.3%	0.4%
Bags	Compostable	<100	<0.1%	0.1%	<0.1%	<0.1%
Bags	Produce (pre-checkout)	100	<0.1%	0.1%	<0.1%	<0.1%
Film	Flexible Plastic Pouches	<100	<0.1%	<0.1%	<0.1%	<0.1%
Film	Other Film (inc Ziplock bags)	14,900	6.7%	5.4%	6.2%	7.3%
	Plastic Cutlery	300	0.1%	0.5%	<0.1%	0.2%
	Durable Plastic Items	5,300	2.4%	4.1%	2.0%	2.9%
	Other	2,900	1.3%	2.6%	1.0%	1.6%
Glass		**6,500**	**3.0%**	**7.1%**	**2.2%**	**3.7%**
Bottles & Containers	Non Wine/Spirit - CRV	1,100	0.5%	0.8%	0.4%	0.6%
Bottles & Containers	Non Wine/Spirit - Non CRV	1,000	0.5%	0.8%	0.4%	0.5%
Bottles & Containers	Wine/Spirit	2,000	0.9%	1.7%	0.7%	1.1%
	Other	2,400	1.1%	6.8%	0.3%	1.8%
Metal		**7,400**	**3.4%**	**4.8%**	**2.8%**	**3.9%**
	Tin/Steel Cans	1,400	0.6%	1.5%	0.5%	0.8%
	Aluminum Cans - CRV	500	0.2%	0.3%	0.2%	0.3%
	Aluminum Cans - Non CRV	100	<0.1%	0.2%	<0.1%	<0.1%
	Other Ferrous	4,200	1.9%	4.5%	1.4%	2.4%
	Other Non-Ferrous	1,100	0.5%	1.0%	0.4%	0.6%
Textiles/Other		**11,000**	**5.0%**	**5.9%**	**4.3%**	**5.6%**
	Cloth and Clothing	4,600	2.1%	3.5%	1.7%	2.4%
	Shoes, Purses, Belts	800	0.4%	0.9%	0.3%	0.5%
	Carpet	1,100	0.5%	2.5%	0.2%	0.8%
	Other	4,400	2.0%	3.9%	1.6%	2.4%

Table 28 (continued). Detailed Commercial Waste Composition

Material Components				Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Compostable Organics				**69,600**	**31.6%**	**18.2%**	**29.6%**	**33.6%**
Leaves and Grass				4,100	1.9%	5.2%	1.3%	2.4%
Chips, Prunings, Trimmings, Branches, Stumps				3,200	1.4%	6.2%	0.8%	2.1%
Food	Edible	Produce		4,000	1.8%	3.6%	1.3%	2.3%
		Meat		1,800	0.8%	2.0%	0.5%	1.1%
		Cooked/Baked/Prepared/Bakery/Dairy		12,600	5.7%	8.8%	4.4%	7.0%
		Packaged/Non-Perishable/Shelf stable		3,300	1.5%	2.1%	1.2%	1.8%
	Inedible			16,000	7.3%	7.5%	6.2%	8.4%
Compostable Paper	Packaging			1,400	0.6%	2.3%	0.4%	0.9%
	Pizza Boxes			400	0.2%	0.3%	0.1%	0.2%
	Other			10,900	4.9%	3.9%	4.5%	5.4%
Wood	Untreated Lumber			6,800	3.1%	9.6%	2.0%	4.1%
	Pallets			5,200	2.4%	8.9%	1.4%	3.3%
Inerts				**18,900**	**8.6%**	**15.9%**	**6.9%**	**10.3%**
Crushable Inerts				7,500	3.4%	10.2%	2.3%	4.5%
Gypsum Boards				1,000	0.5%	3.0%	0.1%	0.8%
Treated Wood Waste				10,400	4.7%	11.5%	3.5%	6.0%
Electronics				**3,700**	**1.7%**	**4.5%**	**1.2%**	**2.2%**
Major Appliances				900	0.4%	2.8%	<0.1%	0.7%
Brown Goods				1,500	0.7%	2.6%	0.4%	1.0%
Computer Related Electronics				400	0.2%	1.1%	<0.1%	0.3%
Other Small Consumer				900	0.4%	1.4%	0.3%	0.6%
HHW				**5,000**	**2.3%**	**7.9%**	**1.4%**	**3.1%**
Paint				200	0.1%	0.7%	<0.1%	0.2%
Used Oil				<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries				<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries				<100	<0.1%	0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps				<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED				<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps				4,700	2.1%	7.9%	1.3%	3.0%
Other				**37,000**	**16.8%**	**12.2%**	**15.5%**	**18.1%**
Tires				400	0.2%	1.2%	<0.1%	0.3%
Latex gloves				800	0.4%	0.5%	0.3%	0.4%
Expanded Polystyrene				800	0.4%	0.7%	0.3%	0.5%
Bioplastics				100	<0.1%	0.1%	<0.1%	<0.1%
Manure				200	0.1%	1.6%	<0.1%	0.3%
Asphalt Roofing				200	<0.1%	0.8%	<0.1%	0.2%
Stranglers & Tanglers (hoses, rubber, etc.)				1,000	0.4%	1.5%	0.3%	0.6%
Diapers and Sanitary Products				6,700	3.1%	5.7%	2.4%	3.7%
Mixed Residue/Other				26,700	12.1%	10.4%	11.0%	13.3%
TOTAL				**220,200**	**100.0%**			

Note: Waste composition based on 226 samples.

5.3.2 Comparison to Previous Studies

Table 29 provides a summary comparison of the Commercial waste composition derived from previous studies. To facilitate a historical comparison, material types were converted to the material types of the current study. **Table 30** provides a summary comparison of the annual Commercial MSW tonnage destined for landfill disposal. For both Table 29 and Table 30, statistically significant differences between the 2023-24 study and the 2017-18 studies are indicated when there is no overlap of the 90 percent confidence intervals. Statistically significant differences are noted as:

- "+" when the proportion has increased from the 2017-18 study to the 2023-24 study.
- "-" when the proportion has decreased from the 2017-18 study to the 2013-24 study.

Material groups that have ***increased*** since the 2017-18 study include:

- **Plastic** (by proportion and annual tonnage)
- **Textiles/Other** (by annual tonnage only)
- **Inerts** (by proportion and annual tonnage)
- **HHW** (by proportion and annual tonnage)

Material groups that have ***decreased*** since the 2017-18 study include:

- **Compostable Organics** (by proportion only)

Material types that have ***increased*** since the 2017-18 study include:

- **Uncoated Corrugated Cardboard** (by proportion and annual tonnage)
- **Recyclable Glass Bottles/Containers** (by annual tonnage only)
- **Other Ferrous** (by annual tonnage only)
- **Wood Pallets** (by proportion and annual tonnage)
- **Textiles/Leather** (by annual tonnage only)
- **Treated Wood Waste** (by proportion and annual tonnage)
- **Other Small Consumer Electronics** (by annual tonnage only)
- **Medical Waste/Sharps** (by proportion and annual tonnage)

Material types that have ***decreased*** since the 2017-18 study include:

- **Recyclable Paper** (by proportion and annual tonnage)
- **Plastic Bottles and Containers** (by proportion only)
- **Plastic Bags** (by proportion and annual tonnage)
- **Other Non-Ferrous Metal** (by proportion only)
- **Food** (by proportion only)
- **Compostable Paper** (by proportion and annual tonnage)
- **Clean Dimensional lumber and Engineered Wood** (by proportion and annual tonnage)

Table 29. Historical Commercial Waste Composition

Material Components		Commercial Waste Composition					
Alameda County 2023-24	**Alameda County 2017-18**	**1995**	**2000**	**2008**	**2017-18**	**2023-24**	
Paper		**22.6%**	**20.0%**	**8.5%**	**10.1%**	**9.0%**	
Uncoated Corrugated Cardboard Paper Grocery Bags Other Paper Bags/Kraft Paper	Uncoated Corrugated Cardboard / Kraft Paper	6.2%	7.0%	2.1%	3.7%	4.6%	+
Recyclable Paper (no food/liquid contam) Folding Cartons & Other Paperboard Pkg	Recyclable Paper (no food/liquid contamination)	16.4%	13.0%	6.4%	6.4%	4.4%	-
Plastic		**5.9%**	**8.1%**	**9.5%**	**7.5%**	**10.8%**	+
Containers: PETE Containers PETE Thermoform Containers HDPE Containers PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Bottles and Plastic Containers	1.2%	2.1%	2.0%	4.4%	3.5%	-
Bags: Grocery/Merchandise "Reusable" Compostable Produce (pre-checkout)	Plastic Bags	NA	NA	1.1%	2.3%	0.6%	-
Other Film (inc Ziplock bags)	Other Film	4.7%	6.0%	6.4%	0.8%	6.7%	+
Glass							
Bottles & Containers - Non Wine/Spirit - CRV - Non Wine/Spirit - Non CRV - Wine/Spirit	Recyclable Glass Bottles/Containers	**2.4%**	**2.0%**	**1.9%**	**1.6%**	**1.9%**	
Metal		**5.0%**	**5.3%**	**3.9%**	**3.1%**	**3.4%**	
Aluminum Cans - CRV Aluminum Cans - Non CRV	Aluminum Cans	0.3%	0.4%	0.2%	0.3%	0.3%	
Tin/Steel Cans	Steel Food/Beverage Containers	0.7%	0.7%	0.7%	0.6%	0.6%	
Other Ferrous	Other Ferrous	3.5%	3.6%	2.5%	1.2%	1.9%	
Other Non-Ferrous	Other Non-Ferrous	0.5%	0.6%	0.5%	0.9%	0.5%	-
Compostable Organics		**25.40%**	**26.70%**	**51.40%**	**39.7%**	**31.6%**	-
Leaves and Grass Chips, Prunings, Trimmings, Branches, Stumps	Yard Waste	4.9%	4.1%	4.3%	2.3%	3.3%	
Food	Food Waste	14.9%	16.2%	26.1%	21.4%	17.1%	-
Compostable Paper - Packaging Compostable Paper - Pizza Boxes Compostable Paper - Other	Compostable Paper	NA	NA	18.0%	9.3%	5.7%	-
Wood - Untreated Lumber	Clean Dimensional Lumber & Eng. Wood	5.6%	6.4%	2.1%	6.4%	3.1%	-
Wood - Pallets	Pallets	NA	NA	0.9%	0.3%	2.4%	+
Textiles/Other		**4.9%**	**4.4%**	**3.8%**	**4.1%**	**5.0%**	
Cloth and Clothing Shoes, Purses, Belts Other	Textiles/Leather	4.9%	2.6%	3.1%	3.8%	4.5%	
Carpet	Carpet	NA	1.8%	0.7%	0.3%	0.5%	

Table 29 (continued). Historical Commercial Waste Composition

Material Components		Commercial Waste Composition					
Alameda County 2023-24	**Alameda County 2017-18**	**1995**	**2000**	**2008**	**2017-18**	**2023-24**	
Inerts		**3.9%**	**6.7%**	**5.7%**	**4.1%**	**8.6%**	+
Crushable Inerts	Crushable Inerts	1.4%	2.2%	2.1%	2.7%	3.4%	
Gypsum Boards	Gypsum Boards	0.4%	0.5%	0.5%	0.6%	0.5%	
Treated Wood Waste	Treated Wood Waste	2.1%	4.0%	3.1%	0.8%	4.7%	+
Electronics		**1.9%**	**2.1%**	**0.8%**	**1.5%**	**1.7%**	
Major Appliances Brown Goods	Brown Goods / White Goods	1.9%	2.1%	0.3%	1.0%	1.1%	
Computer Related Electronics	Computer Related Electronics	NA	NA	0.5%	0.2%	0.2%	
Other Small Consumer	Other Small Consumer				0.2%	0.4%	
HHW		**0.5%**	**0.4%**	**0.4%**	**0.4%**	**2.3%**	+
Paint Used Oil	Paints/Adhesives & Vehicle/Equipment Fluids	<0.1%	<0.1%	0.1%	<0.1%	0.1%	
Lead-acid (automotive) batteries Other batteries Mercury-Containing Items - Not Lamps Lamps - Fluorescent and LED	Universal Hazardous Waste	NA	NA	0.1%	0.2%	<0.1%	
Medical Waste/Sharps	Medical Waste	<0.1%	<0.1%	0.1%	0.2%	2.1%	+
Other Hazardous Waste	Other Hazardous Waste	0.5%	0.4%	0.1%	<0.1%	NA	
Other		**27.7%**	**24.2%**	**14.3%**	**27.8%**	**25.8%**	
Tires	Tires	0.7%	0.9%	0.2%	0.4%	0.2%	
Latex gloves Expanded Polystyrene Bioplastics Manure Asphalt Roofing Stranglers & Tanglers (hoses, rubber, etc.) Diapers and Sanitary Products Mixed Residue/Other Other Paper/Fiber - Packaging Aseptic Cartons Gable-top Cartons Paper/Fiber Food Service Ware Remainder/Composite Paper Flexible Plastic Pouches Plastic Cutlery Durable Plastic Items Other Plastic Other Glass	Materials not specified above	**27.0%**	**23.3%**	**14.1%**	**27.4%**	**25.6%**	
TOTAL		**100%**	**100%**	**100%**	**100%**	**100%**	
Note: Number of Samples for each study:		512	477	568	250	226	

Table 30. Historical Commercial Waste Annual Tonnage

Material Components			Annual Commercial Waste Tonnage					
2023-24 Materials		2017-18 Materials	1995	2000	2008	2017-18	2023-24	
Paper			**59,800**	**70,900**	**20,200**	**19,800**	**19,900**	
Uncoated Corrugated Cardboard Paper Grocery Bags Other Paper Bags/Kraft Paper		Uncoated Corrugated Cardboard / Kraft Paper	16,400	24,800	5,000	7,300	10,100	+
Recyclable Paper (no food/liquid contam) Folding Cartons & Other Paperboard Pkg		Recyclable Paper (no food/liquid contamination)	43,400	46,100	15,200	12,500	9,700	-
Plastic			**15,600**	**28,700**	**22,500**	**14,600**	**23,800**	+
Containers	PETE Containers PETE Thermoform Containers HDPE Containers PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Bottles and Plastic Containers	3,200	7,400	4,700	8,600	7,700	
Bags	Grocery/Merchandise "Reusable" Compostable Produce (pre-checkout)	Plastic Bags	NA	NA	2,600	4,400	1,300	-
	Other Film (inc Ziplock bags)	Other Film	12,400	21,300	15,200	1,600	14,900	+
Glass								
Bottles & Containers	- Non Wine/Spirit - CRV - Non Wine/Spirit - Non CRV - Wine/Spirit	Recyclable Glass Bottles/Containers	**6,300**	**7,100**	**4,500**	**3,100**	**4,100**	+
Metal			**13,200**	**18,800**	**9,300**	**6,000**	**7,400**	
Aluminum Cans - CRV Aluminum Cans - Non CRV		Aluminum Cans	800	1,400	500	700	700	
Tin/Steel Cans		Steel Food/Beverage Containers	1,900	2,500	1,700	1,100	1,400	
Other Ferrous		Other Ferrous	9,300	12,800	5,900	2,400	4,200	+
Other Non-Ferrous		Other Non-Ferrous	1,300	2,100	1,200	1,800	1,100	
Compostable Organics			**67,200**	**94,600**	**122,000**	**77,500**	**69,600**	
Leaves and Grass Chips, Prunings, Trimmings, Branches, Stumps		Yard Waste	13,000	14,500	10,200	4,600	7,300	
Food		Food Waste	39,400	57,400	61,900	41,800	37,700	
Compostable Paper - Packaging Compostable Paper - Pizza Boxes Compostable Paper - Other		Compostable Paper	NA	NA	42,700	18,200	12,600	-
Wood - Untreated Lumber		Clean Dimensional Lumber & Eng. Wood	14,800	22,700	5,000	12,400	6,800	-
Wood - Pallets		Pallets	NA	NA	2,100	500	5,200	+
Textiles/Other			**13,000**	**15,600**	**9,000**	**8,100**	**11,000**	+
Cloth and Clothing Shoes, Purses, Belts Other		Textiles/Leather	13,000	9,200	7,400	7,400	9,800	+
Carpet		Carpet	NA	6,400	1,700	700	1,100	

Table 30 (continued). Historical Commercial Waste Annual Tonnage

Material Components		Annual Commercial Waste Tonnage					
2023-24 Materials	**2017-18 Materials**	**1995**	**2000**	**2008**	**2017-18**	**2023-24**	
Inerts		**10,300**	**23,700**	**13,500**	**8,100**	**18,900**	+
Crushable Inerts	Crushable Inerts	3,700	7,800	5,000	5,200	7,500	
Gypsum Boards	Gypsum Boards	1,100	1,800	1,200	1,200	1,000	
Treated Wood Waste	Treated Wood Waste	5,600	14,200	7,400	1,600	10,400	+
Electronics		**5,000**	**7,400**	**1,900**	**2,900**	**3,700**	
Major Appliances Brown Goods	Brown Goods / White Goods	5,000	7,400	700	2,000	2,400	
Computer Related Electronics	Computer Related Electronics	NA	NA	1,200	400	400	
Other Small Consumer	Other Small Consumer				400	900	+
HHW		**1,300**	**1,400**	**900**	**900**	**5,000**	+
Paint Used Oil	Paints/Adhesives & Vehicle/Equipment Fluids	<100	<100	200	100	200	
Lead-acid (automotive) batteries Other batteries Mercury-Containing Items - Not Lamps Lamps - Fluorescent and LED	Universal Hazardous Waste	NA	NA	200	300	<100	
Medical Waste/Sharps	Medical Waste	<100	<100	200	400	4,700	+
Other Hazardous Waste	Other Hazardous Waste	1,300	1,400	200	NA	NA	
Other		**73,300**	**85,800**	**34,000**	**54,300**	**56,800**	
Tires	Tires	1,900	3,200	500	800	400	
Latex gloves Expanded Polystyrene Bioplastics Manure Asphalt Roofing Stranglers & Tanglers (hoses, rubber, etc.) Diapers and Sanitary Products Mixed Residue/Other Other Paper/Fiber - Packaging Aseptic Cartons Gable-top Cartons Paper/Fiber Food Service Ware Remainder/Composite Paper Flexible Plastic Pouches Plastic Cutlery Durable Plastic Items Other Plastic Other Glass	Materials not specified above	**71,400**	**82,600**	**33,500**	**53,500**	**56,400**	
TOTAL		**264,530**	**354,400**	**237,320**	**195,300**	**220,200**	
Note: Number of Samples for each study:		512	477	568	250	226	

Figure 21 presents the composition of the Commercial material groups from the current and previous four waste characterization studies (2017-18, 2018, 2000, and 1995) in graphic form.

Figure 21. Historical Commercial MSW Composition

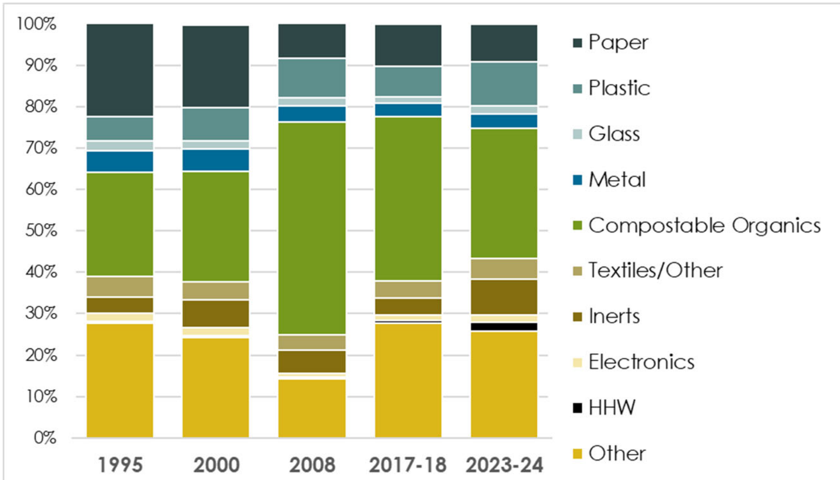
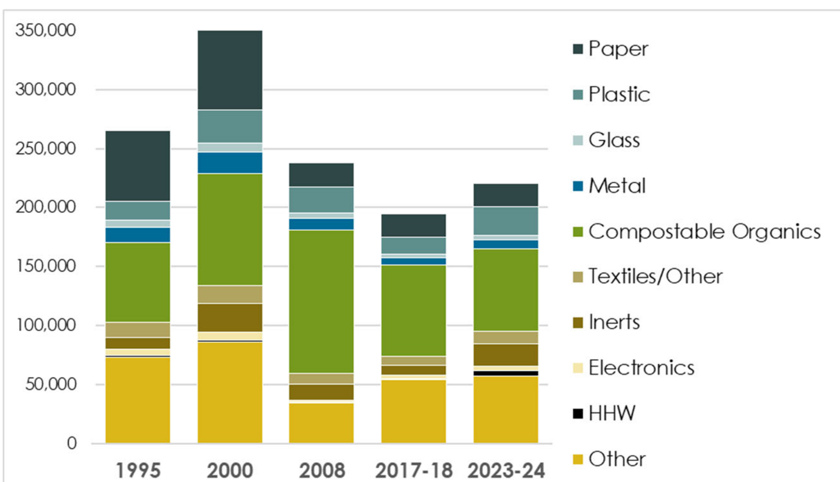


Figure 22 presents the annual Commercial tonnage by material group for the current and previous four studies.

Figure 22. Historical Annual Commercial MSW Tonnage



5.3.3 Comparison to 2021 California Statewide Waste Characterization

Table 31 provides a summary comparison of the 2023-24 Alameda County Commercial MSW composition to the 2021 CalRecycle statewide Commercial MSW composition. Statistically significant differences between the two studies are indicated when there is no overlap of the 90 percent confidence intervals and are noted as:

- "+" when the material proportion is greater for Alameda County than California statewide.
- "-" when the material proportion is lower for Alameda County than California statewide.

Table 31. Commercial Waste Composition: 2023-24 Alameda County vs. 2021 CalRecycle

Material Components			Alameda County 2023-24			CalRecycle 2021		
			Mean	90% Confidence Limits		Mean	90% Confidence Limits	
	Alameda County 2023-24	CalRecycle 2021	Composition	Lower	Upper	Composition	Lower	Upper
Paper			**13.0%** -	**12.3%**	**13.7%**	**17.2%**	**15.4%**	**19.0%**
	Uncoated Corrugated Cardboard	Corrugated Cardboard	3.9% -	3.5%	4.3%	6.9%	5.4%	8.4%
	Paper Grocery Bags	Paper Grocery Bags	0.2%	0.2%	0.2%	0.1%	<0.1%	0.2%
	Other Paper Bags/Kraft Paper	Other Paper Bags/Kraft Paper	0.5%	0.4%	0.6%	0.4%	0.4%	0.5%
	Recyclable Paper (no food/liquid contam	Newspapers/Newspaper Inserts White Office-type Paper and Mail Magazines and Catalogs Other Recyclable Paper	2.7%	2.2%	3.2%	3.1%	2.4%	3.8%
	Folding Cartons & Other Paperboard Pkg	Folding Cartons and Other Paperboard Packaging	1.7%	1.6%	1.9%	1.7%	1.2%	2.2%
	Other Paper/Fiber - Packaging	Other Paper/Fiber - Packaging	0.8%	0.6%	0.9%	1.3%	0.9%	1.7%
	Aseptic Cartons	Aseptic Containers	0.1%	<0.1%	0.1%	0.2%	0.1%	0.3%
	Gable-top Cartons	Gable-top Cartons	0.1%	0.1%	0.2%	0.2%	0.1%	0.3%
	Paper/Fiber Food Service Ware	Paper/Fiber Food Service Ware	1.8% -	1.6%	2.0%	2.5%	2.2%	2.8%
	Remainder/Composite Paper	Remainder/Composite Paper	1.2%	0.9%	1.5%	0.8%	0.5%	1.0%
Plastic			**14.1%**	**13.3%**	**15.0%**	**15.7%**	**14.2%**	**17.2%**
Containers	PETE Containers	PETE Beverage Containers - CRV PETE Bottles and Jars - Non-CRV	0.9%	0.9%	1.0%	1.2%	1.0%	1.3%
Containers	PETE Thermoform Containers	*Included in "Other Plastic Packaging"*	*	*	*	*	*	*
Containers	HDPE Containers	HDPE Beverage Containers - CRV HDPE Bottles and Jars - Non-CRV	0.7%	0.6%	0.8%	0.7%	0.5%	0.8%
Containers	PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Other Plastic Packaging	2.6% -	2.3%	2.8%	3.6%	3.2%	4.1%
Bags	Grocery/Merchandise	Plastic Grocery and Other Merchandise Bags	0.1%	<0.1%	0.1%	0.6%	0.5%	0.7%
Bags	"Reusable"	*Included in "Mixed Residue"*	*	*	*	*	*	*
Bags	Compostable	*Included in "Mixed Residue"*	*	*	*	*	*	*
Bags	Produce (pre-checkout)	*Included in "Mixed Residue"*	*	*	*	*	*	*
Film	Flexible Plastic Pouches	Flexible Plastic Pouches	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Film	Other Film (inc Ziplock bags)	Film Products- Non-Packaging Non-Bag Commercial and Industrial Packaging Film Other Film Bags and Plastic Mailing Pouches Plastic Trash Bags	6.7%	6.2%	7.3%	5.7%	4.6%	6.8%
	Plastic Cutlery	*Included in "Rigid Plastic Food Service Ware"*	*	*	*	*	*	*
	Durable Plastic Items	Durable Plastic Items	2.4%	2.0%	2.9%	2.6%	1.8%	3.4%
	Other	Remainder/Composite Plastic	1.3%	1.0%	1.6%	1.3%	1.0%	1.7%

Material Components		Alameda County 2023-24			CalRecycle 2021		
		Mean	90% Confidence Limits		Mean	90% Confidence Limits	
Alameda County 2023-24	CalRecycle 2021	Composition	Lower	Upper	Composition	Lower	Upper
Glass		**3.0%**	**2.2%**	**3.7%**	**3.2%**	**2.8%**	**3.7%**
Bottles & Containers — Non Wine/Spirit - CRV	Clear Glass Bottles and Containers - CRV	1.9% -	1.7%	2.1%	2.7%	2.4%	2.9%
	Green Glass Bottles and Containers - CRV						
	Brown Glass Bottles and Containers - CRV						
Bottles & Containers — Non Wine/Spirit - Non CRV	Clear Glass Bottles and Containers - Non-CRV						
	Green and Brown Glass Bottles and Containers - Non-CRV						
Bottles & Containers — Wine/Spirit	*Included in Glass Bottles & Containers*						
Inc in Bottles & Containers	Other Colored Glass Bottles and Containers						
Other	Remainder/Composite Glass	1.1%	0.3%	1.8%	0.6%	0.3%	0.9%
Metal		**3.4%**	**2.8%**	**3.9%**	**2.7%**	**2.2%**	**3.1%**
Tin/Steel Cans	Tin/Steel Cans	0.6%	0.5%	0.8%	0.4%	0.3%	0.5%
Aluminum Cans - CRV	Aluminum Cans - CRV	0.2%	0.2%	0.3%	0.3%	0.2%	0.3%
Aluminum Cans - Non CRV	Aluminum Cans - Non-CRV	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Other Ferrous	Other Ferrous	1.9%	1.4%	2.4%	1.5%	1.1%	1.9%
Other Non-Ferrous	Other Non-Ferrous	0.5%	0.4%	0.6%	0.4%	0.3%	0.5%
Textiles/Other		**3.0%**	**2.5%**	**3.4%**	**3.7%**	**2.7%**	**4.8%**
Cloth and Clothing	Textiles - Cloth and Clothing	2.1%	1.7%	2.4%	2.3%	1.8%	2.9%
Shoes, Purses, Belts	Textiles - Shoes, Purses, Belts	0.4%	0.3%	0.5%	0.7%	0.3%	1.1%
Carpet	Carpet	0.5%	0.2%	0.8%	0.7%	<0.1%	1.5%
Other	*Included in "Mixed Residue"*	*	*	*	*	*	*
Compostable Organics		**31.6%** +	**29.4%**	**33.8%**	**25.4%**	**23.3%**	**27.4%**
Leaves and Grass	Leaves and Grass	1.9%	1.3%	2.4%	1.2%	0.7%	1.8%
Chips, Prunings, Trimmings, Branches, Stumps	Prunings and Trimmings	1.4%	0.8%	2.1%	1.3%	0.7%	1.9%
	Branches and Stumps						
Food — Edible — Produce	Food - Potentially Donatable - Vegetative	9.8%	8.8%	10.9%	11.4%	10.3%	12.5%
	Food - Not Donatable - Non-meat						
Food — Edible — Meat	Food - Potentially Donatable - Meat						
	Food - Not Donatable - Meat						
Food — Edible — Cooked/Baked/Prepared/Bakery / Dairy/Other	Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives						
	Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items						
Food — Edible — Packaged/Non-Perishable/Shelf stable	Food - Potentially Donatable - Packaged Non-perishable						
Food — Inedible	Food - Inedible	7.3% +	6.5%	8.1%	2.9%	2.3%	3.4%
Compostable Paper — Packaging	*Included in Other Compostable Paper*	5.7% +	5.2%	6.2%	4.1%	3.7%	4.5%
Compostable Paper — Pizza Boxes	*Included in Other Compostable Paper*						
Compostable Paper — Other	Other Compostable Paper						
Wood — Untreated Lumber	Clean Dimensional Lumber	3.1%	2.0%	4.1%	2.6%	1.6%	3.7%
	Clean Engineered Wood						
Wood — Pallets	Clean Pallets and Crates	2.4%	1.4%	3.3%	1.9%	1.1%	2.6%

Material Components		Alameda County 2023-24				CalRecycle 2021		
		Mean		90% Confidence Limits		Mean	90% Confidence Limits	
Alameda County 2023-24	CalRecycle 2021	Composition		Lower	Upper	Composition	Lower	Upper
Inerts		**8.6%**	+	**6.9%**	**10.3%**	**4.4%**	**3.0%**	**5.9%**
Crushable Inerts	Concrete Rock, Soil and Fines	3.4%		2.3%	4.5%	2.7%	1.4%	3.9%
Gypsum Boards	Gypsum Board	0.5%		0.1%	0.8%	0.6%	0.3%	0.9%
Treated Wood Waste	Treated/Painted/Stained Wood	4.7%	+	3.5%	6.0%	1.2%	0.7%	1.7%
Electronics		**1.7%**		**1.2%**	**2.2%**	**1.7%**	**0.8%**	**2.6%**
Major Appliances	Major Appliances	0.4%		<0.1%	0.7%	0.3%	<0.1%	0.8%
Brown Goods	Large Equipment	0.7%		0.4%	1.0%	0.4%	<0.1%	0.8%
Computer Related Electronics	Covered Video Display Devices	0.2%		<0.1%	0.3%	0.4%	<0.1%	1.1%
Other Small Consumer	Consumer Electronics and Small Equipment	0.4%		0.3%	0.6%	0.6%	0.3%	0.8%
HHW		**0.1%**		**<0.1%**	**0.2%**	**0.3%**	**0.1%**	**0.5%**
Paint	Paint	0.1%		<0.1%	0.2%	0.2%	<0.1%	0.4%
Used Oil	Used Oil	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries	Lead-acid (automotive) batteries	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries	Other batteries	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps	*Included in "Mixed Residue"*	*		*	*	*	*	*
Lamps - Fluorescent and LED	*Included in "Mixed Residue"*	*		*	*	*	*	*
Medical Waste/Sharps	*Included in "Mixed Residue"*	*		*	*	*	*	*
Other		**21.5%**		**19.6%**	**23.5%**	**25.7%**	**22.6%**	**28.7%**
Tires	Tires	0.2%		<0.1%	0.3%	0.1%	<0.1%	0.2%
Latex gloves	*Included in "Personal Protective Eqipment (PPE)"*	*		*	*	*	*	*
Expanded Polystyrene	Expanded Polystyrene Packaging	0.4%		0.3%	0.5%	0.3%	0.1%	0.4%
Bioplastics	*Included in "Mixed Residue"*	*		*	*	*	*	*
Manure	Manures	0.1%		<0.1%	0.3%	0.8%	<0.1%	1.7%
Asphalt Roofing	Asphalt Roofing	<0.1%		<0.1%	0.2%	<0.1%	<0.1%	0.2%
Stranglers & Tanglers (hoses, rubber, etc.)	*Included in "Mixed Residue"*	*		*	*	*	*	*
Diapers and Sanitary Products	Diapers & Sanitary Products	3.1%		2.4%	3.7%	2.0%	1.7%	2.4%
Mixed Residue/Other	Remainder/Composite Metal Other Recyclable Wood Remainder/Composite Organic Remainder/Composite Inerts and Other Mattresses and Foundations Bulky Items Remainder/Composite Special Waste Personal Protective Equipment (PPE) Solar Panels Miscellaneous Inorganics Rigid Plastic Food Service Ware One-Pound or Less Propane Gas Cylinders Pharmaceuticals Remainder/Composite Household Hazardous Mixed Residue	17.8%	-	16.5%	19.0%	22.4%	19.5%	25.2%
TOTAL		**100.0%**				**100.0%**		
Note: Number of Samples for each study:		226				201		

5.4 ROLL-OFF CONTAINERS

5.4.1 2023-24 Waste Composition

About 157,000 tons of waste is disposed of in Roll-Off containers in Alameda County annually. Figure 23 presents the Roll-Off MSW stream by material group.

Figure 23. Roll-Off Container Waste Composition by Material Group

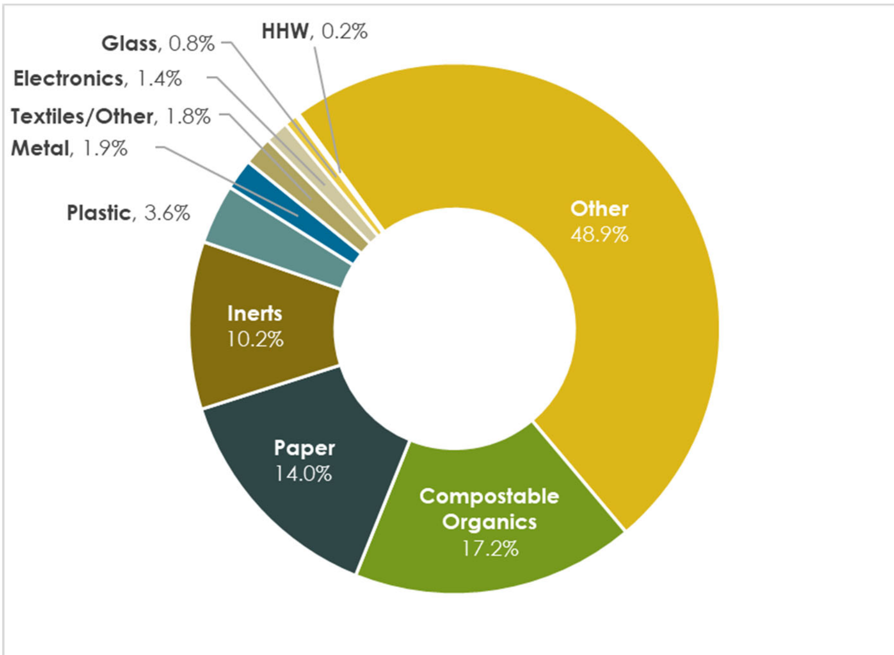


Table 32 presents the ten materials with the highest proportions of Roll-Off MSW, representing in total 83.6 percent. Table 33 presents a detailed composition of Roll-Off MSW based on 142 visually characterized waste loads.

Table 32. Top 10 Materials Represented in Roll-Off MSW

Material		Proportion
1	Mixed Residue/Other	46.2%
2	Uncoated Corrugated Cardboard	8.3%
3	Wood - Pallets	8.0%
4	Treated Wood Waste	5.4%
5	Gypsum Boards	3.8%
6	Wood - Untreated Lumber	3.4%
7	Recyclable Paper (no food/liquid contamination)	2.6%
8	Leaves and Grass	2.3%
9	Plastic Film - Other Film (includes Ziplock bags)	1.9%
10	Stranglers & Tanglers (hoses, rubber, etc.)	1.6%
	Total	**83.6%**

Table 33. Detailed Roll-Off Container Waste Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
						Lower	Upper
Paper			**22,100**	**14.0%**	**18.1%**	**11.5%**	**16.5%**
Uncoated Corrugated Cardboard			13,100	8.3%	12.6%	6.6%	10.1%
Paper Grocery Bags			<100	<0.1%	0.1%	<0.1%	<0.1%
Other Paper Bags/Kraft Paper			2,000	1.2%	6.9%	0.3%	2.2%
Recyclable Paper (no food/liquid contam)			4,100	2.6%	7.1%	1.6%	3.6%
Folding Cartons & Other Paperboard Pkg			1,200	0.8%	4.4%	0.2%	1.4%
Other Paper/Fiber - Packaging			300	0.2%	2.3%	<0.1%	0.5%
Aseptic Cartons			<100	<0.1%	<0.1%	<0.1%	<0.1%
Gable-top Cartons			<100	<0.1%	<0.1%	<0.1%	<0.1%
Paper/Fiber Food Service Ware			500	0.3%	2.6%	<0.1%	0.7%
Remainder/Composite Paper			800	0.5%	2.6%	0.1%	0.8%
Plastic			**5,700**	**3.6%**	**13.5%**	**1.8%**	**5.5%**
	Containers	PETE Containers	<100	<0.1%	0.2%	<0.1%	<0.1%
	Containers	PETE Thermoform Containers	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Containers	HDPE Containers	200	0.1%	1.7%	<0.1%	0.3%
	Containers	PP #5 Containers	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Containers	Other Plastic Containers (3, 4, 6, 7)	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Grocery/Merchandise	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	"Reusable"	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Compostable	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Produce (pre-checkout)	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Flexible Plastic Pouches	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Other Film (inc Ziplock bags)	3,100	1.9%	8.7%	0.7%	3.1%
		Plastic Cutlery	<100	<0.1%	<0.1%	<0.1%	<0.1%
		Durable Plastic Items	1,300	0.8%	2.0%	0.5%	1.1%
		Other	1,100	0.7%	9.4%	<0.1%	2.0%
Glass			**1,300**	**0.8%**	**4.2%**	**0.2%**	**1.4%**
	Bottles & Containers	Non Wine/Spirit - CRV	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bottles & Containers	Non Wine/Spirit - Non CRV	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bottles & Containers	Wine/Spirit	<100	<0.1%	0.2%	<0.1%	<0.1%
	Other		1,200	0.8%	4.2%	0.2%	1.4%
Metal			**3,000**	**1.9%**	**4.6%**	**1.2%**	**2.5%**
Tin/Steel Cans			<100	<0.1%	<0.1%	<0.1%	<0.1%
Aluminum Cans - CRV			<100	<0.1%	0.1%	<0.1%	<0.1%
Aluminum Cans - Non CRV			<100	<0.1%	0.1%	<0.1%	<0.1%
Other Ferrous			1,500	0.9%	2.9%	0.5%	1.3%
Other Non-Ferrous			1,400	0.9%	3.4%	0.4%	1.4%
Textiles/Other			**2,800**	**1.8%**	**5.4%**	**1.0%**	**2.5%**
Cloth and Clothing			1,700	1.1%	4.2%	0.5%	1.7%
Shoes, Purses, Belts			200	0.1%	0.8%	<0.1%	0.3%
Carpet			200	0.1%	2.1%	<0.1%	0.4%
Other			600	0.4%	2.3%	<0.1%	0.7%

Table 33 (continued). Detailed Roll-Off Container Waste Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Compostable Organics			**27,100**	**17.2%**	**24.9%**	**13.8%**	**20.7%**
Leaves and Grass			3,600	2.3%	13.7%	0.4%	4.2%
Chips, Prunings, Trimmings, Branches, Stumps			2,600	1.6%	8.4%	0.5%	2.8%
Food	Edible	Produce	<100	<0.1%	<0.1%	<0.1%	<0.1%
Food	Edible	Meat	<100	<0.1%	<0.1%	<0.1%	<0.1%
Food	Edible	Cooked/Baked/Prepared/Bakery/Dairy	<100	<0.1%	<0.1%	<0.1%	<0.1%
Food	Edible	Packaged/Non-Perishable/Shelf stable	<100	<0.1%	<0.1%	<0.1%	<0.1%
Food	Inedible		2,300	1.5%	7.6%	0.4%	2.5%
Compostable Paper		Packaging	<100	<0.1%	<0.1%	<0.1%	<0.1%
Compostable Paper		Pizza Boxes	<100	<0.1%	<0.1%	<0.1%	<0.1%
Compostable Paper		Other	700	0.4%	4.0%	<0.1%	1.0%
Wood		Untreated Lumber	5,400	3.4%	11.2%	1.9%	5.0%
Wood		Pallets	12,500	8.0%	16.4%	5.7%	10.2%
Inerts			**16,100**	**10.2%**	**21.4%**	**7.3%**	**13.2%**
Crushable Inerts			1,600	1.0%	8.4%	<0.1%	2.2%
Gypsum Boards			6,000	3.8%	12.3%	2.1%	5.5%
Treated Wood Waste			8,500	5.4%	15.7%	3.2%	7.6%
Electronics			**2,200**	**1.4%**	**5.5%**	**0.7%**	**2.2%**
Major Appliances			800	0.5%	3.7%	<0.1%	1.0%
Brown Goods			800	0.5%	3.3%	<0.1%	1.0%
Computer Related Electronics			200	0.2%	0.8%	<0.1%	0.3%
Other Small Consumer			400	0.2%	1.1%	<0.1%	0.4%
HHW			**300**	**0.2%**	**2.8%**	**<0.1%**	**0.6%**
Paint			<100	<0.1%	<0.1%	<0.1%	<0.1%
Used Oil			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED			<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps			300	0.2%	2.8%	<0.1%	0.6%
Other			**76,900**	**48.9%**	**29.7%**	**44.8%**	**53.0%**
Tires			<100	<0.1%	<0.1%	<0.1%	<0.1%
Latex gloves			<100	<0.1%	<0.1%	<0.1%	<0.1%
Expanded Polystyrene			600	0.4%	2.2%	<0.1%	0.7%
Bioplastics			<100	<0.1%	<0.1%	<0.1%	<0.1%
Manure			<100	<0.1%	<0.1%	<0.1%	<0.1%
Asphalt Roofing			<100	<0.1%	<0.1%	<0.1%	<0.1%
Stranglers & Tanglers (hoses, rubber, etc.)			2,600	1.6%	5.9%	0.8%	2.5%
Diapers and Sanitary Products			1,000	0.6%	4.8%	<0.1%	1.3%
Mixed Residue/Other			72,800	46.2%	28.9%	42.2%	50.2%
TOTAL			**157,400**	**100.0%**			

Note: Waste composition based on 142 samples.

5.4.2 Comparison to Previous Studies

Table 34 provides a summary comparison of the Roll-Off waste composition derived from previous studies. To facilitate a historical comparison, material types were converted to the material types of the current study. **Table 35** provides a summary comparison of the annual Roll-Off MSW tonnage destined for landfill disposal. For both Table 34 and Table 35, statistically significant differences between the 2023-24 study and the 2017-18 studies are indicated when there is no overlap of the 90 percent confidence intervals. Statistically significant differences are noted as:

- "+" when the proportion has increased from the 2017-18 study to the 2023-24 study.
- "-" when the proportion has decreased from the 2017-18 study to the 2013-24 study.

