Prepared for:
Metro Vancouver
Prepared by:
Dillon Consulting Limited

2022 Full-Scale Waste Composition Study

May 2023 – 21-2946

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Attention: Terry Fulton
Senior Project Engineer – Solid Waste Services, Metro Vancouver

Metro Vancouver Waste Composition Study – Full-Scale Facility Audit (2022)

Dear Terry,

Dillon Consulting Limited (Dillon) is pleased to submit this draft report to Metro Vancouver for the Metro Vancouver Waste Composition Study – Full-Scale Facility Audit (Project A, 2022) completed at the Metro Vancouver Waste-to-Energy Facility, North Surrey Recycling and Waste Centre, United Boulevard Recycling and Waste Centre, and the Vancouver South Transfer Station from November 7 to December 5, 2022. This report presents the waste composition study results, including Single-Use Item (SUI) and Personal Protective Equipment (PPE) disposal results, an analysis by sector, and a comparison of the 2022 waste composition data with Waste Composition Monitoring Program reports from previous years. Additionally this year, an analysis was completed for books disposed by sector. The audit data containing composition for all categories is attached to this report as **Appendix C**.

Sincerely,

DILLON CONSULTING LIMITED

Heidi Gerlach, EP, Associate
Project Manager

LS:sn

Our file: 21-2946

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Executive Summary

Dillon was retained by Metro Vancouver to conduct the 2022 Full-Scale Waste Composition Study. Sampling was completed at four facilities in the Metro Vancouver region over four weeks in November and December 2022.

Waste was collected, sampled, and sorted from the sectors listed below. Materials from litter cans, municipal abandoned waste collection and street sweeping were not included in this study.

- Single-Family (SF) residential waste;
- Multi-Family (MF) residential waste;
- Commercial/Institutional (CI) waste; and
- Small Loads (SL) waste.

The number of samples analyzed from each sector was based on the variability of each sector, in order to provide waste composition data that is representative of each sector. Samples were collected at the following facilities:

- Metro Vancouver Waste-to-Energy;
- North Surrey Recycling and Waste Centre;
- United Boulevard Recycling and Waste Centre; and
- Vancouver South Transfer Station.

Executive Summary Table 1 summarizes the waste composition by sector and the combined waste composition for all sectors.

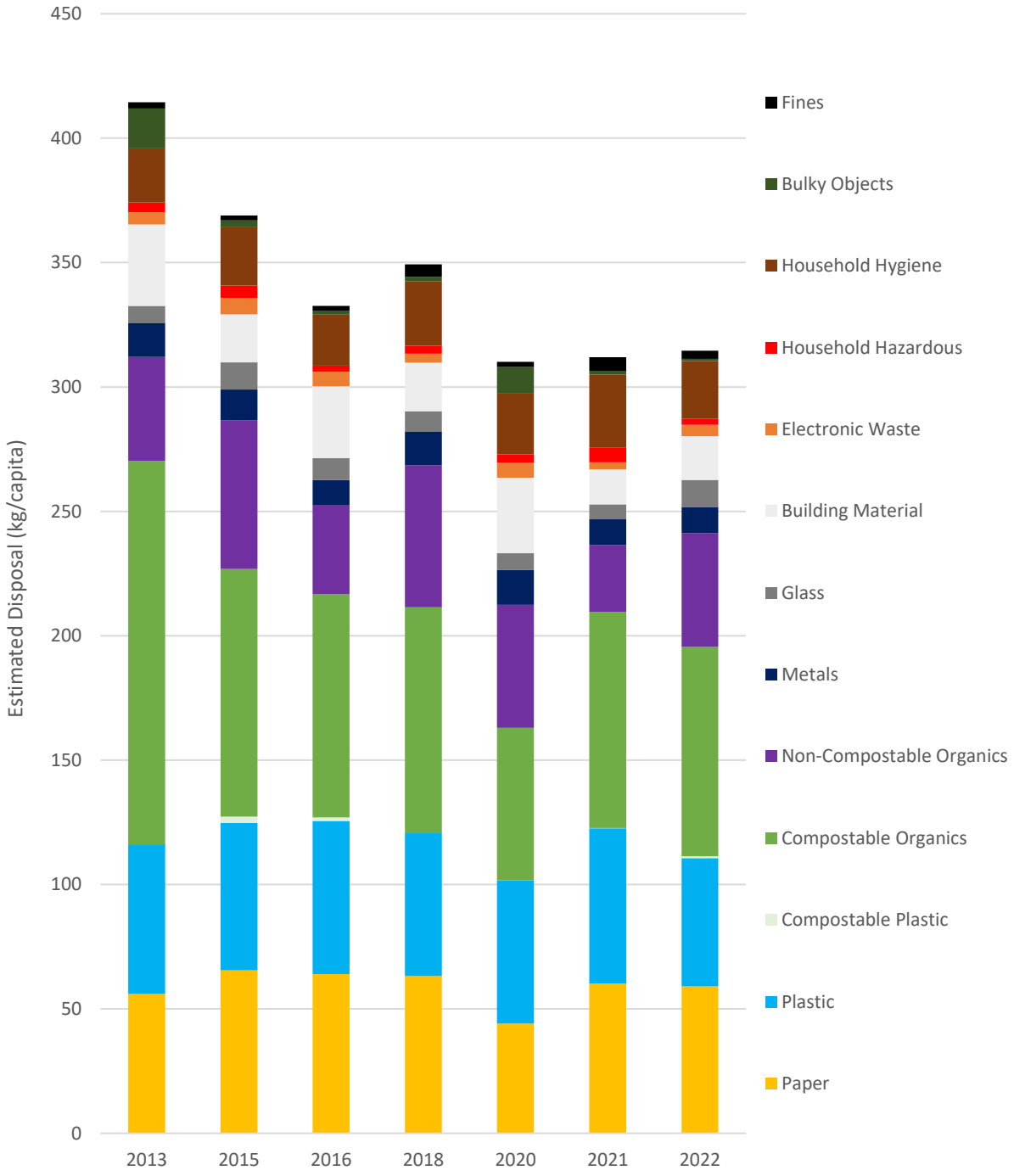
Executive Summary Table 1: Waste Composition Summary

Primary Category	Combined Composition[1]	By Sector[1]			
		SF (n=19)	MF (n=20)	CI (n=33)	SL (n=29)
Disposed Tonnes	**889,292**	**158,566**	**237,019**	**359,550**	**134,157**
Paper	17%	17%	22%	22%	7%
Plastic	16%	20%	18%	18%	7%
Compostable Plastic	<1%	<1%	<1%	<1%	<1%
Compostable Organics	25%	29%	29%	29%	14%
Non-Compostable Organics	19%	8%	8%	8%	50%
Metals	3%	3%	4%	3%	2%
Glass	4%	2%	3%	3%	8%
Building Material	6%	1%	1%	9%	9%
Electronic Waste	1%	2%	1%	2%	1%
Household Hazardous	1%	1%	1%	1%	<1%
Household Hygiene	7%	15%	11%	4%	1%
Bulky Objects	<1%	<1%	<1%	<1%	1%
Fines	1%	1%	2%	1%	<1%

[1]All percentages presented were rounded to the nearest whole number. Percentages may not add up to 100%.

Executive Summary Figure 1 presents the overall waste composition (all sectors combined) for all full-scale, multi-sector waste composition studies completed since 2013. Studies between 2013 and 2022 had similar methodologies and consistent primary categories.

Executive Summary Figure 1: Waste Composition and Disposal for All Sectors Combined (2013 – 2022)

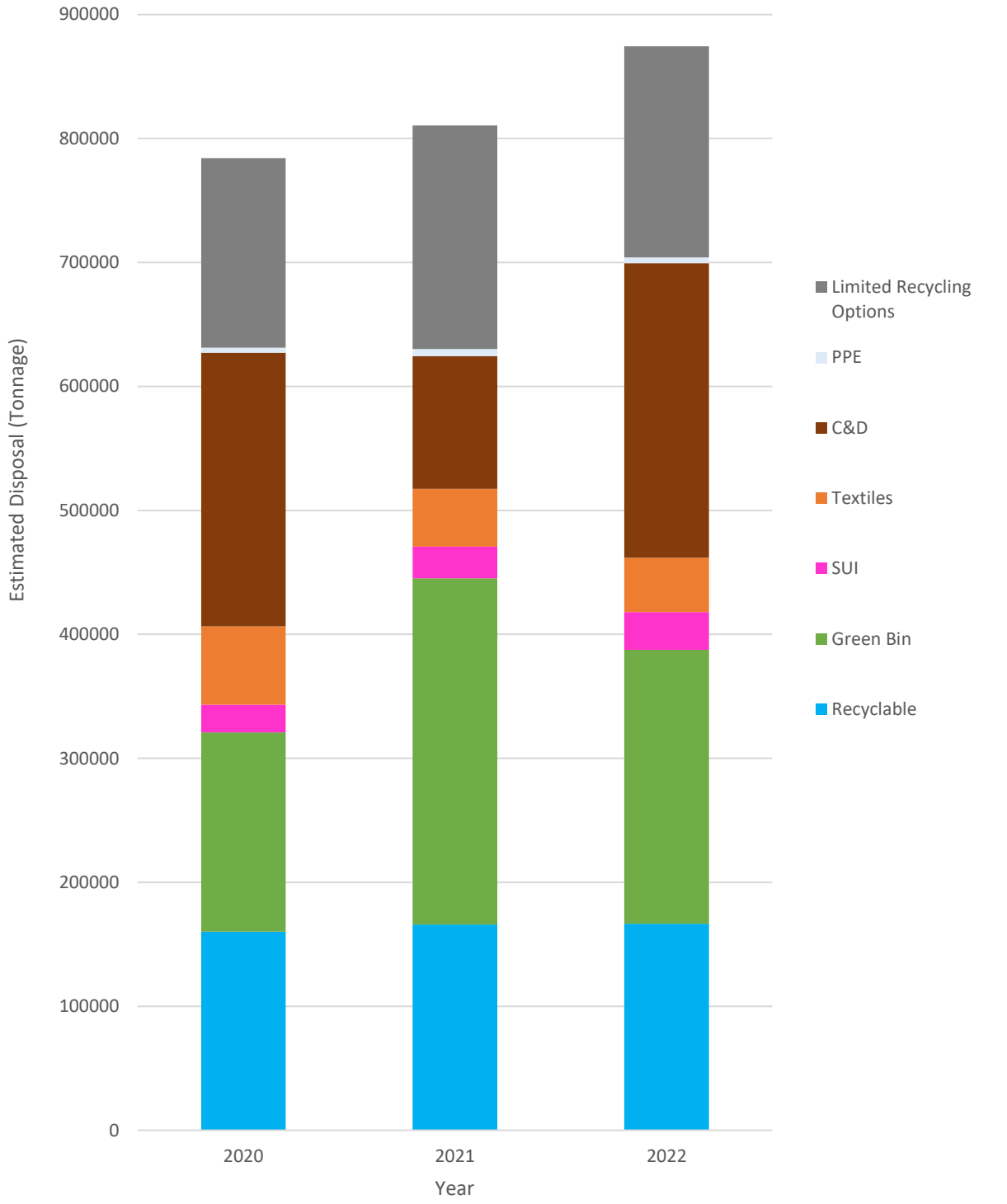


Overall, waste composition in 2018 and 2022 was very similar. Notably, the quantity of non-compostable organics increased significantly from 2021 to 2022. This category includes treated or painted wood, textiles, rubber and leather. The quantity of plastic and household hygiene waste decreased between 2021 and 2022.

Since 2020, each material category has been assigned a functional category that describes the waste management model of the material or end-fate.

Executive Summary Figure 2 presents a comparison of the 2020 through 2022 functional categories for overall waste.

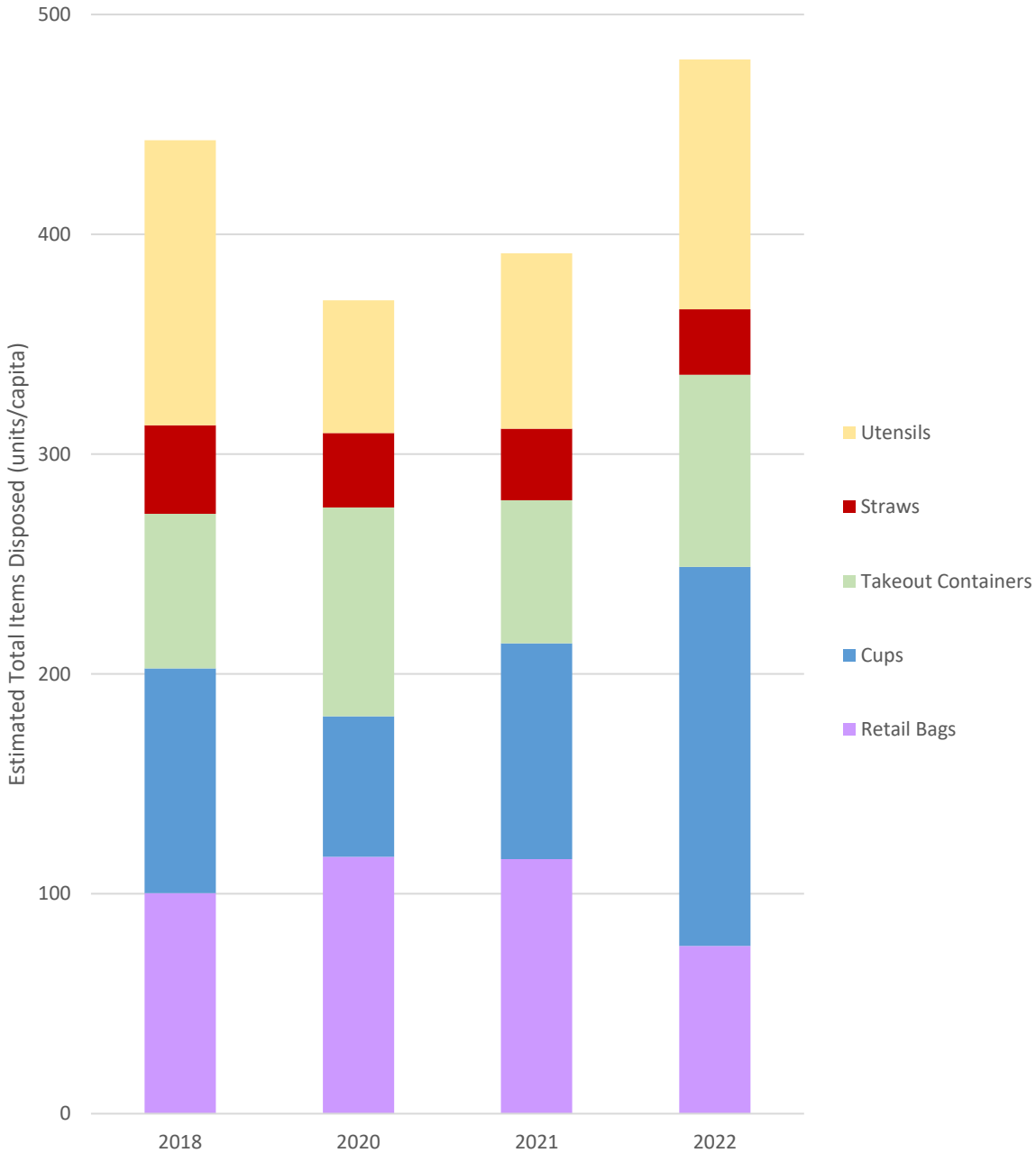
Executive Summary Figure 2: Functional Category Composition for All Sectors Combined (2020 – 2022)



The composition by functional categories in 2022 is similar to 2020. In 2022, the amount of green bin waste, materials with limited recycling options, and textiles decreased, while C&D materials, and SUIs increased compared to 2021.

Executive Summary Figure 3 presents the overall per capita disposal of SUI units by year.

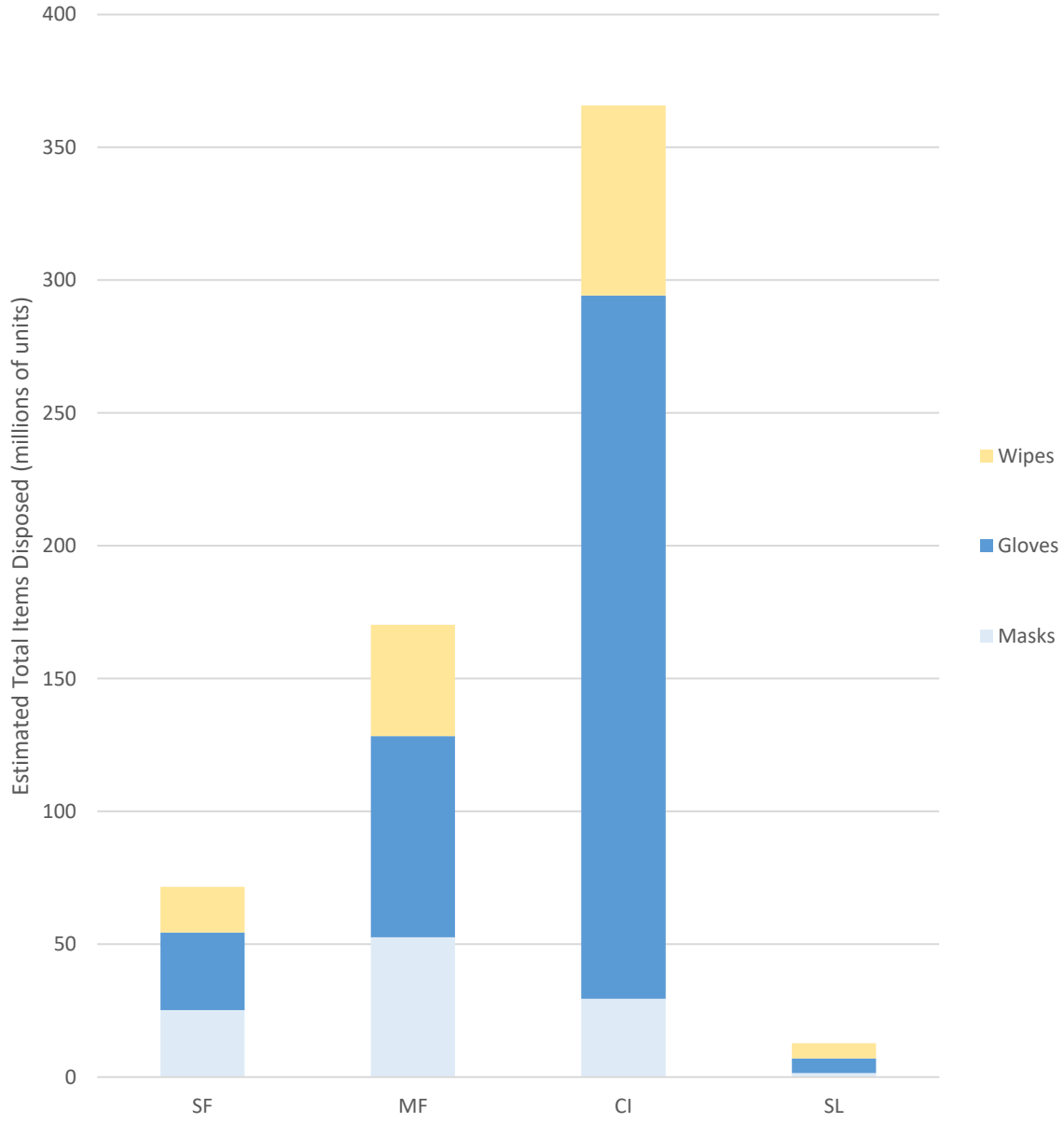
Executive Summary Figure 3: Single-Use Items Disposal for All Sectors Combined (2020 – 2022)



The overall waste composition for SUI disposal in 2022 compared to 2018 appear similar. In 2022, the per capita disposal of retail bags and straws decreased, while utensils, takeout containers, and cups increased from 2021.

Executive Summary Figure 4 presents the quantity of PPE disposed by sector.

Executive Summary Figure 4: Overall Personal Protective Equipment Disposal by Sector



The largest quantity of PPE was disposed by the CI sector, followed by the MF sector, then the SF sector. The CI sector disposed the greatest quantity of wipes, and gloves. The MF sector disposed the most masks.

1.0 Introduction

1.1 Background

Metro Vancouver provides essential services and planning for British Columbia's lower mainland region, including solid waste management for approximately 2.8 million people across 21 municipalities, one Electoral Area, and one Treaty First Nation. Solid waste management in the region is facilitated by a Waste-to-Energy Facility and six Recycling and Waste Centres, in conjunction with Vancouver South Transfer Station and the Vancouver Landfill managed by the City of Vancouver. These facilities comprise the public-sector system which provides waste diversion and disposal services to residents and businesses in the region.

In 2021, approximately 889,000 tonnes of garbage across four waste sectors was disposed at regional facilities. This study aims to better understand the waste composition of garbage entering facilities that comprise the public-sector solid waste management system in Metro Vancouver.

As Metro Vancouver is responsible for the long-term planning for waste generation and disposal by residents and businesses within the region, the Corporation is guided by solid waste management plans, most recently from 2011. Currently, Metro Vancouver is in the process of updating the region's solid waste management plan which will explore options to improve waste reduction, diversion, and recycling. This may include identifying types of waste to prioritize in future initiatives. Waste composition studies are conducted to collect data, complete analysis, and provide results to inform the update of the region's Integrated Solid Waste Management Plan.

1.2 Scope of Work

Dillon Consulting Limited (Dillon) was retained to complete Metro Vancouver's full-scale facility waste composition study for 2022. Dillon completed waste sampling and sorting in accordance with the methodology set out in *Recommended Waste Characterization Methodology for Direct Waste Analysis Studies in Canada* (CCME, 1999) and previous Metro Vancouver waste composition studies. Sampling was completed at four facilities in the Metro Vancouver region over four consecutive weeks from November 7 to December 5, 2022.

Waste was collected, sampled, and sorted from the following sectors:

- Single-Family (SF) residential waste;
- Multi-Family (MF) residential waste;
- Commercial/Institutional (CI) waste; and
- Small Loads (SL) waste.

Materials from litter cans, street sweeping, and abandoned waste collection were not included in this study.

Samples were collected at the following facilities:

- Metro Vancouver Waste-to-Energy Facility;
- Surrey Recycling and Waste Centre;
- United Boulevard Recycling and Waste Centre; and
- Vancouver South Transfer Station.

The number of samples analyzed from each sector, the facilities that materials were sampled from, and the dates for sampling at each facility are presented in **Table 1**. The number of samples to be analyzed from each sector was based on the variability of waste material in each sector, in order to collect data representative of the sector. Therefore, less samples were analyzed from sectors that have low variability between samples (SF and MF) and more samples were analyzed from sectors that have high variability between samples (CI and SL).

Table 1: Number of Samples Completed by Sector and Facility

Sector	Metro Vancouver Waste-to-Energy Facility	North Surrey Recycling and Waste Centre	United Boulevard Recycling and Waste Centre	Vancouver South Transfer Station	Grand Total
Sorting Dates	**November 7 – November 10, 2022**	**November 14 – November 18, 2022**	**November 21 - November 25, 2022**	**November 28 – December 2, 2022; December 5, 2022**	
SF	4	6	5	4	19
MF	6	4	5	5	20
CI	8	9	8	8	33
SL	0	7	9	13	29
Grand Total	**18**	**26**	**27**	**30**	**101**

Overall, 101 samples with a total weight of 9,680 kg were sorted. The average sample weight was 96 kg. The target sample size was 100 kg for SF, MF, and CI sectors and the average sample size for these sectors was 102.3 kg. The average sample size for the SL sector was 79.7 kg.

Garbage was sorted into 13 primary categories and a total of 173 subcategories. Category descriptions are presented in **Appendix A**.

2.0 Methodology

2.1 Sample Collection

Samples were selected at each facility by Dillon's field supervisor based on the sample's sector to adequately represent regional waste generation. The field supervisor worked with facility staff to randomly select samples from the identified sectors. The municipality of origin of inbound waste loads was noted by communicating with the receiving waste facility's scale house or the waste haulers of the load. Following confirmation of the sector, the field supervisor contacted waste facility personnel if the load was to be selected for sampling. At the Metro Vancouver Waste-to-Energy facility, once contacted the waste hauler would unload a portion of the load at the sample collection and sorting area as a sample. At the three other facilities, facility staff would use a loader to retrieve a sample from the tipping floor and transport it to a sample collection and sorting area, designated by the facility's manager. For each load selected, haulers would unload a quarter of their total inbound load, or facility staff retrieved either one loader bucket of the material, weighing approximately 300 to 500 kg, or its entirety if the selected load was insufficient to fill a loader bucket. Dillon field staff then collected a sample of the retrieved material weighing approximately 100 kg, whenever possible, as entire inbound loads could be less than 100 kg if comprised of low-density materials. For inbound loads with low-density materials, 640 L of waste was collected as a sample. Field staff collected the sample in a uniform manner across and around the retrieved material to obtain a representative sample. The collected sample was then weighed and labeled prior to sorting.

2.2 Data Analysis and Statistical Evaluation

Data was compiled electronically throughout the course of the project. Data collected during field work, including scale tickets, was compiled on-site and reviewed daily to ensure accuracy. Sample logs and checklists were employed to confirm that a sufficient distribution of samples was collected for statistical evaluation. Data was regularly subjected to quality assurance and quality control methods during fieldwork and analysis, confirming the differences between pre-sorting and post-sorting sample weights were within acceptable margins of accuracy (i.e., majority of samples fell within 3% difference). The overall composition for each sector was calculated by combining weights of all sorted materials. The composition for all sectors combined was calculated by weighting the sector compositions using the overall Metro Vancouver disposal for each sector. For SUI and PPE disposal analysis, averages were calculated by sector using total weights and counts taken at the end of the fourth week of field work to determine the unit weight for each SUI and PPE category. Standard deviations and 90% confidence intervals were calculated for primary categories and functional material categories (further described in **Section 3.3**) by waste sector. The list of functional material categories is provided in **Appendix B**. Given the variance in total sample weights between samples, waste composition percentages were used to determine the statistical parameters to normalize the data set.

2.3 Single-Use Items, PPE, and Books

Following the sorting of a sample, each item category of SUI, PPE, and books was weighed and counted. In addition, the SUI and PPE items were collected throughout the fourth week of sampling and weighed to obtain a single-week total weight. Similarly, a single-week total count was calculated by combining the count data for SUI and PPE sorted from samples during the fourth week of the study. The single-week total weight for each SUI and PPE category was divided by its respective single-week total count to calculate a unit weight for these categories. The unit weight of books was calculated by dividing the combined sample total weight of books by the total count of books.

The waste generated per capita (kg/capita) for SUI, PPE, and books was calculated using the collected sample data and extrapolated by using regional disposal tonnages and population data. The collected data was also combined to provide a regional total for SUI, PPE, and books disposed. The number of SUI, and PPE waste disposed per capita (unit/capita) was calculated from the counts, waste generation per capita, and 2018 unit weights for each SUI and PPE item category. 2018 unit weights were used to maintain the comparability of results with previous waste composition studies. For SUI and PPE item categories that did not have a corresponding 2018 unit weight, unit weights calculated from this study were used. The number of books disposed per capita (unit/capita) for the SF and MF sector was calculated from the combined sample count of books divided by the regional population dwelling in each sector; the number of books disposed per capita in the CI and SL sectors was calculated with the total regional population.

3.0 Results

3.1 Waste Composition Results

The following sections present the waste composition results reported as weighted average percentages by primary material category. All percentages calculated in the section refer to the percentage of material in comparison to the total amount of sampled materials. Weighted average percentages were calculated by combining all sample data for each sector (SF, MF, CI, and SL). Each set of results had a 90% confidence interval calculated which determines the level of consistency between samples. The three largest primary category components for each set of results are highlighted in the tables presented in this section. Waste composition results for all categories by sector are included in **Appendix C**. Select photographs from the field auditing are included in **Appendix D.**

3.1.1 Single-Family (SF) Waste Composition

Figure 1 presents the weighted average waste composition of garbage by primary category for the SF sector. The largest components by weight were compostable organics (29%), followed by plastic (19%), paper (17%), and household hygiene (15%). Compostable organics mainly comprised unavoidable food waste (13%) which refers to waste produced from food preparation, such as eggshells, bones, and tea bags. Plastic consisted mostly of HDPE & LDPE consumables packaging bags and film (6%). The largest components found in the paper category were other compostable paper (9%) such as paper plates, tissue, and food-soiled paper. Household hygiene consisted mostly of diapers (9%).

Figure 1: Single-Family Waste Composition - Garbage

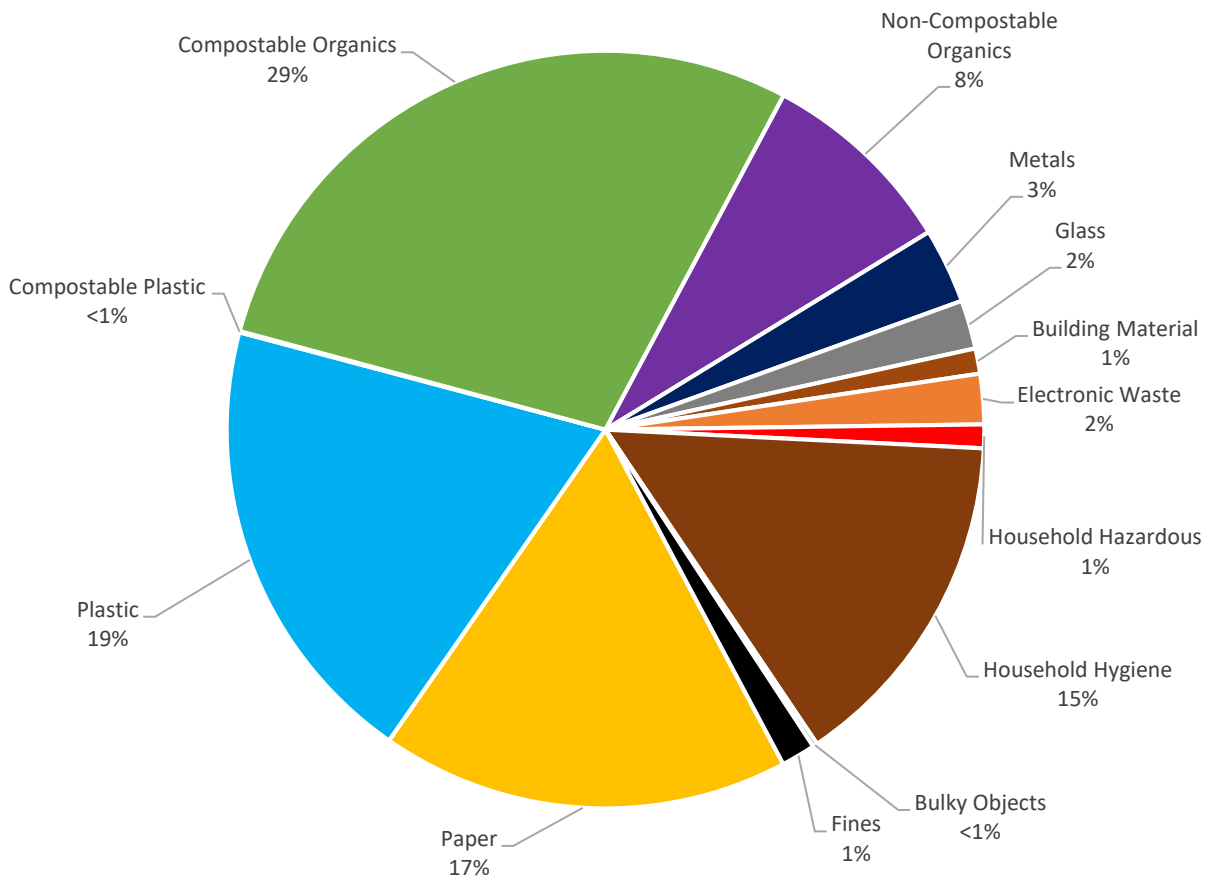


Table 2 summarizes the SF garbage waste composition results and the 90% confidence intervals. The calculated confidence intervals for the primary material categories were low (≤4%), indicating low variability between SF samples. Materials which comprise more than 10% of the waste stream are highlighted in blue.

Table 2: Single-Family Waste Composition - Garbage

Primary Category	Average[1] (n=19)	90% Confidence Interval
Paper	17%	±2%
Plastic	19%	±2%
Compostable Plastic	<1%	-
Compostable Organics	29%	±4%
Non-Compostable Organics	8%	±4%
Metals	3%	±1%
Glass	2%	-
Building Material	1%	±1%
Electronic Waste	2%	±1%
Household Hazardous	1%	-
Household Hygiene	15%	±3%
Bulky Objects	<1%	-
Fines	1%	-

[1]All percentages in the results section were rounded to the nearest whole number. Percentages may not add up to 100%.

3.1.2 Multi-Family (MF) Waste Composition

Figure 2 presents the weighted average waste composition of garbage by primary category for the MF sector. The largest components by weight were compostable organics (29%), followed by paper (22%), plastic (18%), and household hygiene (11%). Compostable organics mainly comprised of unavoidable food waste (12%). Paper consisted mostly of other compostable paper (9%). The largest components found in the plastic category were HDPE & LDPE consumables packaging bags and film (4%). Household hygiene consisted mostly of diapers (6%).

Figure 2: Multi-Family Waste Composition - Garbage

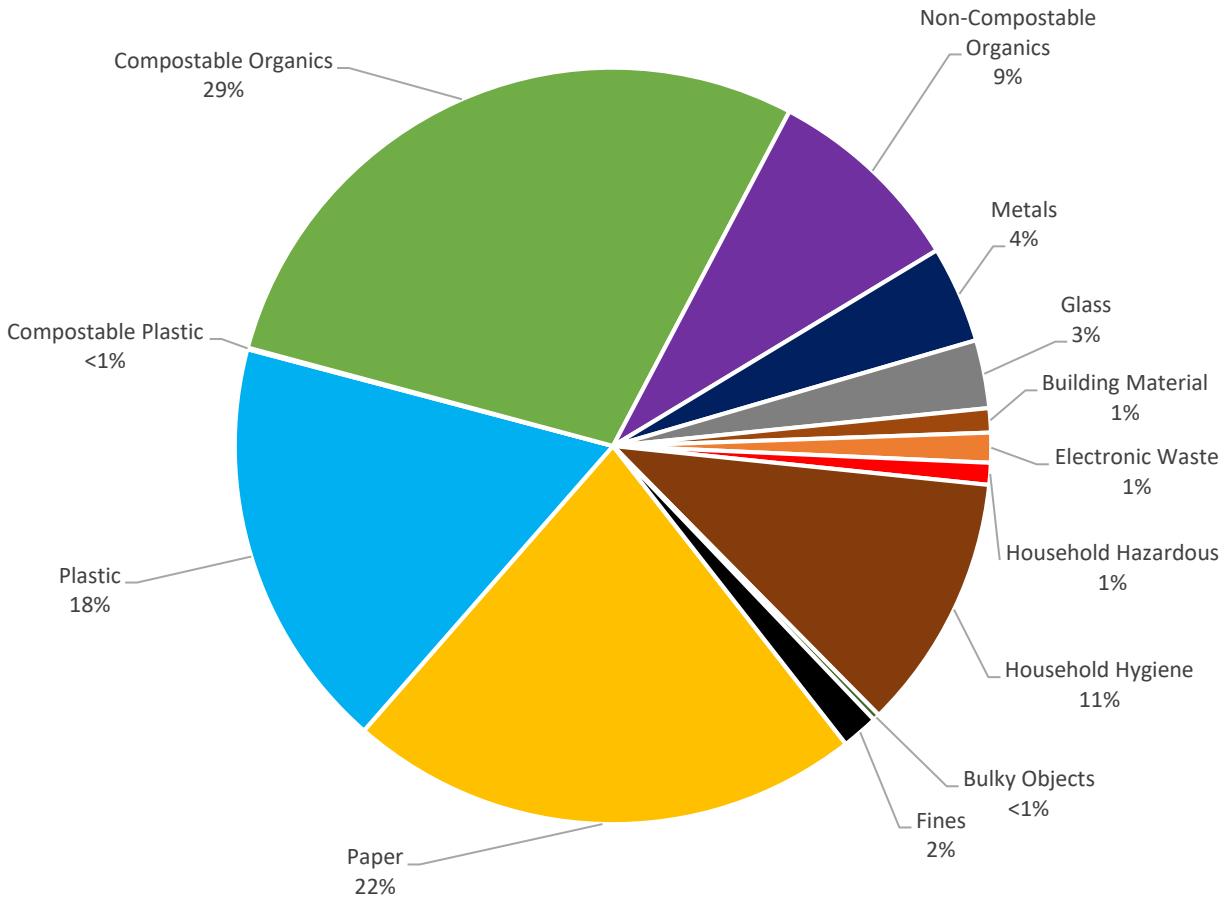


Table 3 summarizes the MF garbage waste composition results and the 90% confidence intervals. The calculated confidence intervals for the primary material categories were low (≤5%), indicating low variability between MF samples. Materials which comprise more than 10% of the waste stream are highlighted in blue.