Material groups that have ***increased*** since the 2017-18 study include:

- **Paper** (by proportion and annual tonnage)
- **Plastic** (by annual tonnage only)
- **Metal** (by proportion and annual tonnage)
- **Inerts** (by proportion only)
- **Electronics** (by proportion and annual tonnage)

Material groups that have ***decreased*** since the 2017-18 study include:

- **Other** (by proportion only)

Material types that have ***increased*** since the 2017-18 study include:

- **Uncoated Corrugated Cardboard** (by proportion and annual tonnage)
- **Other Ferrous** (by proportion and annual tonnage)
- **Yard Waste** (by proportion only)
- **Wood Pallets** (by annual tonnage only)
- **Textiles/Leather** (by annual tonnage only)
- **Treated Wood Waste** (by proportion and annual tonnage)
- **Brown Goods/White Goods** (by proportion and annual tonnage)
- **Computer Related Electronics** (by proportion only)
- **Tires** (by proportion only)

Material types that have ***decreased*** since the 2017-18 study include:

- **Untreated Lumber** (by proportion only)
- **Carpet** (by proportion only)

Table 34. Historical Roll-Off Container Waste Composition

Material Components		Rolloff Waste Composition					
Alameda County 2023-24	**Alameda County 2017-18**	**1995**	**2000**	**2008**	**2017-18**	**2023-24**	
Paper		**17.9%**	**14.2%**	**17.4%**	**5.2%**	**13.0%**	+
Uncoated Corrugated Cardboard Paper Grocery Bags Other Paper Bags/Kraft Paper	Uncoated Corrugated Cardboard / Kraft Paper	8.6%	7.2%	6.9%	1.9%	9.6%	+
Recyclable Paper (no food/liquid contam) Folding Cartons & Other Paperboard Pkg	Recyclable Paper (no food/liquid contamination)	9.3%	7.0%	10.5%	3.3%	3.4%	
Plastic		**6.2%**	**5.1%**	**3.9%**	**0.2%**	**2.1%**	+
Containers: PETE Containers PETE Thermoform Containers HDPE Containers PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Bottles and Plastic Containers	0.4%	1.4%	0.3%	<0.1%	0.2%	
Bags: Grocery/Merchandise "Reusable" Compostable Produce (pre-checkout)	Plastic Bags	NA	NA	0.1%	<0.1%	<0.1%	
Other Film (inc Ziplock bags)	Other Film	5.8%	3.7%	3.5%	0.1%	1.9%	+
Glass							
Bottles & Containers - Non Wine/Spirit - CRV - Non Wine/Spirit - Non CRV - Wine/Spirit	Recyclable Glass Bottles/Containers	**1.3%**	**0.3%**	**1.2%**	**0.2%**	**<0.1%**	-
Metal		**4.3%**	**8.6%**	**4.8%**	**0.8%**	**1.9%**	+
Aluminum Cans - CRV Aluminum Cans - Non CRV	Aluminum Cans	0.2%	0.2%	0.1%	<0.1%	<0.1%	
Tin/Steel Cans	Steel Food/Beverage Containers	0.4%	0.2%	0.1%	<0.1%	<0.1%	
Other Ferrous	Other Ferrous	3.4%	7.3%	4.2%	0.5%	0.9%	
Other Non-Ferrous	Other Non-Ferrous	0.3%	0.9%	0.4%	0.2%	0.9%	+
Compostable Organics		**24.10%**	**25.40%**	**32.50%**	**14.9%**	**17.2%**	
Leaves and Grass Chips, Prunings, Trimmings, Branches, Stumps	Yard Waste	5.2%	2.8%	7.3%	2.6%	3.9%	
Food	Food Waste	5.6%	5.3%	11.5%	5.7%	1.5%	-
Compostable Paper - Packaging Compostable Paper - Pizza Boxes Compostable Paper - Other	Compostable Paper	NA	NA	2.0%	0.5%	0.4%	
Wood - Untreated Lumber	Clean Dimensional Lumber & Eng. Wood	13.3%	17.3%	3.5%	3.5%	3.4%	
Wood - Pallets	Pallets	NA	NA	8.2%	2.6%	8.0%	+
Textiles/Other		**4.1%**	**3.6%**	**3.2%**	**1.1%**	**1.8%**	
Cloth and Clothing Shoes, Purses, Belts Other	Textiles/Leather	4.1%	1.4%	2.3%	0.6%	1.6%	
Carpet	Carpet	NA	2.2%	0.9%	0.6%	0.1%	

Table 34 (continued). Historical Roll-Off Container Waste Composition

Material Components		Rolloff Waste Composition					
Alameda County 2023-24	**Alameda County 2017-18**	**1995**	**2000**	**2008**	**2017-18**	**2023-24**	
Inerts		**10.9%**	**15.1%**	**13.6%**	**7.0%**	**10.2%**	
Crushable Inerts	Crushable Inerts	3.1%	5.0%	4.7%	3.7%	1.0%	-
Gypsum Boards	Gypsum Boards	3.1%	2.6%	2.7%	1.8%	3.8%	
Treated Wood Waste	Treated Wood Waste	4.7%	7.5%	6.2%	1.5%	5.4%	+
Electronics		**1.4%**	**1.3%**	**0.4%**	**0.1%**	**1.4%**	+
Major Appliances Brown Goods	Brown Goods / White Goods	1.4%	1.3%	0.3%	0.1%	1.0%	+
Computer Related Electronics	Computer Related Electronics	NA	NA	0.4%	<0.1%	0.2%	
Other Small Consumer	Other Small Consumer				<0.1%	0.2%	+
HHW		**0.1%**	**0.7%**	**0.6%**	**<0.1%**	**0.2%**	
Paint Used Oil	Paints/Adhesives & Vehicle/Equipment Fluids	NA	NA	0.1%	<0.1%	<0.1%	
Lead-acid (automotive) batteries Other batteries Mercury-Containing Items - Not Lamps Lamps - Fluorescent and LED	Universal Hazardous Waste	NA	NA	0.3%	<0.1%	<0.1%	
Medical Waste/Sharps	Medical Waste	NA	NA	0.1%	<0.1%	0.2%	
Other Hazardous Waste	Other Hazardous Waste	0.1%	0.7%	0.1%	<0.1%	NA	
Other		**30.1%**	**25.6%**	**22.1%**	**70.3%**	**52.2%**	-
Tires	Tires	0.1%	0.1%	0.1%	<0.1%	<0.1%	
Latex gloves Expanded Polystyrene Bioplastics Manure Asphalt Roofing Stranglers & Tanglers (hoses, rubber, etc.) Diapers and Sanitary Products Mixed Residue/Other Other Paper/Fiber - Packaging Aseptic Cartons Gable-top Cartons Paper/Fiber Food Service Ware Remainder/Composite Paper Flexible Plastic Pouches Plastic Cutlery Durable Plastic Items Other Plastic Other Glass	Materials not specified above	**30.0%**	**25.5%**	**22.0%**	**70.3%**	**52.2%**	-
TOTAL		**100%**	**100%**	**100%**	**100%**	**100%**	
Note: Number of Samples for each study:		463	735	800	573	401	

Table 35. Historical Roll-Off Container Waste Tonnage by Material Type

Material Components			Annual Rolloff Waste Tonnage					
2023-24 Materials		2017-18 Materials	1995	2000	2008	2017-18	2023-24	
Paper			**60,600**	**58,000**	**47,500**	**8,700**	**20,400**	+
Uncoated Corrugated Cardboard Paper Grocery Bags Other Paper Bags/Kraft Paper		Uncoated Corrugated Cardboard / Kraft Paper	29,100	29,400	18,800	3,200	15,100	+
Recyclable Paper (no food/liquid contam) Folding Cartons & Other Paperboard Pkg		Recyclable Paper (no food/liquid contamination)	31,500	28,600	28,700	5,500	5,400	
Plastic			**21,100**	**20,700**	**10,500**	**400**	**3,300**	+
Containers	PETE Containers PETE Thermoform Containers HDPE Containers PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Bottles and Plastic Containers	1,300	5,800	700	100	300	
Bags	Grocery/Merchandise "Reusable" Compostable Produce (pre-checkout)	Plastic Bags	NA	NA	200	<100	<100	
	Other Film (inc Ziplock bags)	Other Film	19,700	14,900	9,600	200	3,100	+
Glass								
Bottles & Containers	- Non Wine/Spirit - CRV - Non Wine/Spirit - Non CRV - Wine/Spirit	Recyclable Glass Bottles/Containers	**4,300**	**1,200**	**3,300**	**400**	**<100**	-
Metal			**14,400**	**35,100**	**13,000**	**1,400**	**3,000**	+
Aluminum Cans - CRV Aluminum Cans - Non CRV		Aluminum Cans	500	1,000	300	<100	<100	
Tin/Steel Cans		Steel Food/Beverage Containers	1,300	900	200	<100	<100	
Other Ferrous		Other Non-Ferrous	11,600	29,700	11,500	400	1,500	
Other Non-Ferrous		Other Ferrous	1,000	3,600	1,000	900	1,400	+
Compostable Organics			**81,600**	**103,300**	**89,000**	**24,900**	**27,100**	
Leaves and Grass Chips, Prunings, Trimmings, Branches, Stumps		Yard Waste	17,500	11,400	19,900	4,400	6,200	
Food		Food Waste	19,000	21,700	31,600	9,400	2,300	-
Compostable Paper - Packaging Compostable Paper - Pizza Boxes Compostable Paper - Other		Compostable Paper	NA	NA	5,500	900	700	
Wood - Untreated Lumber		Clean Dimensional Lumber & Eng. Wood	45,100	70,200	9,600	5,900	5,400	
Wood - Pallets		Pallets	NA	NA	22,400	4,400	12,500	+
Textiles/Other			**13,800**	**14,900**	**8,700**	**1,900**	**2,800**	
Cloth and Clothing Shoes, Purses, Belts Other		Textiles/Leather	13,800	5,800	6,300	1,000	2,500	
Carpet		Carpet	NA	9,100	2,400	1,000	200	

Table 35 (continued). Historical Roll-Off Container Tonnage by Material Type

Material Components		Annual Rolloff Waste Tonnage					
2023-24 Materials	2017-18 Materials	1995	2000	2008	2017-18	2023-24	
Inerts		**36,700**	**61,200**	**37,200**	**11,800**	**16,100**	
Crushable Inerts	Crushable Inerts	10,400	20,200	12,700	6,100	1,600	-
Gypsum Boards	Gypsum Boards	10,400	10,700	7,400	3,100	6,000	
Treated Wood Waste	Treated Wood Waste	15,900	30,300	17,100	2,600	8,500	+
Electronics		**4,800**	**5,400**	**1,600**	**200**	**2,200**	+
Major Appliances Brown Goods	Brown Goods / White Goods	4,800	5,400	600	200	1,600	+
Computer Related Electronics	Computer Related Electronics	NA	NA	1,000	<100	200	
Other Small Consumer	Other Small Consumer				<100	400	+
HHW		**300**	**2,800**	**1,900**	**<100**	**300**	
Paint Used Oil	Paints/Adhesives & Vehicle/Equipment Fluids	NA	NA	400	<100	<100	
Lead-acid (automotive) batteries Other batteries Mercury-Containing Items - Not Lamps Lamps - Fluorescent and LED	Universal Hazardous Waste	NA	NA	900	<100	<100	
Medical Waste/Sharps	Medical Waste	NA	NA	200	<100	300	
Other Hazardous Waste	Other Hazardous Waste	300	2,800	400	<100	NA	
Other		**101,600**	**103,900**	**60,900**	**117,400**	**82,200**	-
Tires	Tires	200	600	400	<100	<100	
Latex gloves Expanded Polystyrene Bioplastics Manure Asphalt Roofing Stranglers & Tanglers (hoses, rubber, etc.) Diapers and Sanitary Products Mixed Residue/Other Other Paper/Fiber - Packaging Aseptic Cartons Gable-top Cartons Paper/Fiber Food Service Ware Remainder/Composite Paper Flexible Plastic Pouches Plastic Cutlery Durable Plastic Items Other Plastic Other Glass	Materials not specified above	**101,400**	**103,300**	**60,500**	**117,400**	**82,200**	-
TOTAL		**339,200**	**406,500**	**273,400**	**167,000**	**157,400**	
Note: Number of Samples for each study:		463	735	800	573	401	

Figure 24 presents the composition of the Roll-Off material groups from the current and previous four waste characterization studies (2017-18, 2018, 2000, and 1995) in graphic form.

Figure 24. Historical Roll-Off Container Composition

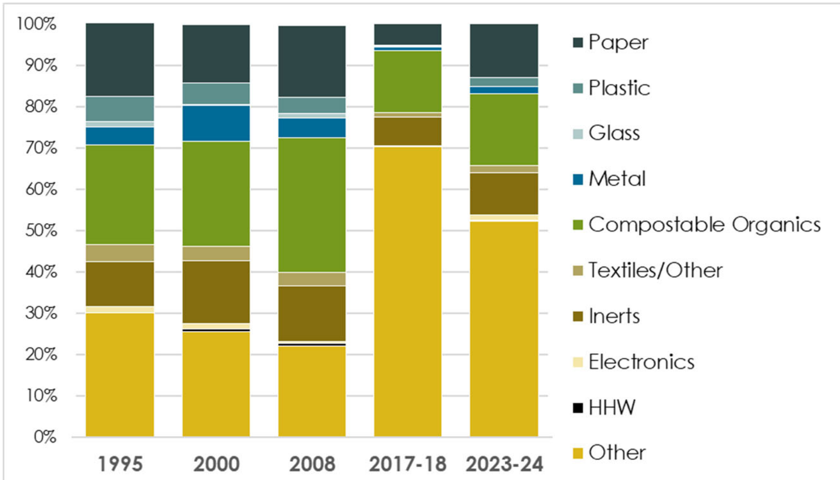
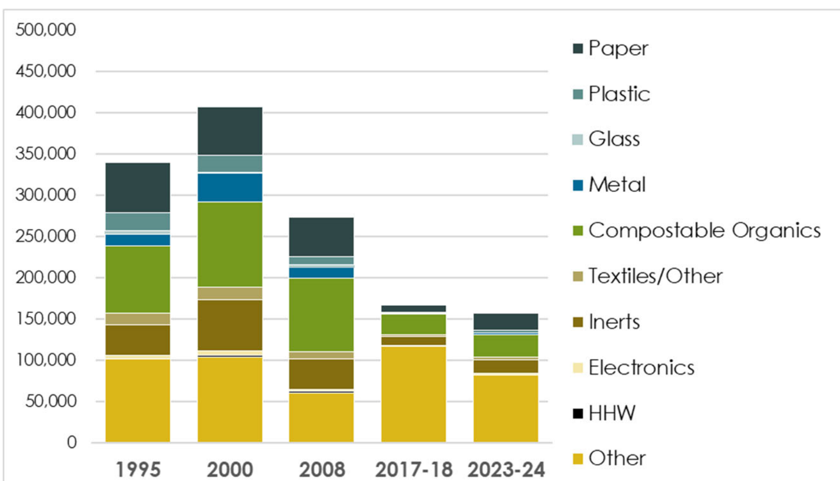


Figure 25 presents the annual Roll-Off container tonnage by material group for the current and previous four studies.

Figure 25. Historical Roll-Off Container MSW Tonnage



5.4.3 Comparison to 2021 California Statewide Waste Characterization

MSW disposed of in Roll-Off containers was not characterized as a separate sector of the 2021 CalRecycle statewide waste characterization study.

5.5 SELF-HAUL

5.5.1 2017-18 Waste Composition

About 450,200 tons of waste is Self-Hauled by the generator to a disposal site in Alameda County annually. **Figure 26** presents the Self-Haul MSW stream by material group.

Figure 26. Self-Haul Waste Composition by Material Group

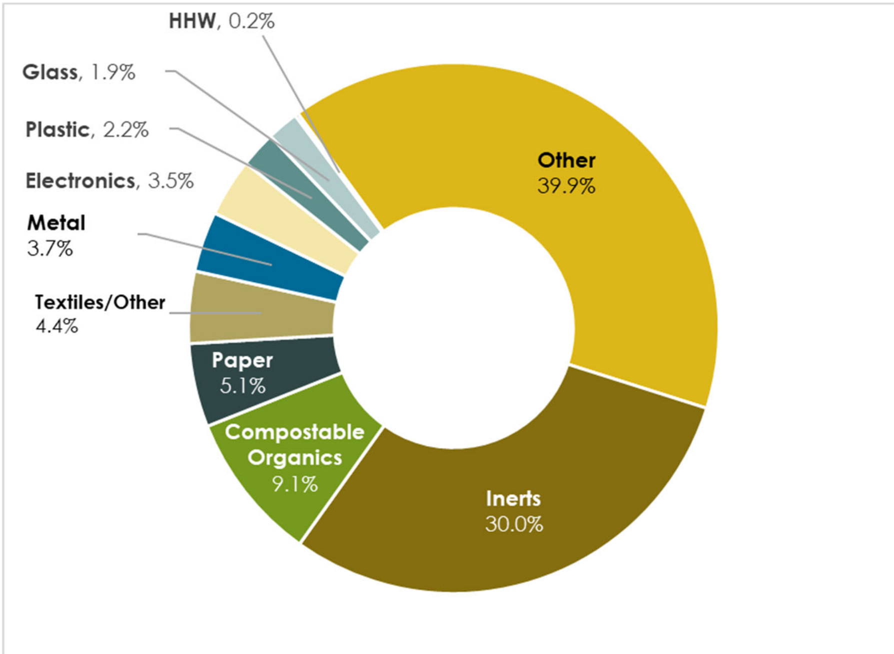


Table 36 presents the ten materials with the highest proportions of Self-Haul MSW, representing in total 83.1 percent. **Table 37** presents a detailed composition of Self-Haul MSW based on 401 visually characterized waste loads.

Table 36. Top 10 Materials Represented in Self-Haul MSW

	Material	Proportion
1	Mixed Residue/Other	36.0%
2	Treated Wood Waste	17.3%
3	Crushable Inerts	7.9%
4	Gypsum Boards	4.8%
5	Uncoated Corrugated Cardboard	3.9%
6	Leaves and Grass	3.6%
7	Other Ferrous	3.4%
8	Wood - Untreated Lumber	2.2%
9	Asphalt Roofing	2.1%
10	Other Textiles/Other	2.0%
	Total	**83.1%**

Table 37. Detailed Self-Haul Waste Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Paper			**23,000**	**5.1%**	**13.4%**	**4.0%**	**6.2%**
	Uncoated Corrugated Cardboard		17,800	3.9%	11.8%	3.0%	4.9%
	Paper Grocery Bags		1,000	0.2%	4.5%	<0.1%	0.6%
	Other Paper Bags/Kraft Paper		600	0.1%	1.5%	<0.1%	0.2%
	Recyclable Paper (no food/liquid contam)		2,300	0.5%	3.1%	0.3%	0.8%
	Folding Cartons & Other Paperboard Pkg		1,100	0.3%	3.4%	<0.1%	0.5%
	Other Paper/Fiber - Packaging		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Aseptic Cartons		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Gable-top Cartons		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Paper/Fiber Food Service Ware		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Remainder/Composite Paper		100	<0.1%	0.4%	<0.1%	<0.1%
Plastic			**9,900**	**2.2%**	**13.0%**	**1.1%**	**3.3%**
	Containers	PETE Containers	200	<0.1%	0.8%	<0.1%	0.1%
	Containers	PETE Thermoform Containers	<100	<0.1%	0.7%	<0.1%	<0.1%
	Containers	HDPE Containers	<100	<0.1%	0.7%	<0.1%	<0.1%
	Containers	PP #5 Containers	100	<0.1%	1.0%	<0.1%	0.1%
	Containers	Other Plastic Containers (3, 4, 6, 7)	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Grocery/Merchandise	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	"Reusable"	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Compostable	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Produce (pre-checkout)	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Flexible Plastic Pouches	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Other Film (inc Ziplock bags)	1,400	0.3%	1.4%	0.2%	0.4%
		Plastic Cutlery	300	<0.1%	5.0%	<0.1%	0.5%
		Durable Plastic Items	6,900	1.5%	10.4%	0.7%	2.4%
		Other	700	0.2%	5.2%	<0.1%	0.6%
Glass			**8,700**	**1.9%**	**10.4%**	**1.1%**	**2.8%**
	Bottles & Containers	Non Wine/Spirit - CRV	1,000	0.2%	5.0%	<0.1%	0.6%
	Bottles & Containers	Non Wine/Spirit - Non CRV	400	<0.1%	1.0%	<0.1%	0.2%
	Bottles & Containers	Wine/Spirit	100	<0.1%	0.8%	<0.1%	<0.1%
	Other		7,200	1.6%	9.1%	0.9%	2.4%
Metal			**16,500**	**3.7%**	**9.4%**	**2.9%**	**4.4%**
	Tin/Steel Cans		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Aluminum Cans - CRV		200	<0.1%	0.5%	<0.1%	<0.1%
	Aluminum Cans - Non CRV		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Other Ferrous		15,100	3.4%	9.3%	2.6%	4.1%
	Other Non-Ferrous		1,200	0.3%	2.2%	<0.1%	0.5%
Textiles/Other			**19,800**	**4.4%**	**16.0%**	**3.1%**	**5.7%**
	Cloth and Clothing		7,900	1.7%	5.3%	1.3%	2.2%
	Shoes, Purses, Belts		<100	<0.1%	0.2%	<0.1%	<0.1%
	Carpet		3,000	0.7%	3.5%	0.4%	1.0%
	Other		8,800	2.0%	14.6%	0.8%	3.2%

Table 37 (continued). Detailed Self-Haul Waste Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Compostable Organics			**40,900**	**9.1%**	**22.0%**	**7.3%**	**10.9%**
Leaves and Grass			16,400	3.6%	13.9%	2.5%	4.8%
Chips, Prunings, Trimmings, Branches, Stumps			7,300	1.6%	10.2%	0.8%	2.5%
Food	Edible	Produce	<100	<0.1%	<0.1%	<0.1%	<0.1%
Food	Edible	Meat	300	<0.1%	2.6%	<0.1%	0.3%
Food	Edible	Cooked/Baked/Prepared/Bakery/Dairy	<100	<0.1%	<0.1%	<0.1%	<0.1%
Food	Edible	Packaged/Non-Perishable/Shelf stable	200	<0.1%	0.6%	<0.1%	<0.1%
Food	Inedible		600	0.1%	1.4%	<0.1%	0.3%
Compostable Paper		Packaging	<100	<0.1%	<0.1%	<0.1%	<0.1%
Compostable Paper		Pizza Boxes	<100	<0.1%	0.5%	<0.1%	<0.1%
Compostable Paper		Other	100	<0.1%	0.8%	<0.1%	0.1%
Wood		Untreated Lumber	9,800	2.2%	10.5%	1.3%	3.0%
Wood		Pallets	6,200	1.4%	9.5%	0.6%	2.1%
Inerts			**135,000**	**30.0%**	**31.9%**	**27.4%**	**32.6%**
Crushable Inerts			35,500	7.9%	16.6%	6.5%	9.3%
Gypsum Boards			21,600	4.8%	12.1%	3.8%	5.8%
Treated Wood Waste			77,900	17.3%	27.7%	15.0%	19.6%
Electronics			**15,900**	**3.5%**	**9.6%**	**2.7%**	**4.3%**
Major Appliances			7,300	1.6%	6.4%	1.1%	2.1%
Brown Goods			5,500	1.2%	4.5%	0.9%	1.6%
Computer Related Electronics			2,800	0.6%	5.4%	0.2%	1.1%
Other Small Consumer			300	<0.1%	1.2%	<0.1%	0.2%
HHW			**900**	**0.2%**	**3.1%**	**<0.1%**	**0.4%**
Paint			800	0.2%	3.1%	<0.1%	0.4%
Used Oil			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED			<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps			<100	<0.1%	0.1%	<0.1%	<0.1%
Other			**179,600**	**39.9%**	**30.4%**	**37.4%**	**42.4%**
Tires			600	0.1%	1.3%	<0.1%	0.2%
Latex gloves			<100	<0.1%	<0.1%	<0.1%	<0.1%
Expanded Polystyrene			800	0.2%	1.5%	<0.1%	0.3%
Bioplastics			<100	<0.1%	<0.1%	<0.1%	<0.1%
Manure			<100	<0.1%	<0.1%	<0.1%	<0.1%
Asphalt Roofing			9,200	2.1%	9.1%	1.3%	2.8%
Stranglers & Tanglers (hoses, rubber, etc.)			5,800	1.3%	8.0%	0.6%	2.0%
Diapers and Sanitary Products			1,000	0.2%	4.7%	<0.1%	0.6%
Mixed Residue/Other			162,100	36.0%	29.5%	33.6%	38.4%
TOTAL			**450,200**	**100.0%**			

Note: Waste composition based on 401 samples.

5.5.2 Comparison to Previous Studies

Table 38 provides a summary comparison of the Self-Haul waste composition derived from previous studies. To facilitate a historical comparison, material types were converted to the material types of the current study. **Table 39** provides a summary comparison of the annual Self-Haul MSW tonnage destined for landfill disposal. For both Table 38 and Table 39, statistically significant differences between the 2023-24 study and the 2017-18 studies are indicated when there is no overlap of the 90 percent confidence intervals. Statistically significant differences are noted as:

- "+" when the proportion has increased from the 2017-18 study to the 2023-24 study.
- "-" when the proportion has decreased from the 2017-18 study to the 2013-24 study.

Material groups that have ***increased*** since the 2017-18 study include:

- **Paper** (by proportion and annual tonnage)
- **Plastic** (by annual tonnage only)
- **Metal** (by proportion and annual tonnage)
- **Compostable Organics** (by annual tonnage only)
- **Inerts** (by proportion and annual tonnage)
- **Electronics** (by proportion and annual tonnage)

Material groups that have decreased since the 2017-18 study include:

- **Other** (by proportion only)

Materials that have ***increased*** since the 2017-18 study include:

- **Uncoated Corrugated Cardboard** (by proportion and annual tonnage)
- **Other Ferrous Metals** (by proportion and annual tonnage)
- **Yard Waste** (by proportion and annual tonnage)
- **Textiles/Leather** (by proportion and annual tonnage only)
- **Gypsum Board** (by annual tonnage only)
- **Treated Wood Waste** (by proportion and annual tonnage)
- **Brown Goods/White Goods** (by proportion and annual tonnage)
- **Computer Related Electronics** (by proportion and annual tonnage)
- **Tires** (by proportion and annual tonnage)

Materials that have ***decreased*** since the 2017-18 study include:

- **Untreated Lumber** (by proportion only)
- **Carpet** (by proportion and annual tonnage)

Table 38. Historical Self-Haul Waste Composition

Material Components: Alameda County 2023-24	Alameda County 2017-18	Self-Haul Waste Composition: 1995	2000	2008	2017-18	2023-24	
Paper		**7.7%**	**5.3%**	**8.4%**	**1.8%**	**5.1%**	+
Uncoated Corrugated Cardboard Paper Grocery Bags Other Paper Bags/Kraft Paper	Uncoated Corrugated Cardboard / Kraft Paper	2.2%	2.8%	3.6%	1.0%	4.3%	+
Recyclable Paper (no food/liquid contam) Folding Cartons & Other Paperboard Pkg	Recycla	5.5%	2.5%	4.8%	0.7%	0.8%	
Plastic		**0.9%**	**1.2%**	**1.6%**	**0.1%**	**0.4%**	
Containers: PETE Containers PETE Thermoform Containers HDPE Containers PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Bottles and Plastic Containers	0.2%	0.6%	0.2%	<0.1%	0.1%	
Bags: Grocery/Merchandise "Reusable" Compostable Produce (pre-checkout)	Plastic Bags	NA	NA	0.1%	<0.1%	<0.1%	
Other Film (inc Ziplock bags)	Other Film	0.7%	0.6%	1.3%	<0.1%	0.3%	+
Glass							
Bottles & Containers: - Non Wine/Spirit - CRV - Non Wine/Spirit - Non CRV - Wine/Spirit	Recyclable Glass Bottles/Containers	**0.5%**	**0.2%**	**0.6%**	**<0.1%**	**0.3%**	
Metal		**4.1%**	**6.1%**	**4.4%**	**1.1%**	**3.7%**	+
Aluminum Cans - CRV Aluminum Cans - Non CRV	Aluminum Cans	0.1%	<0.1%	0.1%	<0.1%	<0.1%	
Tin/Steel Cans	Steel Food/Beverage Containers	0.1%	0.1%	<0.1%	<0.1%	<0.1%	
Other Ferrous	Other Ferrous	3.4%	5.4%	3.7%	0.9%	3.4%	+
Other Non-Ferrous	Other Non-Ferrous	0.5%	0.6%	0.6%	0.2%	0.3%	
Compostable Organics		**36.10%**	**29.10%**	**18.40%**	**9.0%**	**8.8%**	
Leaves and Grass Chips, Prunings, Trimmings, Branches, Stumps	Yard Waste	20.1%	17.2%	9.5%	2.6%	5.3%	+
Food	Food Waste	2.5%	0.5%	1.7%	0.6%	<0.1%	
Compostable Paper - Packaging Compostable Paper - Pizza Boxes Compostable Paper - Other	Compostable Paper	NA	NA	0.3%	<0.1%	<0.1%	
Wood - Untreated Lumber	Clean Dimensional Lumber & Eng. Wood	13.5%	11.4%	6.0%	4.6%	2.2%	-
Wood - Pallets	Pallets	NA	NA	0.9%	1.2%	1.4%	
Textiles/Other		**6.0%**	**6.7%**	**9.0%**	**3.4%**	**4.4%**	
Cloth and Clothing Shoes, Purses, Belts Other	Textiles/Leather	6.0%	1.2%	4.7%	0.6%	3.7%	+
Carpet	Carpet	NA	5.5%	4.3%	2.7%	0.7%	-

Table 38 (continued). Historical Self-Haul Waste Composition

Material Components		Self-Haul Waste Composition					
Alameda County 2023-24	**Alameda County 2017-18**	**1995**	**2000**	**2008**	**2017-18**	**2023-24**	
Inerts		**14.8%**	**23.5%**	**31.4%**	**17.7%**	**30.0%**	+
Crushable Inerts	Crushable Inerts	5.3%	7.6%	10.1%	9.3%	7.9%	
Gypsum Boards	Gypsum Boards	3.0%	5.1%	4.7%	4.3%	4.8%	
Treated Wood Waste	Treated Wood Waste	6.5%	10.8%	16.6%	4.2%	17.3%	+
Electronics		**2.3%**	**1.7%**	**1.2%**	**0.1%**	**3.5%**	+
Major Appliances Brown Goods	Brown Goods / White Goods	2.3%	1.7%	0.7%	<0.1%	2.8%	+
Computer Related Electronics	Computer Related Electronics	NA	NA	0.5%	<0.1%	0.6%	+
Other Small Consumer	Other Small Consumer				<0.1%	<0.1%	
HHW		**0.2%**	**0.4%**	**0.8%**	**<0.1%**	**0.2%**	
Paint Used Oil	Paints/Adhesives & Vehicle/Equipment Fluids	NA	NA	0.3%	<0.1%	0.2%	
Lead-acid (automotive) batteries Other batteries Mercury-Containing Items - Not Lamps Lamps - Fluorescent and LED	Universal Hazardous Waste	NA	NA	0.3%	<0.1%	<0.1%	
Medical Waste/Sharps	Medical Waste	NA	NA	<0.1%	<0.1%	<0.1%	
Other Hazardous Waste	Other Hazardous Waste	0.2%	0.4%	0.2%	<0.1%	NA	
Other		**27.4%**	**25.9%**	**24.3%**	**66.7%**	**43.3%**	-
Tires	Tires	0.2%	0.3%	<0.1%	<0.1%	0.1%	+
Latex gloves Expanded Polystyrene Bioplastics Manure Asphalt Roofing Stranglers & Tanglers (hoses, rubber, etc.) Diapers and Sanitary Products Mixed Residue/Other Other Paper/Fiber - Packaging Aseptic Cartons Gable-top Cartons Paper/Fiber Food Service Ware Remainder/Composite Paper Flexible Plastic Pouches Plastic Cutlery Durable Plastic Items Other Plastic Other Glass	Materials not specified above	**27.2%**	**25.6%**	**24.3%**	**66.7%**	**43.1%**	-
TOTAL		**100%**	**100%**	**100%**	**100%**	**100%**	
Note: Number of Samples for each study:		463	735	800	573	401	

Table 39. Historical Self-Haul Waste Tonnage by Material Type

Material Components		Annual Self Haul Waste Tonnage					
2023-24 Materials	**2017-18 Materials**	**1995**	**2000**	**2008**	**2017-18**	**2023-24**	
Paper		**35,500**	**17,700**	**22,700**	**5,300**	**22,800**	+
Uncoated Corrugated Cardboard Paper Grocery Bags Other Paper Bags/Kraft Paper	Uncoated Corrugated Cardboard / Kraft Paper	10,200	9,200	9,700	3,100	19,400	+
Recyclable Paper (no food/liquid contam) Folding Cartons & Other Paperboard Pkg	Recyclable Paper (no food/liquid contamination)	25,300	8,500	12,900	2,200	3,500	
Plastic		**4,500**	**4,300**	**3,900**	**400**	**1,900**	+
Containers: PETE Containers PETE Thermoform Containers HDPE Containers PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Bottles and Plastic Containers	1,300	2,100	400	200	500	
Bags: Grocery/Merchandise "Reusable" Compostable Produce (pre-checkout)	Plastic Bags	NA	NA	200	<100	<100	
Other Film (inc Ziplock bags)	Other Film	3,200	2,100	3,400	200	1,400	+
Glass							
Bottles & Containers: - Non Wine/Spirit - CRV - Non Wine/Spirit - Non CRV - Wine/Spirit	Recyclable Glass Bottles/Containers	**2,200**	**500**	**1,700**	**100**	**1,500**	
Metal		**18,800**	**20,700**	**11,900**	**3,200**	**16,500**	+
Aluminum Cans - CRV Aluminum Cans - Non CRV	Aluminum Cans	400	200	200	<100	200	
Tin/Steel Cans	Steel Food/Beverage Containers	500	300	100	<100	<100	
Other Ferrous	Other Non-Ferrous	15,800	2,000	10,000	500	15,100	+
Other Non-Ferrous	Other Ferrous	2,100	18,300	1,600	2,600	1,200	
Compostable Organics		**168,000**	**97,800**	**49,700**	**26,600**	**39,800**	
Leaves and Grass Chips, Prunings, Trimmings, Branches, Stumps	Yard Waste	93,700	57,700	25,700	7,600	23,700	+
Food	Food Waste	11,600	1,600	4,500	1,800	<100	
Compostable Paper - Packaging Compostable Paper - Pizza Boxes Compostable Paper - Other	Compostable Paper	NA	NA	900	100	200	
Wood - Untreated Lumber	Clean Dimensional Lumber & Eng. Wood	62,700	38,500	16,100	13,600	9,800	
Wood - Pallets	Pallets	NA	NA	2,600	3,600	6,200	
Textiles/Other		**28,000**	**22,500**	**24,200**	**10,000**	**19,800**	+
Cloth and Clothing Shoes, Purses, Belts Other	Textiles/Leather	28,000	4,100	12,600	1,900	16,800	+
Carpet	Carpet	NA	18,400	11,500	8,000	3,000	-

Table 39 (continued). Historical Self-Haul Waste Tonnage by Material Type

Material Components		AnnualSelf Haul Waste Tonnage					
2023-24 Materials	2017-18 Materials	1995	2000	2008	2017-18	2023-24	
Inerts		**69,300**	**78,900**	**84,500**	**52,500**	**135,000**	+
Crushable Inerts	Crushable Inerts	24,900	25,400	27,100	27,500	35,500	
Gypsum Boards	Gypsum Boards	14,100	17,000	12,600	12,600	21,600	+
Treated Wood Waste	Treated Wood Waste	30,300	36,400	44,800	12,400	77,900	+
Electronics		**10,800**	**5,700**	**3,100**	**300**	**15,900**	+
Major Appliances Brown Goods	Brown Goods / White Goods	10,800	5,700	1,800	200	12,800	+
Computer Related Electronics	Computer Related Electronics	NA	NA	1,300	<100	2,800	+
Other Small Consumer	Other Small Consumer				100	300	
HHW		**1,100**	**1,200**	**2,000**	**<100**	**900**	
Paint Used Oil	Paints/Adhesives & Vehicle/Equipment Fluids	NA	NA	600	<100	800	
Lead-acid (automotive) batteries Other batteries Mercury-Containing Items - Not Lamps Lamps - Fluorescent and LED	Universal Hazardous Waste	NA	NA	700	<100	<100	
Medical Waste/Sharps	Medical Waste	NA	NA	<100	<100	<100	
Other Hazardous Waste	Other Hazardous Waste	1,100	1,200	600	<100	NA	
Other		**127,300**	**87,000**	**65,500**	**197,500**	**194,900**	
Tires	Tires	1,100	900	<100	<100	600	+
Latex gloves Expanded Polystyrene Bioplastics Manure Asphalt Roofing Stranglers & Tanglers (hoses, rubber, etc.) Diapers and Sanitary Products Mixed Residue/Other Other Paper/Fiber - Packaging Aseptic Cartons Gable-top Cartons Paper/Fiber Food Service Ware Remainder/Composite Paper Flexible Plastic Pouches Plastic Cutlery Durable Plastic Items Other Plastic Other Glass	Materials not specified above	**126,200**	**86,100**	**65,400**	**197,500**	**194,200**	
TOTAL		**465,600**	**336,200**	**269,200**	**295,900**	**448,900**	
Note: Number of Samples for each study:		463	735	800	573	401	

Figure 27 presents the composition of the Self-Haul material groups from the current and previous four waste characterization studies (2017-18, 2018, 2000, and 1995) in graphic form.

Figure 27. Historical Self-Haul MSW Composition

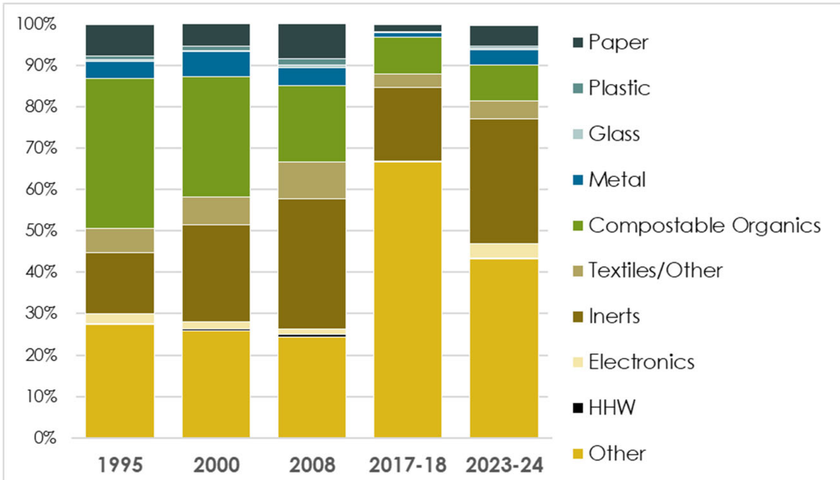
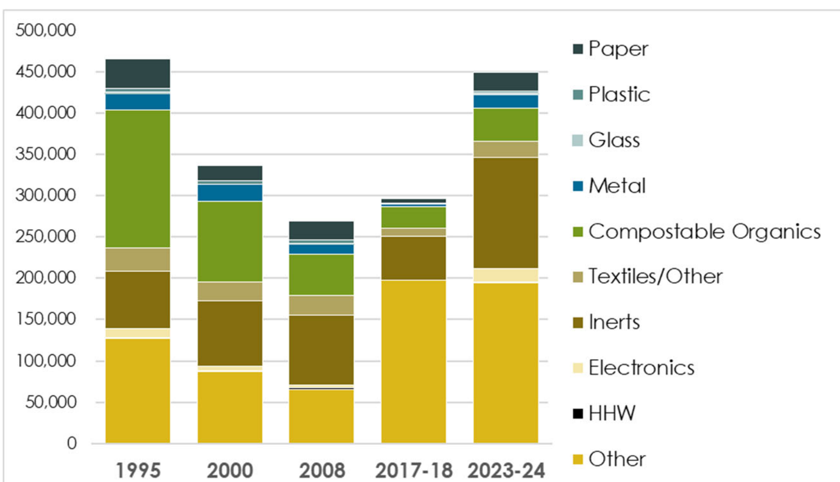


Figure 28 presents the annual Self-Haul tonnage by material group for the current and previous four studies.

Figure 28. Historical Annual Self-Haul MSW Tonnage



5.5.3 Comparison to 2021 California Statewide Waste Characterization

Table 40 provides a summary comparison of the 2023-24 Alameda County Self-Haul MSW composition to the 2021 CalRecycle statewide Self-Haul MSW composition. Statistically significant differences between the 2023-24 study and the 2017-18 studies are indicated when there is no overlap of the 90 percent confidence intervals and are noted as:

- "+" when the material proportion is greater for Alameda County than California statewide.
- "-" when the material proportion is lower for Alameda County than California statewide.

Table 40. Self-Haul Waste Composition: 2023-24 Alameda County vs. 2021 CalRecycle

Material Components			Alameda County 2023-24			CalRecycle 2021		
			Mean	90% Confidence Limits		Mean	90% Confidence Limits	
	Alameda County 2023-24	CalRecycle 2021	Composition	Lower	Upper	Composition	Lower	Upper
Paper			**5.1%**	**4.0%**	**6.2%**	**4.1%**	**3.0%**	**5.2%**
	Uncoated Corrugated Cardboard	Corrugated Cardboard	3.9%	3.0%	4.9%	2.3%	1.3%	3.2%
	Paper Grocery Bags	Paper Grocery Bags	0.2%	<0.1%	0.6%	<0.1%	<0.1%	<0.1%
	Other Paper Bags/Kraft Paper	Other Paper Bags/Kraft Paper	0.1%	<0.1%	0.2%	<0.1%	<0.1%	0.1%
	Recyclable Paper (no food/liquid contam)	Newspapers/Newspaper Inserts White Office-type Paper and Mail Magazines and Catalogs Other Recyclable Paper	0.5%	0.3%	0.8%	0.8%	0.4%	1.2%
	Folding Cartons & Other Paperboard Pkg	Folding Cartons and Other Paperboard Packaging	0.3%	<0.1%	0.5%	0.1%	<0.1%	0.2%
	Other Paper/Fiber - Packaging	Other Paper/Fiber - Packaging	<0.1% -	<0.1%	<0.1%	<0.1%	<0.1%	0.1%
	Aseptic Cartons	Aseptic Containers	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
	Gable-top Cartons	Gable-top Cartons	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
	Paper/Fiber Food Service Ware	Paper/Fiber Food Service Ware	<0.1%	<0.1%	<0.1%	0.3%	<0.1%	0.5%
	Remainder/Composite Paper	Remainder/Composite Paper	<0.1%	<0.1%	<0.1%	0.4%	0.1%	0.6%
Plastic			**2.1%** -	**1.2%**	**3.1%**	**5.9%**	**4.1%**	**7.8%**
Containers	PETE Containers	PETE Beverage Containers - CRV PETE Bottles and Jars - Non-CRV	<0.1%	<0.1%	0.1%	0.1%	<0.1%	0.2%
Containers	PETE Thermoform Containers	*Included in "Other Plastic Packaging"*	*	*	*	*	*	*
Containers	HDPE Containers	HDPE Beverage Containers - CRV HDPE Bottles and Jars - Non-CRV	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Containers	PP #5 Containers Other Plastic Containers (3, 4, 6, 7)	Other Plastic Packaging	<0.1% -	<0.1%	0.1%	0.7%	0.2%	1.1%
Bags	Grocery/Merchandise	Plastic Grocery and Other Merchandise Bags	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Bags	"Reusable"	*Included in "Mixed Residue"*	*	*	*	*	*	*
Bags	Compostable	*Included in "Mixed Residue"*	*	*	*	*	*	*
Bags	Produce (pre-checkout)	*Included in "Mixed Residue"*	*	*	*	*	*	*
Film	Flexible Plastic Pouches	Flexible Plastic Pouches	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Film	Other Film (inc Ziplock bags)	Film Products- Non-Packaging Non-Bag Commercial and Industrial Packaging Film Other Film Bags and Plastic Mailing Pouches Plastic Trash Bags	0.3% -	0.2%	0.4%	1.5%	0.9%	2.2%
	Plastic Cutlery	*Included in "Rigid Plastic Food Service Ware"*	*	*	*	*	*	*
	Durable Plastic Items	Durable Plastic Items	1.5%	0.7%	2.4%	3.1%	1.5%	4.7%
	Other	Remainder/Composite Plastic	0.2%	<0.1%	0.6%	0.5%	0.2%	0.8%

Material Components		Alameda County 2023-24			CalRecycle 2021		
		Mean	90% Confidence Limits		Mean	90% Confidence Limits	
Alameda County 2023-24	**CalRecycle 2021**	**Composition**	**Lower**	**Upper**	**Composition**	**Lower**	**Upper**
Glass		**1.9%**	**1.1%**	**2.8%**	**1.0%**	**0.4%**	**1.6%**
Bottles & Containers – Non Wine/Spirit - CRV	Clear Glass Bottles and Containers - CRV Green Glass Bottles and Containers - CRV Brown Glass Bottles and Containers - CRV	0.3%	<0.1%	0.8%	0.3%	0.2%	0.4%
Bottles & Containers – Non Wine/Spirit - Non CRV	Clear Glass Bottles and Containers - Non-CRV Green and Brown Glass Bottles and Containers - Non-CRV						
Bottles & Containers – Wine/Spirit	*Included in Glass Bottles & Containers*						
Bottles & Containers – *Inc in Bottles & Containers*	Other Colored Glass Bottles and Containers						
Other	Remainder/Composite Glass	1.6%	0.9%	2.4%	0.7%	0.1%	1.2%
Metal		**3.7%**	**2.9%**	**4.5%**	**6.2%**	**4.4%**	**7.9%**
Tin/Steel Cans	Tin/Steel Cans	<0.1%	<0.1%	<0.1%	0.1%	<0.1%	0.2%
Aluminum Cans - CRV	Aluminum Cans - CRV	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Aluminum Cans - Non CRV	Aluminum Cans - Non-CRV	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Other Ferrous	Other Ferrous	3.4%	2.6%	4.1%	4.9%	3.2%	6.6%
Other Non-Ferrous	Other Non-Ferrous	0.3%	<0.1%	0.5%	1.1%	0.6%	1.6%
Textiles/Other		**2.4%**	**1.9%**	**2.9%**	**4.3%**	**2.4%**	**6.2%**
Cloth and Clothing	Textiles - Cloth and Clothing	1.7%	1.3%	2.2%	1.3%	0.7%	2.0%
Shoes, Purses, Belts	Textiles - Shoes, Purses, Belts	<0.1%	<0.1%	<0.1%	<0.1%	<0.1%	0.2%
Carpet	Carpet	0.7%	0.4%	1.0%	2.9%	1.1%	4.7%
Other	*Included in "Mixed Residue"*	*	*	*	*	*	*
Compostable Organics		**9.1%**	**7.2%**	**10.9%**	**27.1%**	**22.1%**	**32.1%**
Leaves and Grass	Leaves and Grass	3.6%	2.5%	4.8%	2.7%	0.8%	4.6%
Chips, Prunings, Trimmings, Branches, Stump	Prunings and Trimmings Branches and Stumps	1.6%	0.8%	2.5%	8.7%	5.5%	11.9%
Food – Edible – Produce	Food - Potentially Donatable - Vegetative Food - Not Donatable - Non-meat	0.1%	<0.1%	0.3%	1.6%	0.9%	1.7%
Food – Edible – Meat	Food - Potentially Donatable - Meat Food - Not Donatable - Meat						
Food – Edible – Cooked/Baked/Prepared/Bakery/ Dairy/Other	Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items						
Food – Edible – Packaged/Non-Perishable/Shelf stable	Food - Potentially Donatable - Packaged Non-perishable						
Food – Inedible	Food - Inedible	0.1%	<0.1%	0.3%	0.1%	<0.1%	0.3%
Compostable Paper – Packaging	*Included in Other Compostable Paper*	<0.1%	<0.1%	0.1%	0.3%	0.2%	0.3%
Compostable Paper – Pizza Boxes	*Included in Other Compostable Paper*						
Compostable Paper – Other	Other Compostable Paper						
Wood – Untreated Lumber	Clean Dimensional Lumber Clean Engineered Wood	2.2%	1.3%	3.0%	11.2%	8.6%	13.7%
Wood – Pallets	Clean Pallets and Crates	1.4%	0.6%	2.1%	2.5%	0.8%	4.2%

Material Components		Alameda County 2023-24				CalRecycle 2021		
		Mean		90% Confidence Limits		Mean	90% Confidence Limits	
Alameda County 2023-24	CalRecycle 2021	Composition		Lower	Upper	Composition	Lower	Upper
Inerts		**30.0%**	+	**27.2%**	**32.8%**	**22.4%**	**18.1%**	**26.7%**
Crushable Inerts	Concrete Rock, Soil and Fines	7.9%		6.5%	9.3%	8.5%	5.6%	11.5%
Gypsum Boards	Gypsum Board	4.8%		3.8%	5.8%	5.4%	3.4%	7.5%
Treated Wood Waste	Treated/Painted/Stained Wood	17.3%	+	15.0%	19.6%	8.5%	6.1%	10.8%
Electronics		**3.5%**	+	**2.8%**	**4.3%**	**1.3%**	**0.4%**	**2.2%**
Major Appliances	Major Appliances	1.6%		1.1%	2.1%	0.9%	<0.1%	1.8%
Brown Goods	Large Equipment	1.2%	+	0.9%	1.6%	<0.1%	<0.1%	0.1%
Computer Related Electronics	Covered Video Display Devices	0.6%	+	0.2%	1.1%	<0.1%	<0.1%	<0.1%
Other Small Consumer	Consumer Electronics and Small Equipment	<0.1%		<0.1%	0.2%	0.3%	<0.1%	0.6%
HHW		**0.2%**		**<0.1%**	**0.4%**	**<0.1%**	**<0.1%**	**0.2%**
Paint	Paint	0.2%		<0.1%	0.4%	<0.1%	<0.1%	0.2%
Used Oil	Used Oil	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries	Lead-acid (automotive) batteries	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries	Other batteries	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps	*Included in "Mixed Residue"*	*		*	*	*	*	*
Lamps - Fluorescent and LED	*Included in "Mixed Residue"*	*		*	*	*	*	*
Medical Waste/Sharps	*Included in "Mixed Residue"*	*		*	*	*	*	*
Other		**41.9%**	+	**38.7%**	**45.2%**	**27.6%**	**22.6%**	**32.5%**
Tires	Tires	0.1%		<0.1%	0.2%	0.1%	<0.1%	0.3%
Latex gloves	*Included in "Personal Protective Eqipment (PPE)"*	*		*	*	*	*	*
Expanded Polystyrene	Expanded Polystyrene Packaging	0.2%		<0.1%	0.3%	0.1%	<0.1%	0.2%
Bioplastics	*Included in "Mixed Residue"*	*		*	*	*	*	*
Manure	Manures	<0.1%		<0.1%	<0.1%	<0.1%	<0.1%	<0.1%
Asphalt Roofing	Asphalt Roofing	2.1%		1.3%	2.8%	4.5%	2.1%	6.9%
Stranglers & Tanglers (hoses, rubber, etc.)	*Included in "Mixed Residue"*	*		*	*	*	*	*
Diapers and Sanitary Products	Diapers & Sanitary Products	0.2%		<0.1%	0.6%	<0.1%	<0.1%	<0.1%
Mixed Residue/Other	Remainder/Composite Metal Other Recyclable Wood Remainder/Composite Organic Remainder/Composite Inerts and Other Mattresses and Foundations Bulky Items Remainder/Composite Special Waste Personal Protective Equipment (PPE) Solar Panels Miscellaneous Inorganics Rigid Plastic Food Service Ware One-Pound or Less Propane Gas Cylinders Pharmaceuticals Remainder/Composite Household Hazardous Mixed Residue	39.3%	+	36.6%	42.1%	22.7%	18.4%	27.0%
TOTAL		**100.0%**				**100.0%**		
Note: Number of Samples for each study:		401				152		

5.6 RESIDENTIAL SOURCE-SEPARATED RECYCLING (SSR)

5.6.1 2023-24 Waste Composition

About 139,100 tons of Residential SSR are generated annually. **Figure 29** presents the Residential SSR stream by material group.

Figure 29. Residential SSR Composition by Material Group

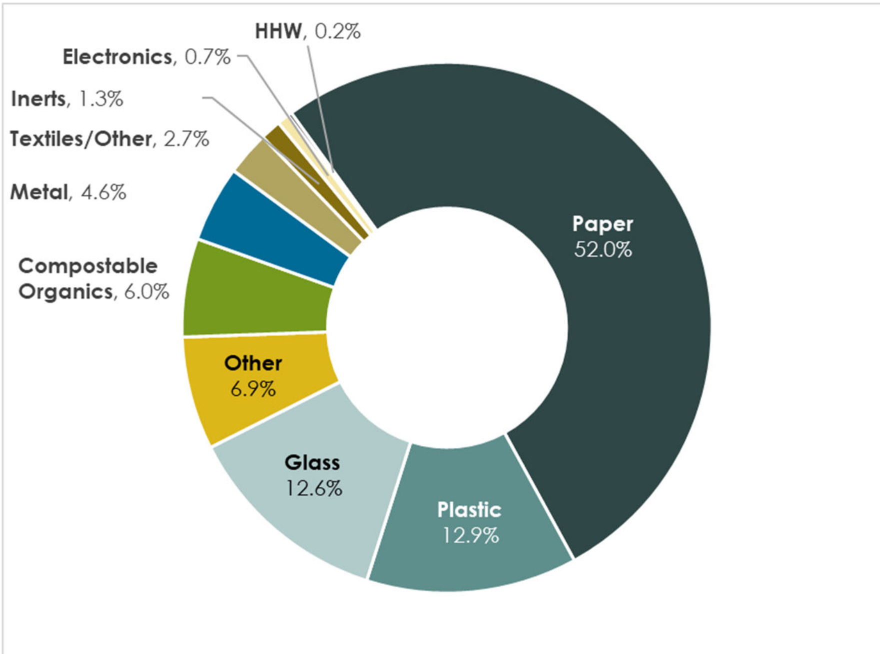


Table 41 presents the ten materials with the highest proportions of Residential SSR, representing in total 69.8 percent. **Table 42** presents a detailed composition of Residential SSR based on 109 manually sorted samples.