Table 3: Multi-Family Waste Composition - Garbage

Primary Category	Average[1] (n=20)	90% Confidence Interval
Paper	22%	±3%
Plastic	18%	±2%
Compostable Plastic	<1%	-
Compostable Organics	29%	±4%
Non-Compostable Organics	9%	±5%
Metals	4%	±2%
Glass	3%	±1%
Building Material	1%	±1%
Electronic Waste	1%	±1%
Household Hazardous	1%	-
Household Hygiene	11%	±2%
Bulky Objects	<1%	-
Fines	2%	-

[1]All percentages in the results section were rounded to the nearest whole number. Percentages may not add up to 100%.

3.1.3 Commercial/Institutional (CI) Waste Composition

Figure 3 presents the weighted average waste composition of garbage by primary category for the CI sector. The largest components by weight were compostable organics (29%), followed by paper (22%), and plastic (18%). Compostable organics were mainly comprised of unavoidable food waste (7%) and wood pallets (6%). Paper consisted mostly of other compostable paper (7%). The largest components found in the plastic category were durable plastic products (3%).

Figure 3: Commercial/Institutional Waste Composition - Garbage

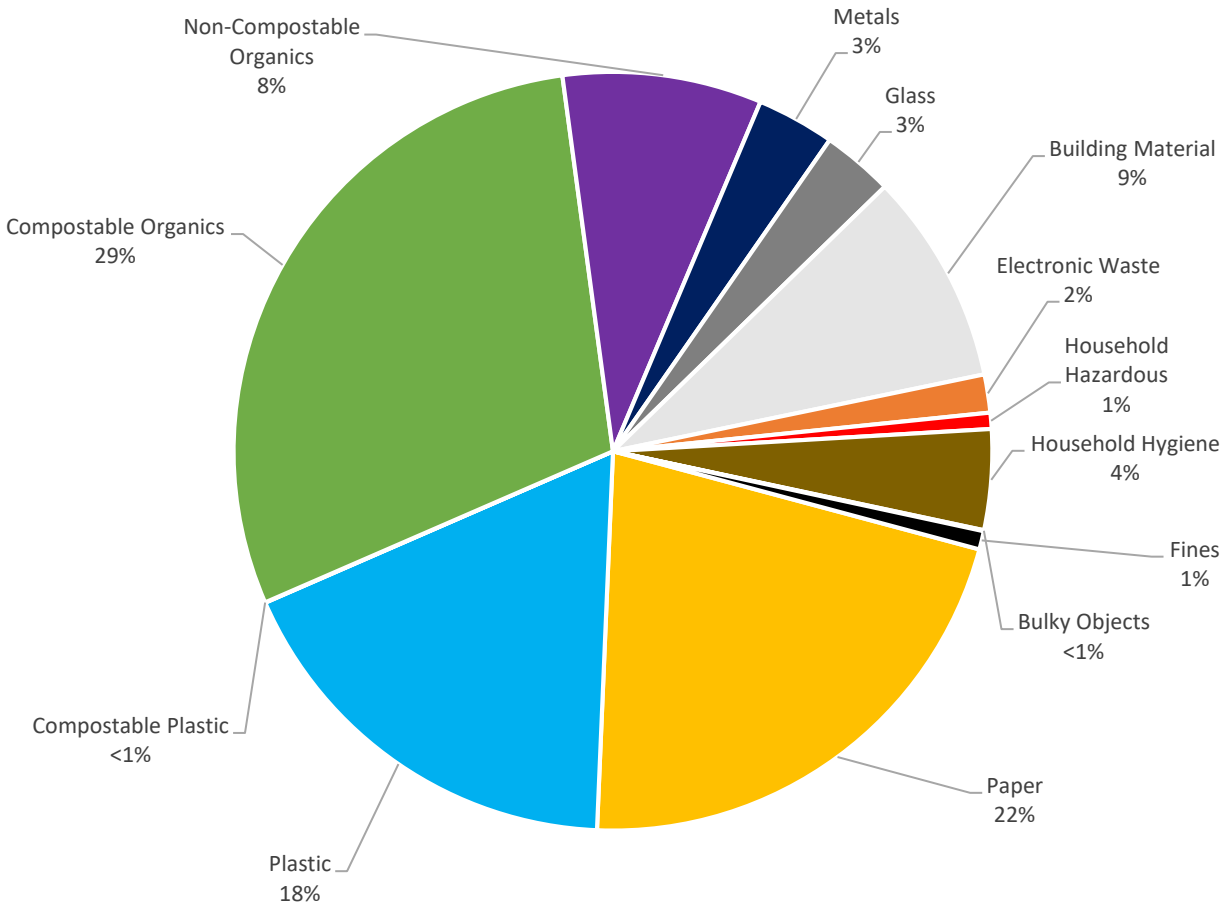


Table 4 summarizes the CI garbage waste composition results and the 90% confidence intervals. Although the calculated confidence intervals for the primary material categories were low (with the majority ≤4%), there was higher variability between CI samples compared to residential sector samples. Materials which comprise more than 10% of the waste stream are highlighted in blue.

Table 4: Commercial/Institutional Waste Composition - Garbage

Primary Category	Average[1] (n=33)	90% Confidence Interval
Paper	22%	±4%
Plastic	18%	±3%
Compostable Plastic	<1%	-
Compostable Organics	29%	±4%
Non-Compostable Organics	8%	±7%
Metals	3%	±1%
Glass	3%	±1%
Building Material	9%	±4%
Electronic Waste	2%	±1%
Household Hazardous	1%	-
Household Hygiene	4%	±2%
Bulky Objects	<1%	-
Fines	1%	±1%

[1]All percentages in the results section were rounded to the nearest whole number. Percentages may not add up to 100%.

3.1.4 Small Load (SL) Waste Composition

Figure 4 presents the weighted average waste composition of garbage by primary category for the SL sector. The largest components by weight were non-compostable organics (50%), followed by compostable organics (14%). Non-compostable organics mainly comprised finished wood furniture (28%) and finished wood (18%). Compostable organics consisted mostly of unfinished wood furniture (8%).

Figure 4: Small Load Waste Composition - Garbage

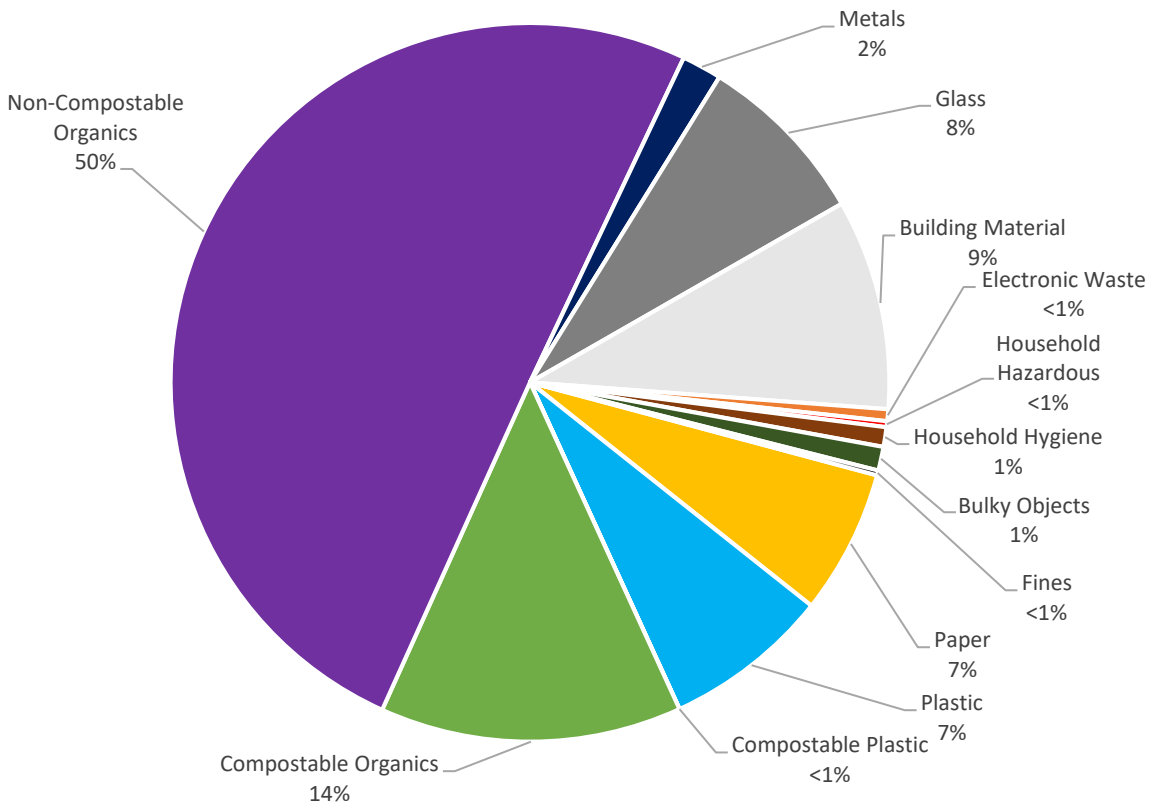


Table 5 summarizes the SL garbage waste composition results and the 90% confidence intervals. The calculated confidence intervals for the primary material categories were considerably higher than in other sectors, with the highest at 11%. This indicates higher variation between SL samples due to waste loads in this sector consisting of varied composition and total weight. Materials which comprise more than 10% of the waste stream are highlighted in blue.

Table 5: Small Load Waste Composition - Garbage

Primary Category	Average[1] (n=29)	90% Confidence Interval
Paper	7%	±5%
Plastic	7%	±3%
Compostable Plastic	<1%	-
Compostable Organics	14%	±4%
Non-Compostable Organics	50%	±11%
Metals	2%	±1%
Glass	8%	±5%
Building Material	9%	±5%
Electronic Waste	1%	-
Household Hazardous	<1%	-
Household Hygiene	1%	±2%
Bulky Objects	1%	±1%
Fines	<1%	-

[1]All percentages in the results section were rounded to the nearest whole number. Percentages may not add up to 100%.

3.1.5 Combined Waste Composition Results

Figure 5 presents the weighted average waste composition of garbage by primary category for all combined sectors. The largest components by weight were compostable organics (25%), followed by non-compostable organics (18%), paper (17%) and plastic (16%). Compostable organics mainly comprised unavoidable food waste (7%) and unfinished wood furniture (4%). Non-compostable organics consisted mostly of finished wood furniture (8%) and finished wood (6%). The largest component found in the paper category was other compostable paper (6%). Plastics comprised mostly of HDPE & LDPE consumables packaging bags and film (3%).

Figure 5: Combined Waste Composition - Garbage

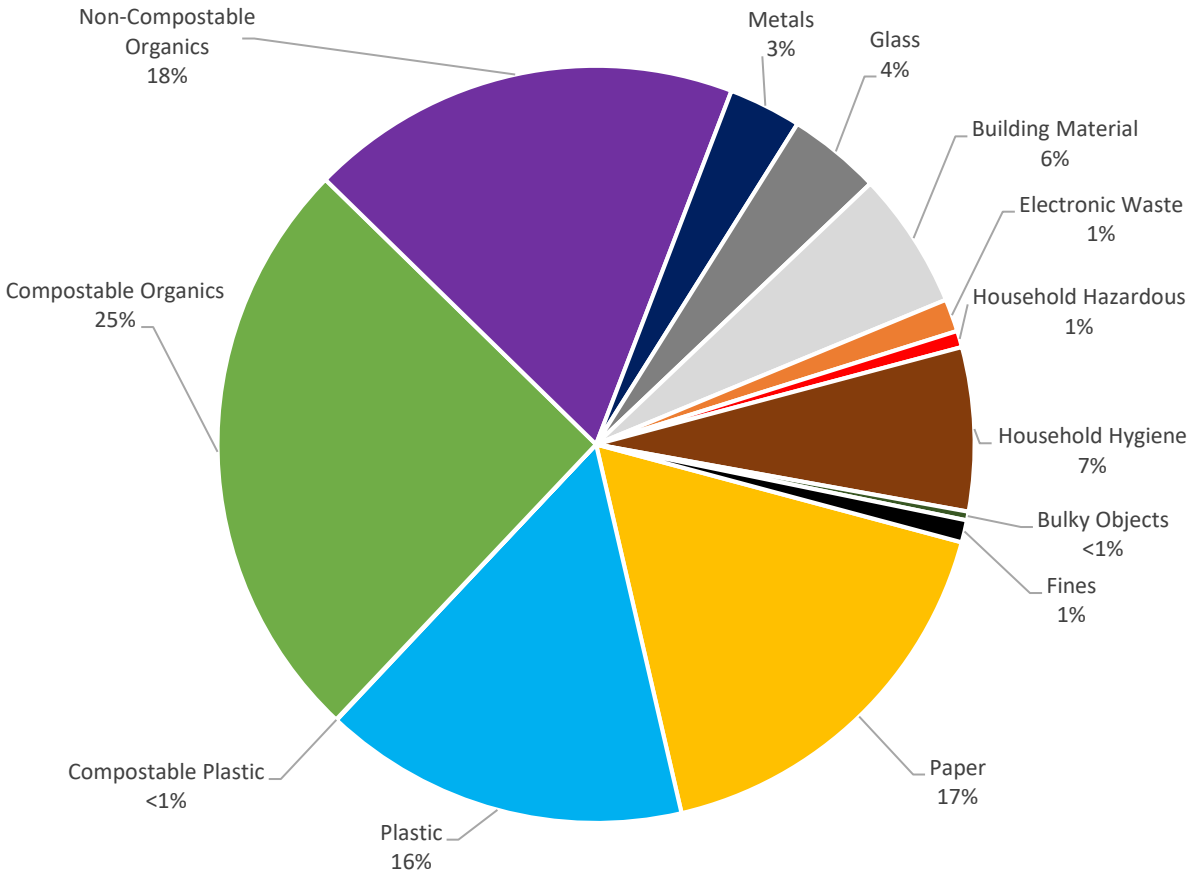


Table 6 summarizes the combined all sector garbage waste composition results and the 90% confidence intervals. The calculated confidence intervals for the primary material categories (≤4%) reflected the expected variation for a given primary category. Materials which comprise more than 10% of the waste stream are highlighted in blue.

Table 6: Combined Waste Composition - Garbage

Primary Category	Average[1] (n=101)	90% Confidence Interval
Paper	17%	±2%
Plastic	16%	±2%
Compostable Plastic	<1%	-
Compostable Organics	25%	±2%
Non-Compostable Organics	18%	±4%
Metals	3%	±1%
Glass	4%	±1%
Building Material	6%	±2%
Electronic Waste	1%	-
Household Hazardous	1%	-
Household Hygiene	7%	±1%
Bulky Objects	<1%	-
Fines	1%	±1%

[1]All percentages in the results section were rounded to the nearest whole number. Percentages may not add up to 100%.

3.2 Waste Disposal

This section presents the regional disposal for all primary categories. Data is presented by sector, total residential (SF and MF sectors), and all sectors combined. Per-capita disposal estimates are included for SF and MF sectors.

3.2.1 Residential Waste (kg/capita)

Table 7 summarizes the residential waste disposal rates. These estimated disposal rates were calculated using the percent composition data collected during auditing and extrapolating using regional disposal and population data. Overall, the SF disposal rate was calculated to be 92.5 kg/capita and the MF disposal rate was calculated to be 206.0 kg/capita. The combined residential disposal rate was calculated to be 139.0 kg/capita.

Table 7: Residential Waste Disposal (kg/capita)

	Single-Family			Multi-Family			Overall Residential	
Disposed Tonnage	**153,266**			**237,019**			**390,285**	
Population	**1,656,892**			**1,150,577**			**2,807,469**	
Primary Category	**% Composition[1]**	**Disposal by Primary Category (kg/capita)**	**90% Confidence Interval (kg/capita)**	**% Composition[1]**	**Disposal by Primary Category (kg/capita)**	**90% Confidence Interval (kg/capita)**	**% Composition[1]**	**Disposal by Primary Category (kg/capita)**
Paper	17%	16.1	±0.2	22%	45.3	±1.2	20%	28.1
Plastic	19%	18.0	±0.3	18%	36.4	±0.6	18%	25.5
Compostable Plastic	<1%	0.0	-	<1%	0.1	-	<1%	0.1
Compostable Organics	29%	26.5	±1.1	29%	58.8	±2.6	29%	39.7
Non-Compostable Organics	8%	7.8	±0.3	9%	17.8	±0.9	9%	11.9
Metals	3%	3.0	-	4%	8.5	-	4%	5.2
Glass	2%	1.9	-	3%	6.0	-	3%	3.6
Building Material	1%	1.0	-	1%	2.1	-	1%	1.5
Electronic Waste	2%	2.0	-	1%	2.6	-	2%	2.2
Household Hazardous	1%	0.9	-	1%	1.9	-	1%	1.3
Household Hygiene	15%	13.7	±0.4	11%	22.6	±0.5	12%	17.3
Bulky Objects	<1%	0.2	-	<1%	0.6	-	<1%	0.3
Fines	1%	1.3	-	2%	3.2	-	2%	2.1
Total	-	**92.5**	-	-	**206.0**	-	-	**139.0**

[1]All percentages in the results section were rounded to the nearest whole number. Percentages may not add up to 100%.

3.2.2 All Waste Disposal (Tonnage by Sector)

Table 8 summarizes the waste disposal for all sectors. These estimated disposed tonnages were calculated using the percent composition data collected during auditing and extrapolating using regional disposal data.

Table 8: Estimated Waste Disposal by Primary Category

	Single-Family			Multi-Family			Commercial/Institutional			Small Load			Combined Waste Composition	
Disposed Tonnage	**153,266**			**237,019**			**366,542**			**126,370**			**883,197**	
Population	**1,656,892**			**1,550,577**			-			-			**2,807,469**	
Primary Category	**% Composition[1]**	**Disposal by Primary Category (tonnes)**	**90% Confidence Interval (tonnes)**	**% Composition[1]**	**Disposal by Primary Category (tonnes)**	**90% Confidence Interval (tonnes)**	**% Composition[1]**	**Disposal by Primary Category (tonnes)**	**90% Confidence Interval (tonnes)**	**% Composition[1]**	**Disposal by Primary Category (tonnes)**	**90% Confidence Interval (tonnes)**	**% Composition[1]**	**Disposal by Primary Category (tonnes)**
Paper	17%	26,758	±4,067	22%	52,128	±1,350	20%	78,832	±2,804	7%	8,226	±498	17%	165,944
Plastic	19%	29,818	±522	18%	41,910	±722	16%	65,207	±2,142	9%	9,464	±358	16%	146,399
Compostable Plastic	<1%	82	-	<1%	164	-	<1%	54	-	<1%	3	-	<1%	304
Compostable Organics	29%	43,846	±1,830	29%	67,639	±3,044	28%	107,732	±4,683	14%	17,158	±746	25%	236,375
Non-Compostable Organics	8%	12,980	±501	9%	20,436	±1,017	16%	31,124	±1,199	44%	63,547	±5975	18%	128,087
Metals	3%	4,925	±30	4%	9,814	±157	3%	12,180	±158	2%	2,270	±24	3%	29,189
Glass	2%	3,184	±13	3%	6,900	±58	3%	11,125	±164	10%	9,956	±647	4%	31,165
Building Material	1%	1,651	±21	1%	2,456	±18	8%	33,115	±1,607	11%	11,970	±665	6%	49,192
Electronic Waste	2%	3,286	±39	1%	3,019	±23	1%	5,957	±67	1%	675	±4	1%	12,937
Household Hazardous	1%	1,545	±8	1%	2,216	±7	1%	2,527	±10	<1%	339	±1	1%	6,627
Household Hygiene	15%	22,655	±705	11%	25,958	±627	4%	15,675	±293	1%	1,115	±20	7%	65,403
Bulky Objects	<1%	301	±1	<1%	680	±3	<1%	154	-	1%	1,355	±25	<1%	2,490
Fines	1%	2,234	±8	2%	3,699	±17	1%	2,873	±9	<1%	276	-	1%	9,082
Total	-	**153,266**	-	-	**237,019**	-	-	**366,542**	-	-	**126,370**	-	-	**883,197**

[1]All percentages in the results section were rounded to the nearest whole number. Percentages may not add up to 100%.

3.2.3 Historical Comparison

The following figures (**Figure 6** to **Figure 9**) show the historical comparisons in each of the sample sectors from 2013 to 2022 by estimated disposal tonnage. Sampling for full-scale waste composition studies typically occurs in the fall. **Figure 10** shows the combined historical comparison for all sample sectors. Findings are discussed in **Section 3.2.3.1**.

Figure 6: Single-Family Historical Comparison 2013 - 2022

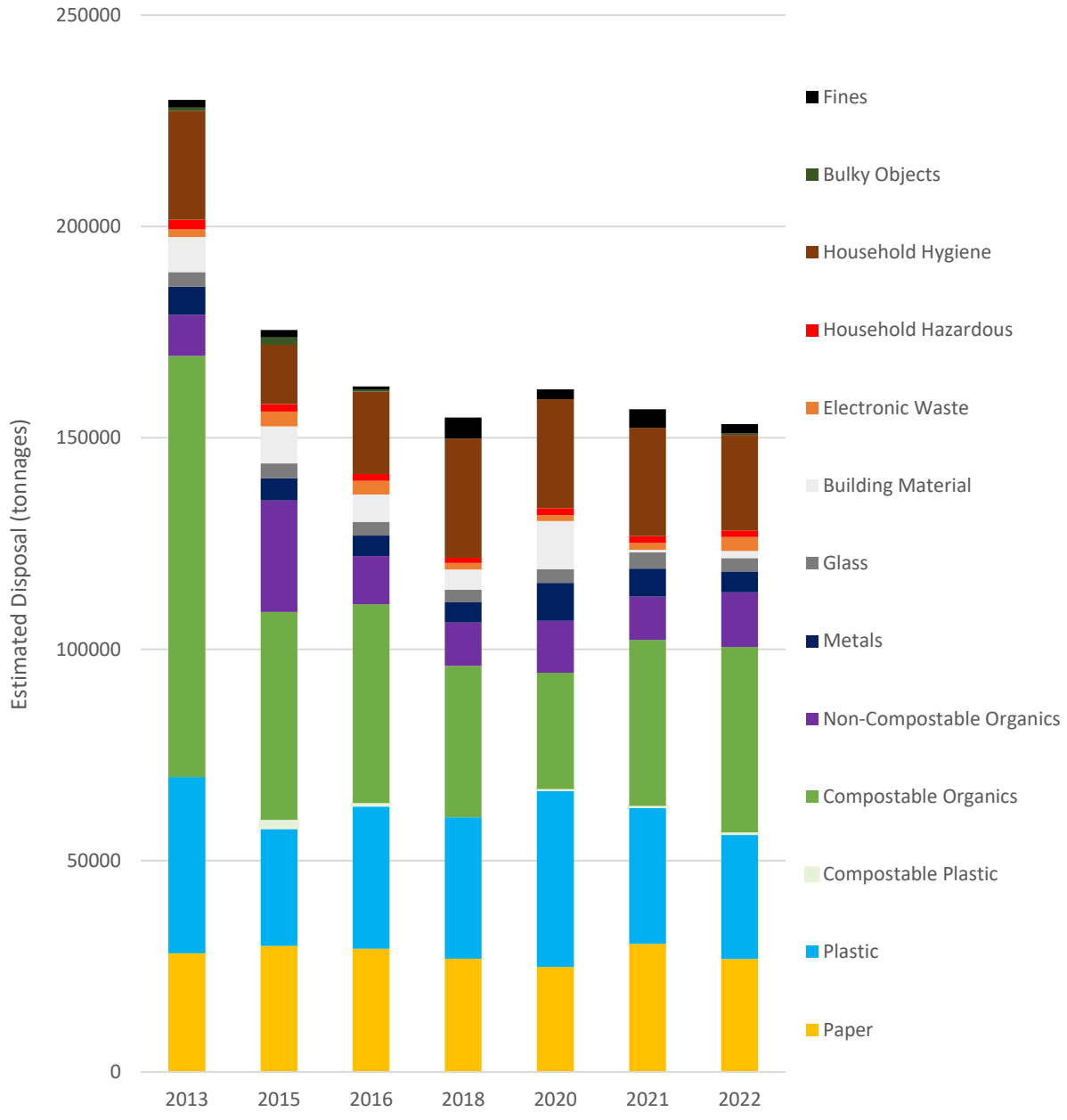


Figure 7: Multi-Family Historical Comparison 2013 - 2022

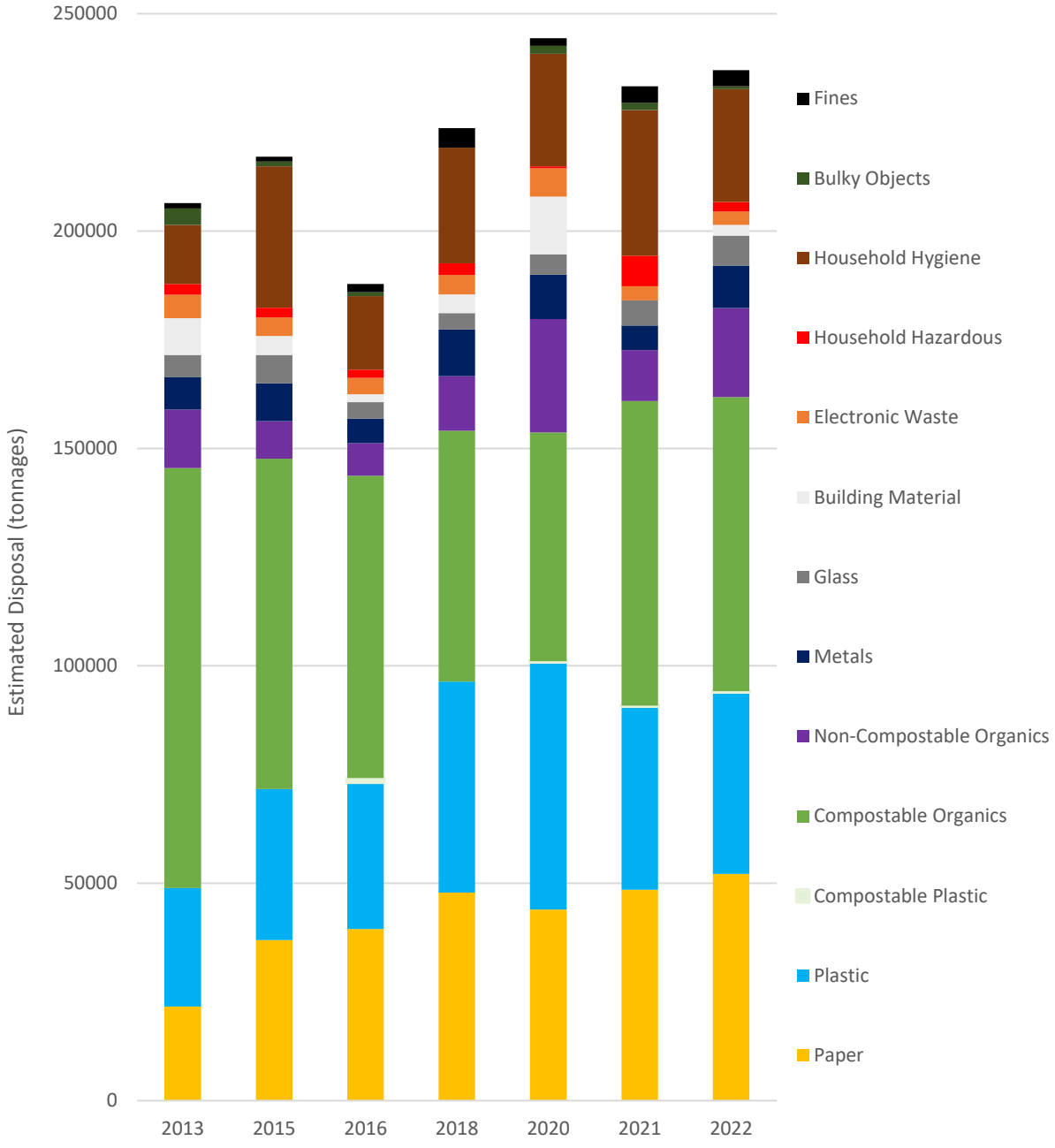


Figure 8: Commercial/Institutional Historical Comparison 2013 - 2022

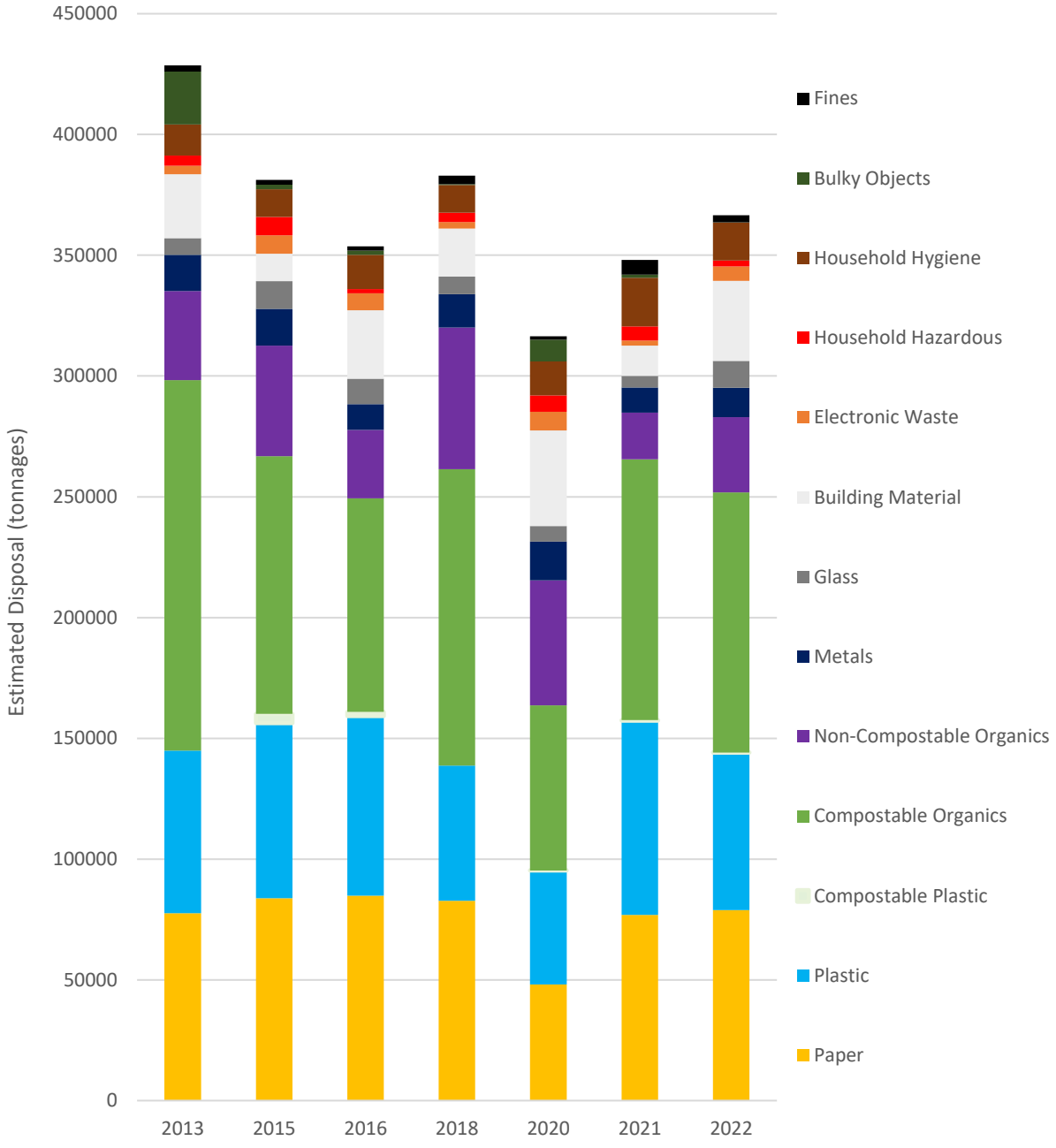


Figure 9: Small Load Historical Comparison 2013 - 2022

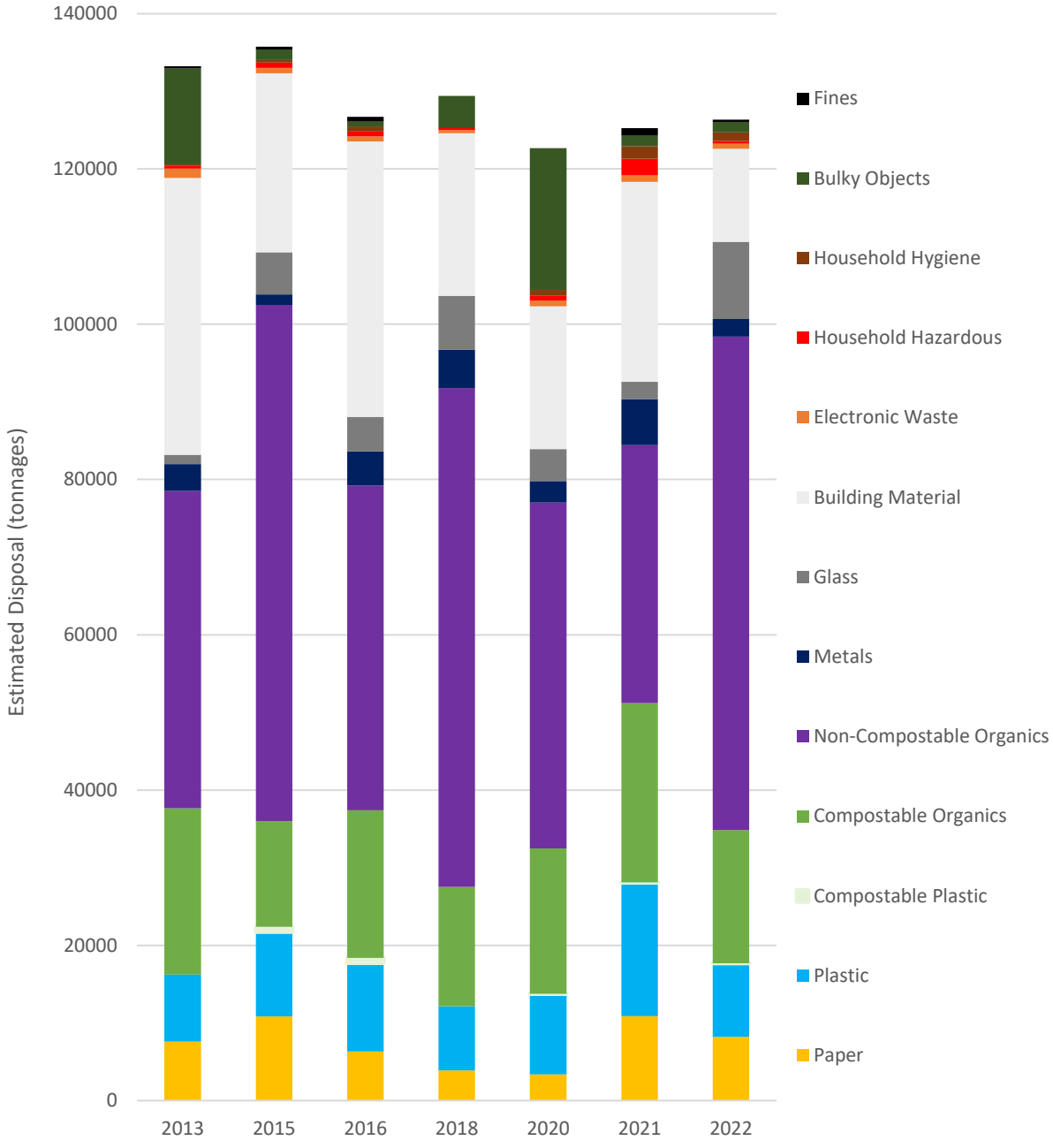
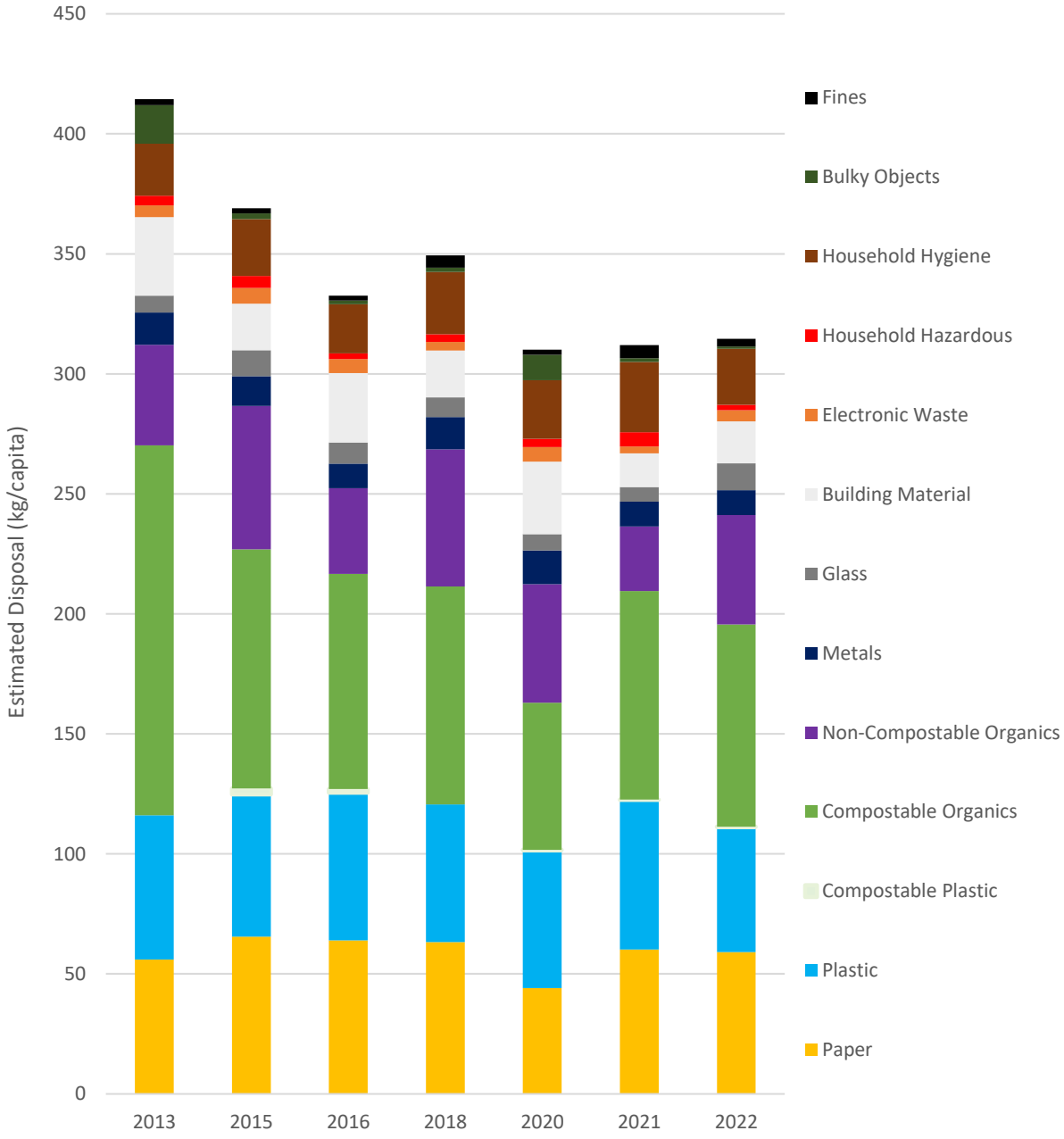