Table 41. Top 10 Materials Represented in Residential SSR

Material		Proportion
1	Uncoated Corrugated Cardboard	26.4%
2	Recyclable Paper (no food/liquid contamination)	13.0%
3	Glass Bottles & Containers Wine/Spirit	7.5%
4	Folding Cartons & Other Paperboard Pkg	6.3%
5	Mixed Residue/Other	5.4%
6	PETE Containers	2.6%
7	Glass Bottles & Containers Non Wine/Spirit - Non CRV	2.4%
8	Plastic Film - Other Film (includes Ziplock bags)	2.1%
9	HDPE Containers	2.1%
10	Other Paper Bags/Kraft Paper	2.0%
	Total	**69.8%**

Table 42. Detailed Residential SSR Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Paper			**72,300**	**52.0%**	**12.3%**	**50.1%**	**54.0%**
	Uncoated Corrugated Cardboard		36,700	26.4%	1.0%	26.2%	26.5%
	Paper Grocery Bags		1,000	0.7%	<0.1%	0.6%	0.8%
	Other Paper Bags/Kraft Paper		2,800	2.0%	1.5%	1.8%	2.2%
	Recyclable Paper (no food/liquid contam)		18,100	13.0%	1.0%	11.8%	14.2%
	Folding Cartons & Other Paperboard Pkg		8,700	6.3%	2.2%	6.0%	6.6%
	Other Paper/Fiber - Packaging		1,700	1.2%	0.6%	1.0%	1.4%
	Aseptic Cartons		400	0.3%	0.2%	0.2%	0.4%
	Gable-top Cartons		800	0.5%	2.5%	0.5%	0.6%
	Paper/Fiber Food Service Ware		1,300	1.0%	1.1%	0.9%	1.0%
	Remainder/Composite Paper		900	0.7%	0.5%	0.5%	0.8%
Plastic			**17,900**	**12.9%**	**4.1%**	**12.2%**	**13.5%**
	Containers	PETE Containers	3,600	2.6%	1.2%	2.4%	2.8%
	Containers	PETE Thermoform Containers	1,800	1.3%	0.6%	1.2%	1.4%
	Containers	HDPE Containers	2,900	2.1%	1.2%	1.9%	2.3%
	Containers	PP #5 Containers	2,100	1.5%	0.7%	1.4%	1.6%
	Containers	Other Plastic Containers (3, 4, 6, 7)	700	0.5%	0.4%	0.5%	0.6%
	Bags	Grocery/Merchandise	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	"Reusable"	500	0.4%	0.3%	0.3%	0.4%
	Bags	Compostable	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Produce (pre-checkout)	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Flexible Plastic Pouches	<100	<0.1%	0.1%	<0.1%	<0.1%
	Film	Other Film (inc Ziplock bags)	3,000	2.1%	1.0%	2.0%	2.3%
		Plastic Cutlery	<100	<0.1%	<0.1%	<0.1%	<0.1%
		Durable Plastic Items	2,100	1.5%	1.5%	1.2%	1.7%
		Other	1,000	0.7%	1.0%	0.6%	0.9%
Glass			**17,600**	**12.6%**	**8.8%**	**11.3%**	**14.0%**
	Bottles & Containers	Non Wine/Spirit - CRV	2,700	2.0%	2.0%	1.7%	2.3%
	Bottles & Containers	Non Wine/Spirit - Non CRV	3,300	2.4%	2.3%	2.0%	2.7%
	Bottles & Containers	Wine/Spirit	10,500	7.5%	6.3%	6.5%	8.5%
	Other		1,100	0.8%	1.7%	0.5%	1.0%
Metal			**6,500**	**4.6%**	**3.0%**	**4.2%**	**5.1%**
	Tin/Steel Cans		2,100	1.5%	1.1%	1.3%	1.7%
	Aluminum Cans - CRV		1,200	0.9%	0.5%	0.8%	1.0%
	Aluminum Cans - Non CRV		300	0.2%	0.5%	0.2%	0.3%
	Other Ferrous		1,700	1.3%	2.4%	0.9%	1.6%
	Other Non-Ferrous		1,100	0.8%	1.5%	0.5%	1.0%
Textiles/Other			**3,700**	**2.7%**	**3.7%**	**2.1%**	**3.3%**
	Cloth and Clothing		1,500	1.1%	2.2%	0.8%	1.5%
	Shoes, Purses, Belts		500	0.3%	0.6%	0.2%	0.4%
	Carpet		<100	<0.1%	0.2%	<0.1%	<0.1%
	Other		1,700	1.2%	2.5%	0.8%	1.6%

Table 42 (continued). Detailed Residential SSR Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Compostable Organics			**8,300**	**6.0%**	**1.9%**	**5.7%**	**6.3%**
Leaves and Grass			300	0.2%	1.1%	<0.1%	0.4%
Chips, Prunings, Trimmings, Branches, Stumps			200	0.1%	0.5%	<0.1%	0.2%
Food	Edible	Produce	300	0.2%	0.4%	0.1%	0.3%
Food	Edible	Meat	200	0.1%	0.3%	<0.1%	0.2%
Food	Edible	Cooked/Baked/Prepared/Bakery/Dairy	1,700	1.2%	1.6%	0.9%	1.5%
Food	Edible	Packaged/Non-Perishable/Shelf stable	1,100	0.8%	0.9%	0.6%	0.9%
Food	Inedible		800	0.6%	0.9%	0.4%	0.8%
Compostable Paper	Packaging		1,200	0.9%	0.7%	0.8%	1.0%
Compostable Paper	Pizza Boxes		1,000	0.7%	0.6%	0.6%	0.8%
Compostable Paper	Other		1,400	1.0%	0.7%	0.9%	1.1%
Wood	Untreated Lumber		200	0.2%	0.4%	<0.1%	0.2%
Wood	Pallets		<100	<0.1%	<0.1%	<0.1%	<0.1%
Inerts			**1,800**	**1.3%**	**2.9%**	**0.8%**	**1.7%**
Crushable Inerts			500	0.3%	1.4%	0.1%	0.6%
Gypsum Boards			<100	<0.1%	<0.1%	<0.1%	<0.1%
Treated Wood Waste			1,300	0.9%	2.5%	0.5%	1.3%
Electronics			**1,000**	**0.7%**	**1.8%**	**0.5%**	**1.0%**
Major Appliances			<100	<0.1%	<0.1%	<0.1%	<0.1%
Brown Goods			300	0.3%	1.2%	<0.1%	0.4%
Computer Related Electronics			300	0.2%	1.1%	<0.1%	0.4%
Other Small Consumer			400	0.3%	0.7%	0.2%	0.4%
HHW			**300**	**0.2%**	**0.6%**	**0.1%**	**0.3%**
Paint			<100	<0.1%	0.3%	<0.1%	<0.1%
Used Oil			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries			<100	<0.1%	0.3%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED			<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps			200	0.1%	0.4%	<0.1%	0.2%
Other			**9,600**	**6.9%**	**4.9%**	**6.1%**	**7.7%**
Tires			<100	<0.1%	<0.1%	<0.1%	<0.1%
Latex gloves			200	0.1%	0.7%	<0.1%	0.2%
Expanded Polystyrene			400	0.3%	0.5%	0.2%	0.3%
Bioplastics			<100	<0.1%	<0.1%	<0.1%	<0.1%
Manure			<100	<0.1%	<0.1%	<0.1%	<0.1%
Asphalt Roofing			<100	<0.1%	<0.1%	<0.1%	<0.1%
Stranglers & Tanglers (hoses, rubber, etc.)			400	0.3%	1.3%	<0.1%	0.5%
Diapers and Sanitary Products			1,000	0.7%	1.3%	0.5%	0.9%
Mixed Residue/Other			7,500	5.4%	4.3%	4.7%	6.1%
TOTAL			**139,100**	**100.0%**			

Note: Waste composition based on 109 samples.

5.7 COMMERCIAL SSR

5.7.1 2023-24 Waste Composition

About 54,500 tons of Commercial SSR are generated annually. **Figure 30** presents the Commercial SSR stream by material group.

Figure 30. Commercial SSR Composition by Material Group

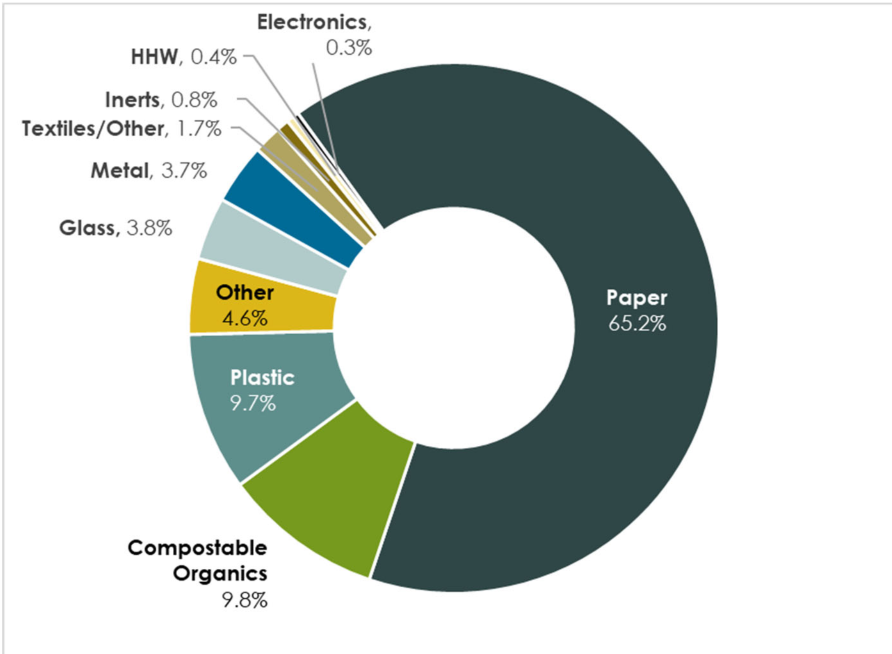


Table 43 presents the ten materials with the highest proportions of Commercial SSR, representing in total 78.3 percent. **Table 44** presents a detailed composition of Commercial SSR based on 43 manually sorted samples.

Table 43. Top 10 Materials Represented in Commercial SSR

Material		Proportion
1	Uncoated Corrugated Cardboard	51.9%
2	Recyclable Paper (no food/liquid contamination)	5.7%
3	Mixed Residue/Other	3.7%
4	Folding Cartons & Other Paperboard Pkg	2.9%
5	Glass Bottles & Containers Wine/Spirit	2.8%
6	HDPE Containers	2.4%
7	Compostable Paper - Other	2.2%
8	Plastic Film - Other Film (includes Ziplock bags)	2.2%
9	Durable Plastic Items	2.2%
10	Other Paper Bags/Kraft Paper	2.2%
	Total	**78.3%**

Table 44. Detailed Commercial SSR Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Paper			**35,500**	**65.2%**	**18.8%**	**60.5%**	**69.9%**
	Uncoated Corrugated Cardboard		28,300	51.9%	19.9%	46.9%	56.9%
	Paper Grocery Bags		100	0.3%	0.3%	0.2%	0.3%
	Other Paper Bags/Kraft Paper		1,200	2.2%	8.1%	0.1%	4.2%
	Recyclable Paper (no food/liquid contam)		3,100	5.7%	9.3%	3.4%	8.0%
	Folding Cartons & Other Paperboard Pkg		1,600	2.9%	3.0%	2.2%	3.7%
	Other Paper/Fiber - Packaging		500	0.9%	1.6%	0.5%	1.3%
	Aseptic Cartons		<100	0.1%	0.2%	<0.1%	0.2%
	Gable-top Cartons		<100	0.2%	0.2%	0.1%	0.2%
	Paper/Fiber Food Service Ware		200	0.5%	0.6%	0.3%	0.6%
	Remainder/Composite Paper		300	0.5%	0.5%	0.4%	0.7%
Plastic			**5,300**	**9.7%**	**5.2%**	**8.4%**	**11.0%**
	Containers	PETE Containers	400	0.7%	0.7%	0.6%	0.9%
	Containers	PETE Thermoform Containers	200	0.3%	0.3%	0.2%	0.4%
	Containers	HDPE Containers	1,300	2.4%	1.5%	2.1%	2.8%
	Containers	PP #5 Containers	300	0.5%	0.7%	0.3%	0.7%
	Containers	Other Plastic Containers (3, 4, 6, 7)	100	0.2%	0.3%	0.2%	0.3%
	Bags	Grocery/Merchandise	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	"Reusable"	<100	0.2%	0.4%	<0.1%	0.3%
	Bags	Compostable	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Produce (pre-checkout)	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Flexible Plastic Pouches	<100	<0.1%	0.3%	<0.1%	0.1%
	Film	Other Film (inc Ziplock bags)	1,200	2.2%	1.8%	1.7%	2.7%
		Plastic Cutlery	<100	<0.1%	0.2%	<0.1%	0.1%
		Durable Plastic Items	1,200	2.2%	2.3%	1.6%	2.8%
		Other	400	0.7%	1.3%	0.4%	1.0%
Glass			**2,100**	**3.8%**	**7.7%**	**1.9%**	**5.8%**
	Bottles & Containers	Non Wine/Spirit - CRV	200	0.4%	0.7%	0.3%	0.6%
	Bottles & Containers	Non Wine/Spirit - Non CRV	200	0.4%	0.6%	0.3%	0.6%
	Bottles & Containers	Wine/Spirit	1,500	2.8%	7.5%	0.9%	4.7%
	Other		<100	0.2%	0.6%	<0.1%	0.3%
Metal			**2,000**	**3.7%**	**4.9%**	**2.5%**	**4.9%**
	Tin/Steel Cans		300	0.6%	0.6%	0.5%	0.8%
	Aluminum Cans - CRV		100	0.2%	0.3%	0.2%	0.3%
	Aluminum Cans - Non CRV		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Other Ferrous		1,200	2.2%	5.1%	0.9%	3.4%
	Other Non-Ferrous		300	0.6%	1.2%	0.3%	0.9%
Textiles/Other			**900**	**1.7%**	**3.0%**	**1.0%**	**2.5%**
	Cloth and Clothing		500	0.9%	2.0%	0.4%	1.4%
	Shoes, Purses, Belts		<100	0.2%	0.6%	<0.1%	0.3%
	Carpet		100	0.2%	0.7%	<0.1%	0.4%
	Other		300	0.5%	1.0%	0.2%	0.7%

Table 44 (continued). Detailed Commercial SSR Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits	
						Lower	Upper
Compostable Organics			**5,300**	**9.8%**	**2.0%**	**9.3%**	**10.3%**
Leaves and Grass			900	1.7%	8.8%	<0.1%	3.9%
Chips, Prunings, Trimmings, Branches, Stumps			200	0.3%	1.9%	<0.1%	0.8%
Food	Edible	Produce	200	0.4%	1.4%	<0.1%	0.9%
		Meat	<100	<0.1%	0.3%	<0.1%	0.2%
		Cooked/Baked/Prepared/Bakery/Dairy	300	0.5%	1.4%	<0.1%	1.1%
		Packaged/Non-Perishable/Shelf stable	<100	0.1%	0.2%	<0.1%	0.2%
	Inedible		1,100	2.0%	5.5%	<0.1%	4.2%
Compostable Paper		Packaging	700	1.2%	3.6%	0.3%	2.1%
		Pizza Boxes	200	0.4%	0.7%	0.2%	0.6%
		Other	1,200	2.2%	5.5%	0.9%	3.6%
Wood		Untreated Lumber	200	0.4%	1.3%	<0.1%	0.7%
		Pallets	200	0.4%	2.1%	<0.1%	0.9%
Inerts			**400**	**0.8%**	**2.6%**	**0.1%**	**1.4%**
Crushable Inerts			200	0.3%	1.8%	<0.1%	0.8%
Gypsum Boards			<100	<0.1%	<0.1%	<0.1%	<0.1%
Treated Wood Waste			200	0.4%	1.0%	0.2%	0.7%
Electronics			**200**	**0.3%**	**1.4%**	**<0.1%**	**0.7%**
Major Appliances			<100	<0.1%	<0.1%	<0.1%	<0.1%
Brown Goods			<100	<0.1%	0.1%	<0.1%	<0.1%
Computer Related Electronics			<100	<0.1%	0.3%	<0.1%	0.1%
Other Small Consumer			200	0.3%	1.4%	<0.1%	0.6%
HHW			**200**	**0.4%**	**1.9%**	**<0.1%**	**0.9%**
Paint			<100	<0.1%	<0.1%	<0.1%	<0.1%
Used Oil			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED			<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps			200	0.4%	1.9%	<0.1%	0.9%
Other			**2,500**	**4.6%**	**5.2%**	**3.3%**	**5.9%**
Tires			<100	<0.1%	<0.1%	<0.1%	<0.1%
Latex gloves			<100	<0.1%	0.2%	<0.1%	0.1%
Expanded Polystyrene			100	0.2%	0.3%	0.1%	0.3%
Bioplastics			<100	<0.1%	<0.1%	<0.1%	<0.1%
Manure			<100	<0.1%	<0.1%	<0.1%	<0.1%
Asphalt Roofing			<100	<0.1%	<0.1%	<0.1%	<0.1%
Stranglers & Tanglers (hoses, rubber, etc.)			<100	0.1%	0.5%	<0.1%	0.2%
Diapers and Sanitary Products			300	0.5%	1.2%	0.2%	0.8%
Mixed Residue/Other			2,000	3.7%	4.9%	2.5%	4.9%
TOTAL			**54,500**	**100.0%**			

Note: Waste composition based on 43 samples.

5.8 RESIDENTIAL SOURCE-SEPARATED ORGANICS (SSO)

5.8.1 2023-24 Waste Composition

About 202,800 tons of Residential SSO are generated annually. **Figure 31** presents the Residential SSO stream by material group.

Figure 31. Residential SSO Composition by Material Group

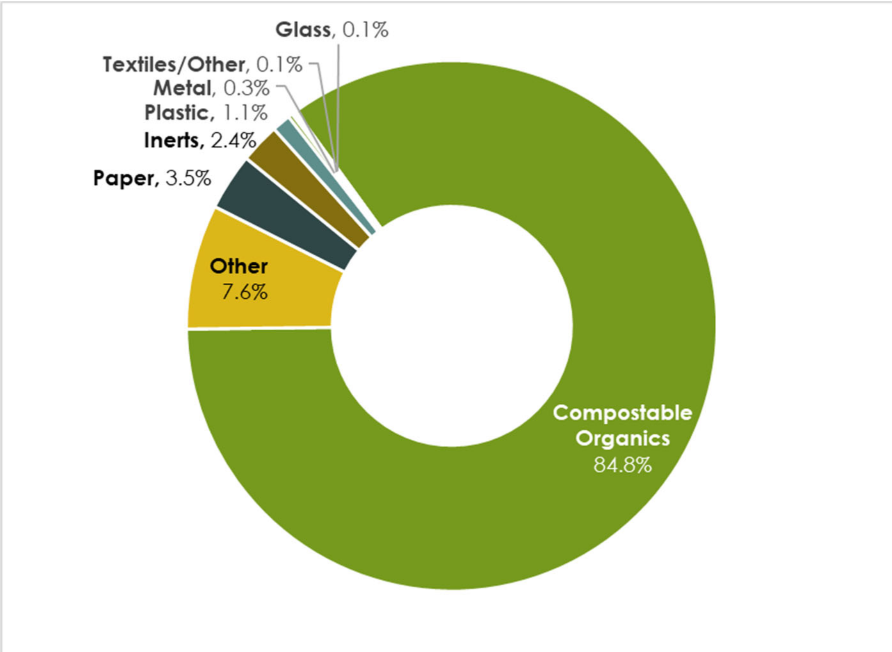


Table 45 presents the ten materials with the highest proportions of Residential SSO, representing in total 93.6 percent. **Table 46** presents a detailed composition of Residential SSO based on 81 manually sorted samples.

Table 45. Top 10 Materials Represented in Residential SSO

Material		Proportion
1	Leaves and Grass	41.1%
2	Chips, Prunings, Trimmings, Branches, Stumps	26.6%
3	Inedible Food	8.1%
4	Mixed Residue/Other	6.4%
5	Edible Food - Produce	2.8%
6	Edible Food - Cooked/Baked/Prepared/Bakery/Dairy/Other	2.5%
7	Treated Wood Waste	1.9%
8	Uncoated Corrugated Cardboard	1.7%
9	Compostable Paper - Other	1.3%
10	Wood - Untreated Lumber	1.1%
	Total	**93.6%**

Table 46. Detailed Residential SSO Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Paper			**7,000**	**3.5%**	**9.1%**	**1.8%**	**5.1%**
	Uncoated Corrugated Cardboard		3,500	1.7%	8.9%	0.1%	3.4%
	Paper Grocery Bags		300	0.1%	0.3%	<0.1%	0.2%
	Other Paper Bags/Kraft Paper		400	0.2%	0.2%	0.2%	0.2%
	Recyclable Paper (no food/liquid contam)		600	0.3%	0.6%	0.2%	0.4%
	Folding Cartons & Other Paperboard Pkg		400	0.2%	0.3%	0.2%	0.3%
	Other Paper/Fiber - Packaging		200	<0.1%	0.3%	<0.1%	0.1%
	Aseptic Cartons		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Gable-top Cartons		100	<0.1%	0.1%	<0.1%	<0.1%
	Paper/Fiber Food Service Ware		1,400	0.7%	0.7%	0.5%	0.8%
	Remainder/Composite Paper		200	<0.1%	0.1%	<0.1%	<0.1%
Plastic			**2,300**	**1.1%**	**1.2%**	**0.9%**	**1.4%**
	Containers	PETE Containers	100	<0.1%	0.1%	<0.1%	<0.1%
	Containers	PETE Thermoform Containers	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Containers	HDPE Containers	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Containers	PP #5 Containers	200	<0.1%	0.1%	<0.1%	0.1%
	Containers	Other Plastic Containers (3, 4, 6, 7)	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	Grocery/Merchandise	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	"Reusable"	100	<0.1%	0.1%	<0.1%	<0.1%
	Bags	Compostable	400	0.2%	0.4%	0.1%	0.3%
	Bags	Produce (pre-checkout)	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Flexible Plastic Pouches	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Other Film (inc Ziplock bags)	800	0.4%	0.5%	0.3%	0.5%
		Plastic Cutlery	<100	<0.1%	<0.1%	<0.1%	<0.1%
		Durable Plastic Items	100	<0.1%	0.1%	<0.1%	<0.1%
		Other	200	<0.1%	0.2%	<0.1%	0.1%
Glass			**200**	**0.1%**	**0.4%**	**<0.1%**	**0.2%**
	Bottles & Containers	Non Wine/Spirit - CRV	100	<0.1%	0.4%	<0.1%	0.1%
	Bottles & Containers	Non Wine/Spirit - Non CRV	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bottles & Containers	Wine/Spirit	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Other		<100	<0.1%	<0.1%	<0.1%	<0.1%
Metal			**500**	**0.3%**	**1.4%**	**<0.1%**	**0.5%**
	Tin/Steel Cans		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Aluminum Cans - CRV		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Aluminum Cans - Non CRV		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Other Ferrous		400	0.2%	1.4%	<0.1%	0.4%
	Other Non-Ferrous		<100	<0.1%	<0.1%	<0.1%	<0.1%
Textiles/Other			**300**	**0.1%**	**0.3%**	**<0.1%**	**0.2%**
	Cloth and Clothing		100	<0.1%	0.2%	<0.1%	0.1%
	Shoes, Purses, Belts		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Carpet		<100	<0.1%	0.1%	<0.1%	<0.1%
	Other		<100	<0.1%	<0.1%	<0.1%	<0.1%

Table 46 (continued). Detailed Residential SSO Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Compostable Organics			**172,000**	**84.8%**	**<0.1%**	**84.8%**	**84.8%**
Leaves and Grass			83,500	41.1%	22.9%	36.9%	45.3%
Chips, Prunings, Trimmings, Branches, Stumps			54,100	26.6%	20.1%	23.0%	30.3%
Food	Edible	Produce	5,600	2.8%	3.9%	1.8%	3.8%
Food	Edible	Meat	800	0.4%	0.7%	0.2%	0.6%
Food	Edible	Cooked/Baked/Prepared/Bakery/Dairy	5,100	2.5%	4.3%	1.4%	3.6%
Food	Edible	Packaged/Non-Perishable/Shelf stable	500	0.3%	0.4%	0.1%	0.4%
Food	Inedible		16,400	8.1%	8.1%	6.0%	10.1%
Compostable Paper	Packaging		700	0.3%	1.1%	0.1%	0.5%
Compostable Paper	Pizza Boxes		500	0.3%	0.5%	0.2%	0.3%
Compostable Paper	Other		2,700	1.3%	1.4%	1.1%	1.6%
Wood	Untreated Lumber		2,200	1.1%	1.9%	0.7%	1.4%
Wood	Pallets		<100	<0.1%	<0.1%	<0.1%	<0.1%
Inerts			**4,900**	**2.4%**	**<0.1%**	**2.4%**	**2.4%**
Crushable Inerts			1,100	0.5%	1.2%	0.3%	0.7%
Gypsum Boards			<100	<0.1%	<0.1%	<0.1%	<0.1%
Treated Wood Waste			3,800	1.9%	3.9%	1.2%	2.6%
Electronics			**<100**	**<0.1%**	**11.8%**	**<0.1%**	**2.2%**
Major Appliances			<100	<0.1%	<0.1%	<0.1%	<0.1%
Brown Goods			<100	<0.1%	<0.1%	<0.1%	<0.1%
Computer Related Electronics			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other Small Consumer			<100	<0.1%	<0.1%	<0.1%	<0.1%
HHW			**<100**	**<0.1%**	**<0.1%**	**<0.1%**	**<0.1%**
Paint			<100	<0.1%	<0.1%	<0.1%	<0.1%
Used Oil			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED			<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other			**15,500**	**7.6%**	**<0.1%**	**7.6%**	**7.6%**
Tires			<100	<0.1%	<0.1%	<0.1%	<0.1%
Latex gloves			<100	<0.1%	<0.1%	<0.1%	<0.1%
Expanded Polystyrene			<100	<0.1%	<0.1%	<0.1%	<0.1%
Bioplastics			<100	<0.1%	<0.1%	<0.1%	<0.1%
Manure			1,800	0.9%	3.8%	0.2%	1.6%
Asphalt Roofing			<100	<0.1%	<0.1%	<0.1%	<0.1%
Stranglers & Tanglers (hoses, rubber, etc.)			<100	<0.1%	<0.1%	<0.1%	<0.1%
Diapers and Sanitary Products			500	0.2%	0.7%	<0.1%	0.4%
Mixed Residue/Other			13,000	6.4%	11.6%	4.3%	8.5%
TOTAL			**202,800**	**100.0%**			

Note: Waste composition based on 81 samples.

5.9 COMMERCIAL SSO

5.9.1 2023-24 Waste Composition

About 48,900 tons of Commercial SSO are generated. **Figure 32** below presents the Commercial SSO stream by material group.

Figure 32. Commercial SSO Composition by Material Group

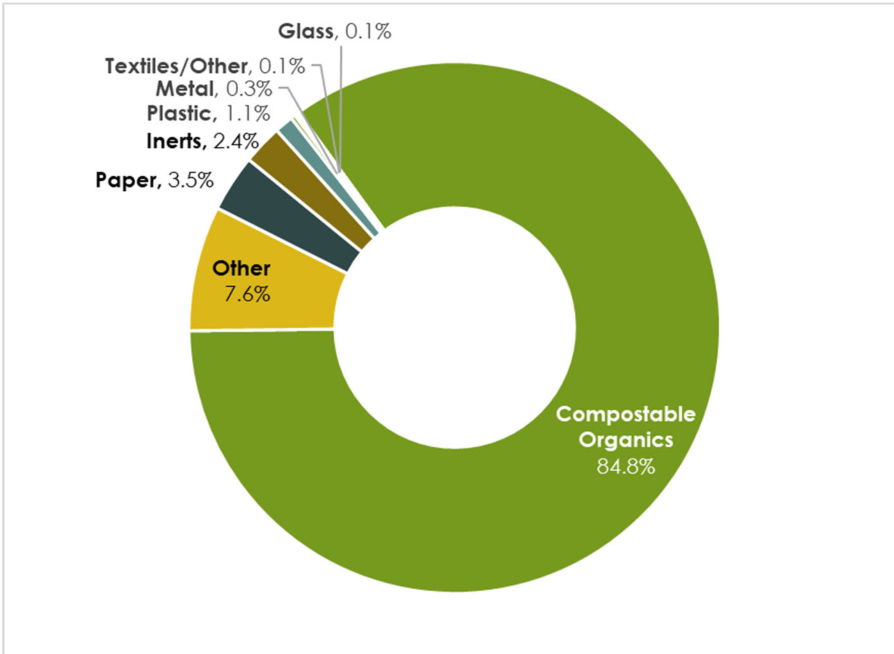


Table 47 presents the ten materials with the highest proportions of Commercial SSO, representing in total 87.6 percent. **Table 48** presents a detailed composition of Commercial SSO based on 17manually sorted samples.

Table 47. Top 10 Materials Represented in Commercial SSO

Material		Proportion
1	Leaves and Grass	22.0%
2	Inedible Food	15.7%
3	Edible Food - Produce	14.8%
4	Edible Food - Cooked/Baked/Prepared/Bakery/Dairy/Other	12.0%
5	Chips, Prunings, Trimmings, Branches, Stumps	7.3%
6	Mixed Residue/Other	4.5%
7	Edible Food - Meat	4.0%
8	Compostable Paper - Other	3.0%
9	Plastic Film - Other Film (includes Ziplock bags)	2.5%
10	Treated Wood Waste	1.8%
	Total	**87.6%**

Table 48. Detailed Commercial SSO Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Paper			**2,000**	**4.2%**	**3.8%**	**2.7%**	**5.7%**
	Uncoated Corrugated Cardboard		300	0.7%	0.6%	0.4%	0.9%
	Paper Grocery Bags		<100	0.1%	0.2%	<0.1%	0.2%
	Other Paper Bags/Kraft Paper		100	0.3%	0.2%	0.2%	0.4%
	Recyclable Paper (no food/liquid contam)		300	0.7%	2.2%	<0.1%	1.5%
	Folding Cartons & Other Paperboard Pkg		200	0.4%	0.5%	0.2%	0.6%
	Other Paper/Fiber - Packaging		200	0.5%	1.1%	<0.1%	0.9%
	Aseptic Cartons		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Gable-top Cartons		<100	<0.1%	0.2%	<0.1%	0.2%
	Paper/Fiber Food Service Ware		400	0.8%	0.9%	0.5%	1.2%
	Remainder/Composite Paper		300	0.6%	0.9%	0.3%	1.0%
Plastic			**2,100**	**4.4%**	**5.4%**	**2.2%**	**6.5%**
	Containers	PETE Containers	<100	0.1%	0.1%	<0.1%	0.2%
	Containers	PETE Thermoform Containers	<100	0.1%	0.2%	<0.1%	0.2%
	Containers	HDPE Containers	<100	0.1%	0.2%	<0.1%	0.2%
	Containers	PP #5 Containers	100	0.2%	0.3%	<0.1%	0.4%
	Containers	Other Plastic Containers (3, 4, 6, 7)	100	0.3%	0.6%	<0.1%	0.5%
	Bags	Grocery/Merchandise	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Bags	"Reusable"	<100	<0.1%	0.1%	<0.1%	0.1%
	Bags	Compostable	200	0.5%	0.8%	0.2%	0.8%
	Bags	Produce (pre-checkout)	<100	<0.1%	0.1%	<0.1%	<0.1%
	Film	Flexible Plastic Pouches	<100	<0.1%	<0.1%	<0.1%	<0.1%
	Film	Other Film (inc Ziplock bags)	1,200	2.5%	4.2%	0.8%	4.2%
		Plastic Cutlery	<100	<0.1%	<0.1%	<0.1%	<0.1%
		Durable Plastic Items	<100	0.1%	0.3%	<0.1%	0.3%
		Other	100	0.2%	0.3%	<0.1%	0.3%
Glass			**200**	**0.4%**	**0.6%**	**0.2%**	**0.6%**
	Bottles & Containers	Non Wine/Spirit - CRV	<100	<0.1%	0.2%	<0.1%	0.2%
	Bottles & Containers	Non Wine/Spirit - Non CRV	<100	0.1%	0.4%	<0.1%	0.3%
	Bottles & Containers	Wine/Spirit	<100	0.1%	0.2%	<0.1%	0.2%
	Other		<100	<0.1%	0.1%	<0.1%	<0.1%
Metal			**300**	**0.6%**	**0.9%**	**0.2%**	**1.0%**
	Tin/Steel Cans		<100	0.1%	0.2%	<0.1%	0.2%
	Aluminum Cans - CRV		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Aluminum Cans - Non CRV		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Other Ferrous		200	0.3%	0.9%	<0.1%	0.7%
	Other Non-Ferrous		<100	<0.1%	<0.1%	<0.1%	<0.1%
Textiles/Other			**200**	**0.5%**	**1.2%**	**<0.1%**	**0.9%**
	Cloth and Clothing		100	0.3%	0.7%	<0.1%	0.6%
	Shoes, Purses, Belts		<100	<0.1%	0.3%	<0.1%	0.2%
	Carpet		<100	<0.1%	<0.1%	<0.1%	<0.1%
	Other		<100	<0.1%	0.3%	<0.1%	0.2%

Table 48 (continued). Detailed Commercial SSO Composition

Material Components			Annual Tonnage	Mean Composition	Standard Deviation	90% Confidence Limits Lower	90% Confidence Limits Upper
Compostable Organics			**40,200**	**82.2%**	**<0.1%**	**82.2%**	**82.2%**
Leaves and Grass			10,700	22.0%	24.7%	12.1%	31.8%
Chips, Prunings, Trimmings, Branches, Stumps			3,600	7.3%	9.5%	3.5%	11.1%
Food	Edible	Produce	7,200	14.8%	24.0%	<0.1%	30.9%
Food	Edible	Meat	1,900	4.0%	5.7%	0.1%	7.8%
Food	Edible	Cooked/Baked/Prepared/Bakery/Dairy	5,900	12.0%	18.7%	<0.1%	24.6%
Food	Edible	Packaged/Non-Perishable/Shelf stable	100	0.3%	0.3%	<0.1%	0.5%
Food	Inedible		7,700	15.7%	16.6%	4.6%	26.9%
Compostable Paper	Packaging		400	0.7%	1.2%	0.3%	1.2%
Compostable Paper	Pizza Boxes		200	0.4%	0.9%	<0.1%	0.8%
Compostable Paper	Other		1,400	3.0%	2.8%	1.8%	4.1%
Wood	Untreated Lumber		900	1.8%	3.8%	0.2%	3.3%
Wood	Pallets		100	0.2%	1.0%	<0.1%	0.6%
Inerts			**900**	**1.8%**	**0.5%**	**1.6%**	**2.0%**
Crushable Inerts			<100	<0.1%	<0.1%	<0.1%	<0.1%
Gypsum Boards			<100	<0.1%	<0.1%	<0.1%	<0.1%
Treated Wood Waste			900	1.8%	5.5%	<0.1%	4.0%
Electronics			**400**	**0.9%**	**7.2%**	**<0.1%**	**3.8%**
Major Appliances			<100	<0.1%	<0.1%	<0.1%	<0.1%
Brown Goods			300	0.7%	2.7%	<0.1%	1.8%
Computer Related Electronics			100	0.2%	0.7%	<0.1%	0.5%
Other Small Consumer			<100	<0.1%	<0.1%	<0.1%	<0.1%
HHW			**<100**	**0.2%**	**<0.1%**	**0.2%**	**0.2%**
Paint			<100	<0.1%	<0.1%	<0.1%	<0.1%
Used Oil			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lead-acid (automotive) batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Other batteries			<100	<0.1%	<0.1%	<0.1%	<0.1%
Mercury-Containing Items - Not Lamps			<100	<0.1%	<0.1%	<0.1%	<0.1%
Lamps - Fluorescent and LED			<100	<0.1%	<0.1%	<0.1%	<0.1%
Medical Waste/Sharps			<100	0.2%	0.5%	<0.1%	0.4%
Other			**2,400**	**4.9%**	**<0.1%**	**4.9%**	**4.9%**
Tires			<100	<0.1%	<0.1%	<0.1%	<0.1%
Latex gloves			<100	0.2%	0.2%	<0.1%	0.3%
Expanded Polystyrene			<100	<0.1%	<0.1%	<0.1%	<0.1%
Bioplastics			<100	<0.1%	0.2%	<0.1%	0.2%
Manure			<100	<0.1%	<0.1%	<0.1%	<0.1%
Asphalt Roofing			<100	<0.1%	<0.1%	<0.1%	<0.1%
Stranglers & Tanglers (hoses, rubber, etc.)			<100	<0.1%	<0.1%	<0.1%	<0.1%
Diapers and Sanitary Products			<100	<0.1%	0.2%	<0.1%	0.2%
Mixed Residue/Other			2,200	4.5%	7.2%	1.7%	7.4%
TOTAL			**48,900**	**100.0%**			

Note: Waste composition based on 17 samples.

6.0 FURTHER ANALYSIS

6.1 DISPOSITION OF WASTE MATERIALS

To assess the sorting behavior of residents, businesses, and organizations, the annual tons derived from the compositions of the three streams (MSW, SSR, SSO) and generating sectors (Single-Family, Multi-Family, Commercial, Roll-Off (RO), and Self-Haul (SH)) were combined to assess the quantity of each material type and group that is placed in each bin or brought to a facility by self-haul.

Figure 33 presents the disposition by material group (in annual tons) of waste materials generated in Alameda County by waste stream and sector.

Figure 33. Disposition of Material Groups by Stream and Sector (Annual Tons)

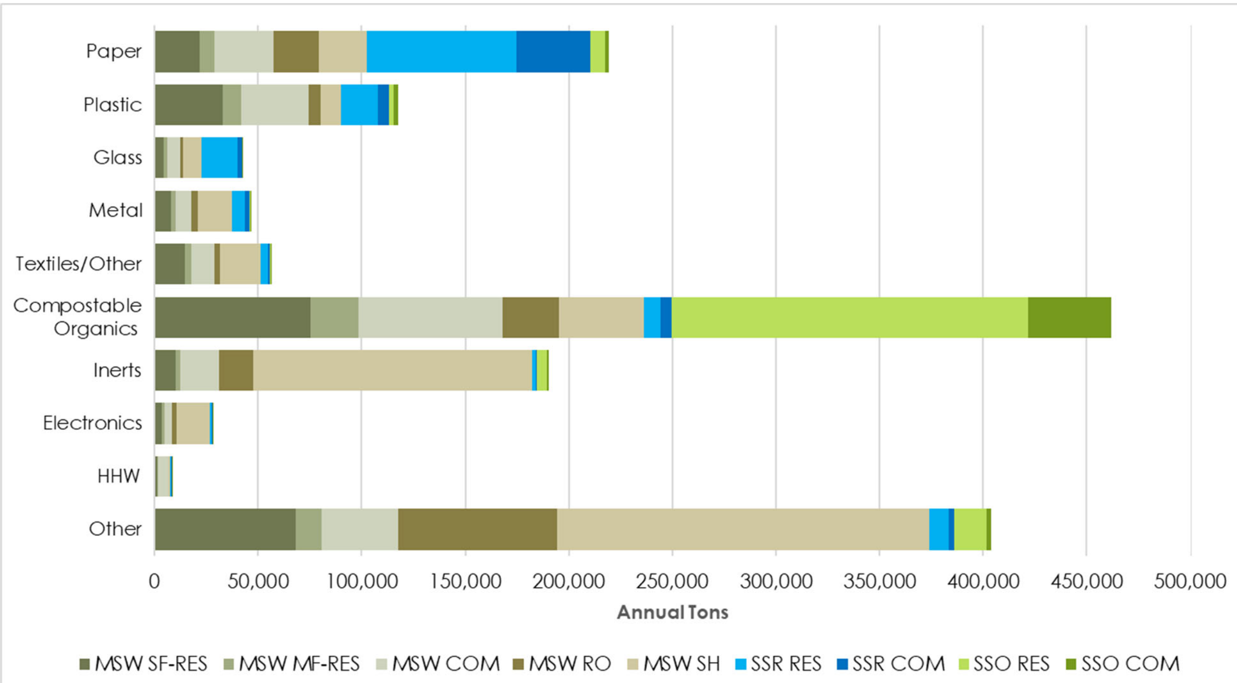
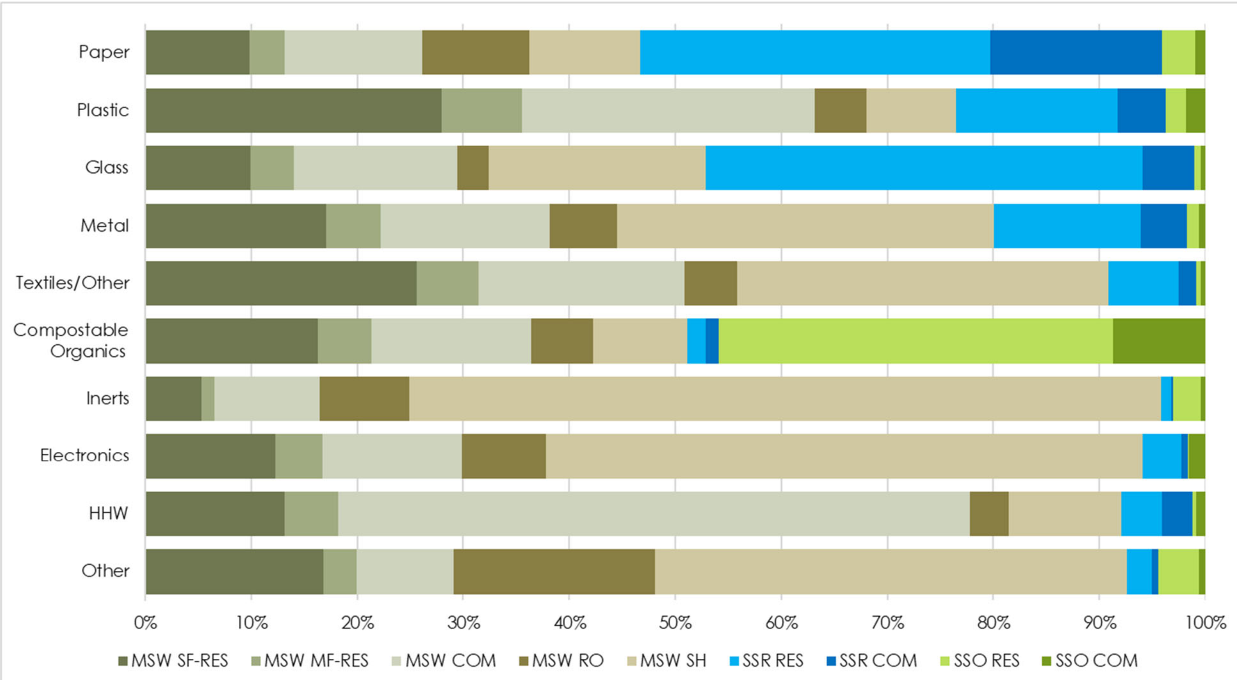


Figure 34 presents the disposition by material group (in proportion) of waste materials generated in Alameda County by waste stream and sector.

Almost half of Compostable Organics generated in the county are currently being source-separated for composting. Similarly, almost half of Paper and Glass generated in the county is currently being source-separated for recycling.

Additional figures representing each material group and the individual materials within each group are presented in **Appendix E.**

Figure 34. Disposition of Material Groups by Stream and Sector (Proportion)



6.1.1 Single-Family Residential Waste

Figure 35 presents the disposition by material group (in annual tons) of waste materials generated by the Single-Family Residential sector in Alameda County.

Figure 35. Disposition of Material Groups by the Single-Family Residential Sector (Annual Tons)

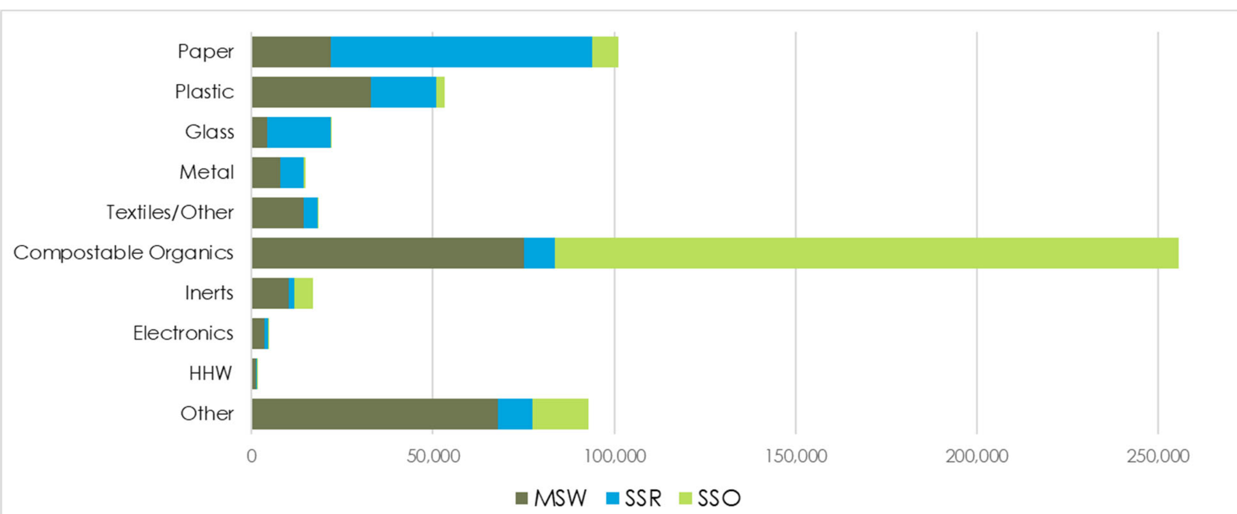


Figure 36 presents the disposition by material group (in proportion) of waste materials generated by the Single-Family Residential sector in Alameda County.

Figure 36. Disposition of Material Groups by the Single-Family Residential Sector (Proportion)

Almost 70 percent of Compostable Organics generated by the Single-Family Residential sector is currently being source-separated for composting. Similarly, almost 80 percent of Paper and Glass generated by the Single-Family Residential sector is currently being source-separated for recycling.

Additional figures representing each material group and the individual materials within each group for the Single-Family Residential sector are presented in **Appendix F.**

6.1.2 Commercial Waste

Figure 35 presents the disposition by material group (in annual tons) of waste materials generated by the Commercial sector in Alameda County.

Figure 37. Disposition of Material Groups by the Commercial Sector (Annual Tons)

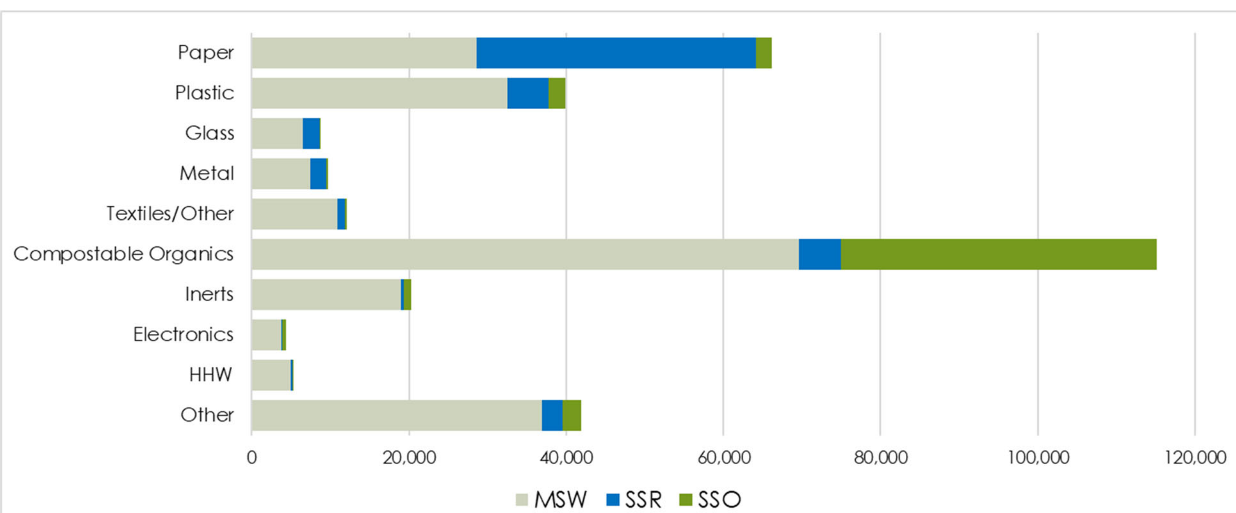
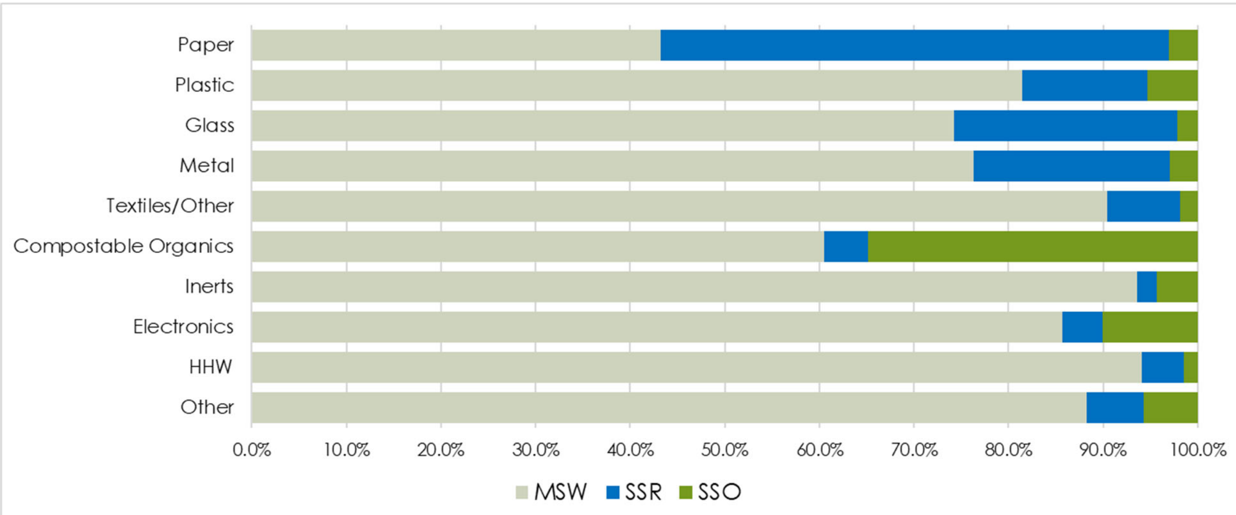


Figure 36 presents the disposition by material group (in proportion) of waste materials generated by the Commercial sector in Alameda County.