Figure 10: Combined All Sectors Historical Comparison 2013 - 2022



3.2.3.1 Summary of Historical Comparison

Overall, the historical waste composition results in this section show that the waste composition in 2020 and 2021 was an outlier due to impacts from the COVID-19 pandemic which began affecting Metro Vancouver residents in March 2020.

Notable events in the pandemic timeline which may have impacted waste disposal in Metro Vancouver include:

- Throughout 2020 and 2021, many types of businesses had modified or limited services and limited capacity (for customers and/or employees).
- All dine-in establishments closed on March 20, 2020 but reopened (with limited capacity) on May 19, 2020 (limited capacity).
- A mandatory mask policy was introduced for all indoor public spaces on November 19, 2020, which was after the 2020 waste composition study. The policy was briefly lifted in the summer of 2021, but had been reinstated prior to the beginning of the 2021 waste composition study.
- The peak of the COVID-19 Omicron wave in BC was in early January 2022, during the final week of the 2021 waste composition study.
- Restrictions limiting capacity for establishments and all indoor public spaces were lifted on February 16, 2022.
- The mandatory mask policy for all indoor public spaces was lifted on March 11, 2022.

In the SF and MF sectors, less compostable organics were disposed and more plastic was disposed in 2020 than in the years before and after. The quantity of building materials disposed by these sectors in 2020 was more than double that which was disposed in the years before and after. The 2022 waste composition and generation was much more similar to data from 2018, suggesting that waste disposal habits have recovered from the changes in reaction to the pandemic.

Notable events in 2022 which may have influenced waste disposal trends in Metro Vancouver include:

- Beginning in October 15, 2022, the organics ban was lifted, which coincided with the waste sampling period for this study; and
- Capacity challenges in the private waste management sector resulted in higher than normal amounts of construction and demolition materials being received at waste facilities in Metro Vancouver.

Notable observations from waste composition data collected in 2022 which do not consider the outlying results from 2020 and 2021 include:

- In the **SF sector**, the overall waste composition has stayed relatively consistent since 2016. Compared to 2018, the disposal of household hygiene waste, building material, and plastics has decreased, while the quantity of electronic waste, non-compostable organics, and compostable organics increased.
- In the **MF sector**, the quantity of building material and plastics decreased, while the quantity of glass, non-compostable organics, and compostable organics disposed increased from 2018.
- In the **CI sector**, the quantity of non-compostable organics, compostable organics, and paper decreased compared to 2018. The quantity of building material, glass, and plastics increased from 2018. In the **SL sector**, the quantity of building materials, and metals decreased compared to 2018, while the quantity of glass, compostable organics, and paper increased.
- **Overall,** the quantity of household hygiene waste, plastics, and paper has decreased from 2018. The quantity of glass and electronic waste increased compared to 2018.

3.3 Functional Categories Composition

The waste composition study assigned a functional group describing the waste management model or end-fate of each material category. The following sections show the composition of the different functional categories for each waste stream and combined adjusted values. Note that not all material categories were assigned a functional category and some materials may be present in more than one functional category. The functional category assigned for material categories is provided in **Appendix B**.

3.3.1 Functional Categories Composition by Sector

The largest functional category by weight percentage in the SF and MF sector was green bin materials which comprised mainly food waste. The largest functional category by weight percentage in the CI and SL sector was construction & demolition (C&D) materials, such as finished wood and wood furniture. **Table 9** shows the functional categories composition of the 2022 waste composition in detail from most prevalent to least prevalent.

Table 9: Functional Categories Composition

Functional Category	Definition	Combined (% composition)	SF (% composition)	MF (% composition)	CI (% composition)	SL (% composition)
Construction & Demolition	Items typically generated by construction, demolition, or renovation activities	27%	5%	4%	25%	68%
Green Bin	Food and yard waste and compostable paper	25%	36%	35%	27%	5%
Limited Recycling Options	Other items (excluding those above) that typically have few or no readily available options for recycling	19%	23%	22%	18%	15%
Recyclable	Items accepted in most residential recycling programs or covered by extended producer responsibility programs in BC	19%	23%	24%	19%	10%
Textiles	Clothing, household textiles, footwear, and accessories	5%	7%	8%	4%	2%
Single-Use Items	Single-Use bags, cups, utensils, straws and takeout containers	3%	4%	5%	4%	1%
Personal Protective Equipment	Personal protective equipment commonly used in response to the COVID-19 pandemic (masks, gloves and disinfectant wipes)	1%	<1%	1%	1%	<1%

[1]All percentages in the results section were rounded to the nearest whole number. Percentages may not add up to 100%.

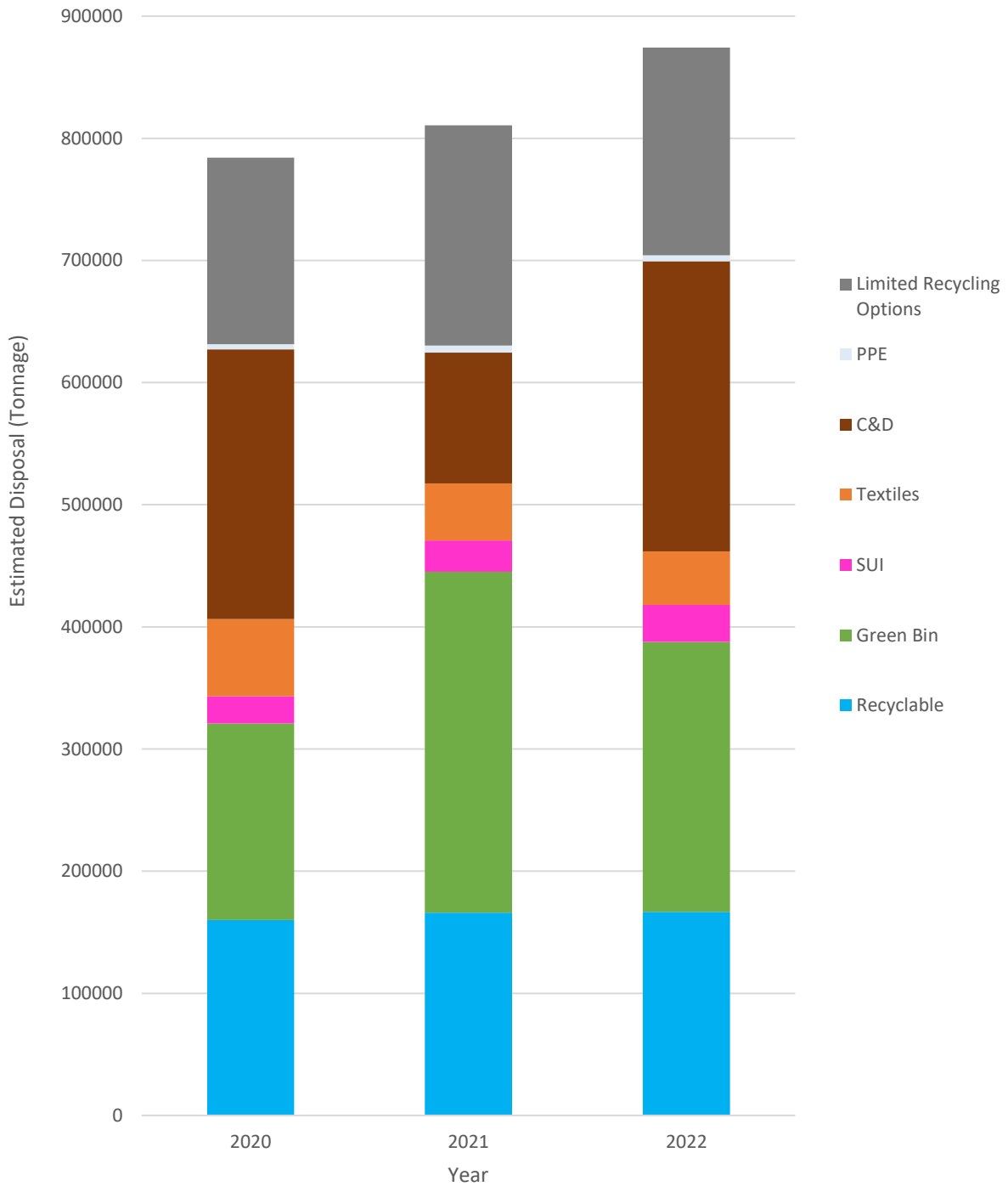
3.3.2 Historical Comparison for Functional Categories

Functional category composition analysis was completed for the first time in 2020; therefore, there is no older data on functional categories. **Figure 11** displays a side-by-side comparison of functional categories from 2020 to 2022.

The composition by functional category in 2022 is similar to 2020. The quantity of SUIs, and C&D materials increased between 2021 and 2022. Estimated disposed tonnages of green bin waste, materials with limited recycling options, and textiles decreased in 2022 compared to 2021 quantities.

The historical comparison section of this report (**Section 3.2.3**) reviews primary category composition from 2013 to 2022. The 2021 waste composition study determined that 2020 was an outlier in the years between 2013 and 2021, where more building materials were observed, and less compostable organics were observed.

Figure 11: Historical Functional Categories 2020 - 2022

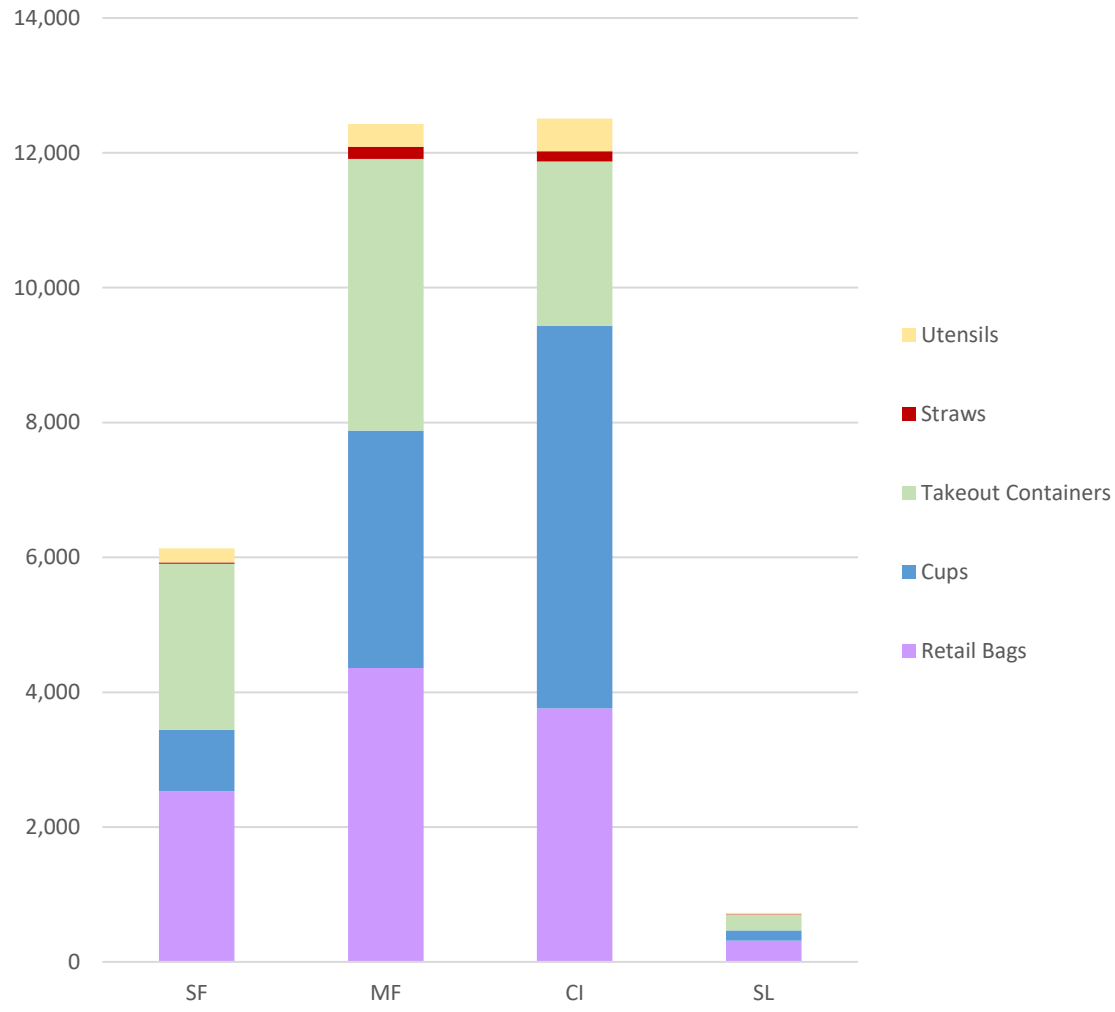


3.4 Single-Use Item Disposal

Metro Vancouver provided 2021 population data and facility inbound waste tonnages to be used with collected waste composition data and item counts to estimate the regional disposal rate of single-use item material categories. Sample outliers were observed that had item counts hundreds of units higher than the majority of samples within each sector. Eight MF sector samples and six CI sector samples were determined to be outliers with significantly higher SUI material. SUI disposal rate results without outlier samples are presented in the following section. Outlier samples were not removed from the analysis of waste and functional category composition as the outlier samples did not significantly influence results due to the low density of SUI materials.

Figure 12 presents the 2022 estimated disposal tonnage of SUIs for each sector.

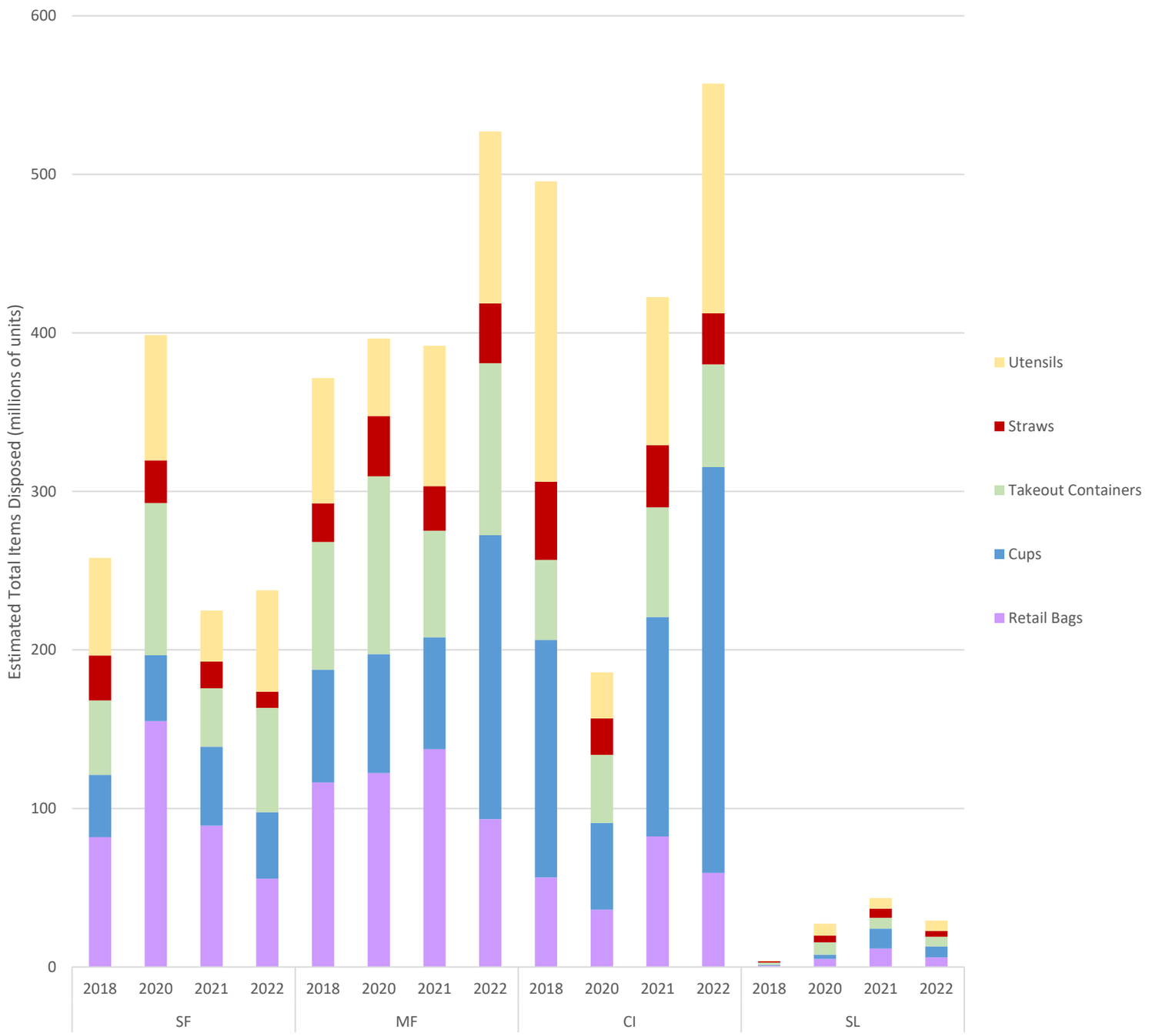
Figure 12: Estimated SUI Disposal by Sector and Category



SUIs were most common in the MF and CI sectors. The largest component of SUIs varied by sector, with retail bags and take out containers being most prevalent in the MF sector, and utensils, and cups being most prevalent in the CI sector.

Figure 13 presents the estimated SUI disposal in 2018, 2020, 2021, and 2022 by millions of units.

Figure 13: Estimated SUI Disposal in 2018, 2020, 2021, and 2022



In general, SUI disposal for the SF, MF, and SL sectors in 2022 differed from 2018, 2020, and 2021; however, SUI disposal in the CI sector in 2022 was similar to 2018, indicating a return to 'business as usual'. The 2022 total estimated SUI disposal for the MF sector was significantly higher than any other year, with significant increases in total cups disposed. In the MF sector, quantities of utensils disposed was also higher in 2022 than previous years, while the quantity of retail bags disposed decreased to its lowest amount since 2018. The 2021 waste composition study determined SUI disposal in 2020 disposal was an outlier. This is likely due to the COVID-19 pandemic and the assumed increase of takeout foods. Notably, the SF sector had significantly higher SUI disposal in 2020 than in other years, and the CI sector had significantly lower SUI disposal in 2020 than in other years.

Table 10 presents the per-capital disposal for SUIs in 2018, 2020, 2021, and 2022.

Table 10: Single-Use Items Disposal - Per-Capita Comparison for 2018, 2020, 2021, and 2022

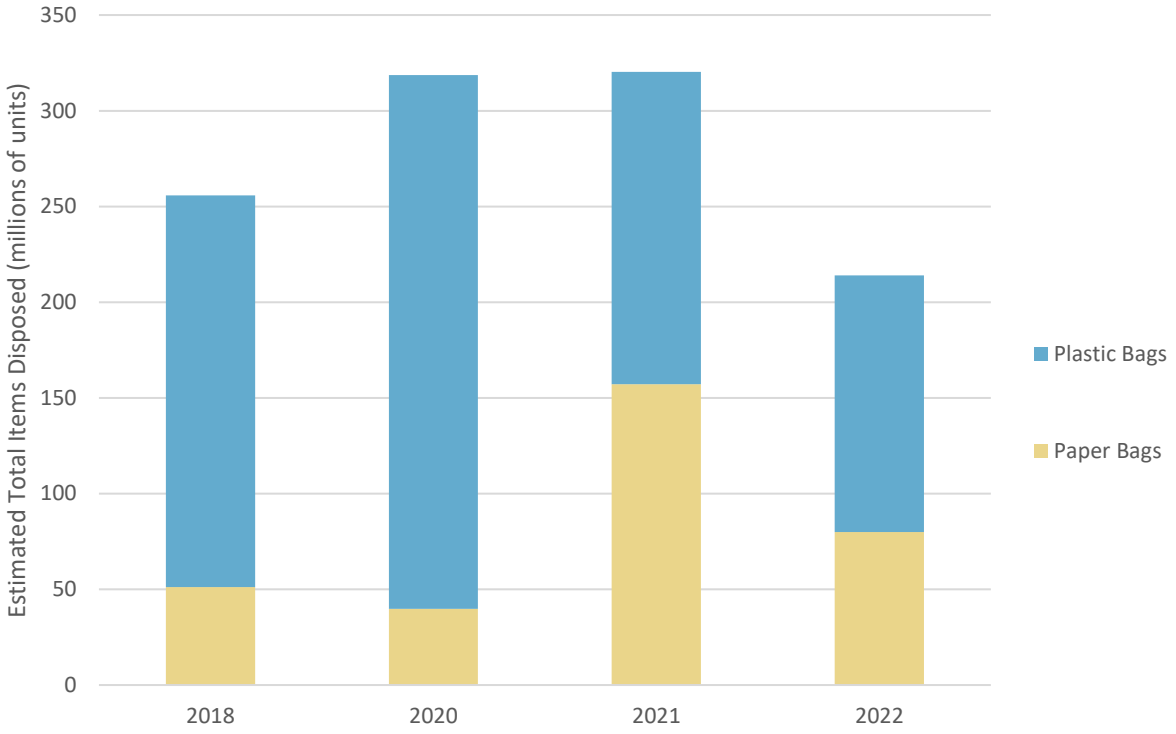
SUI Category	2018 (unit/capita)	2020 (unit/capita)	2021 (unit/capita)	2022 (unit/capita)
Retail Bags	100	117	116	76
Cups	102	64	98	172
Takeout Containers	70	95	65	87
Straws	40	34	33	30
Utensils	130	60	80	114
Total	**443**	**359**	**391**	**480**

Overall, SUI disposal per capita has been trending upwards since 2020, with the largest increase in disposal between 2021 and 2022. The quantity of items disposed per capita increased for cups, takeout containers, and utensils, while retail bags and straws decreased compared to 2021. The decrease in retail bags disposed in 2022 may be due to the influence of Metro Vancouver's ban on plastic retail bags, encouraging the use of reusable bags.

Further investigation was done regarding the potential switch from plastic to paper for retail bags and plastic to wooden utensils to understand the increase in retail bags and utensils noted in **Table 10** above.

Figure 14 presents a historical comparison of retail bags disposed in Metro Vancouver by product material from 2018 to 2022.

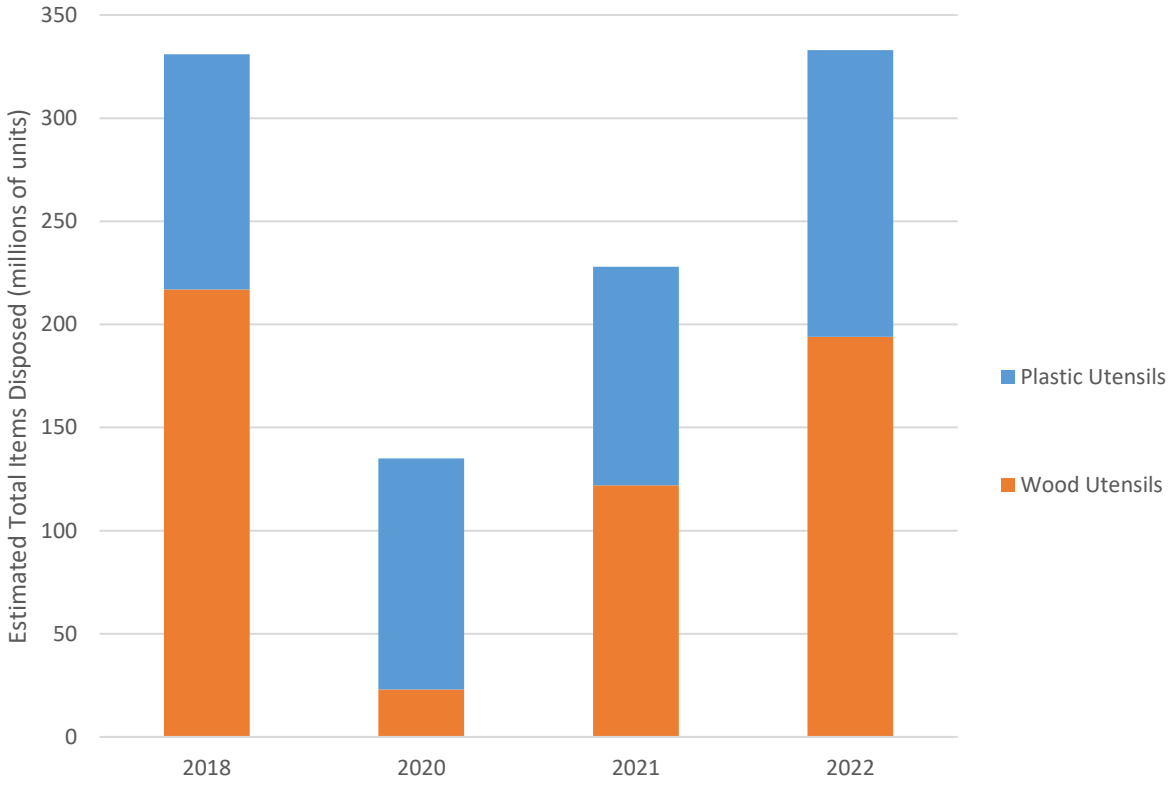
Figure 14: Estimated SUI Retail Bag Disposal by Material



Overall, the number of retail bags disposed in Metro Vancouver has decreased since 2018, with the majority of the decreased being from paper bags. Compared to 2018 and 2020, the proportion of retail bags made of paper materials has grown; however, the disposal of paper bags has decreased since 2021. The overall decrease in the disposal of retail bags coincides with the introduction of a ban on plastic retail bags in Metro Vancouver beginning January 1, 2022, as part of the region's Single-Use Item Reduction Strategy.

Figure 15 presents a historical comparison of utensils disposed in Metro Vancouver by product material from 2018 to 2022.

Figure 15: Estimated SUI Utensils Disposal by Material



Overall, the number of utensils disposed in Metro Vancouver has increased since 2020, but appear similar to quantities disposed in 2018. Since 2020, the proportion of wood utensils disposed to the total quantity of utensils disposed has been increasing, which may be a result of Metro Vancouver's Single-Use Item Reduction Strategy, and its focus on single-use plastics.

3.5 Personal Protective Equipment Disposal

In the 2020, 2021, and 2022 waste composition studies, the quantity of PPE disposed was measured. Metro Vancouver provided 2021 population data and total inbound waste tonnages for each facility sampled. This information was used with collected waste composition data to estimate the regional disposal rate of material categories. Six MF sector samples out of 20 and seven CI sector samples out of 37 were determined to be outliers with significantly higher PPE material. Samples were only considered outliers when it was observed that they had item counts hundreds of units higher than the majority of samples within each sector. PPE disposal rate results without outlier samples are presented in the following section. Outlier samples were not removed from the analysis of waste and functional category composition as the outlier samples did not significantly influence results due to the low density of PPE materials.

Table 11 summarizes the quantity of PPE disposed by sector and combined for all sectors. The largest quantity of PPE was disposed by the CI sector, followed by the MF sector, then the SF sector.

Table 11: Estimated Disposal of PPE Categories

PPE Category	SF (Tonnage)	MF (Tonnage)	CI (Tonnage)	SL (Tonnage)	Combined (Tonnage)
Masks	176	367	206	11	760
Gloves	246	639	2,235	46	3,167
Wipes	67	162	276	22	526
Total	**489**	**1,168**	**2,716**	**79**	**4,453**

Table 12 summarizes the approximate number of PPE items disposed. Additionally, the number of units disposed per capita is presented.

Table 12: Estimated Number of PPE Items Disposed

PPE Category	SF Count (millions of units)	MF Count (millions of units)	CI Count (millions of units)	SL Count (millions of units)	Combined (millions of units)	Combined (units/capita)
Masks	25	53	29	2	109	39
Gloves	29	76	265	6	375	134
Wipes	17	42	72	6	136	49
Total	**72**	**170**	**366**	**13**	**620**	**222**

Figure 16 presents the overall estimated disposal tonnage of PPE for all sectors. The greatest tonnage of PPE was disposed by the CI sector, mainly comprising wipes and gloves. However, the CI sector disposed fewer masks than the MF sector. The MF sector disposed a greater tonnage of all PPE categories compared to the SF sector.

Figure 16: Estimated PPE Disposal by Sector and Category

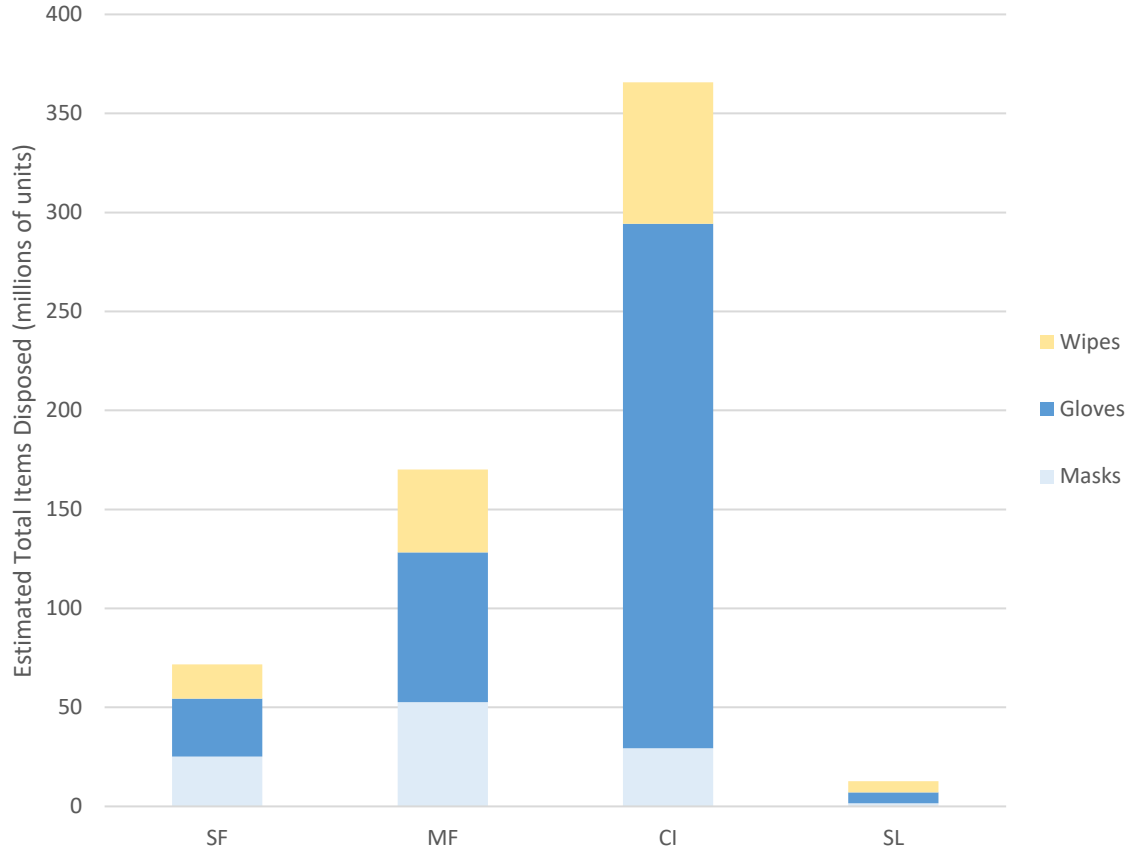
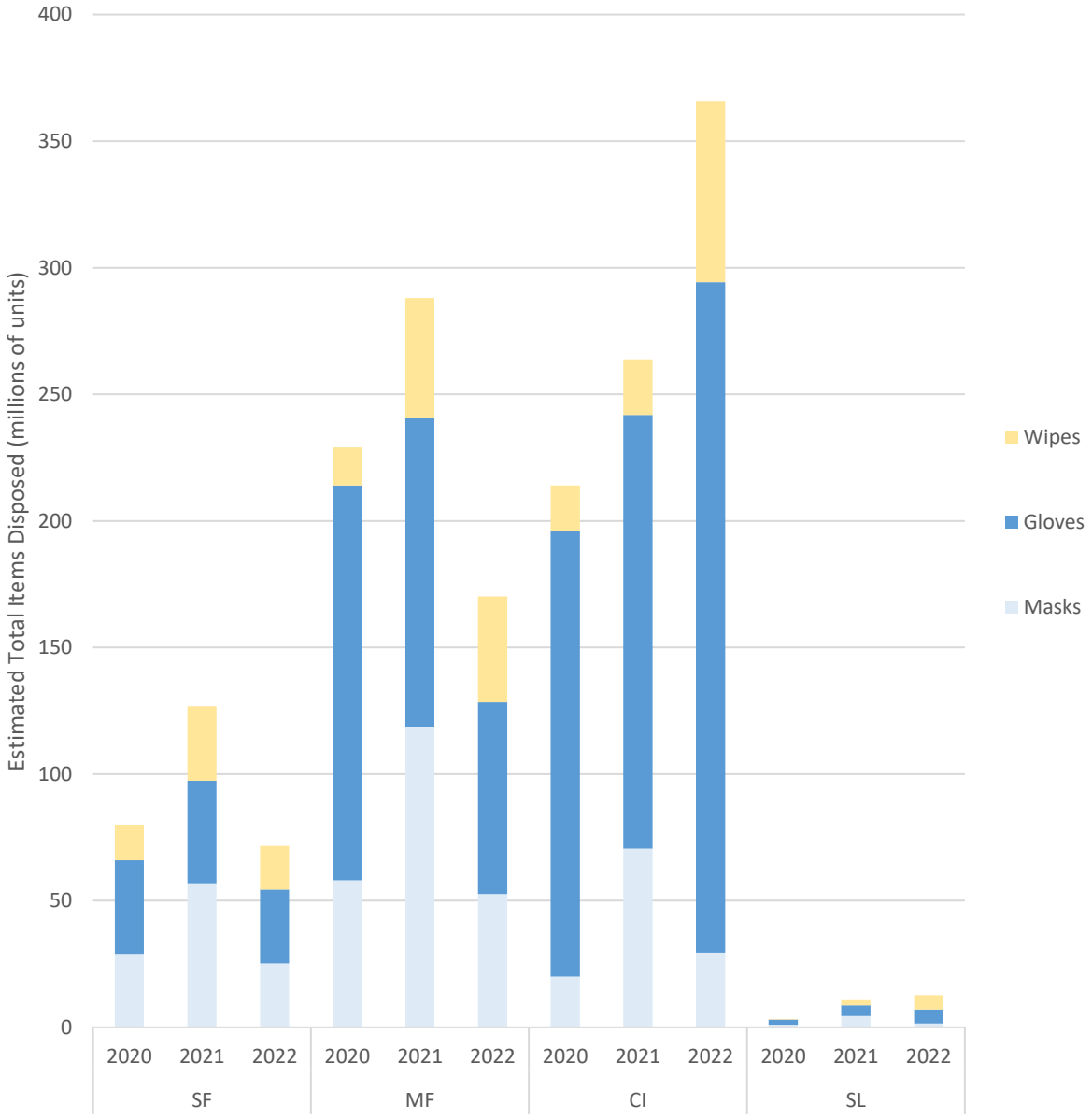


Figure 17 presents a historical comparison of the estimated disposal tonnage of PPE for each sector from 2020 to 2022. Quantities of PPE disposed in the CI and SL sectors increased from 2020 to 2022. In the CI sector, quantities of PPE significantly increased, with the greatest quantity of gloves and wipes disposed compared to previous years. In the SF and MF sectors, estimated disposal of PPE decreased between 2021 and 2022.