Figure 38. Disposition of Material Groups by the Commercial Sector (Proportion)



Almost 35 percent of Compostable Organics generated by the Commercial sector is currently being source-separated for composting. Similarly, almost 35 percent of Paper generated by the Commercial sector is currently being source-separated for recycling.

Additional figures representing each material group and the individual materials within each group for the Commercial sector are presented in **Appendix G**.

6.2 DONATABLE/NON-DONATABLE FOOD VS. EDIBLE/INEDIBLE

Samples of MSW, SSR, and SSO were categorized as Edible Food and Inedible Food. Edible Food was further categorized into four material types:

- Produce
- Meat
- Cooked/Baked/Prepared/Bakery/Dairy/Other
- Packaged/Non-Perishable/Shelf stable

Initial field efforts categorized Edible Food as Donatable Food to be comparable to the 2021 CalRecycle statewide waste characterization study.[3] However, midway through field sampling, it was realized that StopWaste preferred to categorize Edible Food as if it were ever edible regardless of the condition found in samples to more accurately reflect food waste reduction efforts.

[3] In the CalRecycle study, in order to be consider Donatable food, it had to be in edible condition at the time of the sort (i.e. no mold, not partially eaten) and in its original, unopened packaging. While this is accurate to reflect whether food can be donated or not, it classifies a large quantity of wasted food as Inedible. Therefore, for the purposes of the study, Edible is classified as any food that could have been eaten at one point in time even if not in its current condition. Inedible is only foods that are not traditionally considered edible, such as bones and peels.

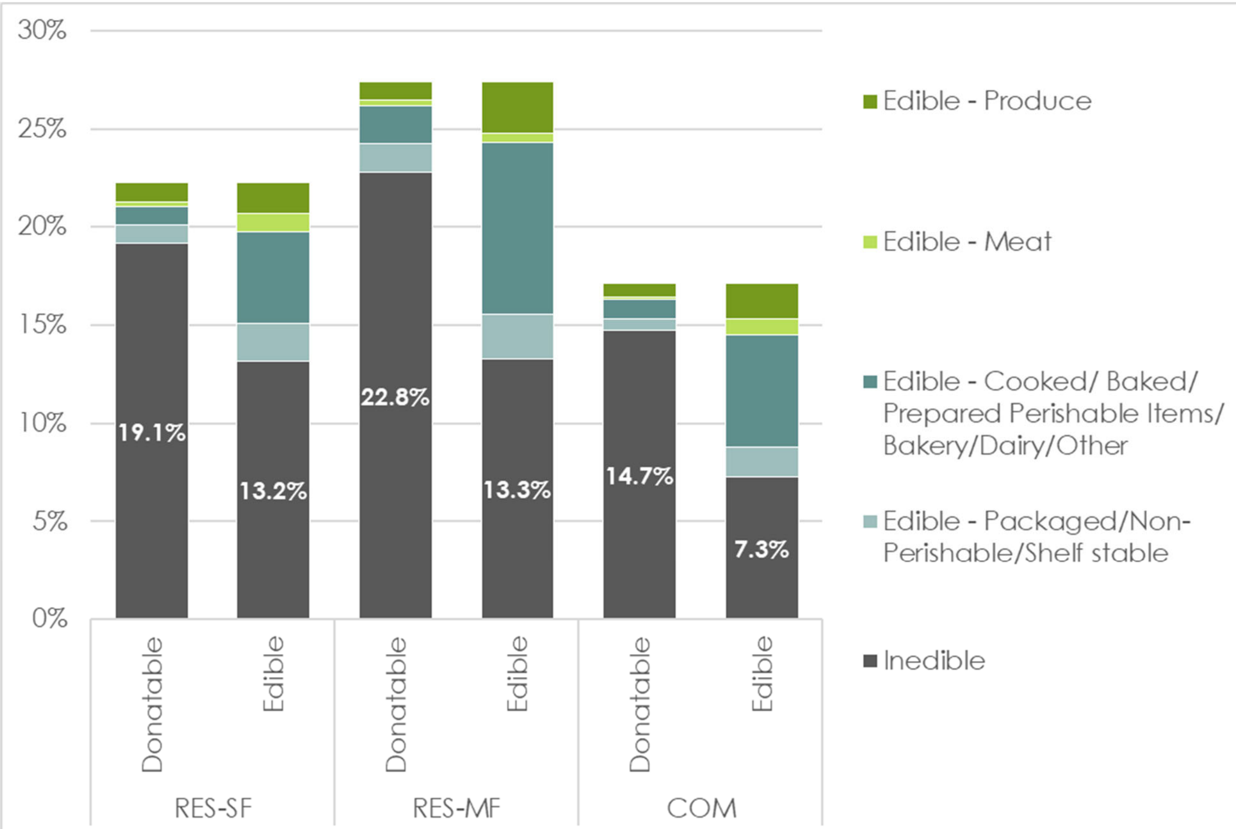
Table 49 presents the composition of food into in both Donatable and Edible formats for MSW, SSR, and SSO streams. SSR and SSO samples were mostly from the Single-Family Residential sector.

Table 49. Summary of Food Composition: Donatable vs. Edible

Food		RES-SF		RES-MF		COM	
		Donatable	Edible	Donatable	Edible	Donatable	Edible
MSW							
Edible	Produce	1.0%	1.6%	0.9%	2.6%	0.7%	1.8%
	Meat	0.2%	0.9%	0.3%	0.5%	0.1%	0.8%
	Cooked/ Baked/ Prepared Perishable Items/ Bakery/Dairy/Other	0.9%	4.7%	1.9%	8.8%	1.0%	5.7%
	Packaged/Non-Perishable/Shelf stable	0.9%	1.9%	1.5%	2.3%	0.6%	1.5%
Inedible		19.1%	13.2%	22.8%	13.3%	14.7%	7.3%
	Subtotal	22.2%		27.4%		17.1%	
SSR							
Edible	Produce	0.1%	0.2%	- -	- -	0.7%	0.4%
	Meat	0.0%	0.1%	- -	- -	0.0%	0.1%
	Cooked/ Baked/ Prepared Perishable Items/ Bakery/Dairy/Other	0.0%	1.2%	- -	- -	0.0%	0.5%
	Packaged/Non-Perishable/Shelf stable	0.3%	0.8%	- -	- -	0.3%	0.1%
Inedible		2.6%	0.6%	- -	- -	2.1%	2.0%
	Subtotal	2.9%				3.1%	
SSO							
Edible	Produce	1.0%	2.8%	- -	- -	2.0%	14.8%
	Meat	0.0%	0.4%	- -	- -	0.0%	4.0%
	Cooked/ Baked/ Prepared Perishable Items/ Bakery/Dairy/Other	0.1%	2.5%	- -	- -	0.2%	12.0%
	Packaged/Non-Perishable/Shelf stable	0.4%	0.3%	- -	- -	0.3%	0.3%
Inedible		12.6%	8.1%	- -	- -	44.3%	15.7%
	Subtotal	14.0%				46.8%	

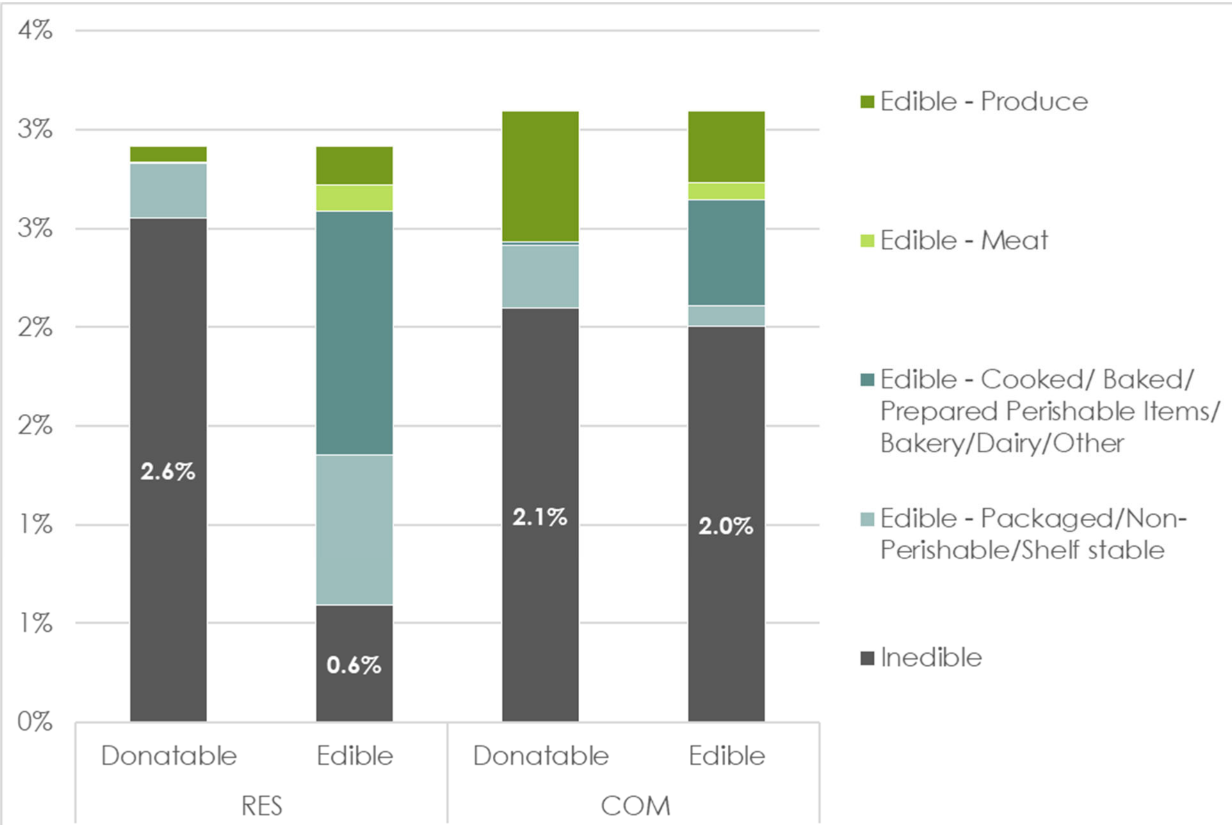
Information presented in Table 49 is presented graphically in **Figure 39** (MSW), **Figure 40** (SSR) and **Figure 41** (SSO).

Figure 39. Composition of Food in MSW: Donatable vs Edible



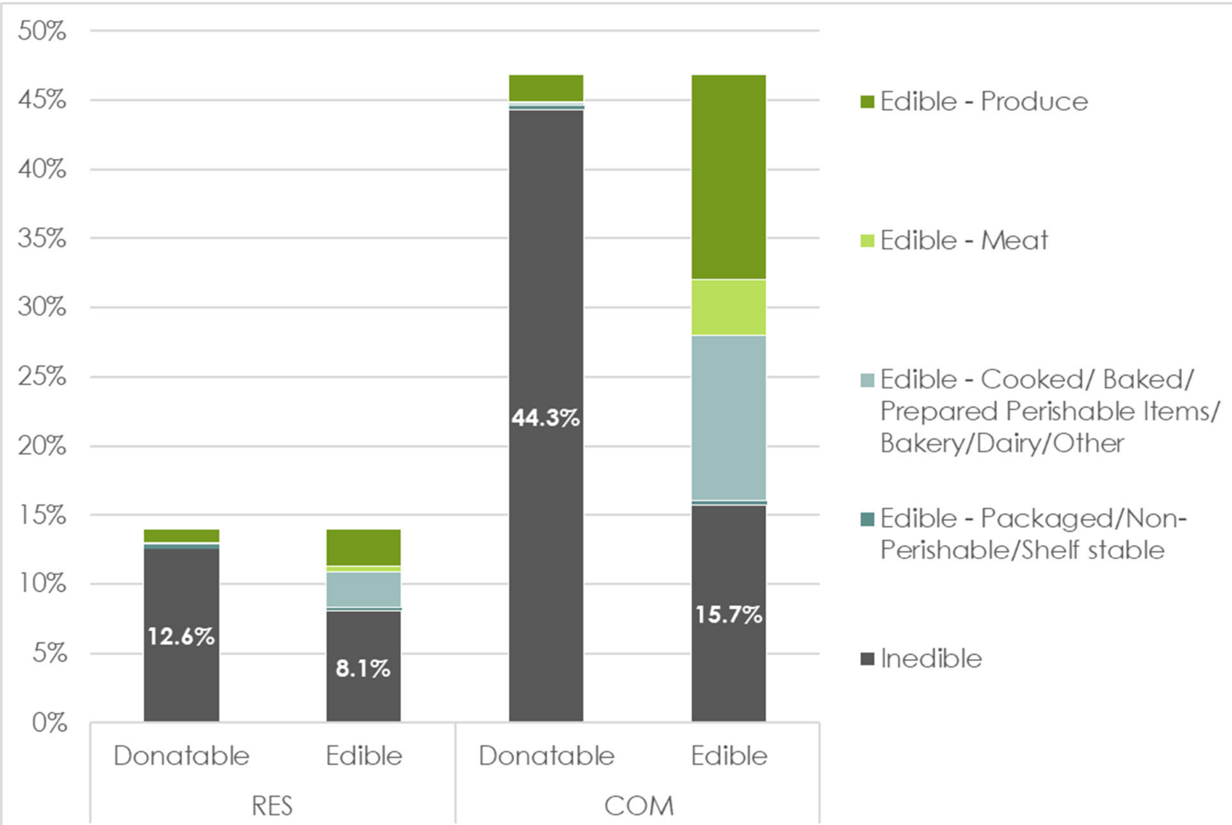
In general, Inedible Food decreased about seven percent in all sectors when categorizing food as Edible regardless of its condition. Cooked/Baked/Prepared Perishable Items/Bakery/Dairy/Other had the largest increases when categorizing food as Edible vs. Donatable.

Figure 40. Composition of Food in SSR: Donatable vs Edible



SSR has very little food. Inedible Food decreased substantially for the Single-Family Residential sector when classified as Edible vs. Donatable. The change in Commercial food categorization did not change significantly from Donatable to Edible. Data for SSR in the Multi-Family sector is not available.

Figure 41. Composition of Food in SSO: Donatable vs Edible



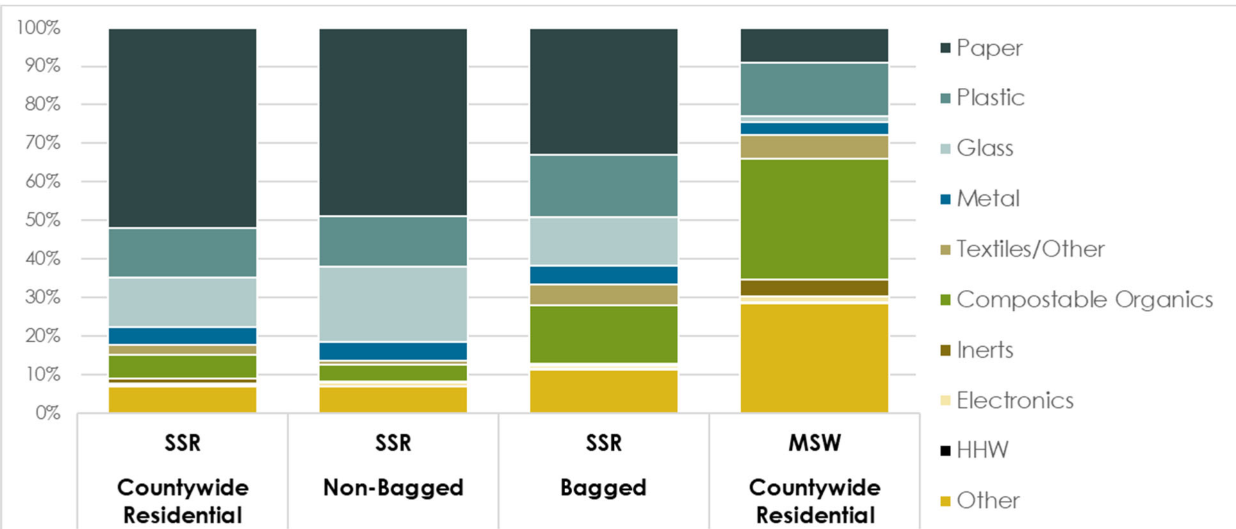
Commercial food changed significantly when categorized as Edible instead of Donatable for SSO. Data for Multi-Family SSO is not available.

6.3 BAGGED VS. NON-BAGGED SSR

During four days of sampling and sorting residential SSR at the CWS Transfer/Processing Facility, SCS sorted materials that were bagged separately from non-bagged (loose) materials for each of the 41 samples. The bagged and non-bagged material weights were combined to generate complete samples that were incorporated into the composition derived for countywide Residential SSR (Section 5.8 of this report).

Figure 42 presents the material groups for the bagged and non-bagged portions of Residential SSR. Also presented in Figure 33 are the material groups for countywide Residential SSR and countywide Residential MSW for comparison.

Figure 42. Bagged and Non-Bagged Residential SSR by Material Group



To further assess contamination levels of bagged and non-bagged Residential SSR, the individual material types were classified into six material groups:

- **Recyclable Paper** – includes paper material types acceptable in curbside recycling collection programs: Uncoated Corrugated Cardboard, Paper Grocery Bags, Other Paper Bags/Kraft Paper, Recyclable Paper (no food/liquid contamination), Folding Cartons & Other Paperboard Packaging, Other Paper/Fiber – Packaging, Aseptic Cartons, and Gable-top Cartons.

- **Recyclable Plastic** – includes plastic material types acceptable in curbside recycling collection programs: PETE Containers, PETE Thermoform Containers, HDPE Containers, PP #5 Containers, and Other Plastic Containers (3, 4, 6, 7).

- **Recyclable Metal** – includes metal material types acceptable in curbside recycling collection programs: Tin/Steel Cans and Aluminum Cans (both CRV and Non-CRV).

- **Recyclable Glass** – includes glass material types acceptable in curbside recycling collection programs: Glass Bottles and Containers (both Wine/Spirit and non-Wine/Spirit, and both CRV and Non-CRV).

- **Compostable Organics** – Green Waste, Food, Compostable Paper, and Wood. These materials are not acceptable in curbside recycling collection programs.

- **Other** – Material types not classified above.

Figure 43 presents the summary of bagged and non-bagged Residential SSR based on 41 samples. Bagged SSR is 53.1 percent recyclable by weight. Non-bagged SSR is 78.9 percent recyclable by weight.

Figure 43. Comparison of Bagged vs Non-Bagged Residential SSR

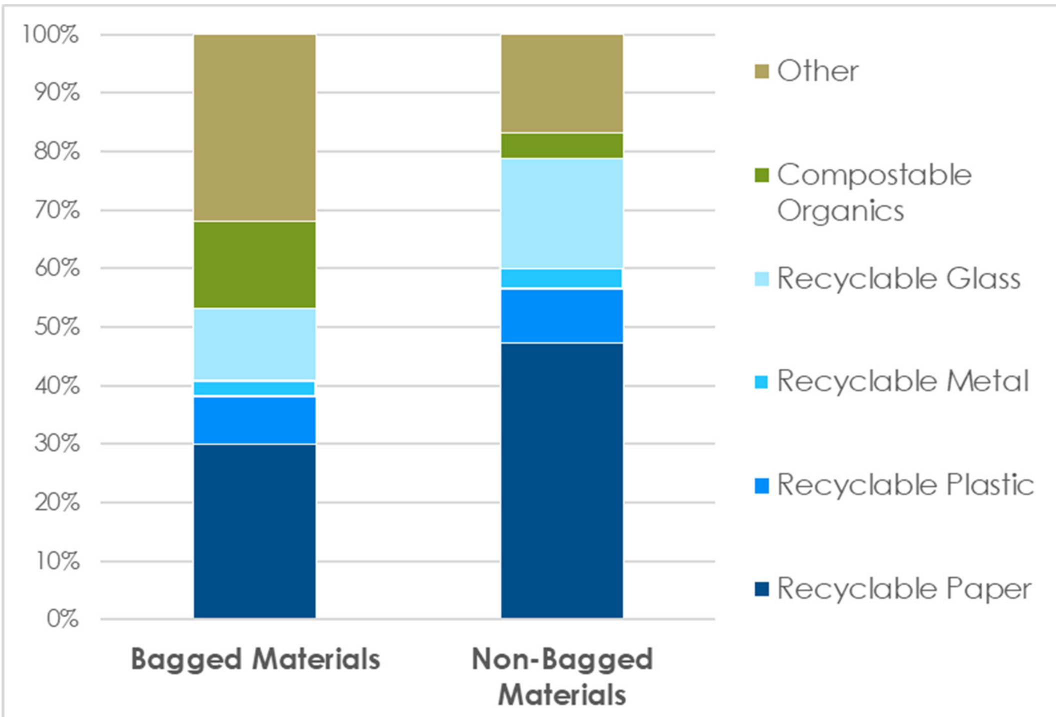


Table 50 presents a detailed composition of bagged and non-bagged Residential SSR based on 41 manually sorted samples.

Table 50. Detailed Residential SSR Composition: Bagged vs. Non-Bagged

Material Componen			Bagged Recyclables	Unbagged Recyclables
Paper			**33.1%**	**48.9%**
	Uncoated Corrugated Cardboard		8.3%	21.8%
	Paper Grocery Bags		1.6%	0.8%
	Other Paper Bags/Kraft Paper		3.4%	2.1%
	Recyclable Paper (no food/liquid contam)		9.2%	12.4%
	Folding Cartons & Other Paperboard Pkg		4.6%	6.9%
	Other Paper/Fiber - Packaging		1.7%	2.1%
	Aseptic Cartons		0.4%	0.4%
	Gable-top Cartons		0.6%	0.7%
	Paper/Fiber Food Service Ware		1.9%	0.9%
	Remainder/Composite Paper		1.3%	0.8%
Plastic			**16.1%**	**13.1%**
	Containers	PETE Containers	3.0%	3.1%
	Containers	PETE Thermoform Containers	1.5%	1.6%
	Containers	HDPE Containers	1.3%	2.7%
	Containers	PP #5 Containers	1.5%	1.5%
	Containers	Other Plastic Containers (3, 4, 6, 7)	0.9%	0.5%
	Bags	Grocery/Merchandise	0.1%	<0.1%
	Bags	"Reusable"	1.3%	0.3%
	Bags	Compostable	<0.1%	<0.1%
	Bags	Produce (pre-checkout)	0.1%	<0.1%
	Film	Flexible Plastic Pouches	0.2%	<0.1%
	Film	Other Film (inc Ziplock bags)	4.4%	1.3%
		Plastic Cutlery	0.1%	<0.1%
		Durable Plastic Items	0.6%	1.7%
		Other	1.1%	0.5%
Glass			**12.6%**	**19.5%**
	Bottles & Containers	Non Wine/Spirit - CRV	1.9%	2.7%
	Bottles & Containers	Non Wine/Spirit - Non CRV	3.2%	3.6%
	Bottles & Containers	Wine/Spirit	7.1%	12.5%
	Other		0.3%	0.6%
Metal			**5.0%**	**4.9%**
	Tin/Steel Cans		1.6%	2.0%
	Aluminum Cans - CRV		1.0%	1.1%
	Aluminum Cans - Non CRV		0.1%	0.4%
	Other Ferrous		0.4%	0.9%
	Other Non-Ferrous		1.8%	0.5%
Textiles/Other			**5.3%**	**1.0%**
	Cloth and Clothing		3.9%	0.7%
	Shoes, Purses, Belts		1.2%	0.1%
	Carpet		<0.1%	<0.1%
	Other		0.2%	0.2%

Table 50 (continued). Detailed Residential SSR Composition: Bagged vs. Non-Bagged

Material Componen			Bagged Recyclables	Unbagged Recyclables
Compostable Organics			**15.0%**	**4.4%**
Leaves and Grass			<0.1%	<0.1%
Chips, Prunings, Trimmings, Branches, Stumps			<0.1%	<0.1%
Food	Edible	Produce	<0.1%	<0.1%
Food	Edible	Meat	0.7%	0.2%
Food	Edible	Cooked/Baked/Prepared/Bakery/Dairy/Other	0.9%	<0.1%
Food	Edible	Packaged/Non-Perishable/Shelf stable	3.7%	0.5%
Food	Inedible		2.0%	0.7%
Compostable Paper		Packaging	2.6%	0.2%
Compostable Paper		Pizza Boxes	1.1%	1.0%
Compostable Paper		Other	0.5%	0.9%
Wood		Untreated Lumber	3.3%	0.6%
Wood		Pallets	<0.1%	<0.1%
Inerts			**0.5%**	**0.3%**
Crushable Inerts			0.4%	0.1%
Gypsum Boards			<0.1%	<0.1%
Treated Wood Waste			<0.1%	0.2%
Electronics			**0.8%**	**0.9%**
Major Appliances			<0.1%	<0.1%
Brown Goods			<0.1%	0.4%
Computer Related Electronics			0.2%	<0.1%
Other Small Consumer			0.5%	0.4%
HHW			**0.4%**	**0.2%**
Paint			<0.1%	<0.1%
Used Oil			<0.1%	<0.1%
Lead-acid (automotive) batteries			<0.1%	<0.1%
Other batteries			<0.1%	<0.1%
Mercury-Containing Items - Not Lamps			<0.1%	<0.1%
Lamps - Fluorescent and LED			<0.1%	<0.1%
Medical Waste/Sharps			0.3%	<0.1%
Other			**11.4%**	**6.9%**
Tires			<0.1%	<0.1%
Latex gloves			0.1%	<0.1%
Expanded Polystyrene			<0.1%	0.1%
Bioplastics			<0.1%	<0.1%
Manure			<0.1%	<0.1%
Asphalt Roofing			<0.1%	<0.1%
Stranglers & Tanglers (hoses, rubber, etc.)			<0.1%	<0.1%
Diapers and Sanitary Products			2.6%	0.2%
Mixed Residue/Other			8.3%	6.4%
TOTAL			**100.0%**	**100.0%**

Note: Waste composition based on 41 samples.

6.4 SECONDARY SORTING

Six material components were identified for secondary sorting:

- Paper/Fiber Food Service Ware
- Plastic Containers
- Glass Bottles & Containers – Non-Wine/Spirit
- Edible Food - Cooked/Baked/Prepared Perishable Items/Bakery/Dairy
- Bioplastics

The purpose of the secondary sorting was to provide greater insight into the types of items and their uses that are categorized in each material component. With the exception of the Edible Food component, SCS counted the number of items within each secondary sort classification. This allowed the average number of items per pound disposed to be calculated, which provided the information to estimate the number of items generated annually in Alameda County.

The following tables provide a summary of the secondary sorting results by stream:

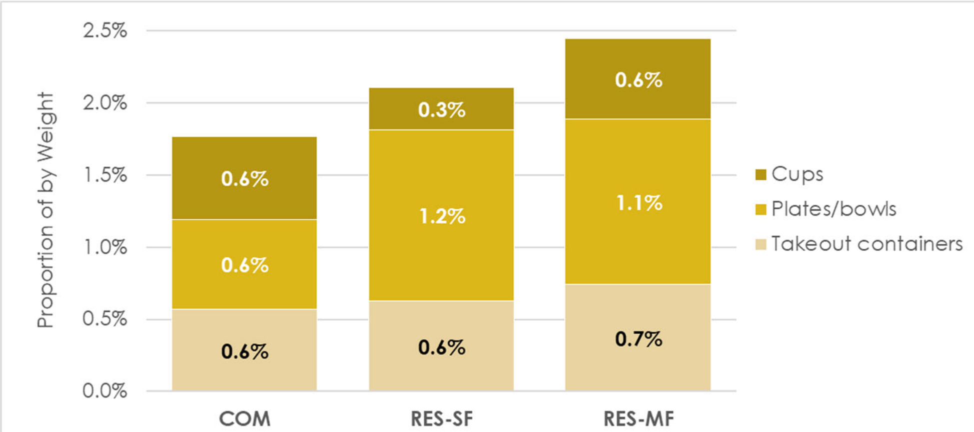
- Table 51 presents secondary sorting results for MSW
- Table 52 presents secondary sorting results for SSR
- Table 53 presents secondary sorting results for SSO

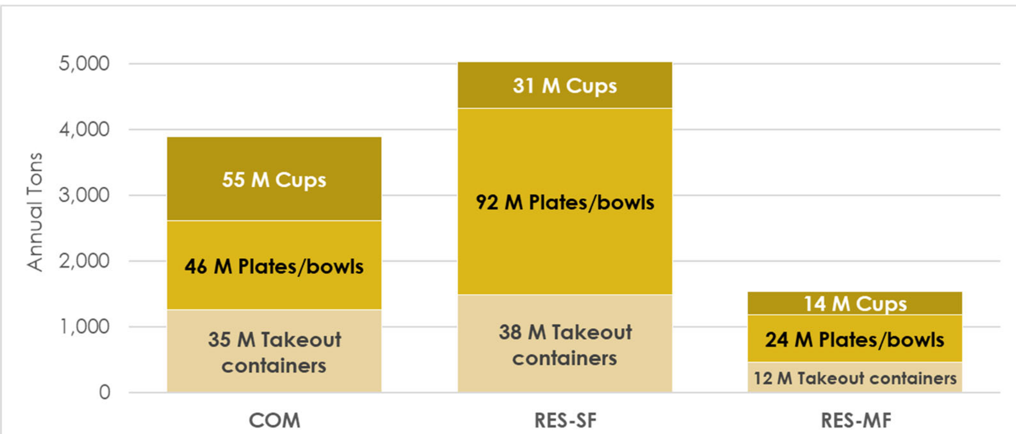
Table 51. Summary of Secondary Sorting Results for MSW

Material Component / Secondary-Sorted Materials	Mean Composition COM	Mean Composition RES-SF	Mean Composition RES-MF	Proportion of Material Component COM	Proportion of Material Component RES-SF	Proportion of Material Component RES-MF	Annual Tons COM	Annual Tons RES-SF	Annual Tons RES-MF	Mean Number of Items/Pound COM	Mean Number of Items/Pound RES-SF	Mean Number of Items/Pound RES-MF	Annual Number of Items Disposed (millions) COM	Annual Number of Items Disposed (millions) RES-SF	Annual Number of Items Disposed (millions) RES-MF
Paper/Fiber Food Service Ware	**1.8%**	**2.1%**	**2.4%**												
Cups	0.6%	0.3%	0.6%	32.7%	14.0%	22.9%	1,272	704	354	21.7	22.0	20.2	55	31	14
Plates/bowls	0.6%	1.2%	1.1%	35.0%	56.2%	46.8%	1,364	2,829	722	16.7	16.3	16.4	46	92	24
Takeout containers	0.6%	0.6%	0.7%	32.3%	29.8%	30.3%	1,258	1,497	467	13.8	12.6	12.9	35	38	12
Plastic Containers	**3.5%**	**3.7%**	**4.0%**												
Beverage Bottles	0.8%	0.5%	0.8%	22.5%	14.5%	20.6%	1,736	1,282	524	16.5	16.0	18.6	57	41	20
Grocery Food Containers (A)	0.7%	1.3%	0.9%	20.3%	34.5%	23.3%	1,564	3,043	593	19.9	15.8	15.4	62	96	18
Takeout Containers (B)	0.7%	0.8%	0.9%	18.9%	22.7%	23.1%	1,455	2,001	588	24.6	16.2	20.0	72	65	24
Cups	0.3%	0.4%	0.3%	9.8%	10.5%	7.1%	754	924	181	30.4	23.7	27.4	46	44	10
Other	1.0%	0.7%	1.0%	28.6%	17.8%	26.0%	2,202	1,567	662	10.3	16.2	12.7	45	51	17
Glass Bottles & Containers Non Wine/Spirit	**1.0%**	**1.0%**	**1.7%**												
Beverage Bottles	0.4%	0.2%	0.3%	42.4%	19.4%	18.2%	901	466	194	2.3	1.7	1.9	4	2	1
Food Containers (yogurt, PB)	0.5%	0.6%	1.2%	48.5%	55.5%	70.2%	1,029	1,333	746	2.0	4.2	1.5	4	11	2
Other	0.1%	0.3%	0.2%	9.1%	25.1%	11.6%	193	603	124	8.5	4.9	5.0	3	6	1
Metal Tin/Steel Cans	**0.6%**	**0.6%**	**0.8%**												
Food	0.5%	0.5%	0.7%	78.0%	86.3%	87.4%	1,079	1,166	439	6.5	5.5	1.8	14	13	2
Non-Food	0.1%	0.1%	0.1%	22.0%	13.7%	12.6%	304	186	63	5.3	5.6	7.0	3	2	1
Cooked/Baked/ Prepared Perishable Items/ Bakery/ Dairy/	**5.7%**	**4.7%**	**8.8%**												
Prepared/cooked foods	3.4%	2.2%	4.8%	59.1%	46.4%	55.1%	7,444	5,206	3,052						
Packaged produce fresh/ uncooked	0.5%	0.6%	0.7%	9.4%	12.2%	8.5%	1,181	1,374	468						
Packaged meat uncooked	0.3%	0.6%	0.9%	5.0%	11.8%	10.3%	635	1,322	568						
Bakery	1.2%	0.9%	1.6%	20.2%	18.2%	18.7%	2,540	2,045	1,037						
Dairy (eg, eggs, cheese, milk)	0.3%	0.5%	0.3%	5.3%	9.7%	3.9%	667	1,083	214						
Other	0.1%	0.1%	0.3%	1.0%	1.7%	3.7%	123	189	203						
Bioplastics	0.055%	0.016%	0.033%												
Foodware/to-go containers	0.010%	0.003%	0.000%	19.0%	22.2%	0.0%	23	8	NS	44.4	50.0	NS	2	1	NS
Cups/beverage containers	0.014%	0.001%	0.014%	26.0%	8.3%	41.7%	31	3	9	35.3	50.0	50.1	2	0.3	1
Utensils	0.029%	0.008%	0.014%	52.8%	48.6%	42.2%	64	18	9	93.4	91.8	154.6	12	3	3
Other	0.001%	0.003%	0.005%	2.3%	20.8%	16.1%	3	8	3	75.0	44.2	155.6	0.4	1	1

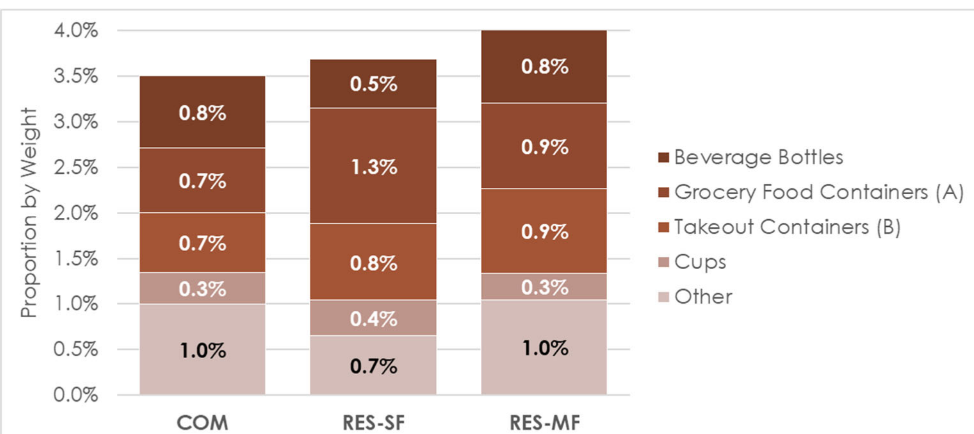
A Examples of Plastic Grocery Food Containers includes yogurt, peanut butter, and produce containers.
B Examples of Plastic Takeout Containers includes clamshells and black bottom/clear top containers.

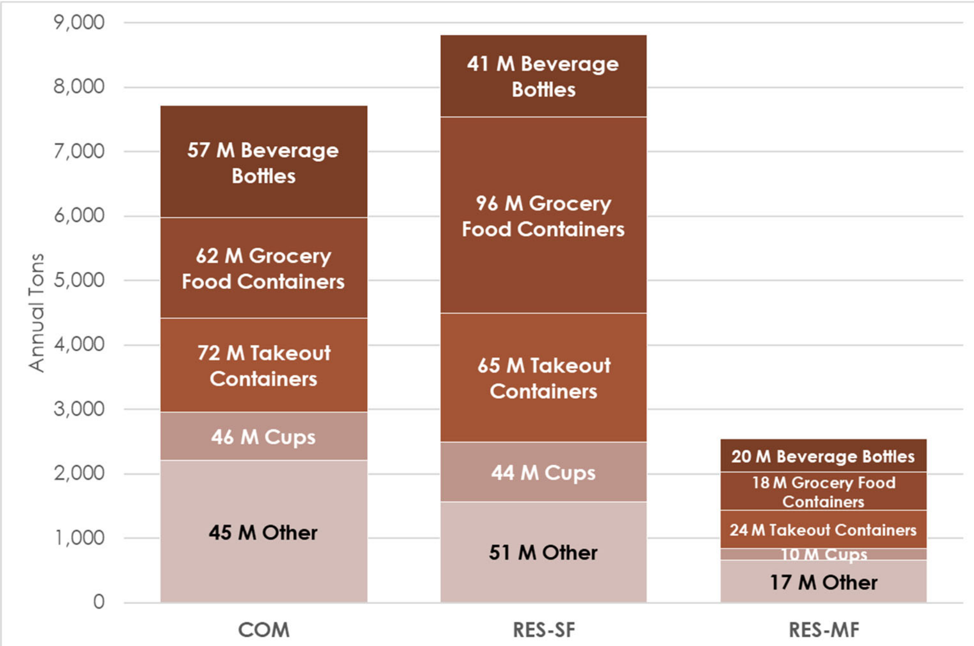
6.4.1 MSW - Paper/Fiber Food Service Ware



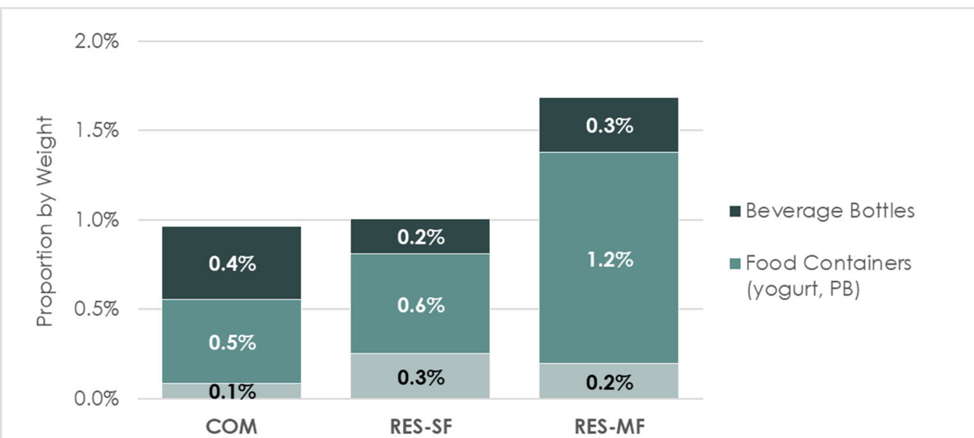


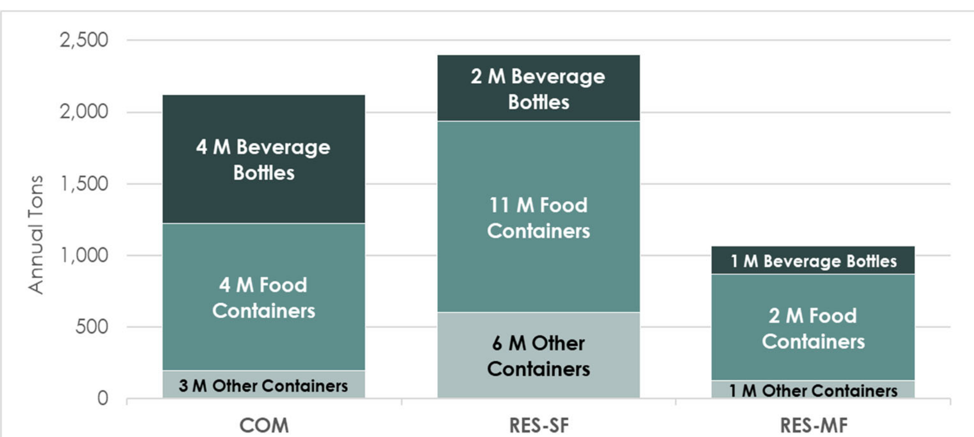
6.4.2 MSW - Plastic Containers



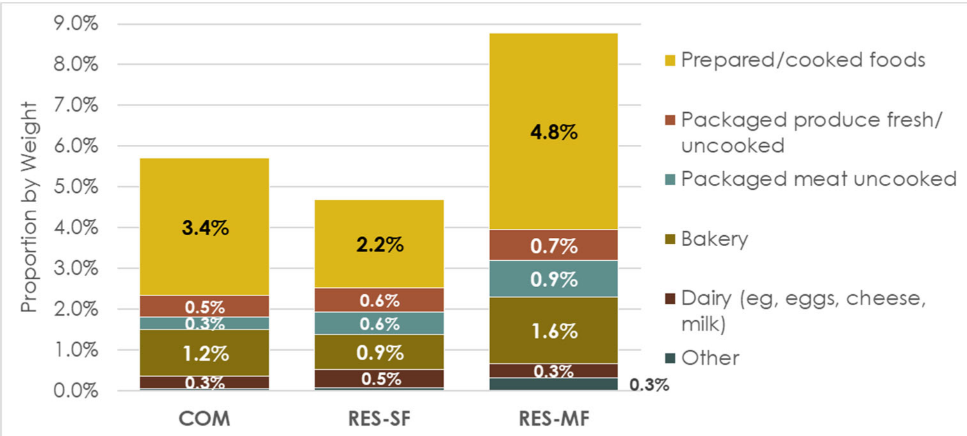


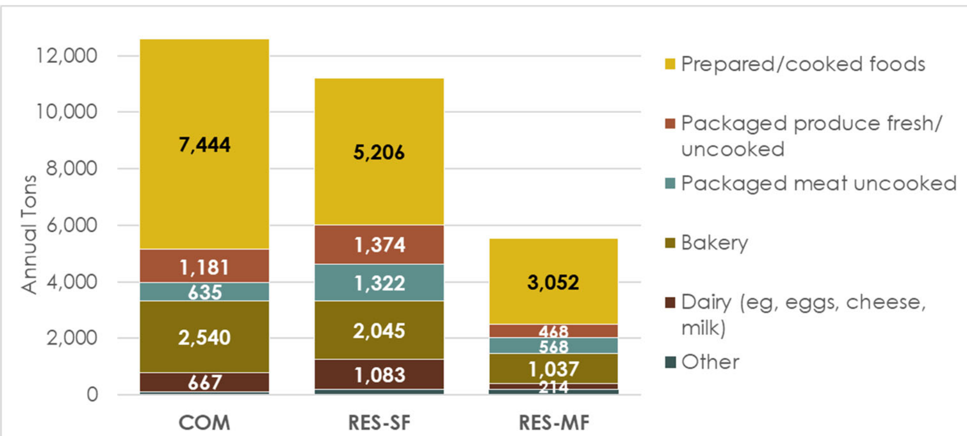
6.4.3 MSW - Glass Bottles & Containers – Non-Wine/Spirit



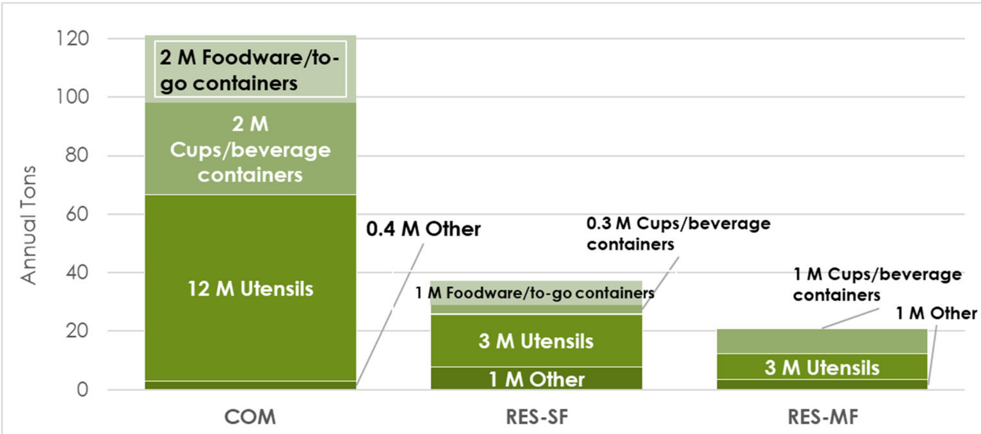


6.4.4 MSW - Edible Food – Cooked/Baked/Prepared Perishable Items/Bakery/Dairy/Other





6.4.5 MSW - Bioplastics



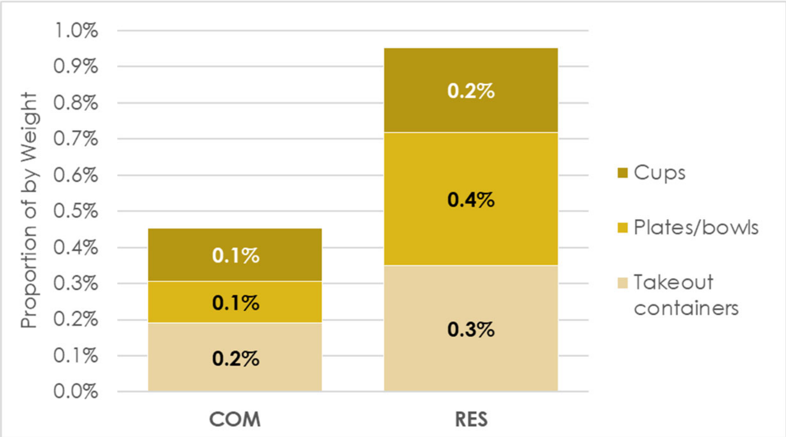
120
100
80
60
40
20
0
Annual Tons
2 M Foodware/to-go containers
2 M Cups/beverage containers
12 M Utensils
0.4 M Other
0.3 M Cups/beverage containers
1 M Foodware/to-go containers
3 M Utensils
1 M Other
1 M Cups/beverage containers
1 M Other
3 M Utensils
COM
RES-SF
RES-MF

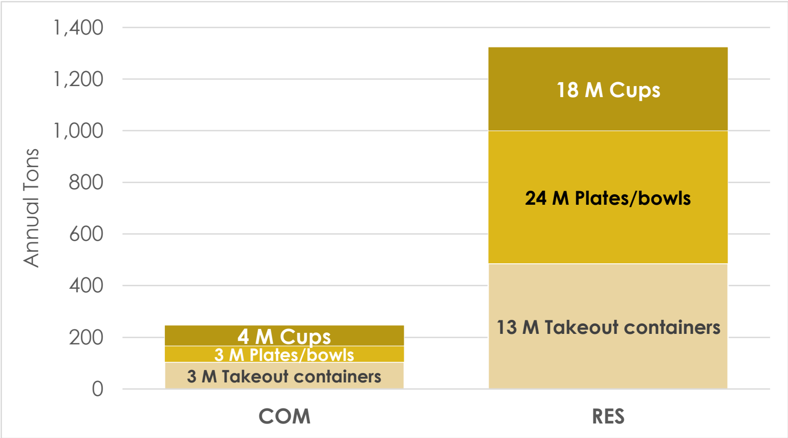
Table 52. Summary of Secondary Sorting Results for SSR

Material Component	Mean Composition		Proportion of Material Component		Annual Tons		Mean Number of Items/Pound		Annual Number of Items (millions)	
Secondary-Sorted Materials	COM	RES	COM	RES	COM	RES	COM	RES	COM	RES
Paper/Fiber Food Service Ware	**0.5%**	**1.0%**								
Cups	0.1%	0.2%	32.3%	24.5%	80	325	27.6	27.9	4	18
Plates/bowls	0.1%	0.4%	25.7%	38.8%	63	513	27.6	23.3	3	24
Takeout containers	0.2%	0.3%	42.0%	36.7%	104	486	13.1	13.6	3	13
Plastic Containers	**4.2%**	**8.0%**								
Beverage Bottles	1.5%	2.4%	35.9%	30.3%	831	3,363	13.5	13.8	22	93
Grocery Food Containers (A)	0.9%	2.6%	21.8%	32.5%	504	3,614	13.0	16.1	13	116
Takeout Containers (B)	0.6%	1.0%	13.3%	12.1%	308	1,349	17.4	25.1	11	68
Cups	0.3%	0.4%	6.6%	4.4%	152	489	26.9	32.8	8	32
Other	0.9%	1.7%	22.4%	20.7%	518	2,301	18.6	11.8	19	54
Glass Bottles & Containers Non Wine/Spirit	**0.9%**	**4.3%**								
Beverage Bottles	0.4%	1.9%	51.1%	44.5%	237	2,686	2.6	1.8	1	10
Food Containers (yogurt, PB)	0.4%	2.1%	43.9%	49.0%	204	2,954	1.8	1.6	1	10
Other	0.0%	0.3%	5.0%	6.5%	23	393	4.5	5.4	0	4
Metal Tin/Steel Cans	**0.6%**	**1.5%**								
Food	0.5%	1.4%	83.6%	89.1%	283	1,878	6.7	7.6	4	28
Non-Food	0.1%	0.2%	16.4%	10.9%	56	230	6.7	6.8	1	3
Cooked/Baked/ Prepared Perishable Items/ Bakery/ Dairy/	**5.7%**	**8.8%**								
Prepared/cooked foods	2.6%	2.2%	45.2%	24.8%	1,409	3,031				
Packaged produce fresh/ uncooked	0.8%	1.8%	14.1%	20.3%	440	2,478				
Packaged meat uncooked	0.9%	0.7%	16.1%	8.4%	503	1,026				
Bakery	0.6%	2.9%	10.8%	33.5%	336	4,095				
Dairy (eg, eggs, cheese, milk)	0.7%	0.4%	12.3%	4.9%	382	595				
Other	0.1%	0.7%	1.5%	8.1%	48	984				
Bioplastics	0.012%	0.017%								
Foodware/ to-go containers	NS	0.003%	NS	15.1%	NS	4	NS	85.0	NS	1
Cups/beverage containers	0.009%	0.009%	73.5%	50.0%	5	12	62.1	70.7	1	2
Utensils	0.003%	0.005%	26.5%	26.6%	2	6	82.3	58.3	0.3	1
Other	NS	0.001%	NS	8.3%	NS	2	NS	30.0	NS	0.1

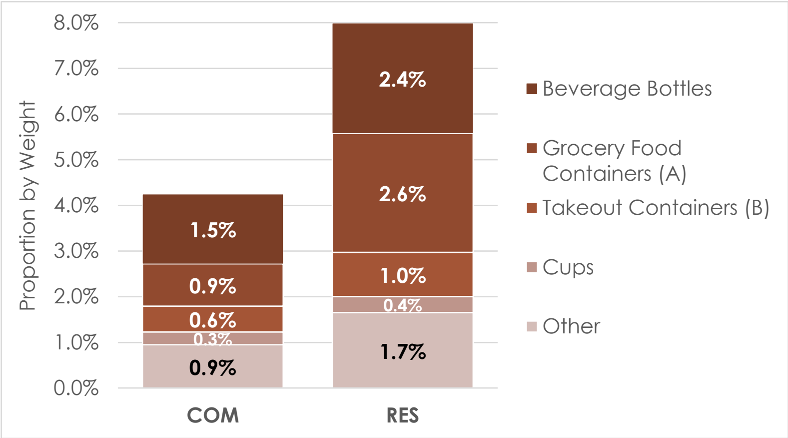
A Examples of Plastic Grocery Food Containers includes yogurt, peanut butter, and produce containers.
B Examples of Plastic Takeout Containers includes clamshells and black bottom/clear top containers.