Figure 17: Estimated PPE Disposal in 2020, 2021, and 2022



3.6 Book Disposal

Books were weighed and counted during sample sorting to estimate the regional disposal results. The analysis of books disposed was not completed in previous waste composition studies for Metro Vancouver; therefore, a historical comparison of disposal results for this material category was not possible.

Table 13 summarizes the estimated disposal tonnage and total item disposal by sector. The unit weight of books was calculated to be 0.37 kg per book.

Table 13: Estimated Disposal of Books

	SF	MF	CI	SL
Estimated Disposal (tonnage)	1,093	1,554	482	677
Estimated Item Disposal (millions of Units)	2.3	4.6	1.9	1.7
Estimated Total Item Disposal (units/capita)	1.4	4.0	0.7	0.6

Figure 18 presents the estimated book disposal tonnage by sector, and **Figure 19** presents the estimated total book item disposal.

Figure 18: Estimated Book Disposal by Sector (Tonnage)

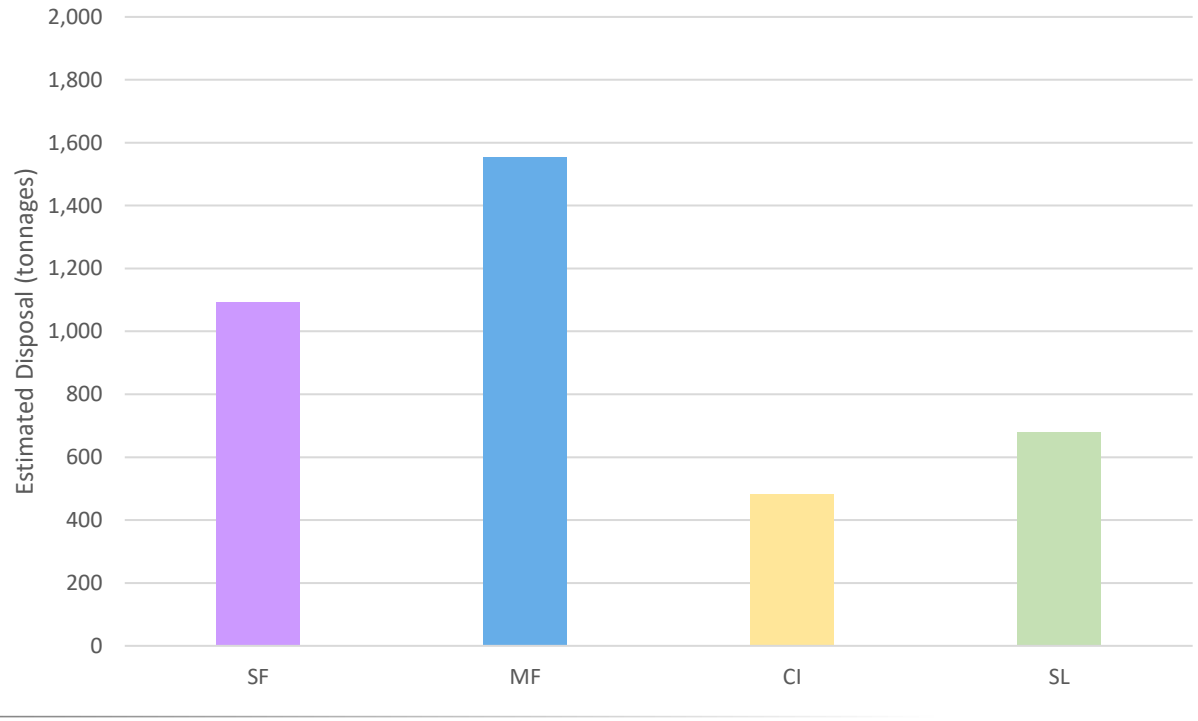
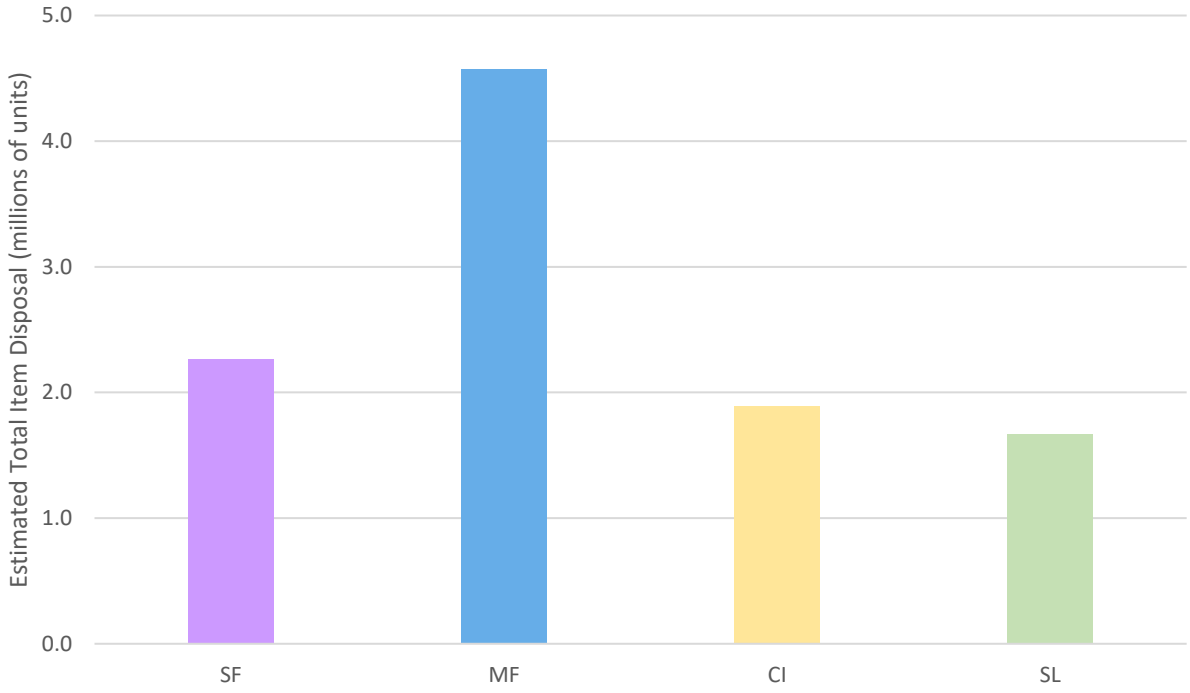


Figure 19: Estimated Total Book Disposal by Sector (Units)



4.0 Limitations and Sources of Error

Limitations and potential sources of error for the study include:

- Weights measured by the electronic scale can be inaccurate. These inaccuracies could be the result of operator errors during weighing (e.g. by not placing the scale on a level-surface or neglecting to keep the scale tared) or due to wear-and-tear on the scale. This was controlled by having field staff monitor and maintain proper scale use, and retaining spare scales.
- Sample weights may change after being weighed in due to small materials being lost during sorting or transportation, and by changing moisture content from excessive rain or snow. This was most evident during a two-day period of high snowfall during the fourth week of sampling.
- Discrepancies between the weigh-in mass of the sample and the weigh-out mass, calculated by summing the net weights for each sorted item category can occur. This type of discrepancy may be the result of errors in recording the field data, either during weigh-in or when sorted categories are weighed. Such errors were monitored for by QA/QC procedures for error checking during data collection, as a result the errors were minor.
- Larger bulky or otherwise oddly shaped items may not have been effectively retrievable by the facility's loader or the field staff for sample collection. Such items were noted if detected.
- Sorting accuracy was limited in certain cases due to notable health and safety hazards to field staff as a result of the waste contents or how the contents were contained.
- Personal wipes, sorted from samples as a PPE category, in certain cases may not be distinguishable from other tissues and sanitary wipes and therefore may not have been accurately weighed or counted.

5.0 Closure and Professional Statement

This report was prepared exclusively for the purposes, project and location outlined in this report. The report is based on the composition of the inbound material over a specific period of time as indicated in the report. Although a reasonable analysis was conducted by Dillon, Dillon's analysis was by no means exhaustive. Rather, Dillon's report represents a reasonable review of the audit results as a "snapshot" in time. These results only reflect the conditions of the period of time in which they were collected. The audit results for the assessments that took place November 2022 to December 2022 are those reflected in this report.

Dillon prepared this report for the sole benefit of the Metro Vancouver. The material in the report reflects Dillon's best judgement in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decision based on it, are the responsibilities of such third parties.

Appendix A

Category Descriptions

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Paper	Fine, Office, Envelopes	01	Junk Mail, Flyers, Unaddressed Mail	Recyclable		
Paper	Fine, Office, Envelopes	02	Other Fine Office Paper or Envelopes	Recyclable		
Paper	Newsprint	03	Newsprint	Recyclable		
Paper	OCC	04	Clean Recyclable OCC	Recyclable		
Paper	OCC	05	Waxed OCC	Limited Recycling Options		Non-recyclable, compostable
Paper	OCC	06	Other Soiled OCC	Green Bin		Contaminated with food/blood/grease, dirty pizza boxes
Paper	Boxboard	07	Cereal Boxes and Other Box Packaging	Recyclable		
Paper	Bound Paper Products	08	Telephone Books	Recyclable		
Paper	Bound Paper Products	09	Magazines	Recyclable		
Paper	Bound Paper Products	10	Books	Recyclable		
Paper	Beverage Containers – Gabletop/ Drink Box/ Aseptic	11	Dairy or Dairy Substitute	Recyclable		
Paper	Beverage Containers – Gabletop/ Drink Box/ Aseptic	12	Non-Dairy/Deposit	Recyclable		
Paper	Other Paper	13	Plastic-Lined Paper Hot Cups	SUI	Y	Coffee, tea, drinks, etc., not including compostable
Paper	Other Paper	14	Plastic-Lined Paper Cold Cups	SUI	Y	Fountain drinks, Slurpees, etc.

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Paper	Other Paper	15	Plastic-Lined Paper Cups Labeled Compostable	SUI	Y	Hot or cold beverage containers labeled compostable
Paper	Other Paper	16	Paper Straws	SUI	Y	Paper Straws
Paper	Other Paper	17	Unlined Paper Takeout Containers	SUI	Y	Fibre based to-go containers e.g. Unbranded pulp clamshells
Paper	Other Paper	18	Plastic-Lined Paper Takeout Containers	SUI	Y	Fold-flat fibre based to-go containers – coated e.g. Fast food containers
Paper	Other Paper	19	Plastic-Lined Paper Takeout Containers	SUI	Y	Fibre-based bowl containers – coated e.g. Soup or curry containers
Paper	Other Paper	20	Paper bags	SUI	Y	Grocery bags, retail carryout
Paper	Other Paper	21	Other Recyclable Paper	Recyclable		Kraft paper, moulded pulp. Recyclable polycoat containers
Paper	Other Paper	22	Other Compostable Paper	Green Bin		Paper plates, tissue paper, toweling, etc.
Paper	Other Paper	23	Non-compostable, Non-recyclable Paper	Limited Recycling Options		Tar paper, laminated paper, coated paper, etc.
Plastic	Film	24	Re-Used Plastic Bags	SUI	Y	Retail & grocery – Reused as kitchen catchers
Plastic	Film	25	Empty Plastic Bags	SUI	Y	Retail & grocery – Empty that have not been reused as garbage bags

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Plastic	Film	26	Consumables Packaging Bags and Film	Recyclable		Dry cleaning bags, bread bags, frozen food bags, milk mags, toilet paper and toweling over-wrap, lawn seed, soil, peat moss, fertilizer, multi-layer plastic films; meat, poultry and fish wrap; vacuum sealed bacon; luncheon meat and cheese; cereal liners; chip bags and other snack food bags; candy wraps; pasta bags; boil in a bag; plastic based food pouches; bubble wrap; cling wrap; etc.
Plastic	Film	27	Garbage Bags Sandwich/Freezer Bags	Limited Recycling Options		HDPE & LDPE garbage bags, kitchen catchers, blue or clear bags for recyclables
Plastic	Film	28	OFPP	Limited Recycling Options		Other flexible plastic packaging (e.g. chip bags, coffee bags, candy bar wrappers, and other crinkly wrappers)
Plastic	Film	29	Freezer Bags	Limited Recycling Options		HDPE & LDPE sandwich, freezer bags, Ziplocs and other food use bags
Plastic	Film	30	Deposit Beverage Pouches	Recyclable		

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Plastic	Film	31	Other Plastic Film			Pallet/distribution wrap and lumber wrap (nonwoven), tarps, other plastic film
Plastic	Textiles (Synthetic)	32	Clothing and accessories	Textiles		Includes all clothing and accessories (e.g. purses) primarily made of synthetic materials
Plastic	Textiles (Synthetic)	33	Household	Textiles		Includes all linens, towels, curtains, tablecloths, pet clothes, etc. made of synthetic materials
Plastic	Textiles (Synthetic)	34	Reusable bags	Textiles	Y**	Reusable retail carryout bags made of synthetic materials **Counted washable vs non-washable**
Plastic	Textiles (Synthetic)	35	Other	Textiles		All other textiles (e.g. stuffed toys and animals, masks, pet collars and leashes made of synthetic materials)
Plastic	Rigid Beverage Containers	36	Dairy or Dairy Substitute	Recyclable		
Plastic	Rigid Beverage Containers	37	Deposit Containers – Water	Recyclable		Water bottles
Plastic	Rigid Beverage Containers	38	Deposit Containers – Other	Recyclable		All other deposit beverage bottles: juice, pop, alcohol

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Plastic	Rigid Beverage Containers	39	Rigid Plastic Cups	SUI	Y	Plastic beverage cups for iced coffee, tea, drinks, etc.
Plastic	Rigid Beverage Containers	40	Other	Recyclable		Non-deposit juice, water, or pop containers
Plastic	Rigid (non-beverage)	41	# 1 PETE – Bottles and Jars	Recyclable		Other bottles and jars: #1, cooking oil, peanut butter, dish soap, mouthwash, etc. (excluding bottles that contained HHW)
Plastic	Rigid (non-beverage)	42	#1 PETE – Other Packaging	Recyclable		Other packaging: #1, bakery, clamshells, trays, oven proof trays, egg cartons
Plastic	Rigid (non-beverage)	43	#2 HDPE – Bottles and Jugs	Recyclable		Other Bottles and Jugs: #2, laundry soap, shampoo, windshield washer fluid, etc. (excluding bottles that contained HHW)
Plastic	Rigid (non-beverage)	44	#2 HDPE – Tubs and Lids	Recyclable		Wide mouth tubs and lids, dairy tubs, pails, lawn, garden, pool supplies, kitty litter, etc.
Plastic	Rigid (non-beverage)	45	#3 PVC	Recyclable		Bottles and Jars: #3 bottles and jars, lotions, soaps, bug repellents, shampoos, etc.
Plastic	Rigid (non-beverage)	46	#4 LDPE	Recyclable		Wide mouth tubs and lids, dairy tubs, etc.