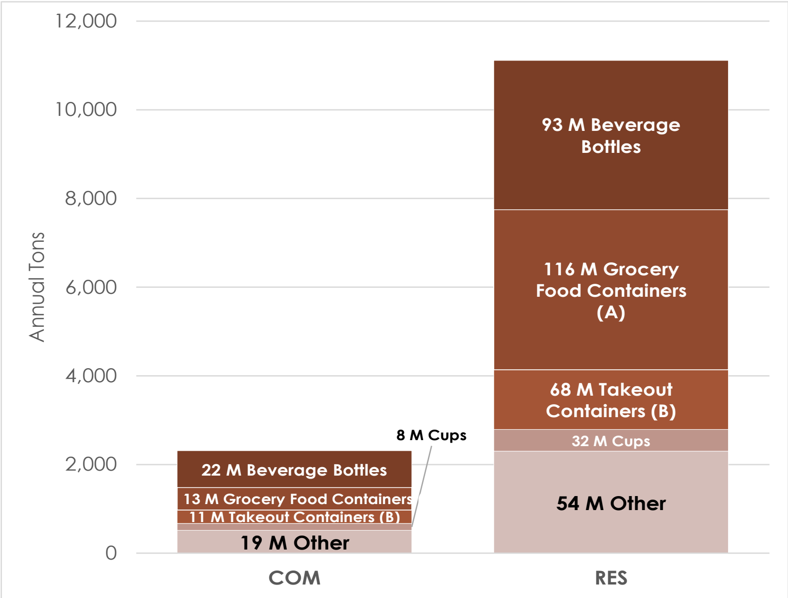
6.4.6 SSR - Paper/Fiber Food Service Ware



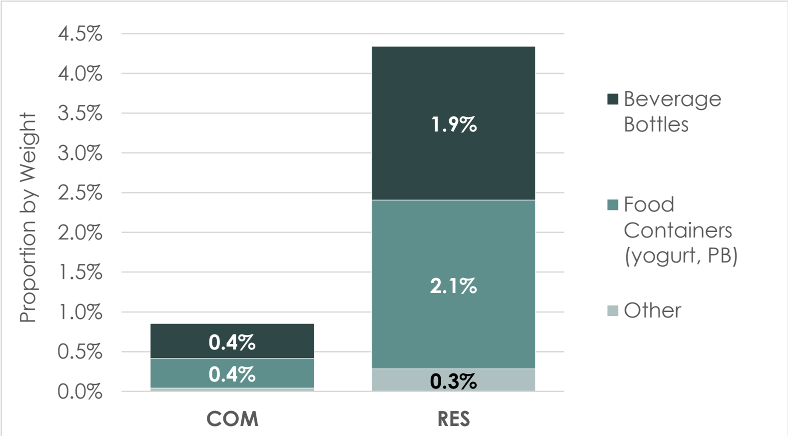


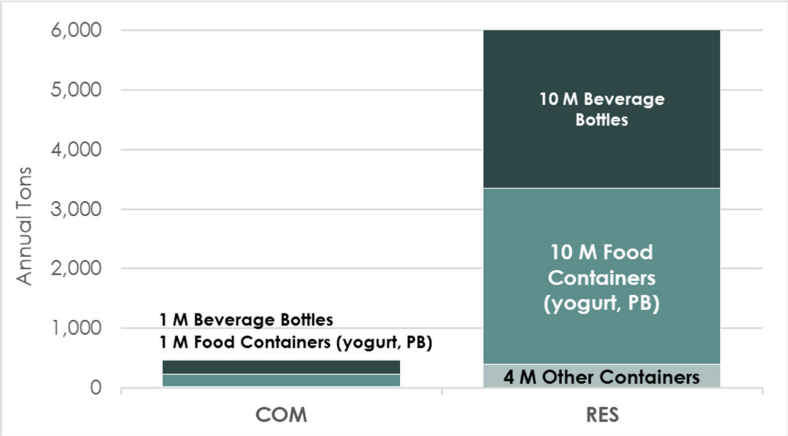
6.4.7 SSR - Plastic Containers



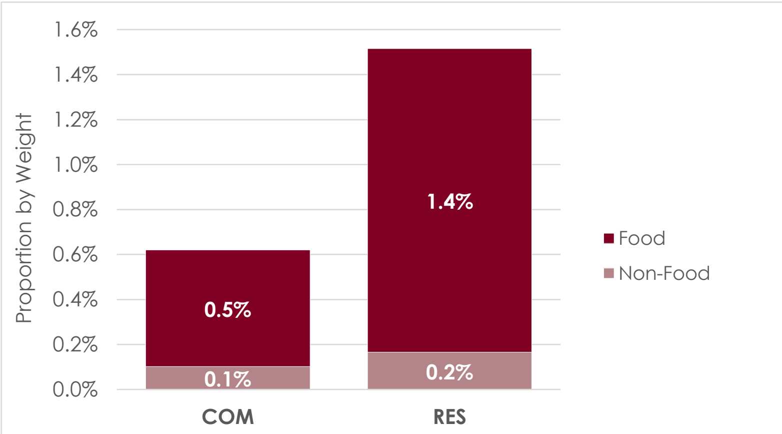


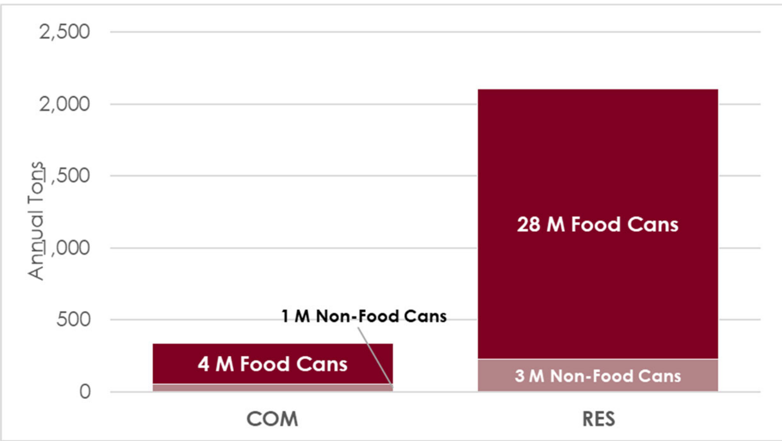
6.4.8 SSR - Glass Bottles & Containers – Non-Wine/Spirit



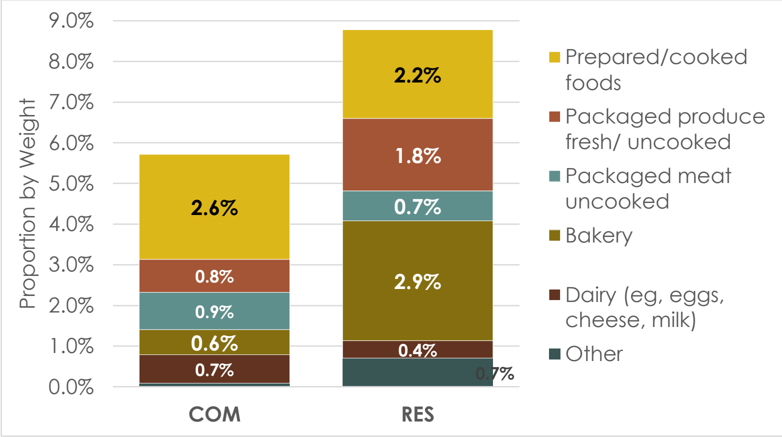


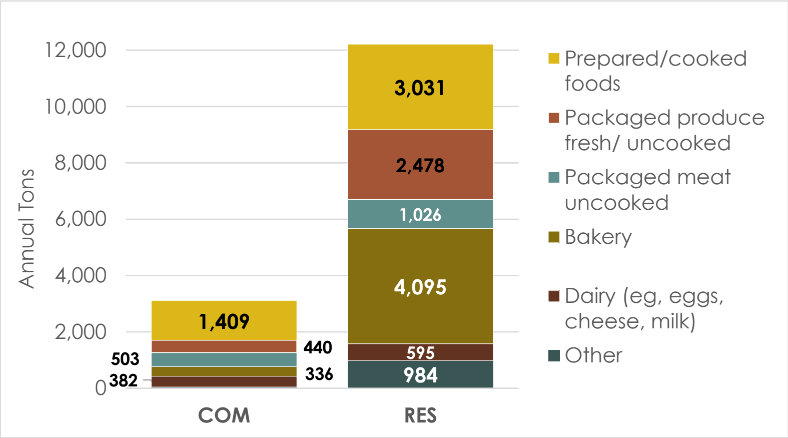
6.4.9 SSR – Tin/Steel Cans



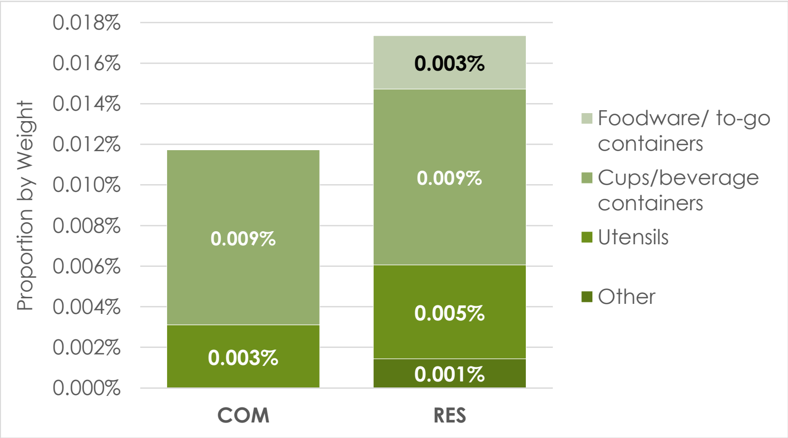


6.4.10 SSR - Edible Food – Cooked/Baked/Prepared Perishable Items/Bakery/Dairy/Other





6.4.11 SSR - Bioplastics



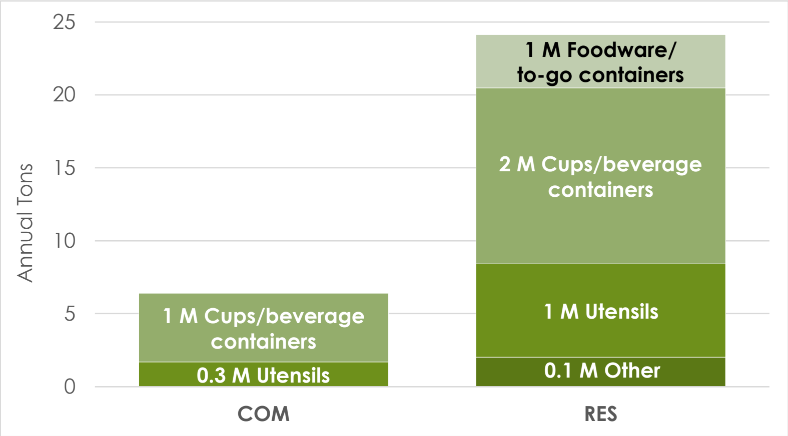


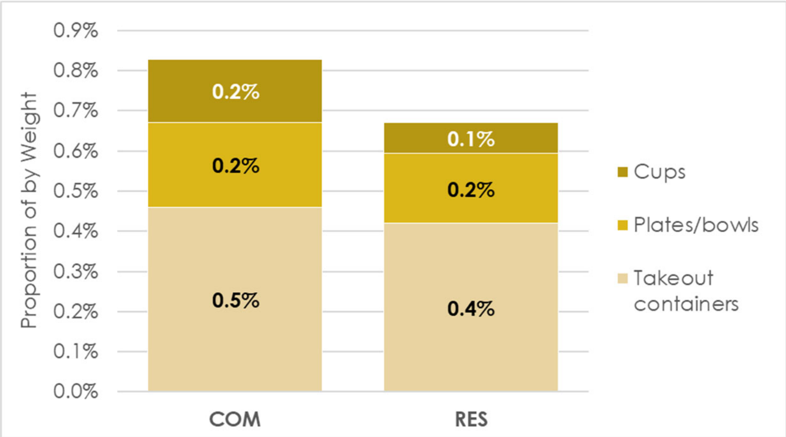
Table 53. Summary of Secondary Sorting Results for SSO

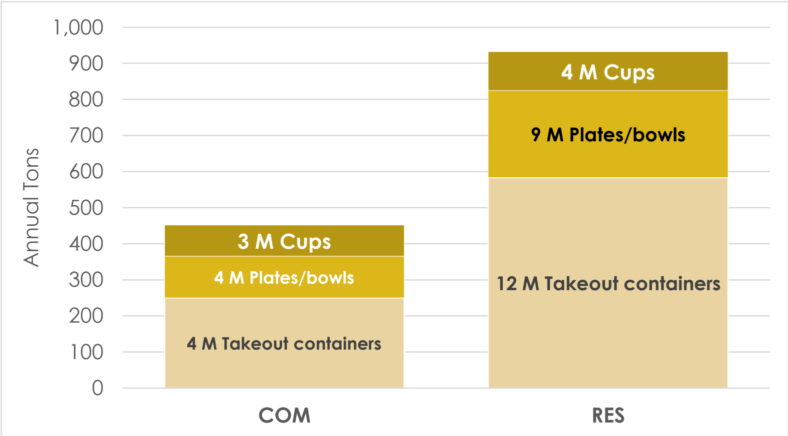
Material Component Secondary-Sorted Materials	Mean Composition COM	Mean Composition RES	Proportion of Material Component COM	Proportion of Material Component RES	Annual Tons COM	Annual Tons RES	Mean Number of Items/Pound COM	Mean Number of Items/Pound RES	Annual Number of Items (millions) COM	Annual Number of Items (millions) RES
Paper/Fiber Food Service Ware	**0.8%**	**0.7%**								
Cups	0.2%	0.1%	19.0%	11.5%	86	107	18.6	17.2	3	4
Plates/bowls	0.2%	0.2%	25.6%	25.9%	116	242	15.7	18.7	4	9
Takeout containers	0.5%	0.4%	55.4%	62.6%	250	583	8.7	9.9	4	12
Plastic Containers	**0.9%**	**0.3%**								
Beverage Bottles	0.2%	0.0%	23.1%	17.0%	112	59	13.7	33.6	3	4
Grocery Food Containers (A)	0.3%	0.0%	29.4%	17.5%	142	61	11.3	17.4	3	2
Takeout Containers (B)	0.2%	0.1%	24.7%	33.4%	119	117	23.8	16.7	6	4
Cups	0.0%	0.0%	3.5%	14.1%	17	49	21.8	26.9	1	3
Other	0.2%	0.0%	19.4%	18.1%	94	64	22.7	49.4	4	6
Glass Bottles & Containers Non Wine/Spirit	**0.1%**	**0.1%**								
Beverage Bottles	0.0%	0.1%	31.1%	66.7%	23	77	1.9	2.2	0	0
Food Containers (yogurt, PB)	0.1%	0.0%	68.9%	33.3%	51	39	1.4	1.1	0	0
Other	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Metal Tin/Steel Cans	**0.1%**	**0.0%**								
Food	0.1%	0.0%	95.2%	100.0%	67	28	9.0	8.4	1	1
Non-Food	0.0%	NS	4.8%	NS	3	NS	4.8	NS	0	NS
Cooked/Baked/ Prepared Perishable Items/ Bakery/ Dairy/	**5.7%**	**8.8%**								
Prepared/cooked foods	0.2%	1.9%	3.0%	21.5%	94	2,624				
Packaged produce fresh/ uncooked	3.5%	2.3%	61.8%	25.8%	1,928	3,148				
Packaged meat uncooked	0.1%	0.7%	0.9%	7.6%	28	923				
Bakery	1.9%	3.7%	34.0%	42.0%	1,061	5,129				
Dairy (eg, eggs, cheese, milk)	0.0%	0.3%	0.2%	3.2%	6	385				
Other	0.0%	0.0%	0.0%	0.0%	0	0				
Bioplastics	0.090%	0.011%								
Foodware/ to-go containers	0.030%	NS	33.3%	NS	16	NS	64.0	NS	2	NS
Cups/beverage containers	0.042%	0.011%	46.7%	100.0%	23	16	11.4	40.0	1	1
Utensils	0.018%	NS	20.0%	NS	10	NS	40.0	NS	0.8	NS
Other	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

A Examples of Plastic Grocery Food Containers includes yogurt, peanut butter, and produce containers.

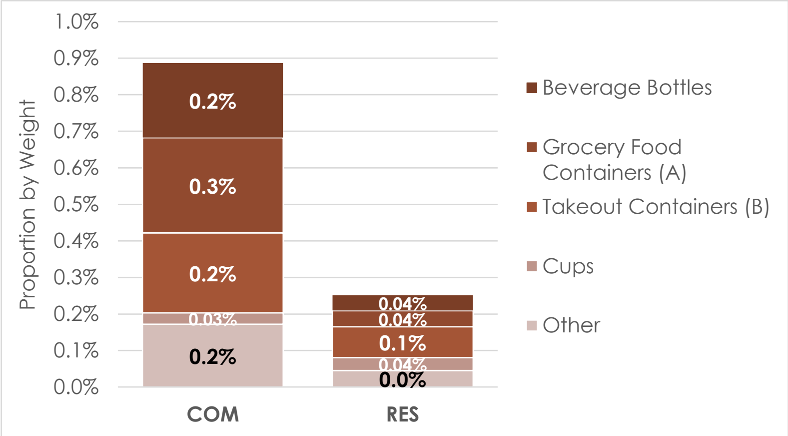
B Examples of Plastic Takeout Containers includes clamshells and black bottom/clear top containers.

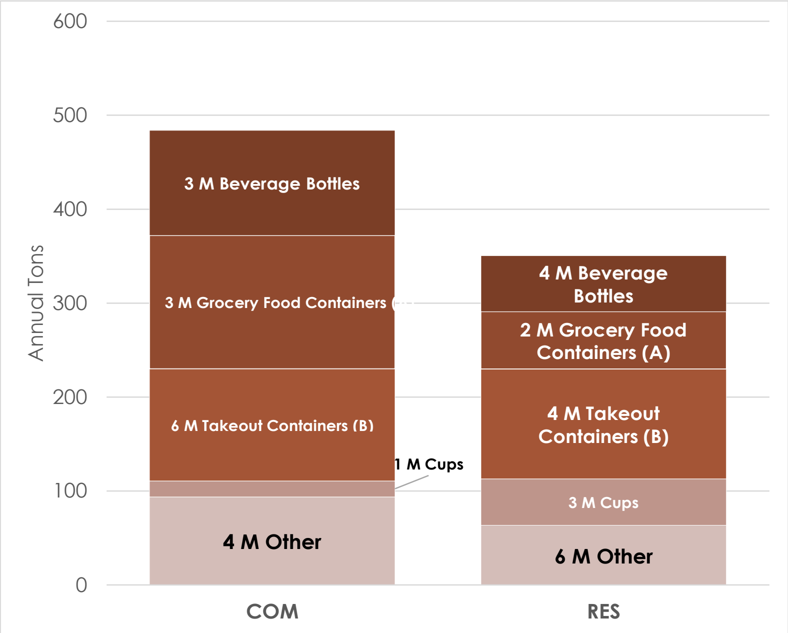
6.4.12 SSO - Paper/Fiber Food Service Ware



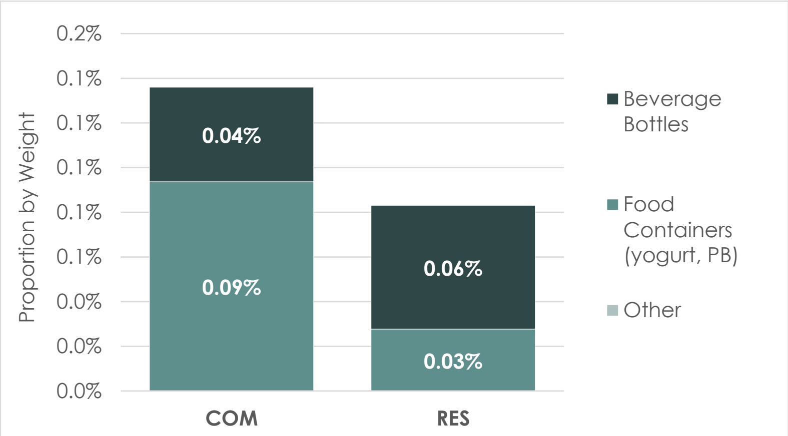


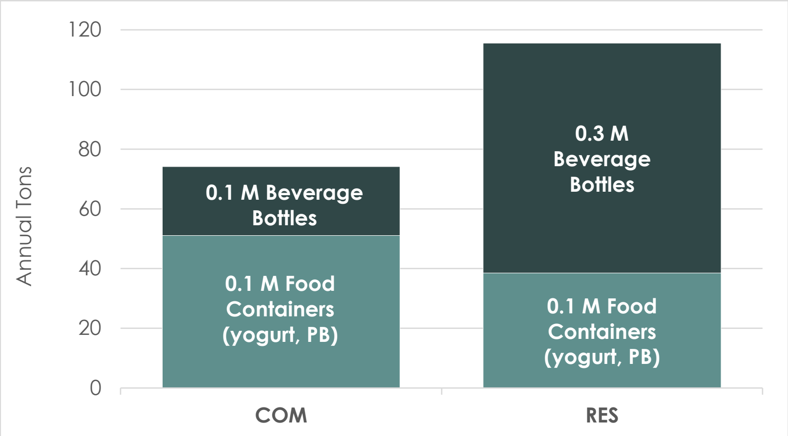
6.4.13 SSO - Plastic Containers



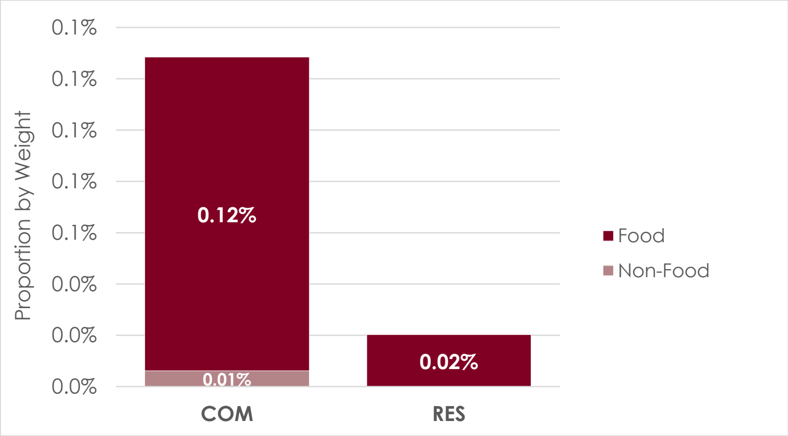


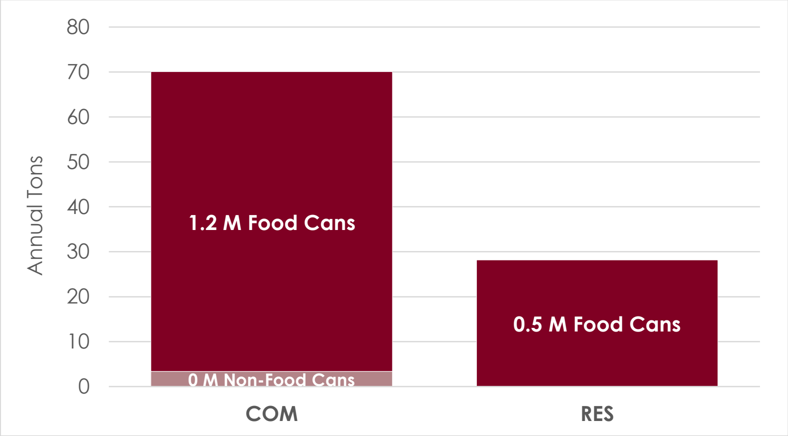
6.4.14 SSO - Glass Bottles & Containers – Non-Wine/Spirit



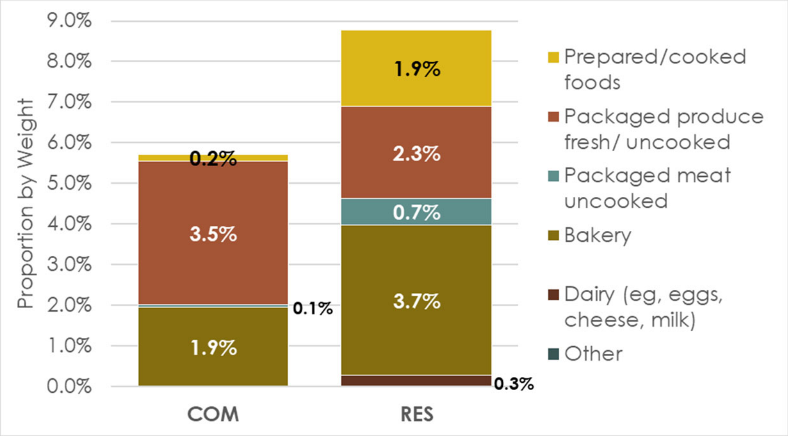


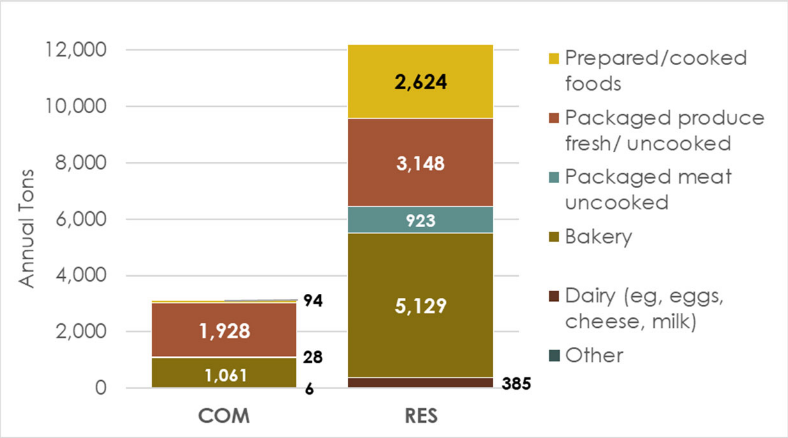
6.4.15 SSO – Tin/Steel Cans



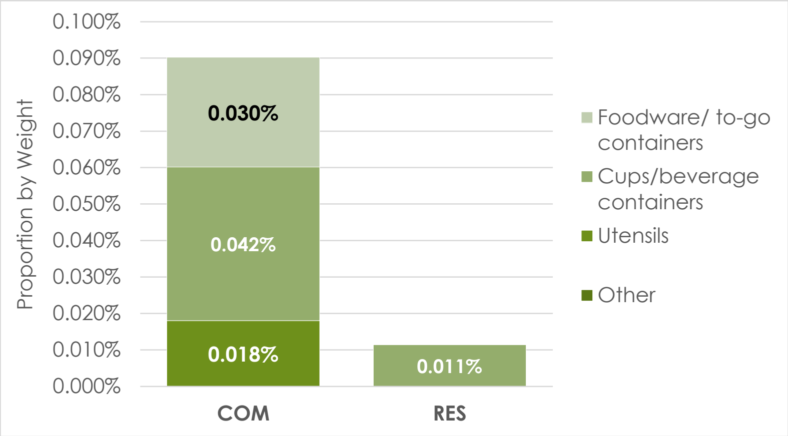


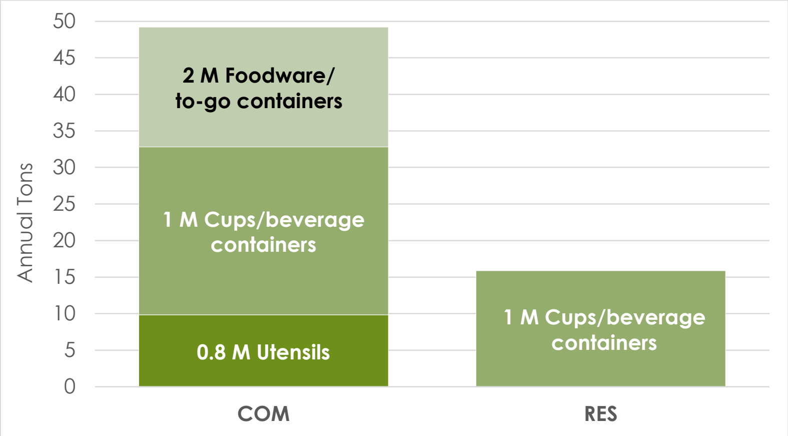
6.4.16 SSO - Edible Food – Cooked/Baked/Prepared Perishable Items/Bakery/Dairy/Other





6.4.17 SSO - Bioplastics





END OF REPORT

Appendix A

Material Components

MATERIAL TYPE				DESCRIPTION
PAPER	Uncoated Corrugated Cardboard			Paper laminate usually composed of three layers. The center wavy layer is sandwiched between the two outer layers. It does not have any coating on the inside or outside. This type does not include chipboard boxes such as cereal and tissue boxes.
PAPER	Paper Grocery Bags			Bags (usually brown) made from Kraft paper generally designed to carry out groceries from stores and that can be clearly identified as coming from a grocery store through the store's name or logo on the bag
PAPER	Other Paper Bags/Kraft Paper			Bags made from Kraft paper that are not clearly identified as grocery bags, and sheets of Kraft paper. The paper may be brown (unbleached) or white (bleached). The paper may also be single layer or multi-layer (multiwall).
PAPER	Recyclable Paper (no food/liquid contam)			Paper that is recyclable and generally NOT composted
PAPER	Folding Cartons & Other Paperboard Pkg			Paperboard boxes, other than corrugated, which fold and are typically used as the primary packaging for various products such as breakfast cereals, ice cream, frozen foods, candy, cookies, jewelry, tobacco, pharmaceuticals and cosmetics. It also includes non-box paperboard.
PAPER	Other Paper/Fiber - Packaging			Packaging and packaging-related items that cannot be placed in other categories, that are usually combined with non-paper materials. Items may be contaminated with food or moisture.
PAPER (cont)	Aseptic Cartons			Bleached polycoated paperboard containers or paper containers with a foil liner of various sizes and shapes that contain shelfstable food products. Aseptic containers may include a plastic pour spout as part of the container.
PAPER (cont)	Gable-top Cartons			Cartons for both non-refrigerated items and refrigerated items. These are usually paper-based, may be any shape, and may include a plastic pour spout as part of the carton
PAPER (cont)	**Paper/Fiber Food Service Ware**			Items used to store to convey food that could have used a reusable alternative. This does NOT include fiber containers in grocery stores used to package berries or mushrooms.
PAPER (cont)	Remainder/Composite Paper			Items made mostly of paper but combined with large amounts of other materials. These are items that do not fit into any other categories, and are not generally compostable or recyclable.
Glass	Glass Bottles & Containers	**Non-Wine/ Spirit**	**CRV**	Glass containers that display the CRV notification. Includes whole and broken containers
Glass	Glass Bottles & Containers	**Non-Wine/ Spirit**	**Non-CRV**	Glass containers that do NOT display the CRV notification. Includes whole and broken containers
Glass	Glass Bottles & Containers	Wine/Spirit		Glass containers that contained wine or liquor
Glass	Other			Glass not defined above

MATERIAL TYPE				DESCRIPTION
METAL	**Tin/Steel Cans**			Rigid containers made mainly of steel, both CRV and non-CRV containers. These items will stick to a magnet and may be tincoated. This subtype is used to store food, beverages, paint, and a variety of other household and consumer products.
METAL	Aluminum Cans		CRV	Beverage container that is made mainly of aluminum and that displays the CRV notification. This subtype does not include bimetal containers with steel sides and aluminum ends.
METAL	Aluminum Cans		Non-CRV	Container that is made mainly of aluminum and that does not display the CRV notification.
METAL	Other Ferrous			Iron or steel that is magnetic or any stainless-steel item. This type does not include tin/steel cans
METAL	Other Non-Ferrous			Metal item, other than aluminum cans, that is not stainless steel and that is not magnetic. These items may be made of aluminum, copper, brass, bronze, lead, zinc, or other metals.
PLASTIC	**Containers**	**PETE Containers**		
PLASTIC	**Containers**	**PETE Thermoform Containers**		Plastic containers made from a plastic sheet that has been heated and formed to a specific shape in a mold
PLASTIC	**Containers**	**HDPE Containers**		Bottles, jars, containers, tubs, lids, clamshells, trays, tray lids, cups, bowls, plates, cake domes, small storage containers, and trays that are marked HDPE (2) that are used to package items such as fresh produce, baked good, nuts, and deli items.
PLASTIC	**Containers**	**PP #5 Containers**		Bottles, jars, containers, lids, and other packaging labelled with PP (5), both with and without the CRV symbol.
PLASTIC	**Containers**	**Other Plastic Containers (3, 4, 6, 7)**		Bottles, jars, containers, lids, and other packaging that are made of types of plastic other than PET (1), HDPE (2), or PP (5). Items may be made of vinyl, LDPE, PVC, PS, or other plastic. They may bear the number 3, 4, 6, or 7 in the triangular recycling symbol, or may bear no recycling symbol.
PLASTIC	Plastic Bags	Grocery/Merchandise		Single use, typically thin film
PLASTIC	Plastic Bags	"Reusable"		Thicker film used in some grocery stores. Often labeled "Reusable"
PLASTIC	Plastic Bags	Compostable		
PLASTIC	Plastic Bags	Produce (pre-checkout)		
PLASTIC	Film	Flexible Plastic Pouches		Plastic pouches made of thicker, multilayer flexible material. Material is thicker than potato chip bags and frozen vegetable bags. May have a flat bottom so that package would stand up on its own, but not always. May have plastic screw tops.
PLASTIC	Film	Other Film (inc Ziplock bags)		
PLASTIC	Durable Plastic Items			Plastic items other than containers or film plastic that are made to last for more than one use. These items may bear the numbers 1 through 7 in the triangular recycling symbol.
PLASTIC	Other			

MATERIAL TYPE				DESCRIPTION
Textiles/ Other	Cloth and Clothing			
	Shoes, Purses, Belts			
	Carpet			
	Other			
COMPOSTABLE ORGANICS	Green Waste	Leaves and Grass		
		Chips, Prunings, Trimmings,		
	Food	Edible	Produce	Uncooked or fresh vegetables, fruits, and fungi either whole or partially consumed and are unmixed with non-vegetative food types.
			Meat	Uncooked meat (beef, poultry, pork, lamb) or fish product that is in a whole or partial state, unmixed with other food types. Packaged or unpackaged.
COMPOSTABLE ORGANICS (cont)	Food	Edible	**Cooked/Baked/ Prepared Perishable Items/Bakery/Dairy/ Other**	Food items that have been cooked or prepared and could have multiple food types mixed together as a part of cooking or preparation.
			Packaged/Non-Perishable/Shelf stable	Shelf-stable foods that are in a whole or partial state.
		Inedible		
	Compostable Paper		Packaging	Packaging for either food or non-food items, usually brown non-waxed paperboard or kraft paper
			Pizza Boxes	
			Other	
	Wood	Untreated Lumber		
		Pallets		

MATERIAL TYPE		DESCRIPTION
INERTS	Crushable Inerts	Includes rock, brick, Portland-cement concrete, asphaltic-cement concrete, tile, and ceramics
	Gypsum Boards	Gypsum-based wallboard including board for use in the drywall or plaster trades. NO paint, NO spackle, NO wallpaper.
	Treated Wood Waste	Any wood with paint or preservative treatment including particleboard, chipboard, OSB (oriented strand board), MDF (medium-density fiberboard) and masonite.
ELECTRONICS	Major Appliances	
	Brown Goods	Typically electronically powered household products fabricated from metals and plastics and not easily separable into individual materials. Includes hair dryers, toasters, and other common house electronics
	Computer Related Electronics	Processors, keyboards, printers, fax machines, mice, disk drives, and modems
	Other Small Consumer	Personal digital assistants (PDAs), cell phones (including those with a screen larger than 4 inches), phone systems, phone answering machines, portable electronic book readers (like Kindles and Nooks) and other devices for reading static text, computer games and other electronic toys, portable CD players, camcorders, digital cameras, cell phone chargers and other electronic device chargers, and other electronic devices)
HHW	Paint	
	Used Oil	
	Lead-acid (automotive) batteries	
	Other batteries	
	Mercury-Containing Items - Not Lamps	
	Lamps - Fluorescent and LED	
	Medical Waste/Sharps	Treated medical waste that has been sanitized prior to disposal or untreated medical waste such as sharps, surgical instruments, and bloody bandages. Includes Medicine in either pill or liquid form.
OTHER	Tires	
	Latex gloves	
	Expanded Polystyrene	
	Bioplastics	Designated/labelled as compostable or bioplastic
	Manure	
	Asphalt Roofing	
	Stranglers & Tanglers (hoses, rubber, etc.)	
	Diapers and Sanitary Products	
	Mixed Residue/Other	

Appendix B

Field Data Sheets

StopWaste 2023 Waste Characterization Study			
Date:		**M T W Th F**	**Time:**
Site:			
Sample #:		**Route #:**	**Incoming WT:**
Waste Type: circle one	**TRASH SSR SSO**	**Sector: RES-SF RES-MF COM** circle one	
Jurisdiction of Origin:		**Vehicle type/ Truck #:**	
Notes:			

MATERIAL TYPE				WEIGHT (In Pounds) Gross	Tare	Net
Paper	Uncoated Corrugated Cardboard					
	Paper Grocery Bags					
	Other Paper Bags/Kraft Paper					
	Recyclable Paper (no food/liquid contam)					
	Folding Cartons & Other Paperboard Pkg					
	Other Paper/Fiber - Packaging					
	Aseptic Cartons					
	Gable-top Cartons					
	Paper/Fiber Food Service Ware					
	Remainder/ Composite Paper					
Glass	**Glass Bottles & Containers**	**Non-Wine/ Spirit**	**CRV**			
			Non-CRV			
		Wine/Spirit				
	Other					
Metal	**Tin/Steel Cans**					
	Aluminum Cans		CRV			
			Non-CRV			
	Other Ferrous					
	Other Non-Ferrous					
Plastic	**Containers**	**PETE Containers**				
		PETE Thermoform Containers				
		HDPE Containers				
		PP #5 Containers				
		Other Plastic Containers (3, 4, 6, 7)				
	Plastic Bags	Grocery/Merchandise				
		"Reusable"				
		Compostable				
		Produce (pre-checkout)				
	Film	Flexible Plastic Pouches				
		Other Film (inc Ziplock bags)				
	Plastic Cutlery					
	Durable Plastic Items					
	Other					
Textiles/ Other	Cloth and Clothing					
	Shoes, Purses, Belts					
	Carpet					
	Other					

MATERIAL TYPE				WEIGHT (In Pounds)		
				Gross	Tare	Net
Compostable Organics	Green Waste	Leaves and Grass				
		Chips, Prunings, Trimmings, Branches, Stumps				
	Food	Edible	Produce			
			Meat			
			Cooked/Baked/ Prepared Perishable Items/Bakery/Dairy/ Other			
			Packaged/Non-Perishable/Shelf stable			
		Inedible				
	Compostable Paper		Packaging			
			Pizza Boxes			
			Other			
	Wood	Untreated Lumber				
		Pallets				
Inerts	Crushable Inerts					
	Gypsum Boards					
	Treated Wood Waste					
Electronics	Major Appliances					
	Brown Goods					
	Computer Related Electronics					
	Other Small Consumer					
HHW	Paint					
	Used Oil					
	Lead-acid (automotive) batteries					
	Other batteries					
	Mercury-Containing Items - Not Lamps					
	Lamps - Fluorescent and LED					
	Medical Waste/Sharps					
Other	Tires					
	Latex gloves					
	Expanded Polystyrene					
	Bioplastics					
	Manure					
	Asphalt Roofing					
	Stranglers & Tanglers (hoses, rubber, etc.)					
	Diapers and Sanitary Products					
	Mixed Residue/Other					
					Total Net Weight:	

Comments:

Appendix C

Volume to Weight Conversion Estimates

Volume-to-Weight Conversion Factors
U.S. Environmental Protection Agency
Office of Resource Conservation and Recovery
April 2016

EPA's 1997 report, "Measuring Recycling: A Guide for State and Local Governments", was a guide to facilitate standardization of MSW data collection at the local level, which included volume-to-weight conversion factors for comparing recovery efforts between municipalities, regions and states. The factors are also valuable when planners work with the national recovery data presented in EPA's sustainable materials management report series.

This document provides updates to the volume-to-weight conversion factors found in the 1997 report Appendix B.

The goal of this update is to identify more current secondary data measurements of the various products. Of particular interest are products known to have been source reduced through light weighting since the early nineties such as plastic, glass and metal packaging. Some factors included on the original table are excluded from the revised table due to lack of updated data. Primary data collection was not performed.

The original Appendix B table included 12 materials categories; the updated table provides factors for 15 material categories, including the following.

- Appliances
- Automotive
- Carpeting
- Commingled Recyclables
- Electronics
- Food
- Glass
- Metals
- Municipal Solid Waste
- Paper
- Plastic
- Textiles
- Wood
- Yard Trimmings
- Construction & Demolition Debris (C&D)

All of the categories include multiple products and/or density measurements. Four product categories—carpeting, commingled recyclable material, electronics and construction and demolition debris—are new. Previously lead-acid batteries and scrap tires were separate categories but are combined into the single category "Automotive" in the updated table.

Other differences include the removal/addition of products within some of the categories to better reflect the current recycling industry. For example, eliminating "Tab Card" and adding "Mixed Paper" to the paper category reflects the move toward commingled recyclables collection. The addition of "Electronics" reflects the growth in these products since the original table was published.

The updated factors are shown in the table below.

Standard Volume-to-Weight Conversion Factors

Category	Recyclable Materials	Volume	Estimated Weight (lbs)	Source
Appliances	Major Appliances			
	Dishwasher	1 unit	125	1
	Clothes Dryer	1 unit	125	1
	Stove	1 unit	150	1
	Refrigerator	1 unit	250	1
	Clothes Washer	1 unit	150	1
Automotive	Lead-Acid Battery			
	Auto	one	36	3
	Truck	one	47	3
	Scrap Tire			
	Light Duty Tires (passenger, light truck)	one	22.5	5
	Commercial Tires	one	120	5
	Fluids			
	Used Motor Oil	gallon	7.4	2
	Antifreeze	gallon	8.42	2
	Other Automotive			
	Oil Filters not crushed	drum	175	1
	Oil Filters crushed	drum	700	1
	Oil Filters	gallon	5	1
Carpeting	Carpet			
	Carpet	cubic yard	147	6
	Carpet Padding	cubic yard	62	6
Commingled Recyclable Material	Containers (Plastic bottles, Aluminum cans, Steel cans, Glass bottles) and Paper			
	Commingled Recyclables	cubic yard	262	4
	Containers (Plastic bottles, Aluminum cans, Steel cans, Glass bottles), Corrugated Containers and Paper			
	Campus Recyclables	cubic yard	92	7
	Commingled Recyclables	cubic yard	111	4
	Containers (Plastic bottles, Aluminum cans, Steel cans, Glass bottles) – No paper			
	Campus Recyclables	cubic yard	70	7
	Commingled Recyclables	cubic yard	67	4
	Commercial Recyclables	cubic yard	113	8
	Containers (Cans, Plastic) - No glass			
	Campus Recyclables	cubic yard	32	7
	Containers (Cans, Plastic) and Paper - No glass			
	Residential Recyclables	cubic yard	260	2
	Containers (Food/beverage, Glass) Corrugated Containers and Paper			
	Commercial Recyclables	cubic yard	88	2
	Commercial Recyclables	cubic yard	58	21
	Multifamily Recyclables	cubic yard	96	2
	Multifamily Recyclables	cubic yard	51	21

2

Category	Recyclable Materials	Volume	Estimated Weight (lbs)	Source
Commingled Recyclable Material	*Single family Recyclables*	cubic yard	126	2
	Containers (Food/beverage, Glass) Corrugated Containers and Paper- No glass			
	Campus Recyclables	cubic yard	139	2
	Commercial Recyclables	cubic yard	155	2
Electronics	Computer Equipment			
	Desktop	one	27	24
	Laptop	one	9.8	24
	Monitor			
	CRT	one	40	1
	15"	one	30	2
	17"	one	45	2
	21"	one	60	2
	Flat Panel	one	24	1
	Mixed Monitors	one	29.4	24
	Televisions			
	CRT < 19 inch	one	41	1
	CRT ≥ 19 inch	one	73	1
	Flat Panel	one	29	1
	Mixed TVs	one	67.3	24
	Peripheral Devices			
	Printers	one	16.1	24
	Mice	one	0.2	9
	Keyboards	one	2.9	9
	Mobile Devices			
	Cellular Phone	one	0.22	9
	Mixed Electronics			
	Brown Goods	cubic yard	343	6
	Computer-related Electronics	cubic yard	354	6
	Other Small Consumer Electronics	cubic yard	438	6
Food				
	Fats, Oils, Grease	55-gallon	412	2
	Organics - commercial	cubic yard	135	21
	Source Separated Organics - commercial	cubic yard	1,000	15
	Food Waste - restaurants	cubic yard	396	21
	Food Waste	cubic yard	463	4
	Food Waste	cubic foot	22-45	4
	Food waste - university	gallon	3.8	22
	Food Waste	64 gallon toter	150	4
	Food waste	2 cubic yard full towable	2,736	4
Glass	Bottles			
	Loose	cubic yard	380	4

3

Category	Recyclable Materials	Volume	Estimated Weight (lbs)	Source
Metals	Aluminum Cans			
	Uncompacted	cubic yard	46	4
	Uncompacted	case = 24 cans	0.7	11
	Baled	cubic yard	250-500	10
	Steel Cans			
	Whole	cubic yard	50-175	10
	Baled	cubic yard	700-1,000	10
	Steel Cans - Institution			
	Whole	can	0.09	7
	Whole	cubic yard	136	7
Paper	Newsprint			
	Loose	cubic yard	360-800	1
	Baled	cubic yard	750-1,000	10
	Books - paperback, loose	cubic yard	428	23
	Old Corrugated Containers			
	Flattened	cubic yard	106	4
	Baled	cubic yard	700-1,100	10
	Old Corrugated Containers and Chip Board			
	Uncompacted	cubic yard	74.54	4
	Office Paper			
	Computer Paper			
	Loose	cubic yard	375-465	1
	Compacted/Baled	cubic yard	755-925	1
	Mixed			
	Loose	cubic yard	110-380	1
	Loose	cubic yard	323	4
	Compacted	cubic yard	610-755	1
	Shredded	cubic yard	128	4
	Mixed Baled	cubic yard	1,000-1,200	10
	Miscellaneous			
	Cartons (milk and juice) uncrushed	cubic yard	50	7
Plastic	PET			
	PET Bottles - baled	30"x42"x 48"	525-630	12
	PET Thermoform - baled	30"x42"x 48"	525-595	12
	HDPE			
	HDPE Dairy - baled	30"x42"x 48"	525-700	12
	HDPE Mixed - baled	30"x42"x 48"	525-700	12
	Mixed PET and HDPE			
	Loose	cubic yard	32	7
	Mixed Bottles/Containers #1 - #7			
	Loose	cubic yard	40.4	4
	Mixed Bottles/Containers #3 - #7			

4

Category	Recyclable Materials	Volume	Estimated Weight (lbs)	Source
Plastic	*Loose*	cubic yard	25.7	4
	Film			
	LDPE, loose	cubic yard	35	13
	LDPE, compacted	cubic yard	150	13
	LDPE, baled	30" x 42" x 48"	1,100	13
	Miscellaneous			
	Trash Bags	cubic yard	35	6
	Grocery/Merchandise Bags	cubic yard	35	6
	Expanded Polystyrene Packaging/Insulation	cubic yard	32	6
Textiles	Mixed Textiles			
	Loose	cubic yard	125-175	10
	Baled	cubic yard	600-750	10
Wood	Wood			
	Wood Chips, green	cubic yard	473	1
	Wood Chips, dry	cubic yard	243	1
	Saw Dust, wet	cubic yard	530	1
	Saw Dust, dry	cubic yard	275	1
	Pallets	one	25	1
	Pallets and Crates	cubic yard	169	18
	Christmas Trees, loose	cubic yard	30	1
Yard Trimmings	Yard Trimmings			
	Leaves	cubic yard	250-500	1
	Leaves (Minnesota)	cubic yard	300 - 383	15
	Mixed Yard Waste			
	Uncompacted	cubic yard	250	1
	Compacted	cubic yard	640	1
	Prunings & Trimmings	cubic yard	127	6
	Branches & Stumps	cubic yard	127	6
Municipal Solid Waste	MSW - Commercial			
	Commercial - dry waste	cubic yard	56-73	16, 8
	Commercial - all waste, uncompacted	cubic yard	138	21
	Mixed MSW - Residential, Institutional, Commercial			
	Uncompacted	cubic yard	250-300	14
	Compacted	cubic yard	400-700	14
	Mixed MSW - Multifamily uncompacted	cubic yard	95	21
	MSW - Landfill			
	Compacted - MSW Small Landfill with Best Management Practices	cubic yard	1,200-1,700	17
	Compacted - MSW Large Landfill with Best Management Practices	cubic yard	1,700-2,000	17

5

Category	Recyclable Materials	Volume	Estimated Weight (lbs)	Source
Municipal Solid Waste	*Compacted - MSW Very Large Landfill with Best Management and Cover Practices, Combined MMSW/Industrial/and other solid waste, or/and Leachate Recirculation*	cubic yard	>2,000	17
C &D	Concrete			
	Large Concrete with Re-bar	cubic yard	860	18
	Large Concrete without Re-bar	cubic yard	860	18
	Small Concrete with Re-bar	cubic yard	860	18
	Small Concrete without Re-bar	cubic yard	860	18
	Asphalt Paving			
	Large Asphalt Paving with Re-bar	cubic yard	773	19
	Large Asphalt Paving without Re-bar	cubic yard	773	19
	Small Asphalt Paving with Re-bar	cubic yard	773	19
	Small Asphalt Paving without Re-Bar	cubic yard	773	19
	Roofing			
	Composition Roofing	cubic yard	731	18
	Other Asphalt Roofing	cubic yard	731	18
	Other Aggregates	cubic yard	860	18
	Wood			
	Clean Dimensional Lumber	cubic yard	169	18
	Clean Engineered Wood	cubic yard	268	18
	Other Recyclable Wood	cubic yard	169	18
	Painted/Stained Wood	cubic yard	169	18
	Treated Wood	cubic yard	169	18
	Gypsum Board			
	Clean Gypsum Board	cubic yard	467	18
	Painted/Demolition Gypsum	cubic yard	467	18
	Aggregate			
	Large Rock	cubic yard	999	18
	Small Rock/Gravel	cubic yard	999	18
	Dirt and Sand	cubic yard	929	18
	Remainder/Composite Construction and Demolition	cubic yard	417	18
	Construction & Demolition Bulk	cubic yard	484	20
	Metal			
	Major Appliances	cubic yard	145	18
	Other Ferrous	cubic yard	225	18
	Other Non-Ferrous	cubic yard	225	18
	Remainder/Composite Metal (avg of metals, without used oil filters)	cubic yard	143	18
	HVAC Ducting	cubic yard	47	18

6

1	Oregon Department of Environmental Quality. 2007 Oregon Material Recovery and Waste Generation Rates Report September 2008 08-LQ-092. Attachment B: Measurement Standards and Reporting Guidelines 07-LQ-134. http://www.deq.state.or.us/lq/pubs/docs/sw/MRAttachmentB.pdf
2	Department of Ecology, State of Washington. Coordinated Prevention Grant Conversion Sheet. March,2014. www.ecy.wa.gov/pubs/1107016.pdf
3	Factor developed using lead per battery data from Battery Council International. Recycling Rates 2009 to 2013. April 2014. http://c.ymcdn.com/sites/batterycouncil.org/resource/resmgr/BCI_Recycling_Rate_Study_200.pdf applied to battery composition data from Sulllivan, JL and Gaines, L. 2010. A Review of Battery Life Cycle Analysis: State of Knowledge and Critical Needs. October 2010. Center for Transportation Research, Energy Systems Division, Argonne National Laboratory ANL/ESD/10-7.
4	Keep America Beautiful. Volume-to-Weight Recycling and Trash Conversion Factors Report. December 2013.
5	Rubber Manufacturers Association (RMA). 2013 U.S. Scrap Tire Management Summary. November 2014. http://www.rma.org/download/scrap-tires/market-reports/US_STMarket2013.pdf
6	California Integrated Waste Management Board. Targeted Statewide Waste Characterization Study: Detailed Characterization of Construction and Demolition Waste. June 2006. http://www.calrecycle.ca.gov/publications/Documents/Disposal%5C34106007.pdf
	Brown Goods: larger, non-portable electronic goods that have some circuitry. Examples include microwaves, stereos, VCRs, DVD players, radios, audio/visual equipment, and non-CRT televisions (such as LCD televisions).
	Computer-related Electronics: electronics with large circuitry that is computer-related. Examples include processors, mice, keyboards, laptops, disk drives, printers, modems, and fax machines.
	Other Small Consumer Electronics: portable non-computer-related electronics with large circuitry. Examples include personal digital assistants (PDAs), cell phones, phone systems, phone answering machines, computer games and other electronic toys, portable CD players, camcorders, and digital cameras.
7	Keep America Beautiful, Recycle-Bowl Competition. Accessed February 2015. http://recycle-bowl.org/wp-content/uploads/Recycle-Bowl-Estimating-Data-Fact-Sheet.pdf
8	Great Forest. Volume to Weight Conversion Ratios for Commercial Office Waste in New York City. January 2013. Primary data; Commingled; large commercial properties (500,000 sq. ft – 1m sq. ft) in the New York metropolitan area. http://www.greatforest.com/files/FileUpload/files/Great%20Forest%20-%20Waste%20Conversion%20Paper%20-
9	US EPA Electronics Waste Management in the United States Through 2009 . May 2011.
10	WasteCare Corporation. Some Typical Loose and Baled Weights of Various Materials. Accessed April 2015. http://www.wastecare.com/Products-Services/Balers/aboutbalers.htm.
11	The Aluminum Association. U.S. Aluminum Beverage Can Recycling. http://www.aluminum.org/sites/default/files/section_images/UBCRecyclingRate2013.pdf
12	The Association of Postconsumer Plastic Recyclers (APR). Model Bale Specifications. http://www.plasticsrecycling.org
13	Caldwell, Maggie. Recycling Plastic Film and Shrink Wrap. May 16, 2014. http://www.federalinternational.com/blog/recy
14	Caterpillar Performance Handbook. 40th Edition. January 2010.
15	Minnesota Pollution Control Agency. Data provided by professional composter. 2015. Source separated organics - food scraps, non-recyclable paper (paper plates/towels/etc) and compostable plastics.
16	Minnesota Department of Administration 2015 hauler records (excludes organics).
17	Minnesota Pollution Control Agency. 2013 MPCA MSW Landfill Annual Report Data.
18	California Integrated Waste Management Board. Targeted Statewide Waste Characterization Study: Detailed Characterization of Construction and Demolition Waste. June 2006
19	Tellus scaled down by factor from Florida C&D study – Converting C&D Debris from Volume to Weight: A Fact Sheet for C&D Debris Facility Operators, University of Florida, 2000.
20	Florida Dept of Environmental Protection http://www.dep.state.fl.us/waste/categories/recycling/cd/canddmain.htm
21	CalRecycle. 2014 Generator-Based Characterization of Commercial Sector Disposal and Diversion in California. September 10, 2015. http://www.calrecycle.ca.gov/Publications/Documents/1543/20151543.pdf Organics - putrescible material hauled by a contracted third party to a permitted facility mainly engaged in producing compost or mulch, or in anaerobic digestion of organics. Minor mechanical separation of contaminants or recyclable materials may occur at the facility prior to composting or digestion.
22	Goldstein, Nora. "Food Scraps Composting Laboratory". *BioCycle.* January 2013, Vol. 54, No. 1, p. 33. https: //www .biocycle.net/2013/01/22/food-scraps-composting-laboratory/
23	U.S. EPA. Standard Volume-to-Weight Conversion Factors. Last updated: February 28, 2006. https://www.epa.gov/smm/metrics-waste-reduction
24	National Center for Electronics Recycling (NCER). http://www.electronicsrecycling.org/ Mixed monitors and TVs: total pounds collected divided by total units collected.

7

Appendix D

Summary of StopWaste Benchmarking Study

StopWaste Benchmarking Project:

Purpose: to provide the residential and commercial rate payers of Alameda with an annual picture of their progress towards "Less than 10% good stuff in the garbage."

- Collect between 1600- 2000 samples from residential accounts annual
- Collect at least 1000 samples from commercial accounts representing selected sectors.

Residential Sampling Protocol:

The sampling protocol for the residential component of the project aligns closely with the sampling protocol followed by the RSR Contest- minus the bin labels and lid flips at adjacent addresses.

1. Select random number "x" for day-
2. Go to the "xth" address on the route
3. Note the set out- if nothing is set out skip and go to the next "xth" address
4. If just organics and recycling bins or just organics or just recycling bins are set out (no garbage) flip lids of set out bins to check for contamination and note size of set out bins and note "zero good stuff in garbage" on the data sheet.
5. If all three bins are set out, note size of bins, check recycling and organics for contamination, and pull garbage for sorting
6. If just garbage bin is set out pull sample and note absence of recycling and organics bins.
7. Garbage sample should be whatever is present in trash bin up to 96 gallons.
8. Sort sample into five categories, trash, recyclable, plant debris, compostable paper, foodscraps; weigh categories and record.

Commercial Sampling Protocol:

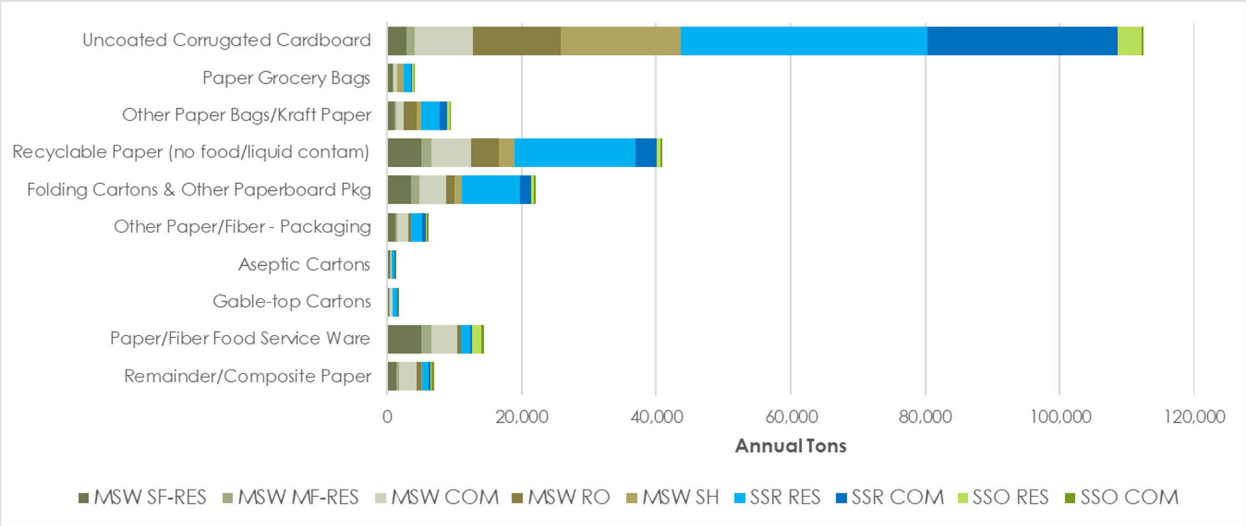
1. Go to nearest address on route
2. Confirm business type at the address
3. Once business type has been confirmed locate waste bin/cart
4. If waste bin/cart is not present, if access to bin is denied, or if there is less than 96 gallons available to sample go to the next address
5. If waste bin/cart is present locate recycling and organics bins/carts and check for contamination
6. Pull 96 gallon sample from waste bin (if material is loose in bin/cart load into labeled bags)
7. Sort sample into five categories, trash, recyclable, plant debris, compostable paper, foodscraps, weigh categories and record.

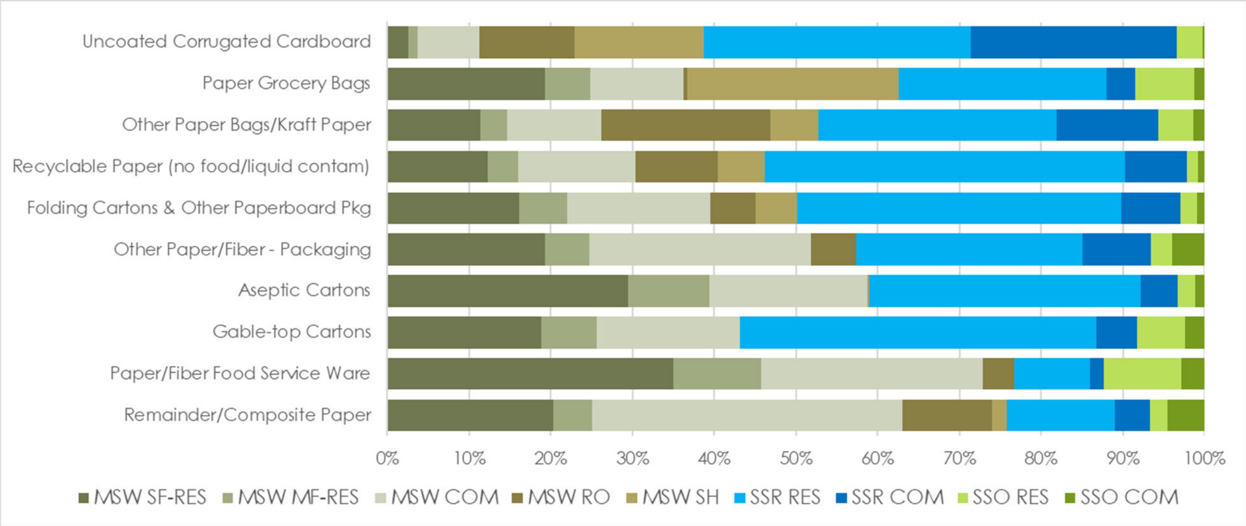
- Commercial Business “Types”
    - Office/Professional (125 samples)
    - Shared Office Settings (125 samples)
    - General Retail (100 samples)
    - Strip Mall/Shared (100 samples)
    - Restaurants (at least 150 samples with potential to split into fast food vs. sit down establishments)
    - Schools, Community Colleges, Universities (100 samples)
    - Industrial/light manufacturing (100 samples)
    - Shipping/receiving (100 samples)
    - Grocery (100 samples)

Appendix E

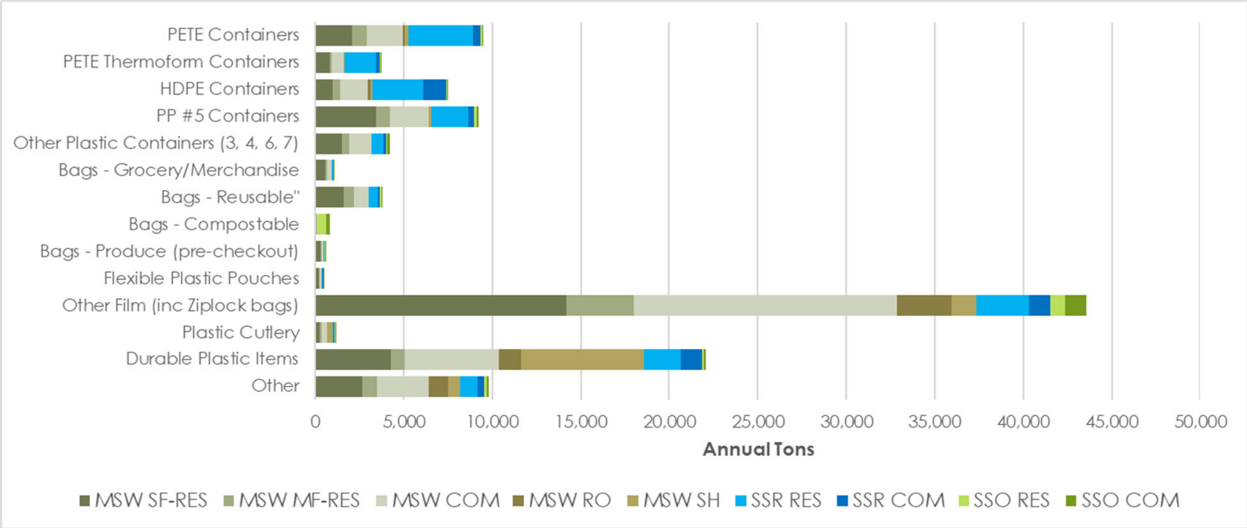
Summary of Disposition Charts by Material Group
All Streams

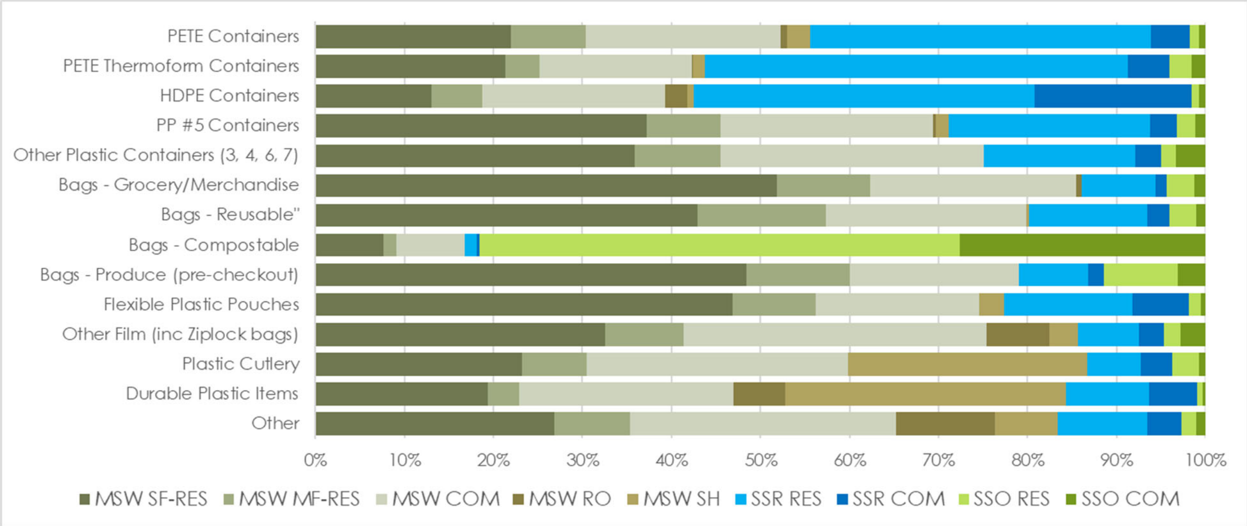
Paper



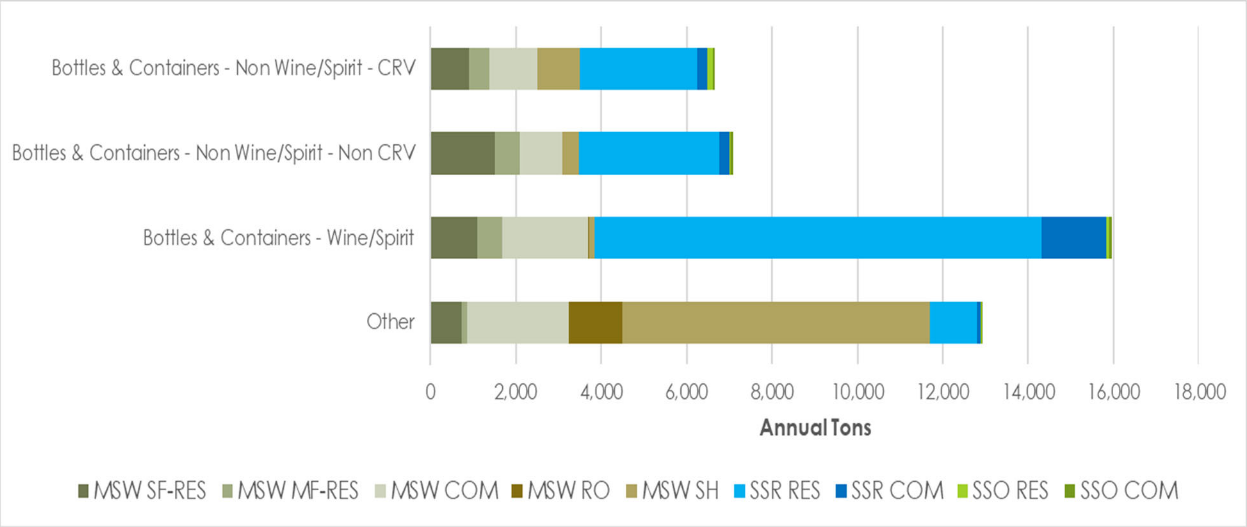


Plastic

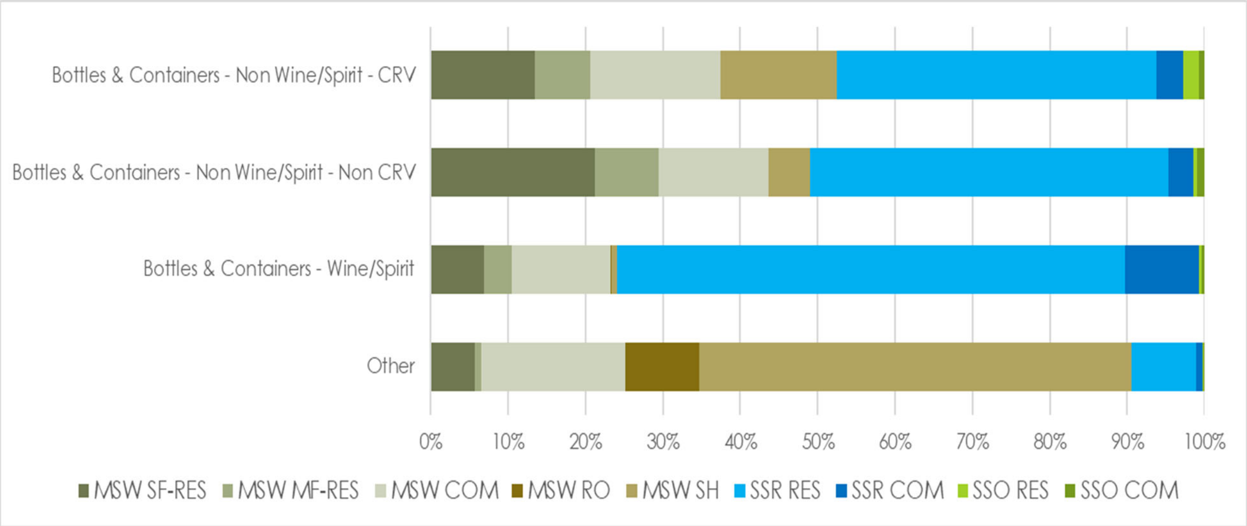

PETE Containers
PETE Thermoform Containers
HDPE Containers
PP #5 Containers
Other Plastic Containers (3, 4, 6, 7)
Bags - Grocery/Merchandise
Bags - Reusable"
Bags - Compostable
Bags - Produce (pre-checkout)
Flexible Plastic Pouches
Other Film (inc Ziplock bags)
Plastic Cutlery
Durable Plastic Items
Other
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
45,000
50,000
Annual Tons
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM


PETE Containers
PETE Thermoform Containers
HDPE Containers
PP #5 Containers
Other Plastic Containers (3, 4, 6, 7)
Bags - Grocery/Merchandise
Bags - Reusable"
Bags - Compostable
Bags - Produce (pre-checkout)
Flexible Plastic Pouches
Other Film (inc Ziplock bags)
Plastic Cutlery
Durable Plastic Items
Other
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM

Glass

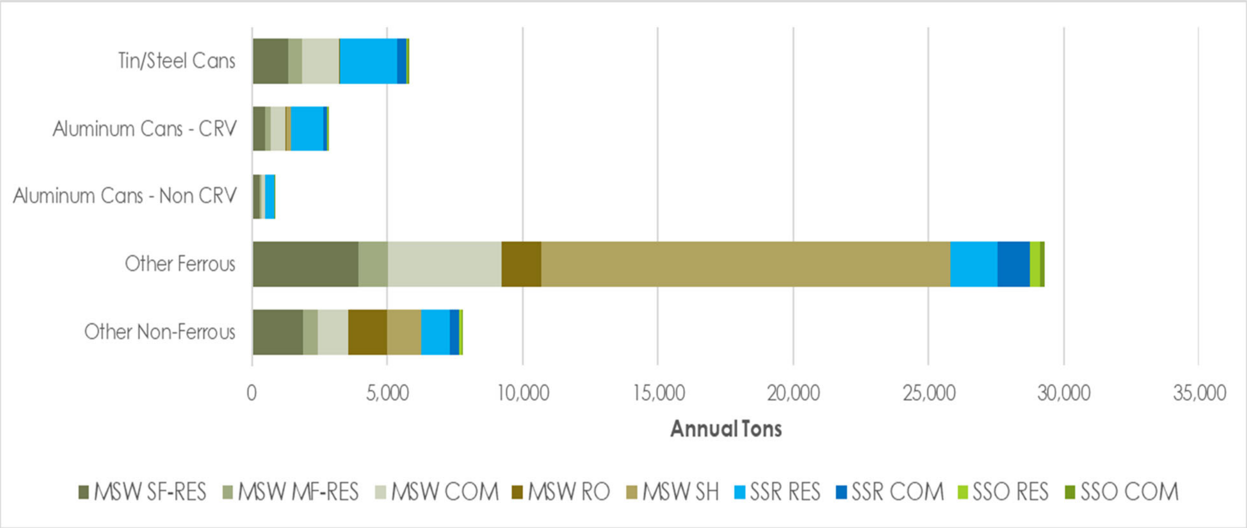


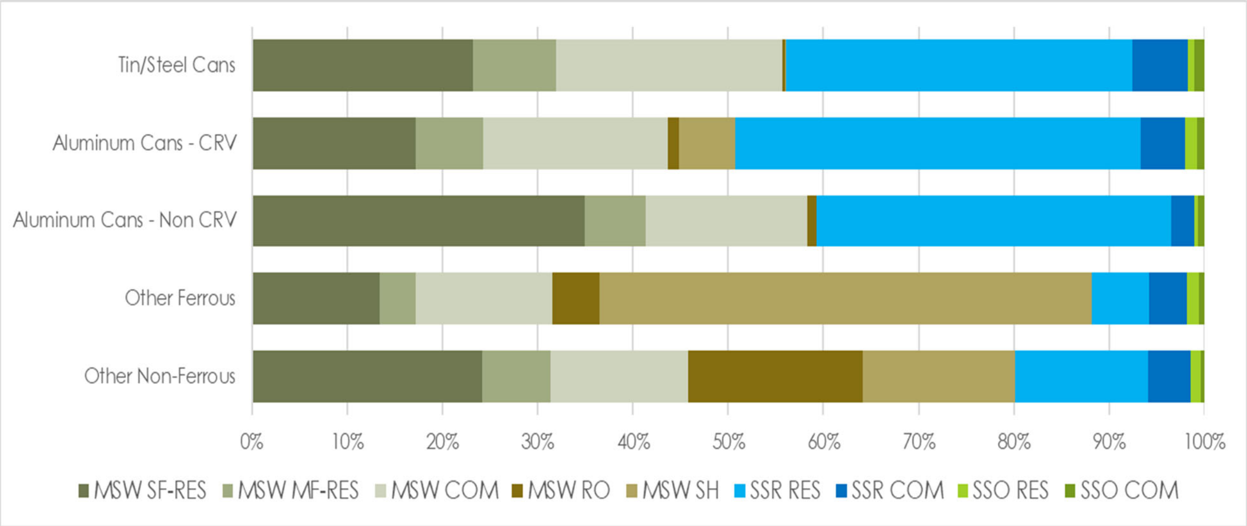
Bottles & Containers - Non Wine/Spirit - CRV
Bottles & Containers - Non Wine/Spirit - Non CRV
Bottles & Containers - Wine/Spirit
Other
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
Annual Tons
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM



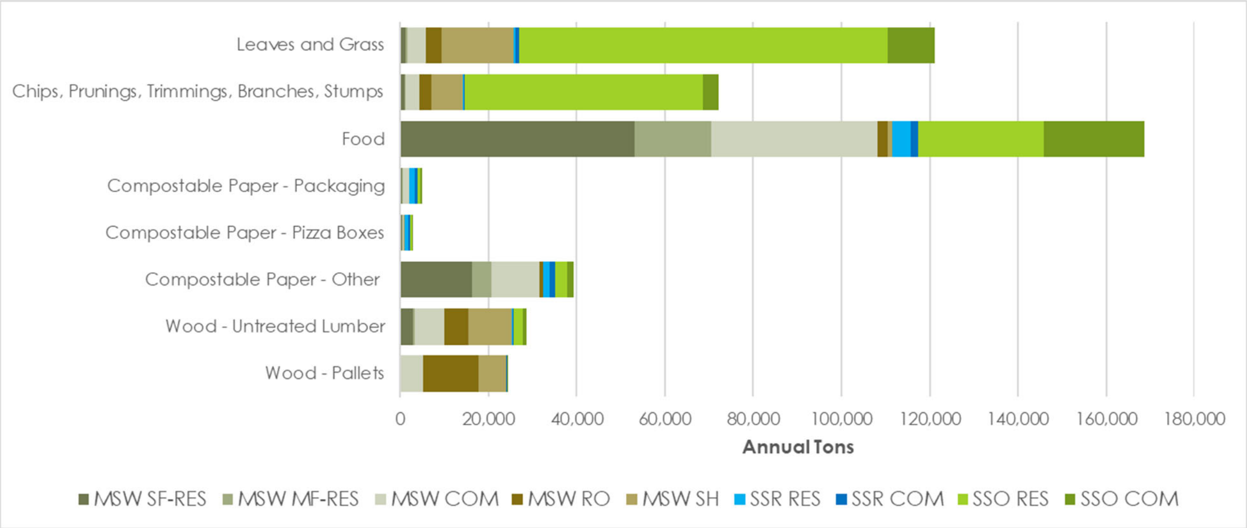
Bottles & Containers - Non Wine/Spirit - CRV
Bottles & Containers - Non Wine/Spirit - Non CRV
Bottles & Containers - Wine/Spirit
Other
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM

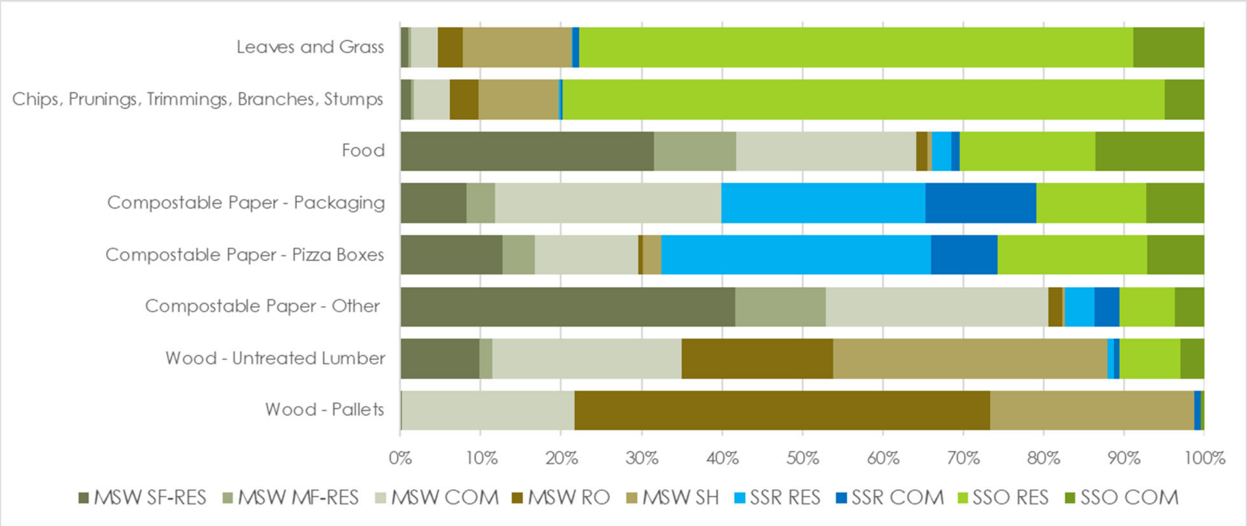
Metal


Tin/Steel Cans
Aluminum Cans - CRV
Aluminum Cans - Non CRV
Other Ferrous
Other Non-Ferrous
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Annual Tons
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM

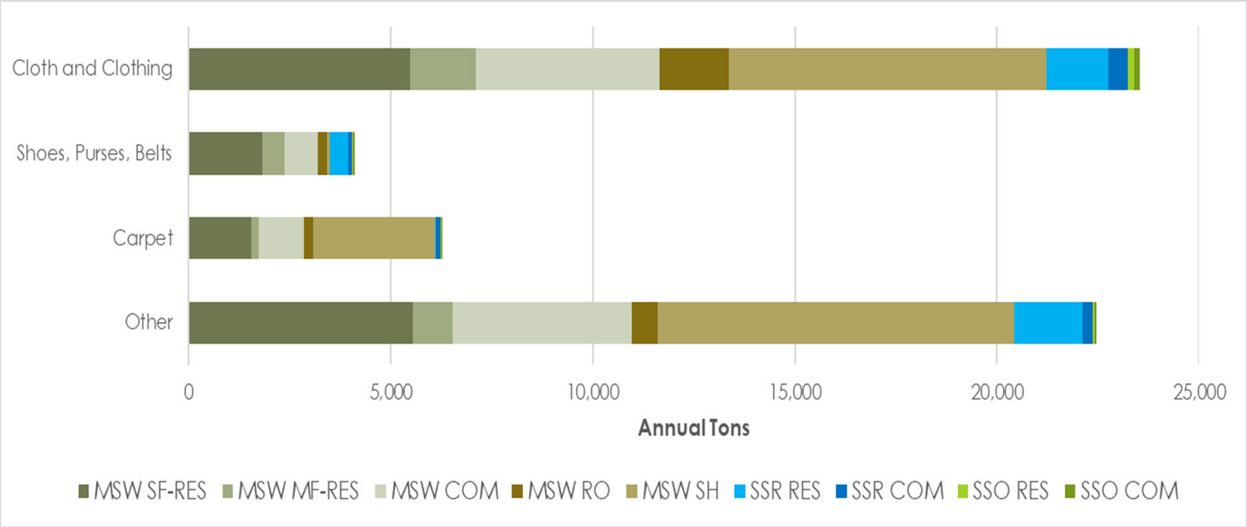

Tin/Steel Cans
Aluminum Cans - CRV
Aluminum Cans - Non CRV
Other Ferrous
Other Non-Ferrous
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM

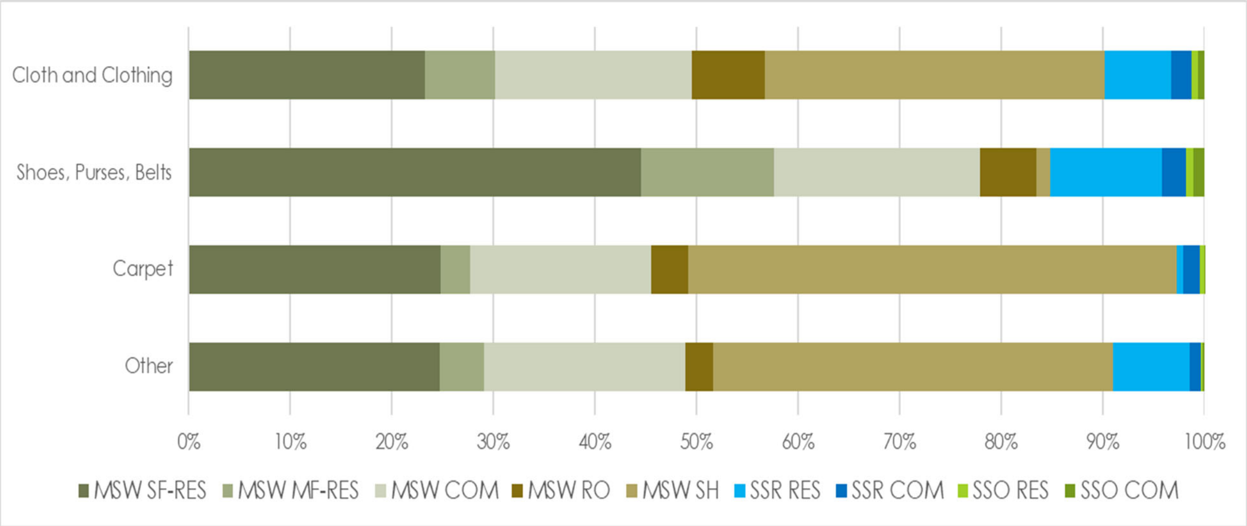
Compostable Organics



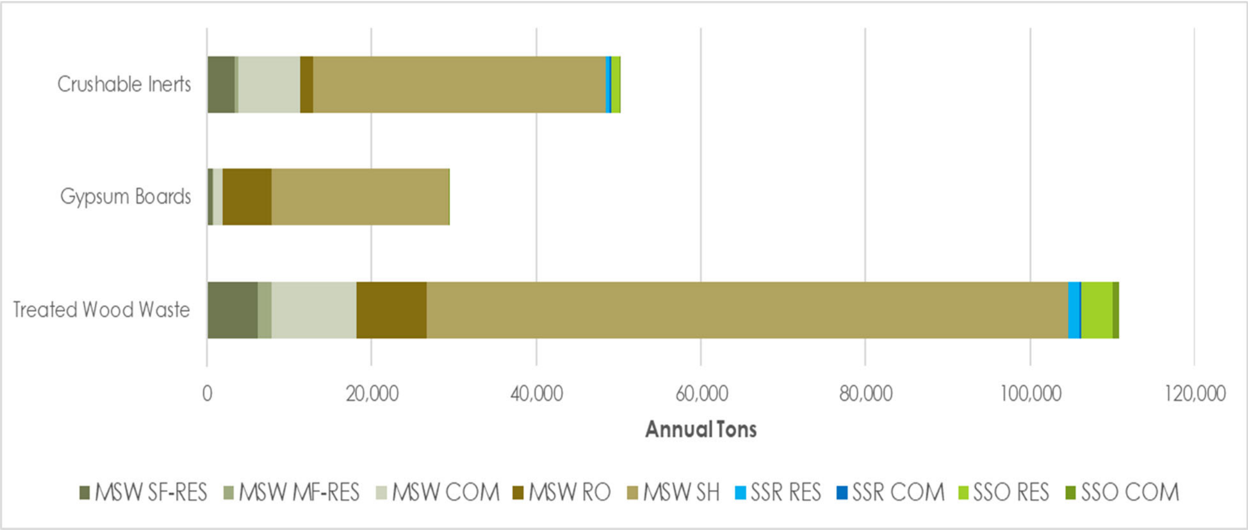


Textiles/Other

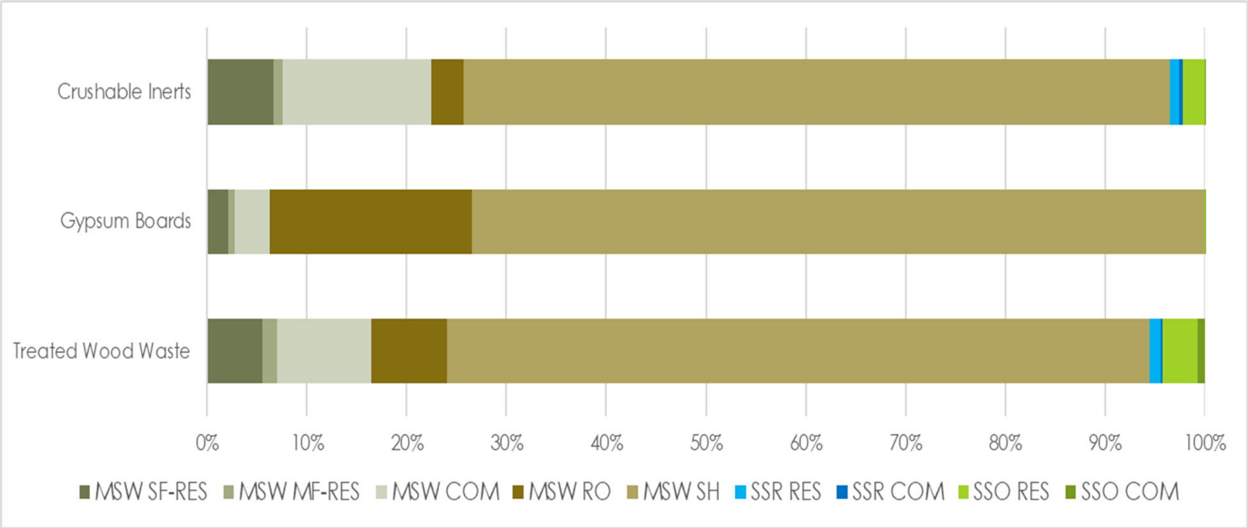




Inerts

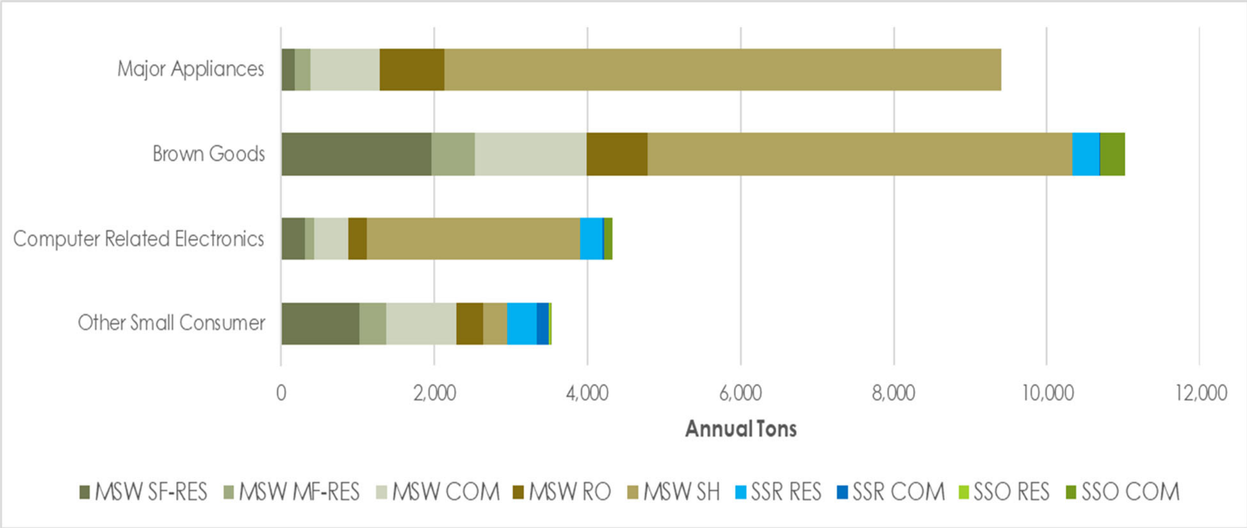


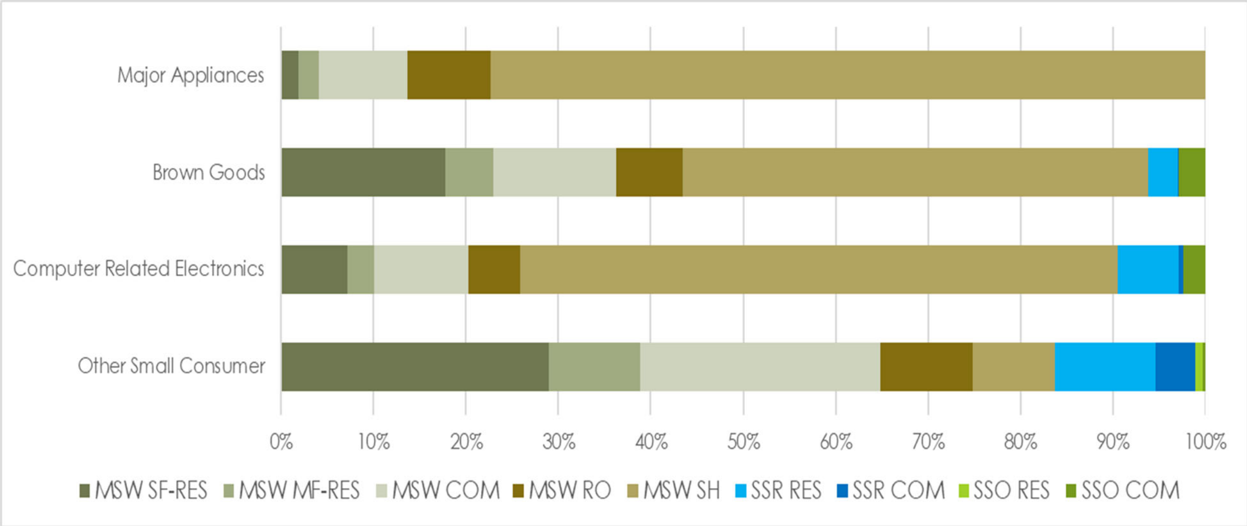
Crushable Inerts
Gypsum Boards
Treated Wood Waste
0
20,000
40,000
60,000
80,000
100,000
120,000
Annual Tons
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM



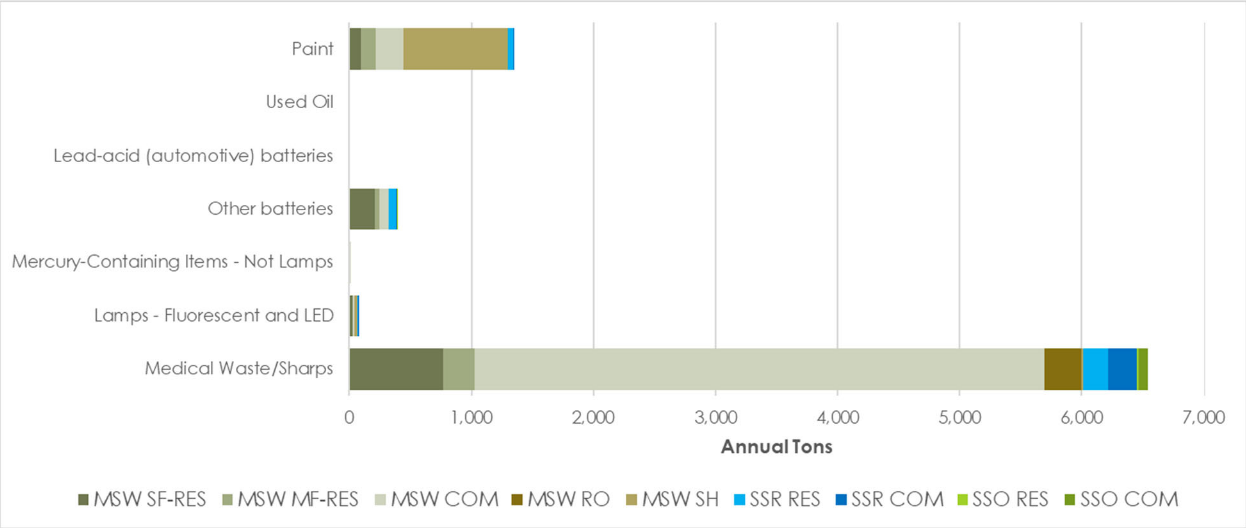
Crushable Inerts
Gypsum Boards
Treated Wood Waste
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM

Electronics

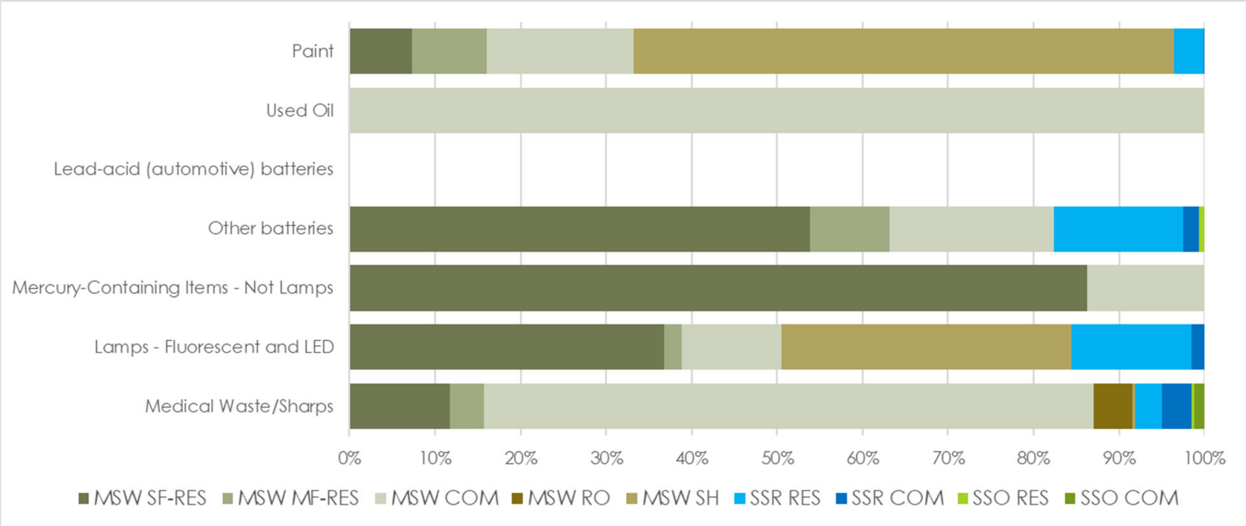




HHW

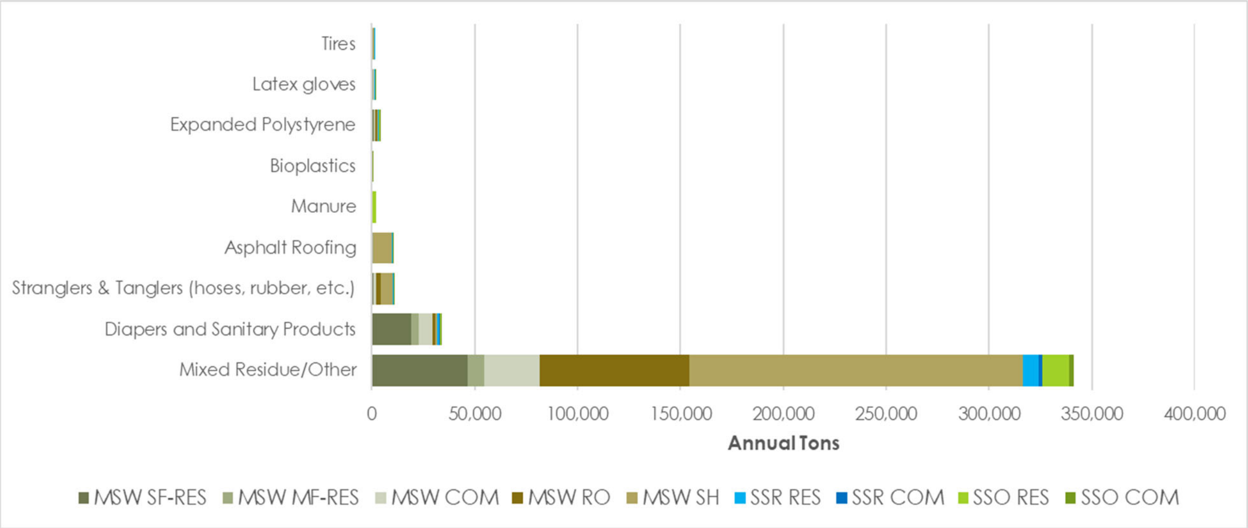


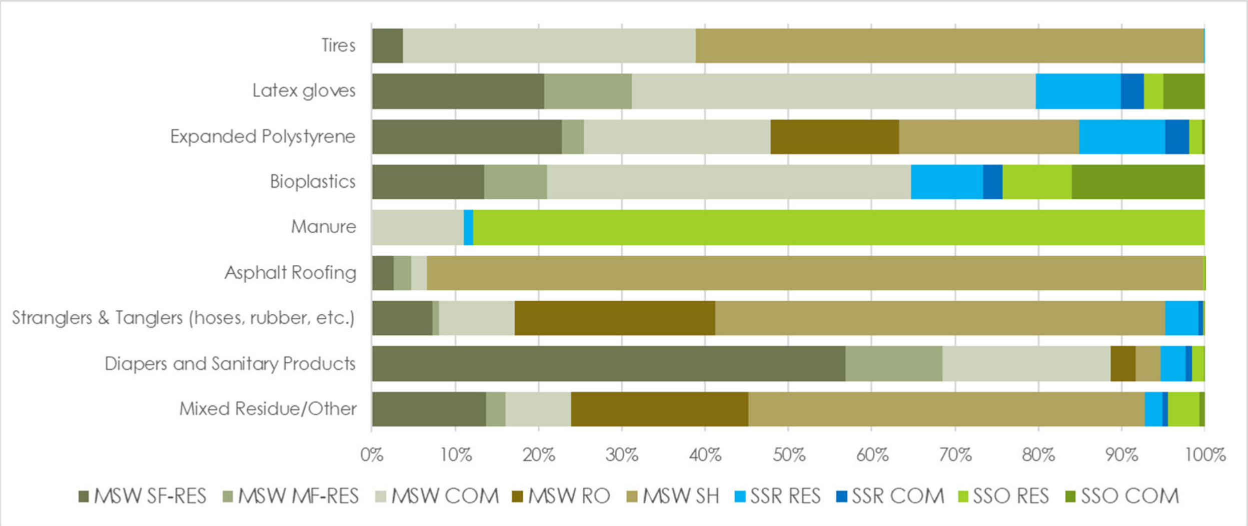
Paint
Used Oil
Lead-acid (automotive) batteries
Other batteries
Mercury-Containing Items - Not Lamps
Lamps - Fluorescent and LED
Medical Waste/Sharps
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
Annual Tons
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM



Paint
Used Oil
Lead-acid (automotive) batteries
Other batteries
Mercury-Containing Items - Not Lamps
Lamps - Fluorescent and LED
Medical Waste/Sharps
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM

Other

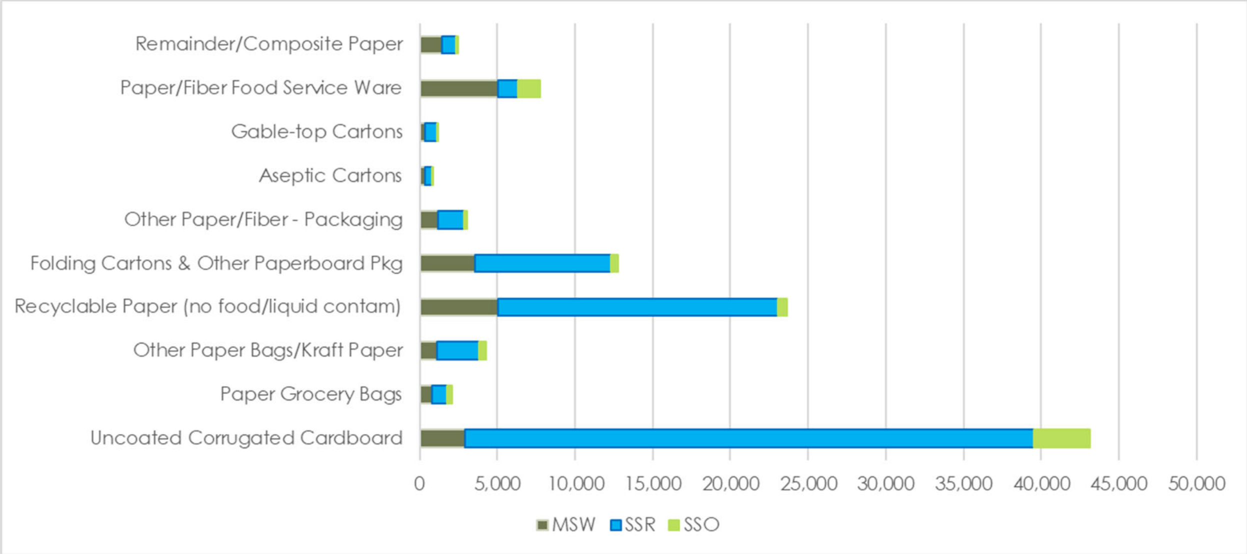

Tires
Latex gloves
Expanded Polystyrene
Bioplastics
Manure
Asphalt Roofing
Stranglers & Tanglers (hoses, rubber, etc.)
Diapers and Sanitary Products
Mixed Residue/Other
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
Annual Tons
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM

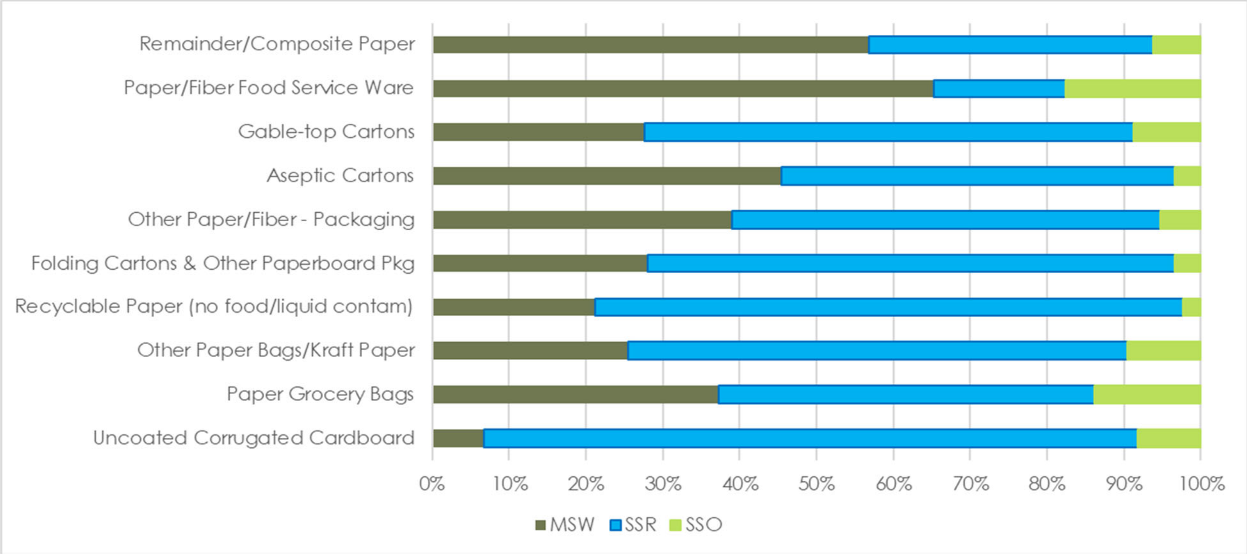

Tires
Latex gloves
Expanded Polystyrene
Bioplastics
Manure
Asphalt Roofing
Stranglers & Tanglers (hoses, rubber, etc.)
Diapers and Sanitary Products
Mixed Residue/Other
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW SF-RES
MSW MF-RES
MSW COM
MSW RO
MSW SH
SSR RES
SSR COM
SSO RES
SSO COM

Appendix F

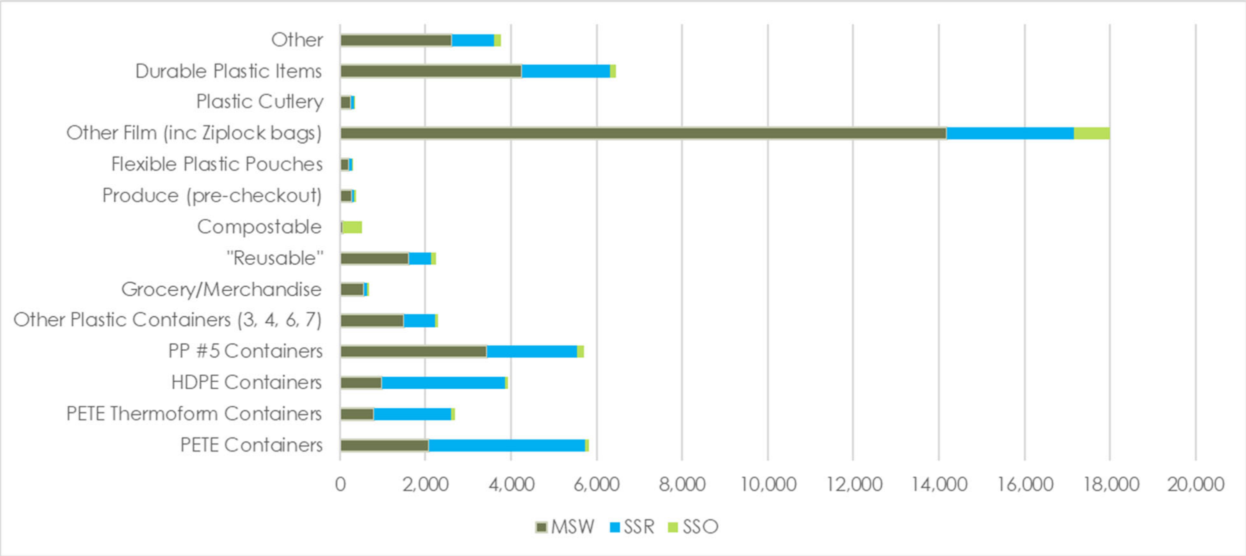
Summary of Disposition Charts by Material Group Single-Family Residential Sector (MSW, SSR, and SSO only)

Paper

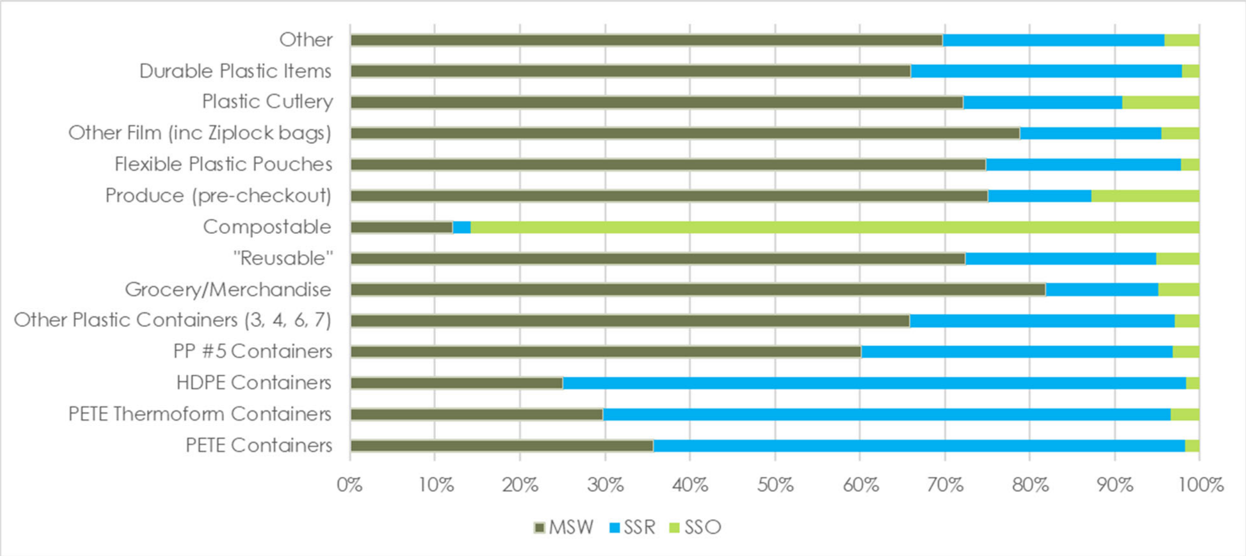




Plastic

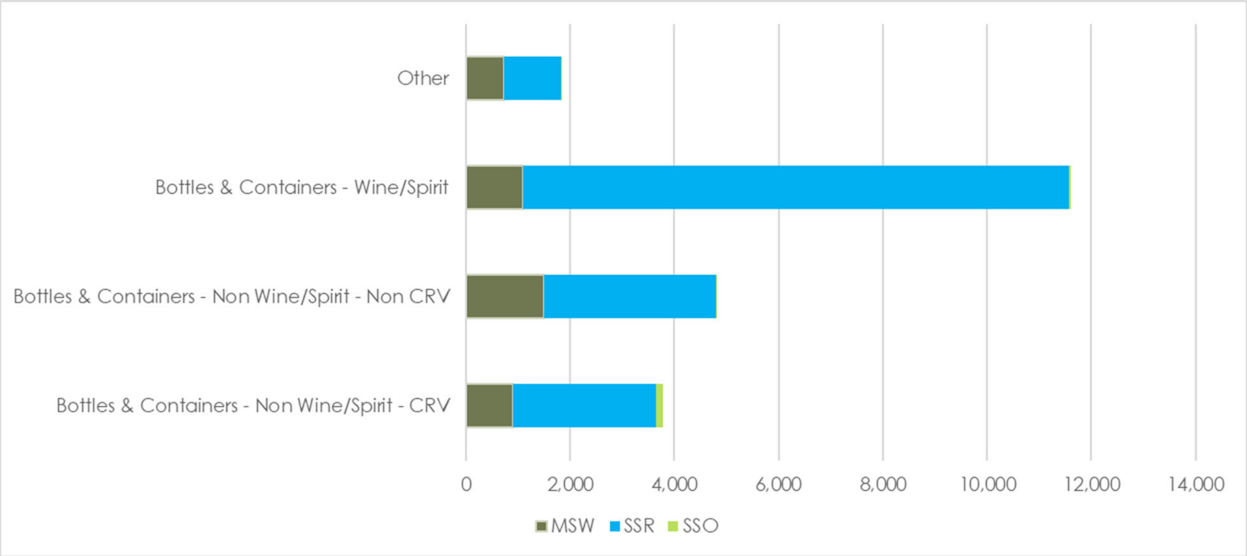


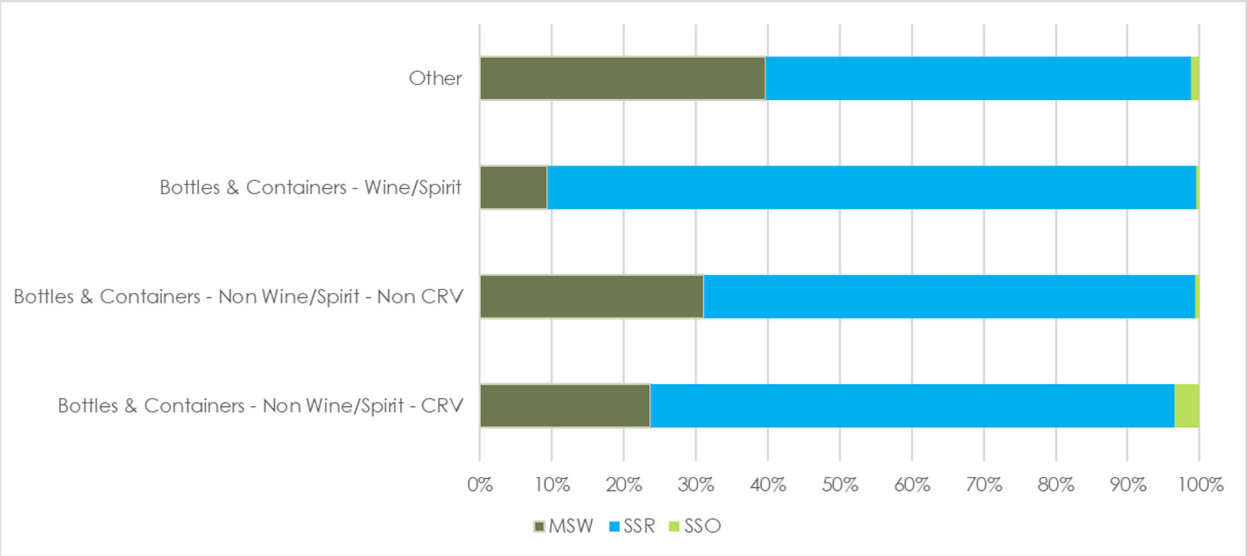
Other
Durable Plastic Items
Plastic Cutlery
Other Film (inc Ziplock bags)
Flexible Plastic Pouches
Produce (pre-checkout)
Compostable
"Reusable"
Grocery/Merchandise
Other Plastic Containers (3, 4, 6, 7)
PP #5 Containers
HDPE Containers
PETE Thermoform Containers
PETE Containers
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
MSW
SSR
SSO



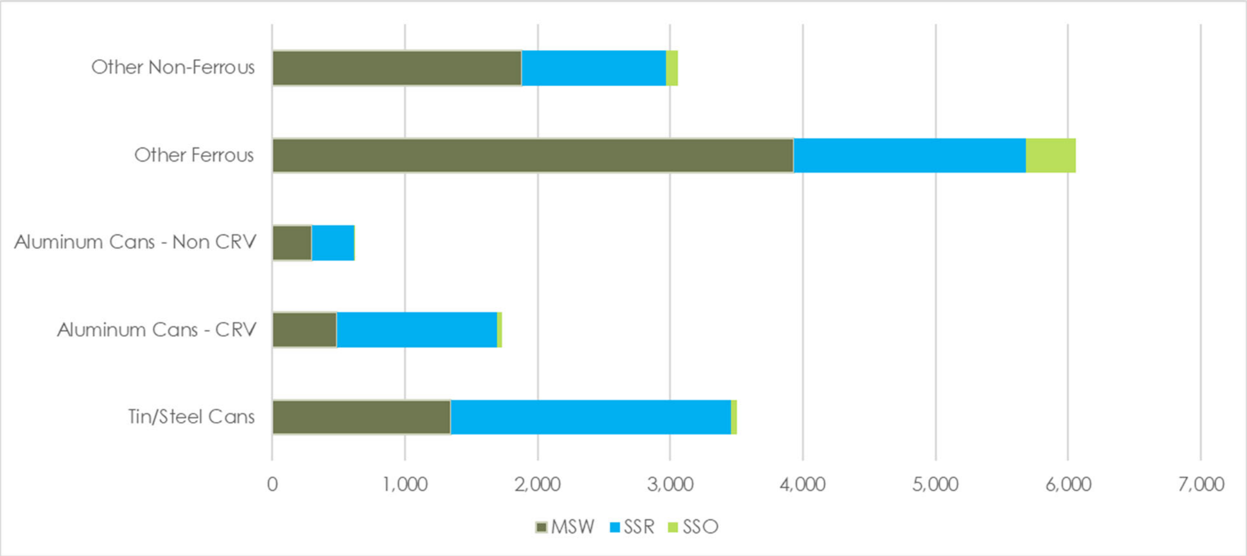
Other
Durable Plastic Items
Plastic Cutlery
Other Film (inc Ziplock bags)
Flexible Plastic Pouches
Produce (pre-checkout)
Compostable
"Reusable"
Grocery/Merchandise
Other Plastic Containers (3, 4, 6, 7)
PP #5 Containers
HDPE Containers
PETE Thermoform Containers
PETE Containers
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW
SSR
SSO

Glass

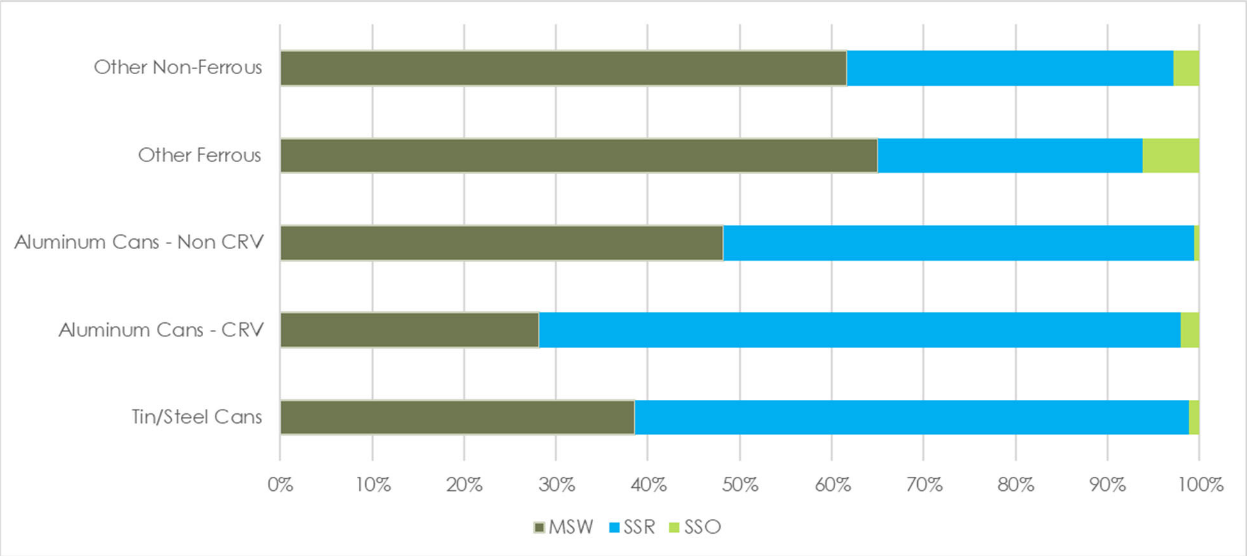

Other
Bottles & Containers - Wine/Spirit
Bottles & Containers - Non Wine/Spirit - Non CRV
Bottles & Containers - Non Wine/Spirit - CRV
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
MSW
SSR
SSO


Other
Bottles & Containers - Wine/Spirit
Bottles & Containers - Non Wine/Spirit - Non CRV
Bottles & Containers - Non Wine/Spirit - CRV
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW
SSR
SSO

Metal

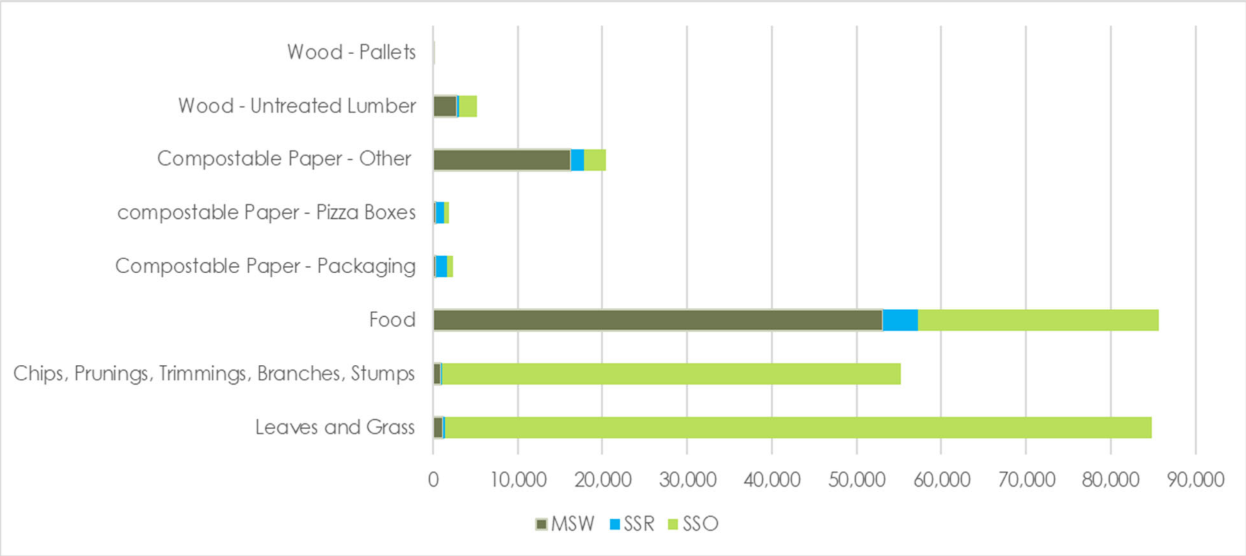


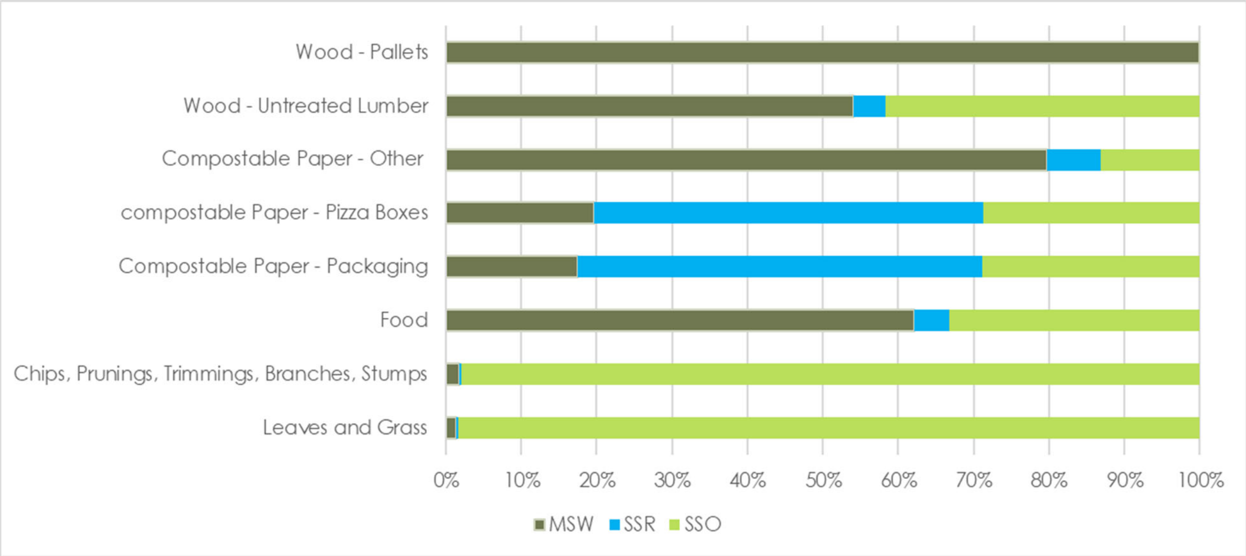
Other Non-Ferrous
Other Ferrous
Aluminum Cans - Non CRV
Aluminum Cans - CRV
Tin/Steel Cans
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
MSW
SSR
SSO



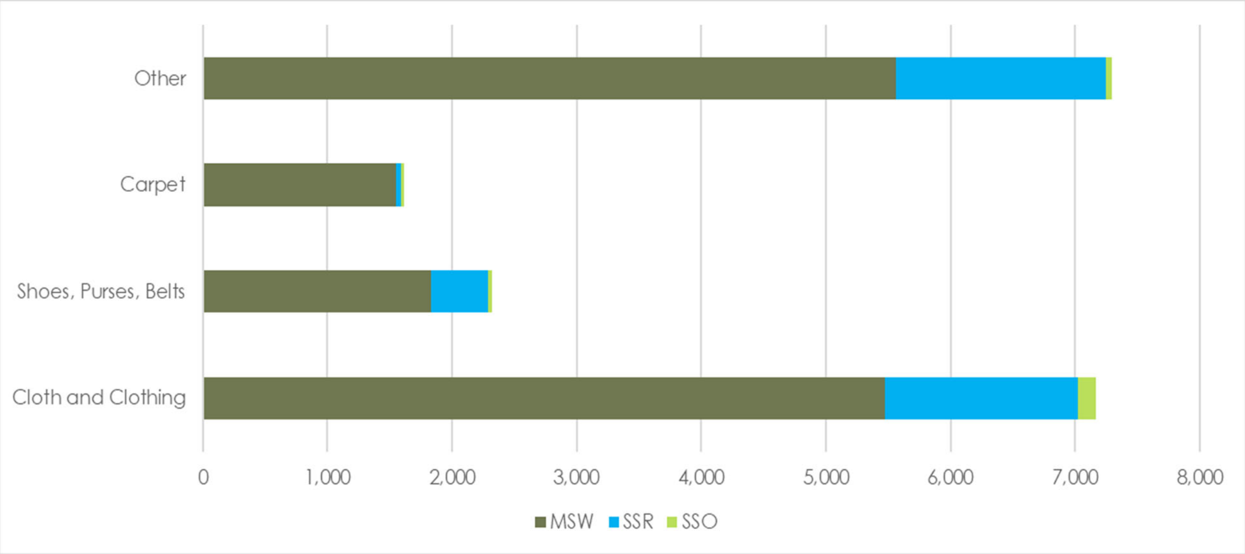
Other Non-Ferrous
Other Ferrous
Aluminum Cans - Non CRV
Aluminum Cans - CRV
Tin/Steel Cans
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW
SSR
SSO

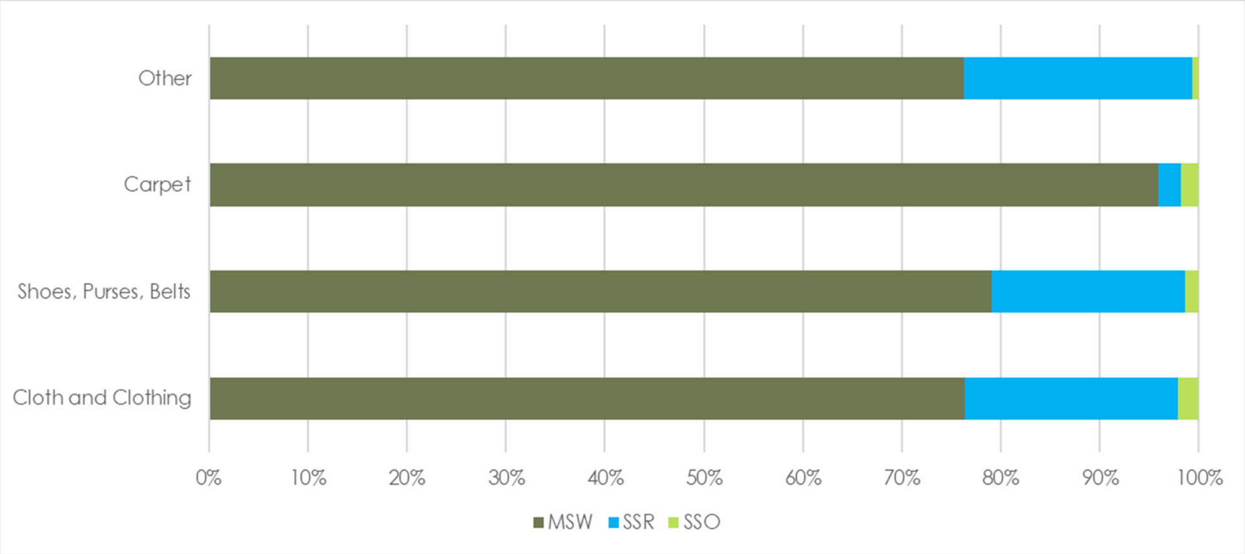
Compostable Organics



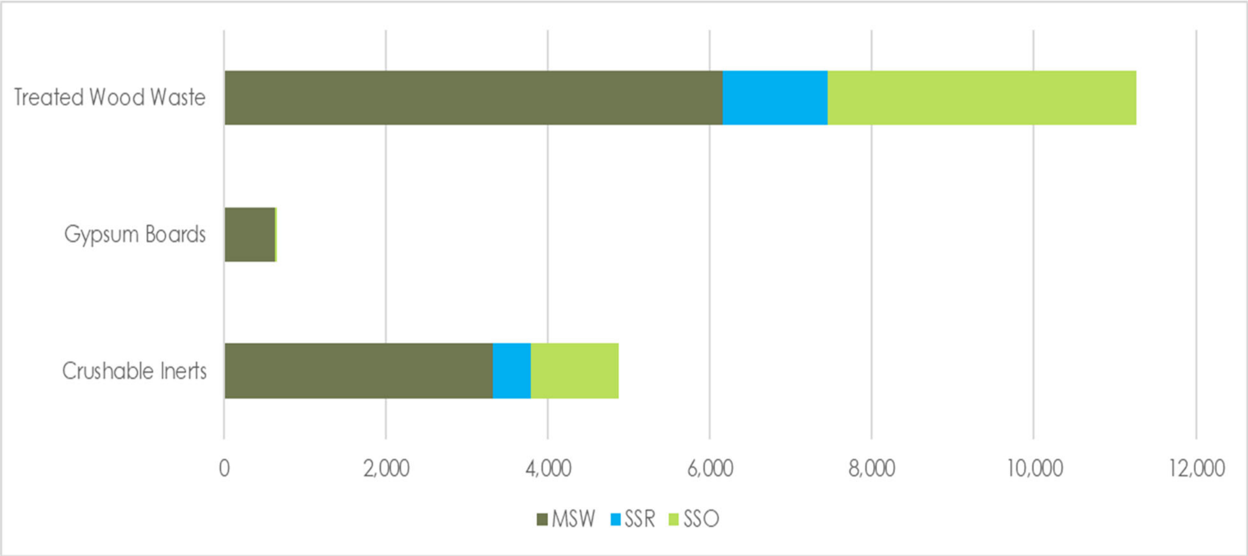


Textiles/Other

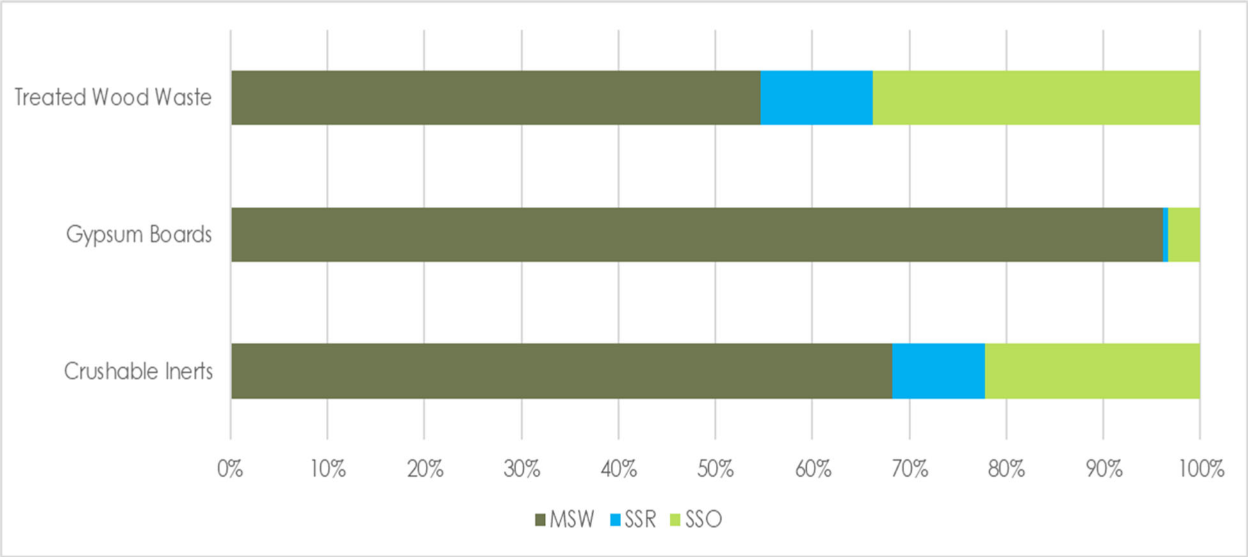




Inerts

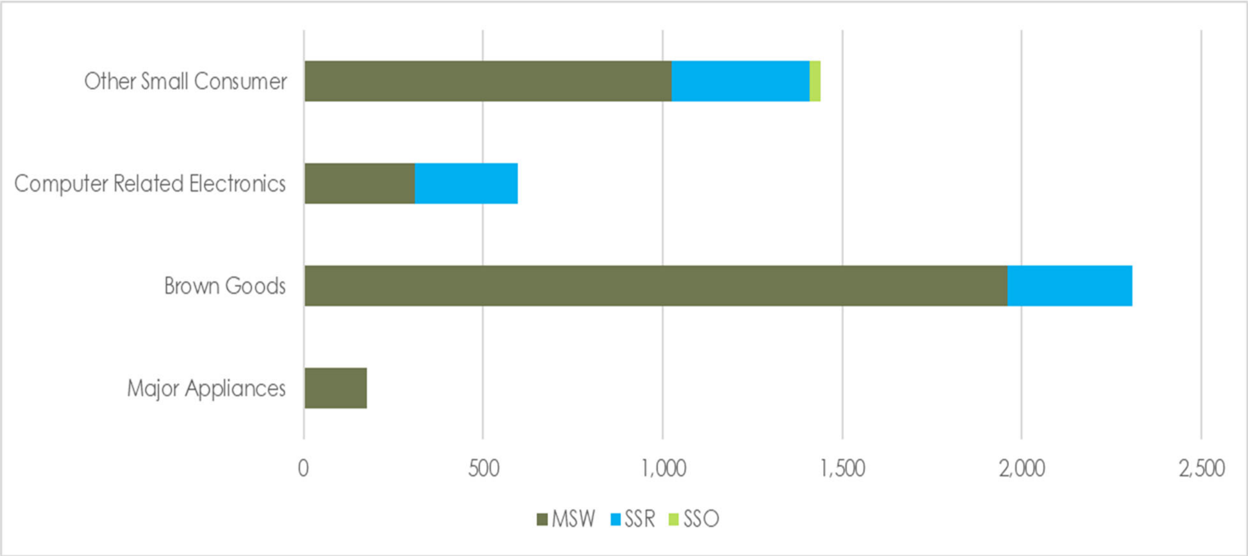


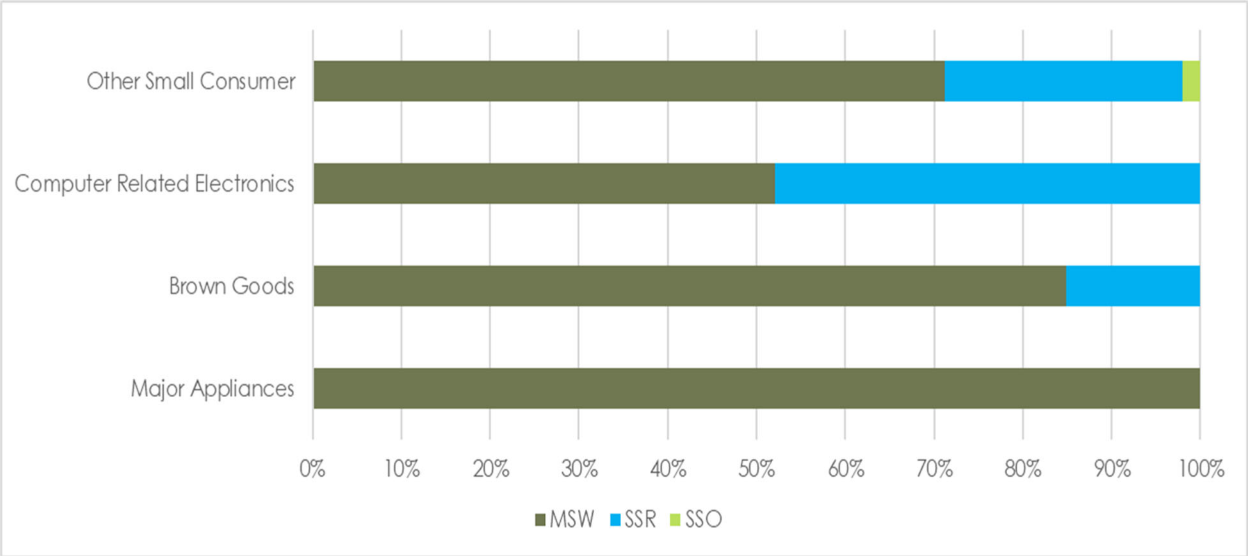
Treated Wood Waste
Gypsum Boards
Crushable Inerts
0
2,000
4,000
6,000
8,000
10,000
12,000
MSW
SSR
SSO



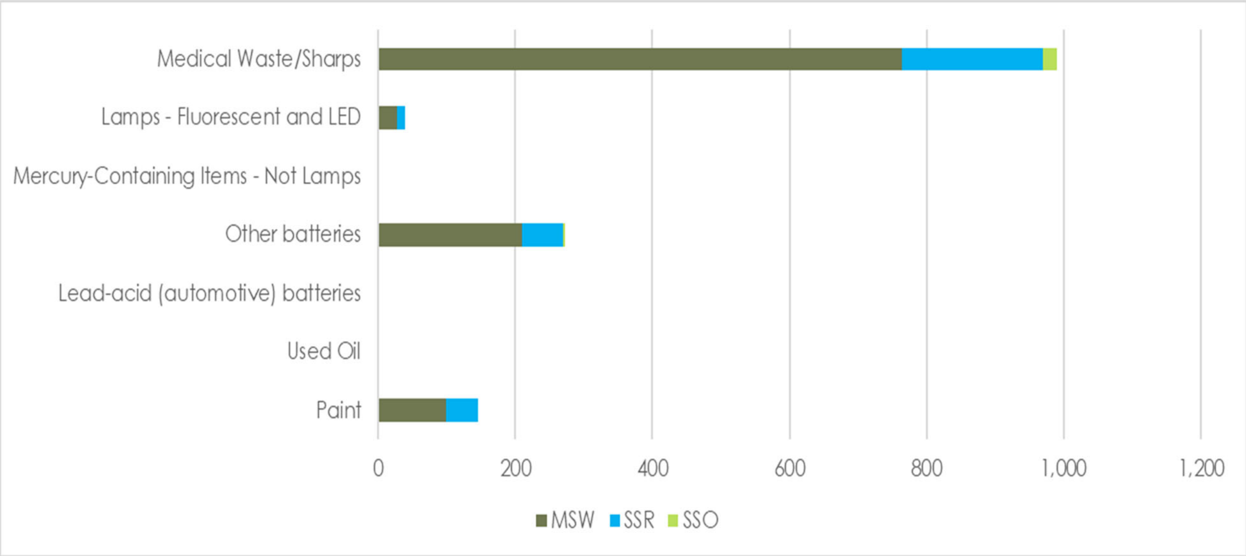
Treated Wood Waste
Gypsum Boards
Crushable Inerts
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW
SSR
SSO

Electronics

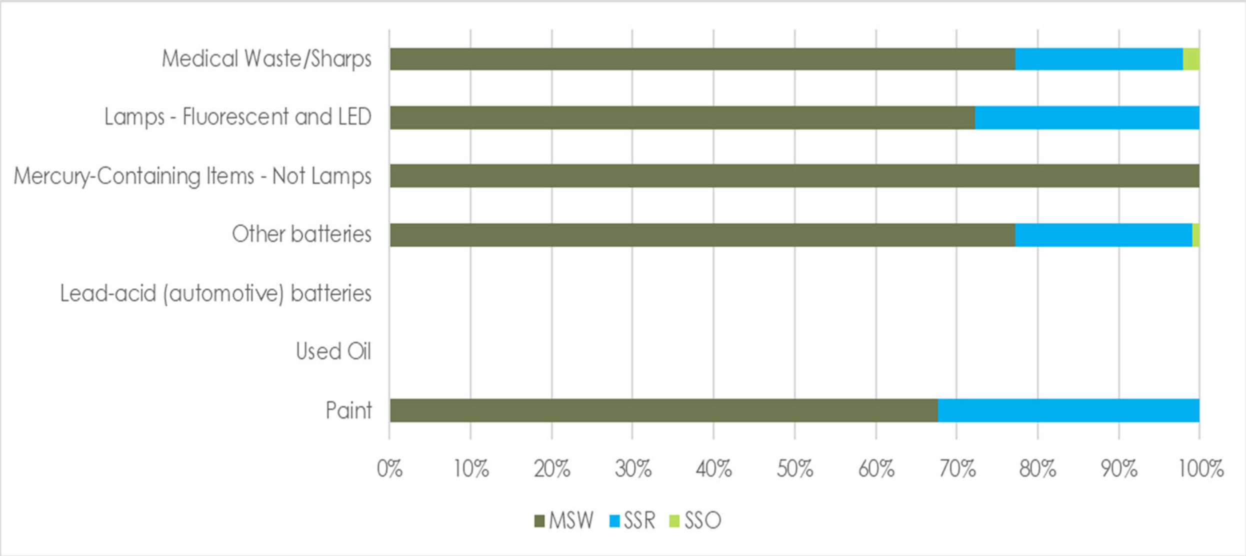




HHW

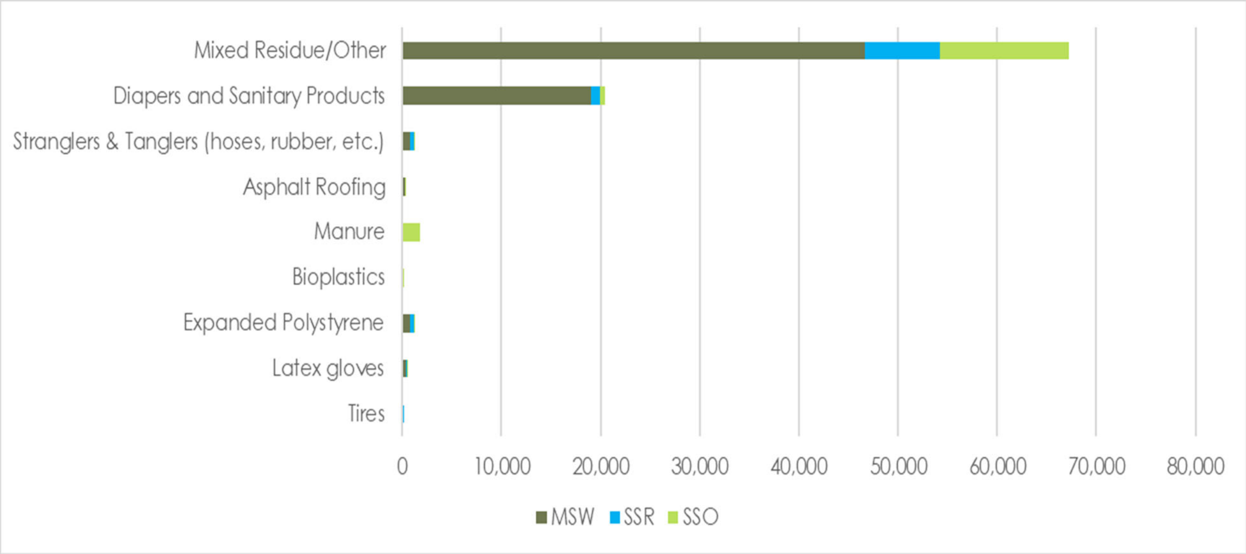


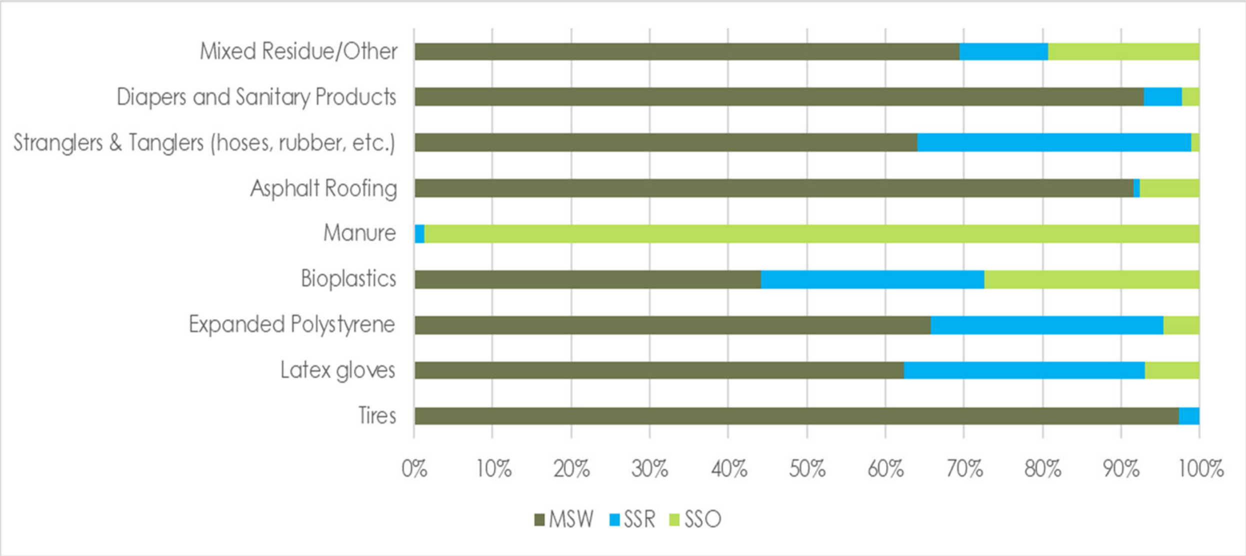
Medical Waste/Sharps
Lamps - Fluorescent and LED
Mercury-Containing Items - Not Lamps
Other batteries
Lead-acid (automotive) batteries
Used Oil
Paint
0
200
400
600
800
1,000
1,200
MSW
SSR
SSO



Medical Waste/Sharps
Lamps - Fluorescent and LED
Mercury-Containing Items - Not Lamps
Other batteries
Lead-acid (automotive) batteries
Used Oil
Paint
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW
SSR
SSO

Other

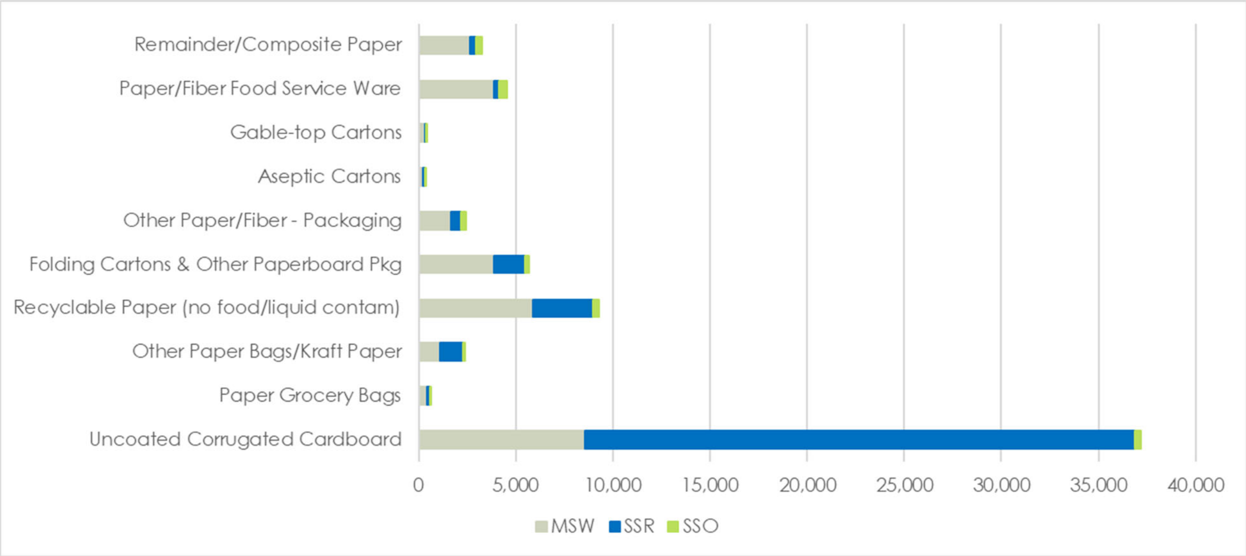

Mixed Residue/Other
Diapers and Sanitary Products
Stranglers & Tanglers (hoses, rubber, etc.)
Asphalt Roofing
Manure
Bioplastics
Expanded Polystyrene
Latex gloves
Tires
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
MSW
SSR
SSO

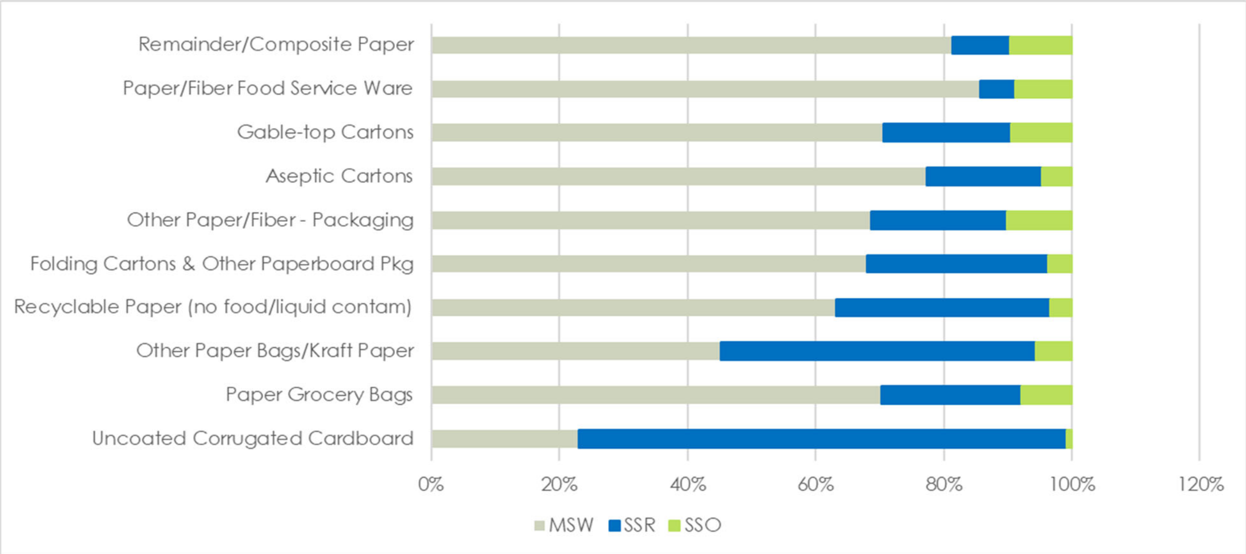

Mixed Residue/Other
Diapers and Sanitary Products
Stranglers & Tanglers (hoses, rubber, etc.)
Asphalt Roofing
Manure
Bioplastics
Expanded Polystyrene
Latex gloves
Tires
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
MSW
SSR
SSO

Appendix G

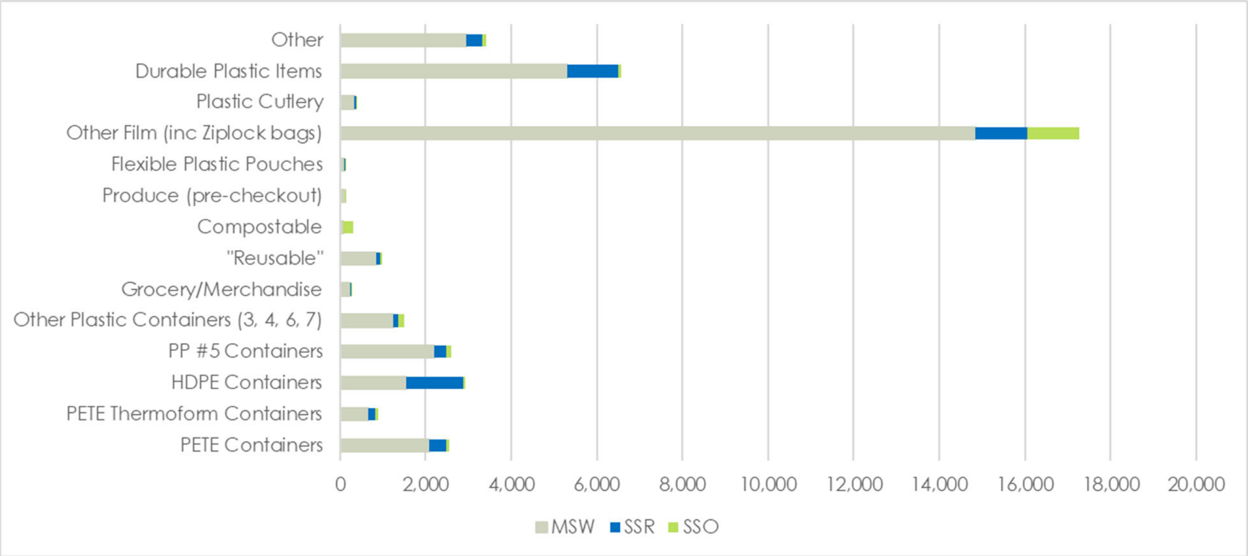
Summary of Disposition Charts by Material Group Commercial Sector (MSW, SSR, and SSO only)

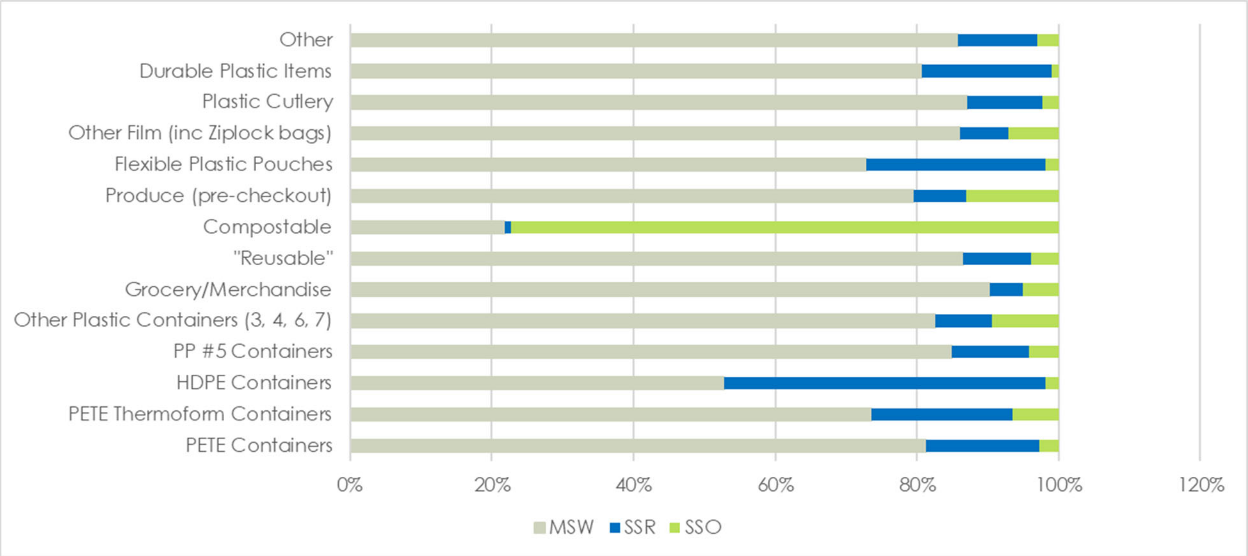
Paper



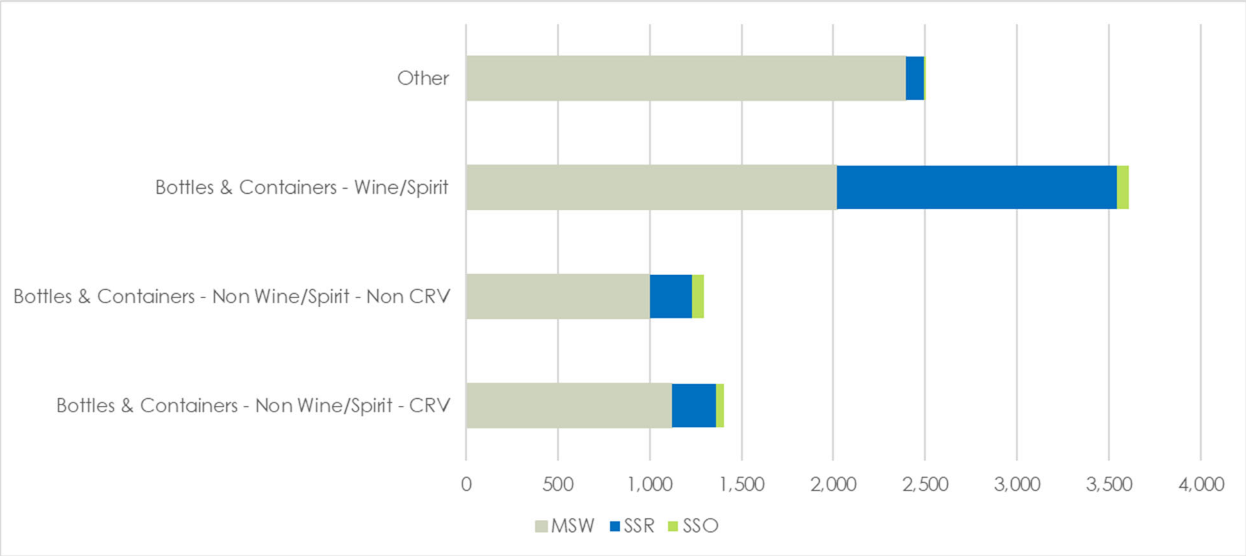


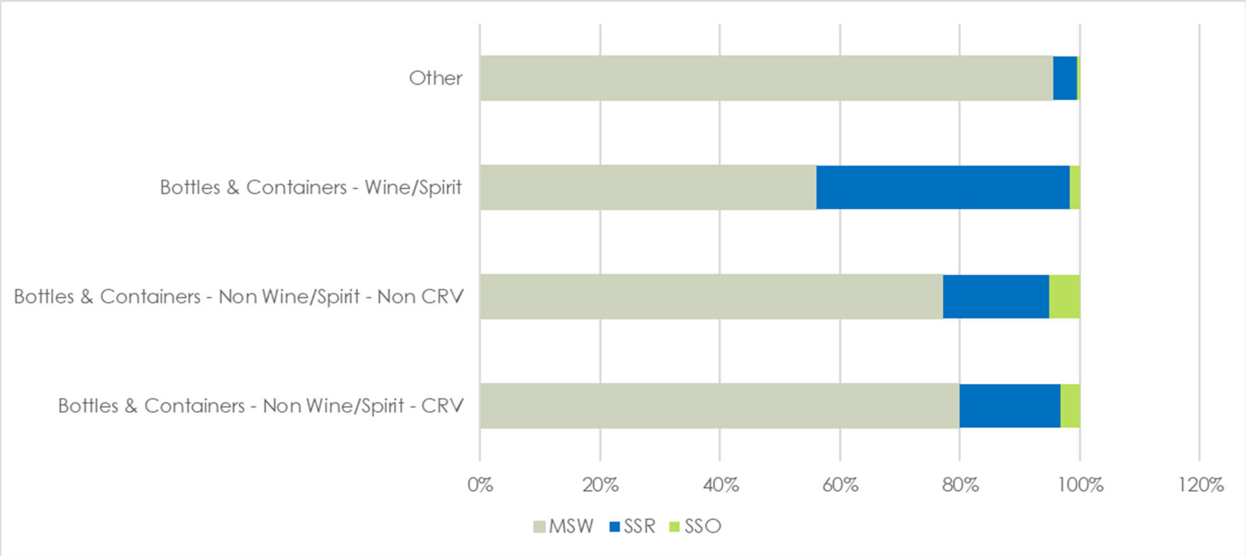
Plastic


Other
Durable Plastic Items
Plastic Cutlery
Other Film (inc Ziplock bags)
Flexible Plastic Pouches
Produce (pre-checkout)
Compostable
"Reusable"
Grocery/Merchandise
Other Plastic Containers (3, 4, 6, 7)
PP #5 Containers
HDPE Containers
PETE Thermoform Containers
PETE Containers
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
MSW
SSR
SSO

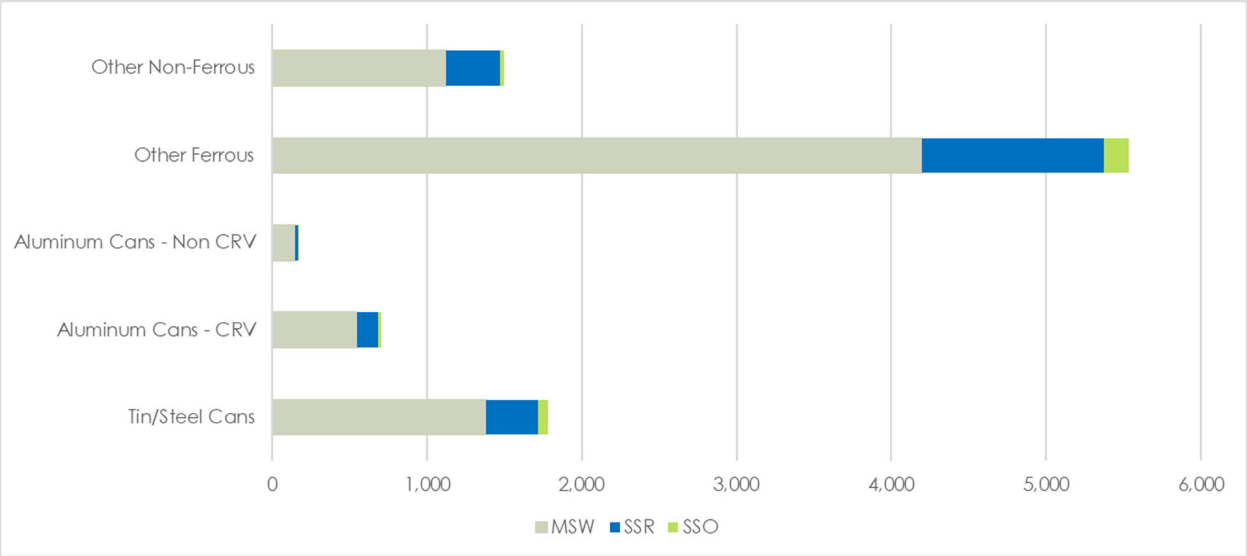

Other
Durable Plastic Items
Plastic Cutlery
Other Film (inc Ziplock bags)
Flexible Plastic Pouches
Produce (pre-checkout)
Compostable
"Reusable"
Grocery/Merchandise
Other Plastic Containers (3, 4, 6, 7)
PP #5 Containers
HDPE Containers
PETE Thermoform Containers
PETE Containers
0%
20%
40%
60%
80%
100%
120%
MSW
SSR
SSO

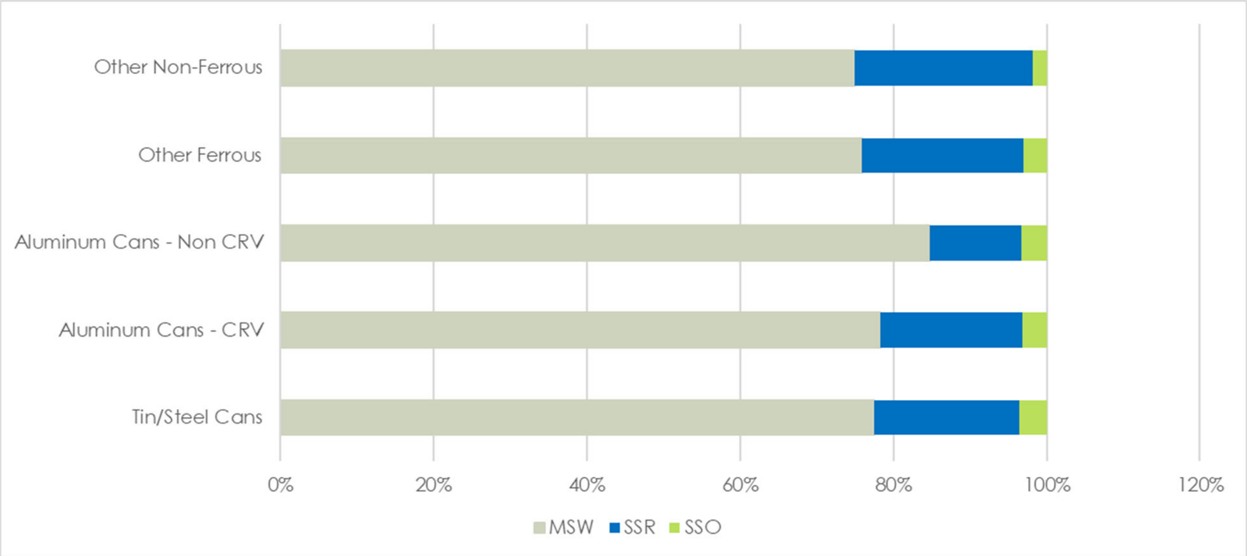
Glass


Other
Bottles & Containers - Wine/Spirit
Bottles & Containers - Non Wine/Spirit - Non CRV
Bottles & Containers - Non Wine/Spirit - CRV
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
MSW
SSR
SSO

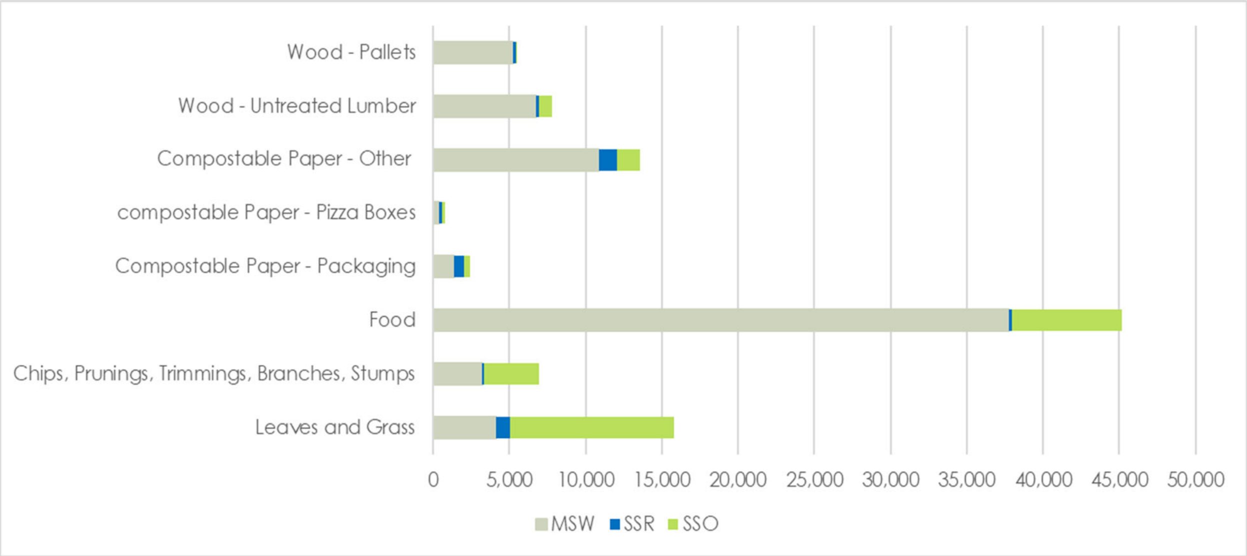

Other
Bottles & Containers - Wine/Spirit
Bottles & Containers - Non Wine/Spirit - Non CRV
Bottles & Containers - Non Wine/Spirit - CRV
0%
20%
40%
60%
80%
100%
120%
MSW
SSR
SSO

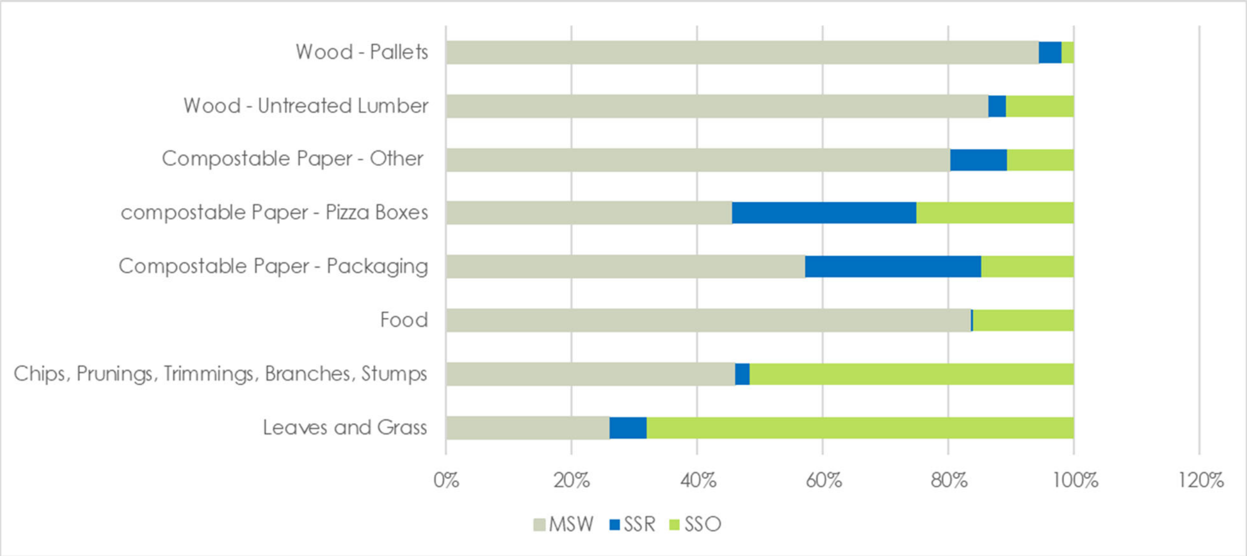
Metal


Other Non-Ferrous
Other Ferrous
Aluminum Cans - Non CRV
Aluminum Cans - CRV
Tin/Steel Cans
0
1,000
2,000
3,000
4,000
5,000
6,000
MSW
SSR
SSO

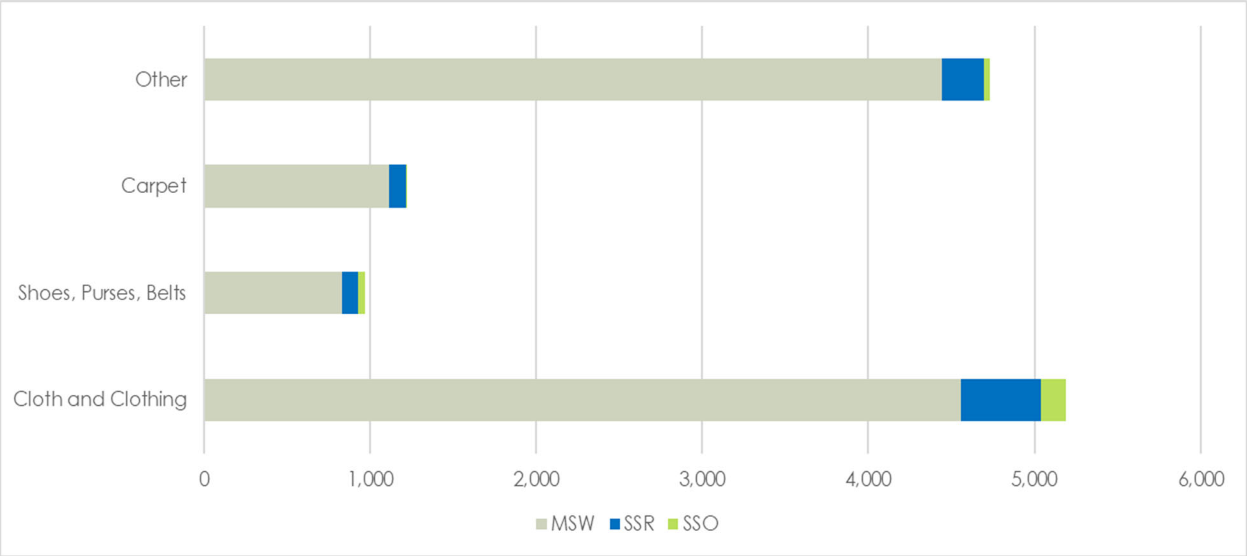

Other Non-Ferrous
Other Ferrous
Aluminum Cans - Non CRV
Aluminum Cans - CRV
Tin/Steel Cans
0%
20%
40%
60%
80%
100%
120%
MSW
SSR
SSO

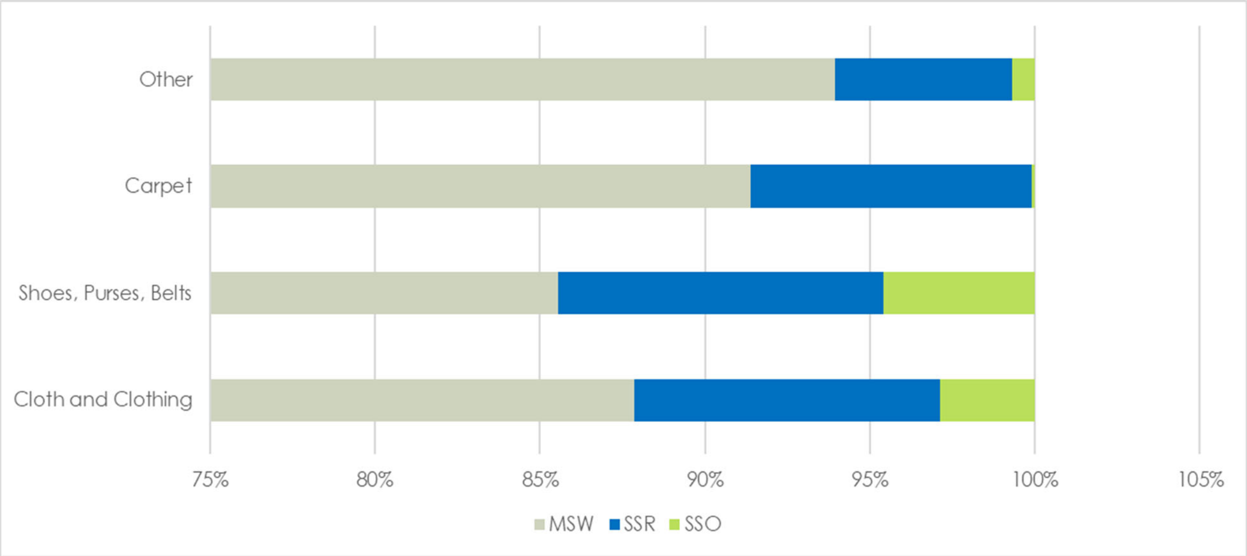
Compostable Organics



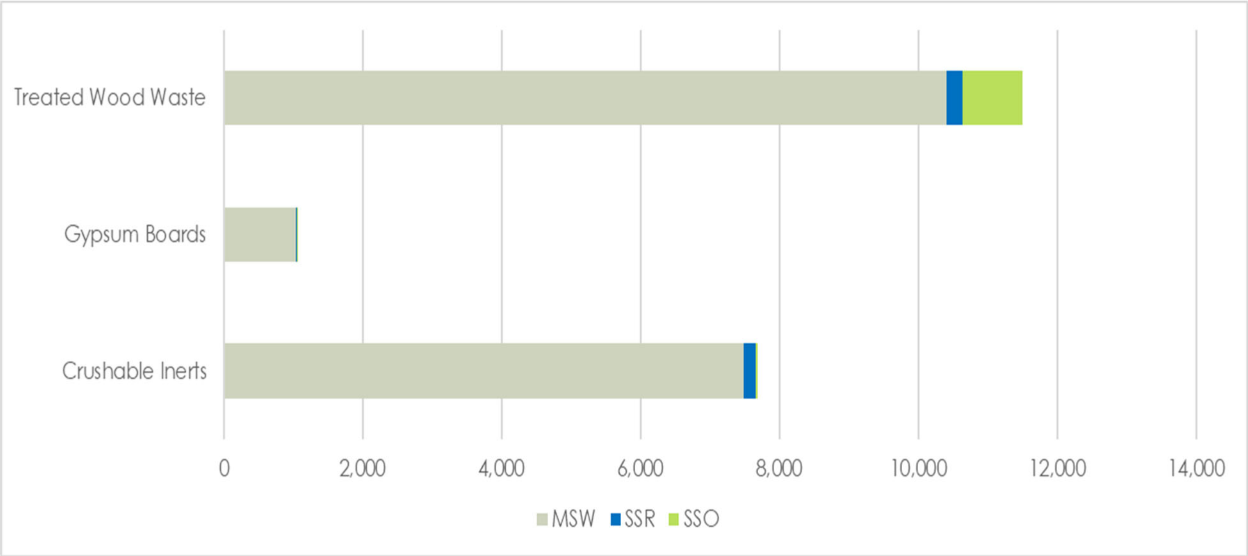


Textiles/Other

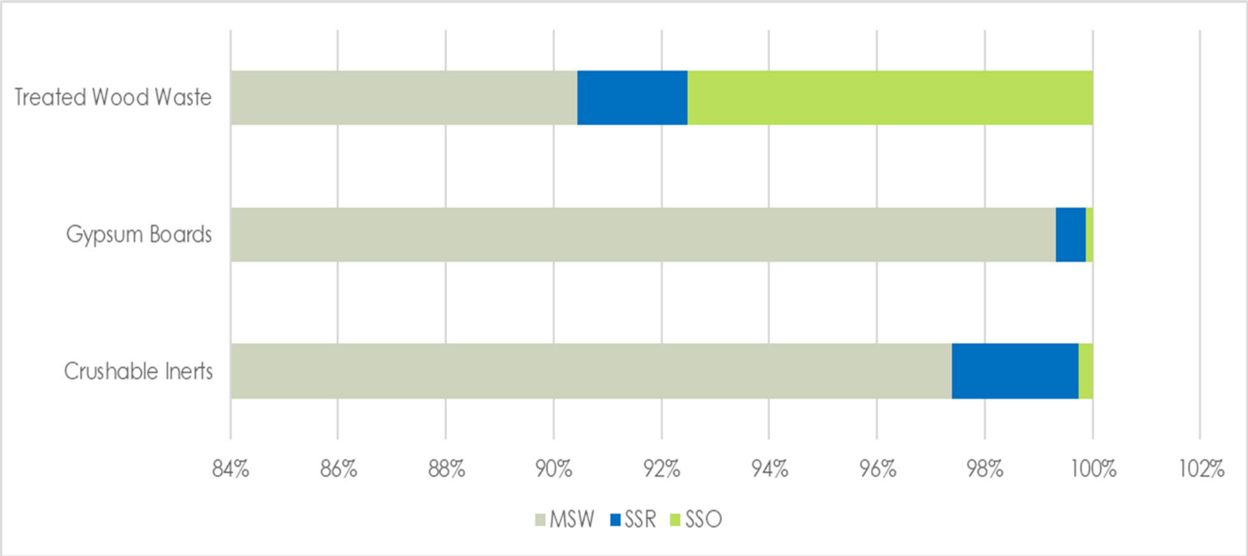




Inerts

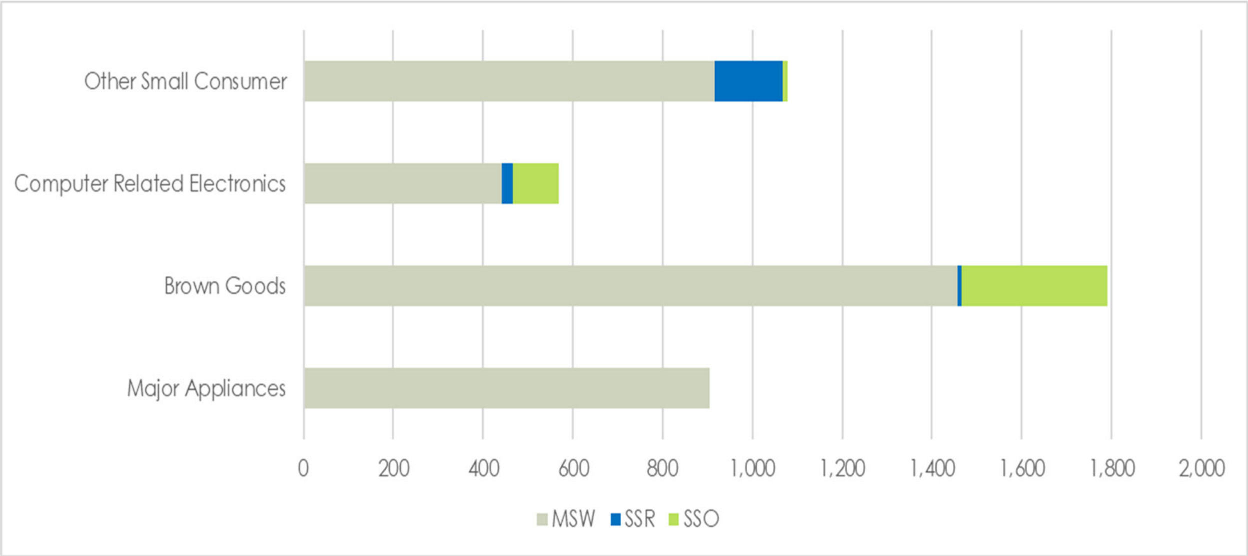


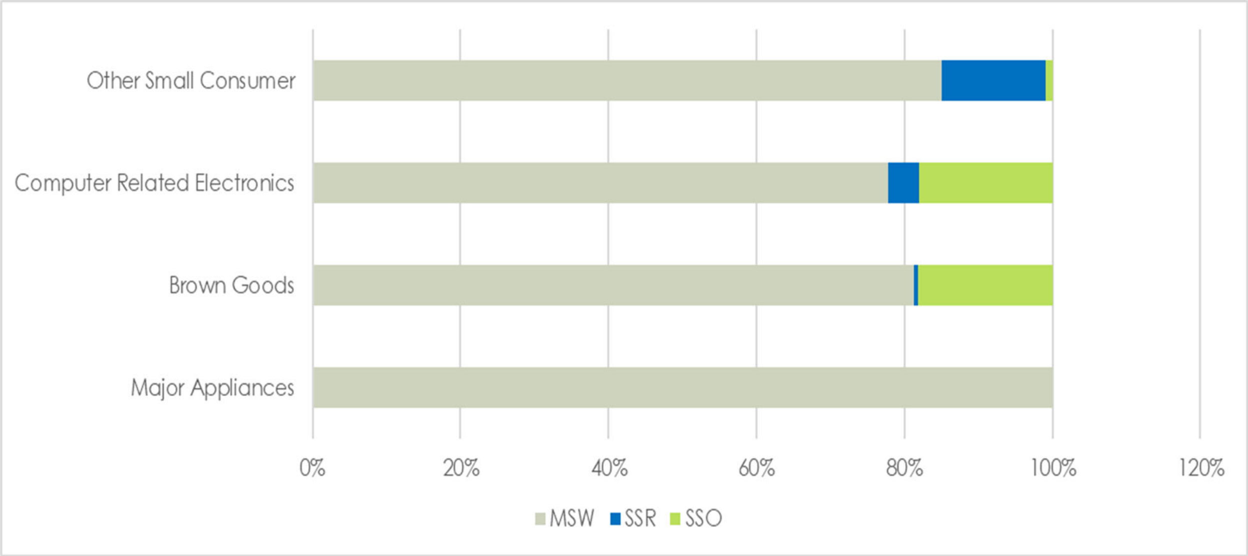
Treated Wood Waste
Gypsum Boards
Crushable Inerts
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
MSW
SSR
SSO



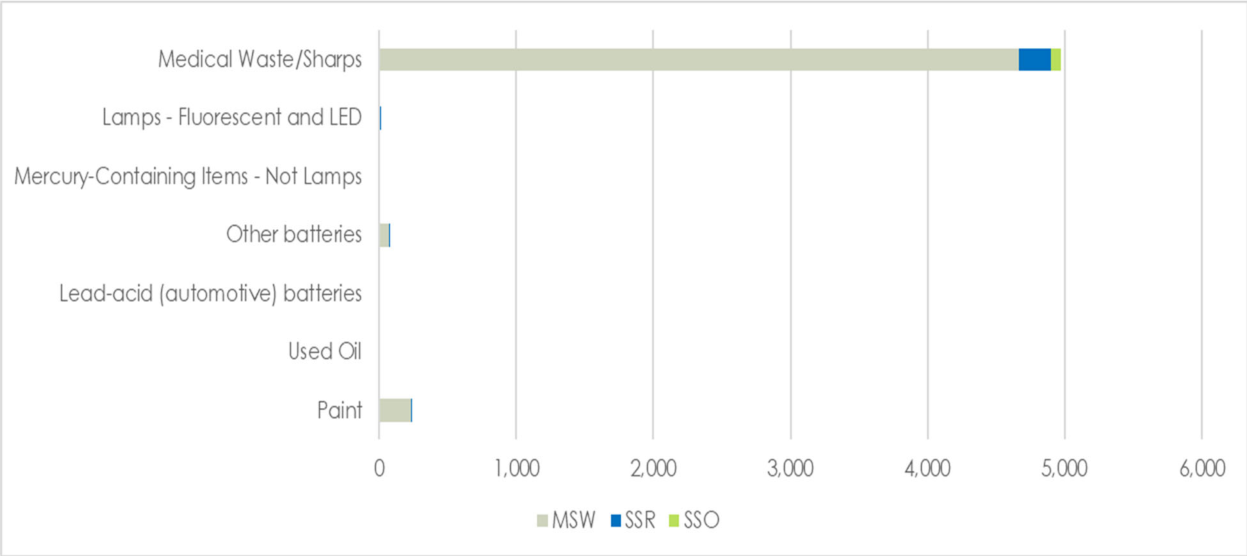
Treated Wood Waste
Gypsum Boards
Crushable Inerts
84%
86%
88%
90%
92%
94%
96%
98%
100%
102%
MSW
SSR
SSO

Electronics

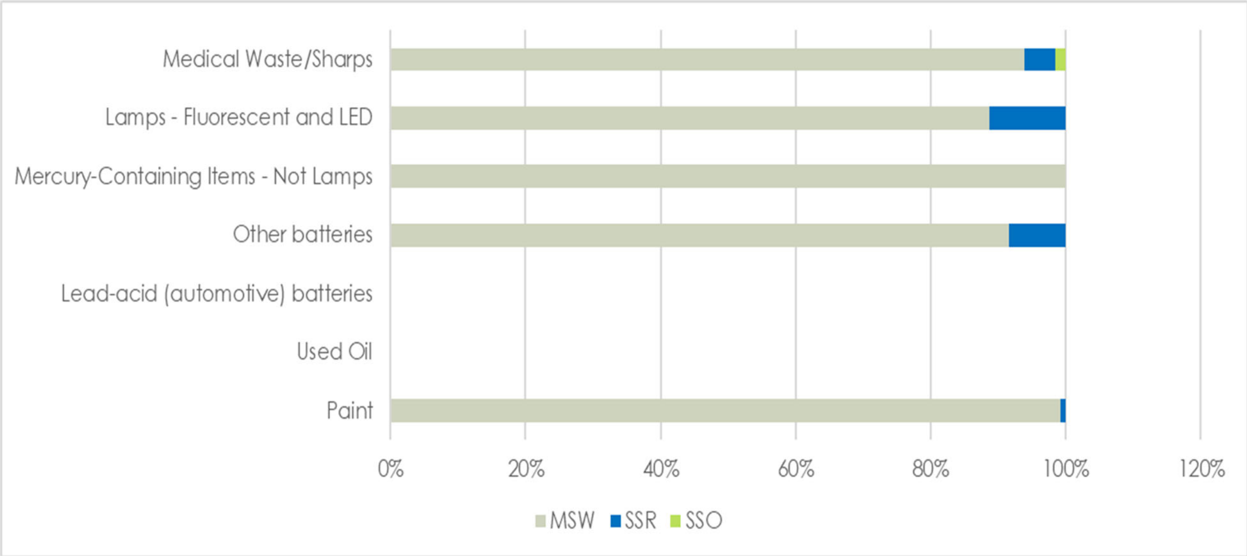




HHW

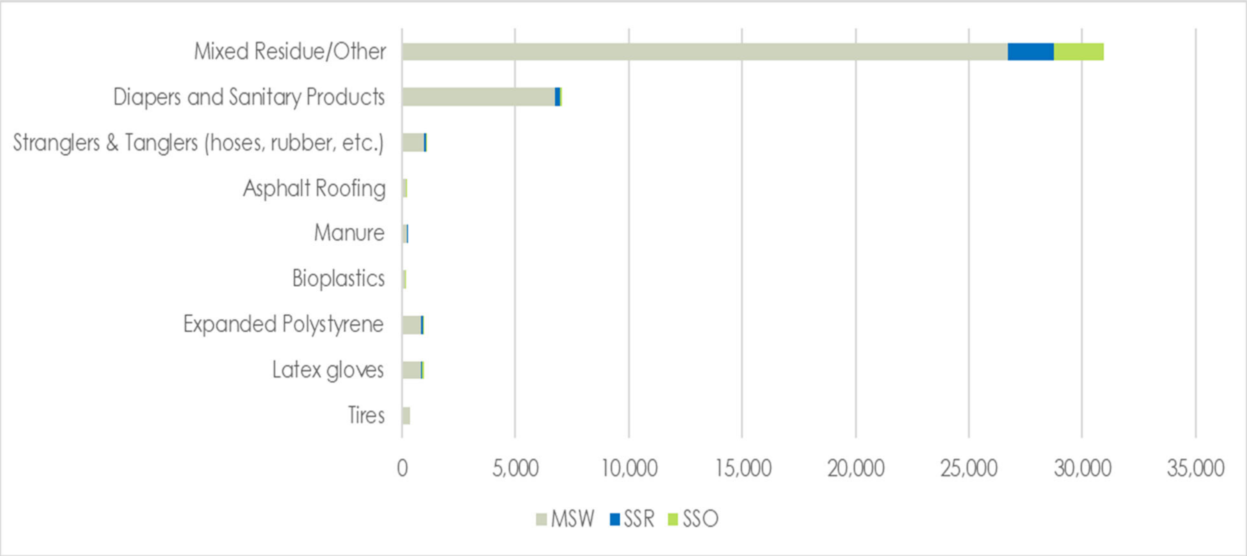


Medical Waste/Sharps
Lamps - Fluorescent and LED
Mercury-Containing Items - Not Lamps
Other batteries
Lead-acid (automotive) batteries
Used Oil
Paint
0
1,000
2,000
3,000
4,000
5,000
6,000
MSW
SSR
SSO



Medical Waste/Sharps
Lamps - Fluorescent and LED
Mercury-Containing Items - Not Lamps
Other batteries
Lead-acid (automotive) batteries
Used Oil
Paint
0%
20%
40%
60%
80%
100%
120%
MSW
SSR
SSO

Other



Mixed Residue/Other
Diapers and Sanitary Products
Stranglers & Tanglers (hoses, rubber, etc.)
Asphalt Roofing
Manure
Bioplastics
Expanded Polystyrene
Latex gloves
Tires
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
MSW
SSR
SSO