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Plastic	Rigid (non-beverage)	47	#5 PP	Recyclable		Wide mouth tubs and lids, dairy tubs, pails, lawn, garden, pool supplies, kitty litter, etc.
Plastic	Rigid (non-beverage)	48	#6 PS – Non-Foam	Recyclable		#6 PS (non-foam), trays, clamshells, lids, pill and vitamin bottles, seedling trays, etc.
Plastic	Rigid (non-beverage)	49	#6 PS – Packing Foam	Recyclable		#6 PS (foam) EPS used to protect boxed products such as TVs, electronics etc.
Plastic	Rigid (non-beverage)	50	Foam Cups	SUI	Y	#6 Expanded polystyrene Cups
Plastic	Rigid (non-beverage)	51	Foam Takeout Containers	SUI	Y	#6 Expanded polystyrene Takeout containers
Plastic	Rigid (non-beverage)	52	#6 PS – Foam foodware	Recyclable		Meat trays, egg cartons
Plastic	Rigid (non-beverage)	53	#6 PS – Other PS Foam	Recyclable		Packaging peanuts, seedling trays, other EPS
Plastic	Rigid (non-beverage)	54	Other Foam	Limited Recycling Options		Non EPS Foam
Plastic	Rigid (non-beverage)	55	#7 Mixed Resin Plastic	Recyclable		Food containers, mustard, ketchup and some juices

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Plastic	Rigid (non-beverage)	56	Uncoded Packaging/Containers	Recyclable		Blister packaging, tubes for pharmaceutical & health care/cosmetic products, plant pots, unmarked/coded packaging, etc.
Plastic	Rigid (non-beverage)	57	Rigid Plastic takeout Containers	SUI	Y	Clamshells, plastic non-foam, non-compostable containers used for takeout (most likely #1 PETE but possibly others)
Plastic	Other	58	Durable Plastic Products	Limited Recycling Options		Non-packaging such as VCR tapes, CDs, toys, games, plant pots, Tupperware, furniture, siding, plumbing pipes, etc.
Plastic	Other	59	Plastic Straws	SUI	Y	
Plastic	Other	60	Plastic Utensils	SUI	Y	
Plastic	Other	61	Coffee Pods			
Plastic	Other	62	Other/Mixed Plastics	Limited Recycling Options		
Compostable Plastic	Foodware	63	Rigid Plastic Cups Labeled Compostable	SUI	Y	
Compostable Plastic	Foodware	64	"Plastic Takeout Containers Labeled Compostable"	SUI	Y	
Compostable Plastic	Foodware	65	Other Foodware Labeled Compostable	SUI	Y	Compostable cutlery, straws or other

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Compostable Plastic	Film	66	Plastic Bags Labeled Compostable	SUI	Y	Compostable grocery or other retail carryout
Compostable Plastic	Film	67	Bags and Liners	Limited Recycling Options		Compostable kitchen catcher bags, tote liners, overwrap, etc.
Compostable Plastic	Other Compostable Products and Packaging	68	Packaging , Bottles	Limited Recycling Options		Bags, pop bottles, water bottles, or other compostable packaging
Compostable Organics	Yard & Garden	69	Small Yard Waste	Green Bin		Small yard waste (leaves, branches, brush, grass clippings, wood chips, plant material, potting soil, peat, etc.)
Compostable Organics		70	Large Yard Waste	Green Bin		Other large yard wastes (branches, etc. over 15 cm dia. or 1 m long)
Compostable Organics	Food Waste - Unavoidable	71	Unavoidable Food Waste	Green Bin		Unavoidable food waste arising from food/drink preparation (bones, egg shells, tea bags, peels, oil, fats)
Compostable Organics	Food Waste - Avoidable	72	Plate Scrapings, Unfinished Meals	Green Bin		
Compostable Organics	Food Waste – Avoidable	73	Whole Fruits and Vegetables	Green Bin		
Compostable Organics	Food Waste – Avoidable	74	Whole Meats, Fish	Green Bin		
Compostable Organics	Food Waste – Avoidable	75	Full/Unused Ready-Made	Green Bin		Packaged items, canned foods
Compostable Organics	Food Waste – Avoidable	76	Baked Goods	Green Bin		

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Compostable Organics	Food Waste – Avoidable	77	Dairy	Green Bin		Yogurt, cheese, butter
Compostable Organics	Food Waste – Avoidable	78	Liquids (drinks, oil in package)	Green Bin		
Compostable Organics	Food Waste – Avoidable	79	Candy and snacks	Green Bin		Chips, candy, nuts
Compostable Organics	Food Waste – Avoidable	80	Condiments and sauces	Green Bin		Condiments, pasta sauce, salsa in container
Compostable Organics	Food Waste – Avoidable	81	Pet food	Green Bin		
Compostable Organics	Clean Wood	82	Wood Pallets	C&D		Unpainted, untreated
Compostable Organics	Clean Wood	83	Unfinished Wood Furniture	C&D	Y	No composites
Compostable Organics	Clean Wood	84	Wood Utensils	SUI		Chopsticks, stir sticks, other wood utensils
Compostable Organics	Clean Wood	85	Other Wood	C&D		Mixed/dimensional lumber, rotting wood - unpainted, untreated
Compostable Organics	Other Compostable Organics	86	Manure, Slaughterhouse, Animals			Manure, animals prepared for food
Non-compostable organics	Treated or Painted Wood	87	Pressure Treated Wood	C&D		Treated lumber, shingles, decking etc.
Non-compostable organics	Treated or Painted Wood	88	Finished Wood	C&D		Flooring, paneling, siding, glued particle board, plywood, OSB - painted, stained or finished
Non-compostable organics	Treated or Painted Wood	89	Finished Wood Furniture	C&D		Not multi-material

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Non-compostable organics	Textiles	90	Natural Fiber Clothing	Textiles		Includes all clothing, lingerie, socks, costumes, snowsuits, swimwear, bags, purses, backpacks, gloves, mittens, hats, scarves, wallets etc. primarily made of natural materials
Non-compostable organics	Textiles	91	Household	Textiles	Y	Includes all linens, towels, curtains, tablecloths, pet clothes etc. made of natural materials
Non-compostable organics	Textiles	92	Reusable bags	Textiles		Reusable retail carryout bags made of natural materials
Non-compostable organics	Textiles	93	Other	Textiles		All other textiles (e.g., stuffed toys and animals, masks, pet collars and leashes made of natural materials)
Non-compostable organics	Rubber	94	Tires	Recyclable		
Non-compostable organics	Rubber	95	Other Rubber	Recyclable		Gloves
Non-compostable organics	Leather / Multiple/Composite Organic Materials	96	Leather	Limited Recycling Options		Jackets, purses, belts
Non-compostable organics	Other	97	Composite Organic Materials (shoes)	Textiles		Includes all footwear, sport shoes, insoles etc.

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Non-compostable organics	Other	98	Other	Textiles		Wax and other non-compostable materials
Metals	Ferrous	99	Food Containers	Recyclable		
Metals	Ferrous	100	Spiral-Wound Containers	Recyclable		Frozen juice containers, coffee cans, chip and nut containers
Metals	Ferrous	101	Other Ferrous	Recyclable		Includes springs, cutlery and lids
Metals	Bimetallic	102	Food Containers	Recyclable		Multiple types of metals, usually it is a visible difference between colour the lid and the can (e.g. pet food cans, spam cans etc.)
Metals	Non-Ferrous (copper, aluminum, brass)	103	Alcoholic	Recyclable		Beer cans, cider cans, cooler cans etc.
Metals	Non-Ferrous (copper, aluminum, brass)	104	Non-Alcoholic	Recyclable		Pop cans, water or juice cans.
Metals	Non-Ferrous (copper, aluminum, brass)	105	Food Containers	Recyclable		
Metals	Non-Ferrous (copper, aluminum, brass)	106	Foil Trays, Wrap	Recyclable		
Metals	Non-Ferrous (copper, aluminum, brass)	107	Other Non-Ferrous	Recyclable		

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Metals	Non-Consumable Mixed Metals	108	Household	Recyclable		Kitchen & bathroom fixtures, coat hangers, other metal fixtures, closet doors, filing cabinets, furnishings, etc.
Metals	Non-Consumable Mixed Metals	109	Machine Parts	Recyclable		Auto parts, electric motors, bicycles and parts, lawn mowers, etc.
Metals	Non-Consumable Mixed Metals	110	Construction/Industrial	Recyclable		Nails, screws, handheld tools, drywall trim, flashing, baseboard heaters, industrial doors, panels, etc.
Glass	Beverage Containers	111	Beer	Recyclable		
Glass	Beverage Containers	112	Other Alcohol	Recyclable		
Glass	Beverage Containers	113	Non-Alcoholic & Non-Dairy	Recyclable		
Glass	Beverage Containers	114	Dairy or Dairy Substitute	Recyclable		
Glass	Food Containers	115	Food Containers	Recyclable		
Glass	Other Glass and Ceramics	116	Other Glass and Ceramics	Limited Recycling Options		Dishware, mirrors, incandescent light bulbs, fibreglass insulation, plant pots, coffee cups
Glass	Other Glass and Ceramics	117	Light bulbs (Non-hazardous)	Recyclable		Incandescent and halogen light bulbs
Building Material	Gypsum / Drywall	118	Gypsum/Drywall	C&D		
Building Material	Masonry	119	Masonry	C&D		

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Building Material	Rock, Sand, Dirt	120	Rock, Sand, Dirt	C&D		
Building Material	Rigid Asphalt	121	Rigid Asphalt	C&D		
Building Material	Carpet Waste	122	Carpet	C&D		
Building Material	Carpet Waste	123	Underlay	C&D		
Building Material	Other Inorganics	124	Other Inorganics	C&D		Insulation, linoleum, laminate, stucco etc.
Electronic Waste	Computers and Peripherals	125	Desktop Computers	Recyclable		
Electronic Waste	Computers and Peripherals	126	Notebook Computers	Recyclable		
Electronic Waste	Computers and Peripherals	127	Computer Peripherals	Recyclable		Including key board, mouse, cables, modems, routers and external hardware other than below
Electronic Waste	Computers and Peripherals	128	Computer Monitors	Recyclable		
Electronic Waste	Computers and Peripherals	129	Printers, Scanners	Recyclable		
Electronic Waste	Televisions & AV Equipment	130	Televisions	Recyclable		
Electronic Waste	Televisions & AV Equipment	131	Other Audio/Video	Recyclable		

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Electronic Waste	Telephones & Telecommunications Equipment	132	Mobile Phones & Accessories	Recyclable		
Electronic Waste	Telephones & Telecommunications Equipment	133	Other	Recyclable		Land line phones and accessories, fax machines
Electronic Waste	Small Appliances & Floor Care Appliances	134	Small Appliances & Floor Care Appliances	Recyclable		Microwaves, toasters, vacuum cleaners, coffee makers, corded and cordless, etc.
Electronic Waste	Electronic Toys	135	Electronic Toys	Recyclable		
Electronic Waste	Smoke Detectors	136	Smoke Detectors	Recyclable		
Electronic Waste	Other Electronics	137	Other Electronics	Recyclable		
Household Hazardous	Batteries	138	Lead Acid	Recyclable		Car, truck, boat, wheel chair, golf cart batteries over 2 kg under BCBCP Stewardship Program
Household Hazardous	Batteries	139	Household Batteries (Non Lithium-Ion)	Recyclable		Small, Rechargeable and Non Rechargeable Batteries (Ni-Cd, Ni-MH, and Pb under 5 kg)
Household Hazardous	Batteries	140	Lithium Ion Batteries	Recyclable		Small, lithium rechargeable (Li-ion) and single use lithium metal batteries under 5 kg

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Household Hazardous	Medical/Biological	141	Sharps			Needles
Household Hazardous	Medical/Biological	142	Animal Carcass			
Household Hazardous	Medical/Biological	143	Other			Bandages, IV bags, etc.
Household Hazardous	HHW	144	Stains/Preservatives	Recyclable		
Household Hazardous	HHW	145	Latex Paint	Recyclable		
Household Hazardous	HHW	146	Oil-Based Paint	Recyclable		
Household Hazardous	HHW	147	Paint Aerosols	Recyclable		
Household Hazardous	HHW	148	Solvents	Recyclable		
Household Hazardous	HHW	149	Cleaners, Soaps etc.	Recyclable		
Household Hazardous	HHW	150	Pesticides/Herbicides/Preservatives	Recyclable		With PCP Reg. #
Household Hazardous	HHW	151	Motor Oil	Recyclable		
Household Hazardous	HHW	152	Oil Filters	Recyclable		
Household Hazardous	HHW	153	Antifreeze	Recyclable		
Household Hazardous	HHW	154	Pharmaceuticals	Recyclable		
Household Hazardous	HHW	155	Other Petroleum Based Products	Recyclable		
Household Hazardous	HHW	156	Other	Recyclable		
Household Hazardous	Mercury Containing Items	157	Thermostats and Switches	Recyclable		

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Household Hazardous	Mercury Containing Items	158	CFLs	Recyclable		
Household Hazardous	Other HHW	159	Other HHW or Containers			
Household Hazardous	Biological	160	Diapers	Limited Recycling Options		
Household Hygiene	Biological	161	Pet Waste	Limited Recycling Options		Animal feces, bedding, cat litter
Household Hygiene	Biological	162	Other (sanitary products, condoms)	Limited Recycling Options		Sanitary napkins, tampons, condoms
Household Hygiene	Public Health	163	Masks	PPE	Y	Surgical or face coverings
Household Hygiene	Public Health	164	Gloves	PPE	Y	Nitrile or latex gloves
Household Hygiene	Public Health	165	Wipes	PPE	Y	Single-use disinfectant wipes
Household Hygiene	Liquid Product	166	Personal Care	Limited Recycling Options		Full shampoo bottles, beauty products, creams, etc.
Bulky Objects	White Goods	167	Large Appliances	Recyclable		
Bulky Objects	Furniture	168	Mattresses, Box Springs	Recyclable		
Bulky Objects	Furniture	169	Other Upholstered Furniture			
Bulky Objects	Furniture	170	Other Furniture			Multi-material furniture (e.g. plastic, metal, small amount wood)

Primary	Secondary	Category Number	Tertiary	Functional Group	Count?	Description
Fines	Fines	171	Fines	Limited Recycling Options		Items too small to classify efficiently (e.g. bread tabs, twist ties, typically <1")

Appendix B

Functional Categories Listing

Functional Category	Sorting Category
Green Bin	006 - Other Soiled OCC
	022 - Other Compostable Paper
	069 - Small Yard Waste
	070 - Large Yard Waste
	071 - Unavoidable Food Waste
	072 - Plate Scrapings, Unfinished Meals
	073 - Whole Fruits and Vegetables
	074 - Whole Meats, Fish
	075 - Full/Unused Ready-Made
	076 - Baked Goods
	077 - Dairy
	078 - Liquids (drinks, oil in package)
	079 - Candy and snacks
	080 - Condiments and sauces
	081 - Pet food
Limited Recycling Options	005 - Waxed OCC
	023 - Non-compostable, non-recyclable paper
	027 - Garbage Bags Sandwich/Freezer Bags
	029 - Freezer Bags
	031 - Other Plastic Film
	054 - Other Foam
	058 - Durable Plastic Products
	062 - Other/Mixed Plastics
	067 - Bags and Liners
	068 - Packaging , Bottles
	095 - Other Rubber
	097 - Composite Organic Materials (shoes)
	098 - Other
	116 - Other Glass and Ceramics
	160 - Diapers
	161 - Pet Waste
	162 - Other (sanitary products, condoms)
	166 - Personal Care
	171 - Fines
Recyclable	001 - Junk Mail, Flyers, Unaddressed Mail
	002 - Other Fine Office Paper or Envelopes
	003 - Newsprint
	004 - Clean Recyclable OCC
	007 - Cereal Boxes and Other Box Packaging

Functional Category	Sorting Category
	008 - Telephone Books
	009 - Magazines
	011 - Dairy or Dairy Substitute
	012 - Non-Dairy/Deposit
	021 - Other Recyclable Paper
	026 - Consumables Packaging Bags and Film
	028 - OFPP
	030 - Deposit Beverage Pouches
	036 - Dairy or Dairy Substitute
	037 - Deposit Containers – Water
	038 - Deposit Containers – Other
	040 - Other
	041 - # 1 PETE – Bottles and Jars
	042 - #1 PETE – Other Packaging
	043 - #2 HDPE – Bottles and Jugs
	044 - #2 HDPE – Tubs and Lids
	045 - #3 PVC
	046 - #4 LDPE
	047 - #5 PP
	048 - #6 PS – Non-Foam
	049 - #6 PS – Packing Foam
	052 - #6 PS – Foam Foodware
	053 - #6 PS – Other PS Foam
	055 - #7 Mixed Resin Plastic
	056 - Uncoded Packaging/Containers
	094 - Tires
	099 - Food Containers
	100 - Spiral-Wound Containers
	101 - Other Ferrous
	102 - Food Containers
	103 - Alcoholic
	104 - Non-Alcoholic
	105 - Food Containers
	106 - Foil Trays, Wrap
	107 - Other Non-Ferrous
	108 - Household
	109 - Machine Parts
	110 - Construction/Industrial
	111 - Beer

Functional Category	Sorting Category
	112 - Other Alcohol
	113 - Non-Alcoholic & Non-Dairy
	114 - Dairy or Dairy Substitute
	115 - Food Containers
	117 - Light bulbs (Non-hazardous)
	125 - Desktop Computers
	126 - Notebook Computers
	127 - Computer Peripherals
	128 - Computer Monitors
	129 - Printers, Scanners
	130 - Televisions
	131 - Other Audio/Video
	132 - Mobile Phones & Accessories
	133 - Other
	134 - Small Appliances & Floor Care Appliances
	135 - Electronic Toys
	136 - Smoke Detectors
	137 - Other Electronics
	138 - Lead Acid
	139 - Household Batteries (Non Lithium-Ion)
	140 - Lithium Ion Batteries
	144 - Stains/Preservatives
	145 - Latex Paint
	146 - Oil-Based Paint
	147 - Paint Aerosols
	148 - Solvents
	149 - Cleaners, Soaps etc.
	150 - Pesticides/Herbicides/Preservatives
	151 - Motor Oil
	152 - Oil Filters
	153 - Antifreeze
	154 - Pharmaceuticals
	155 - Other Petroleum Based Products
	157 - Thermostats and Switches
	158 - CFLs
	167 - Large Appliances
	168 - Mattresses, Box Springs
Textiles	032 - Clothing and accessories
	033 - Household

Functional Category	Sorting Category
	034 - Reusable bags
	035 - Other
	090 - Natural Fiber Clothing
	091 - Household
	092 - Reusable bags
	093 - Other
	096 - Leather
Single-Use Items	013 - Plastic-Lined Paper Hot Cups
	014 - Plastic-Lined Paper Cold Cups
	015 - Plastic-Lined Paper Cups Labeled Compostable
	016 - Paper Straws
	017 - Unlined Paper Takeout Containers
	018 - Plastic-Lined Paper Takeout Containers
	019 - Plastic-Lined Paper Takeout Containers
	020 - Paper bags
	024 - Re-Used Plastic Bags
	025 - Empty Plastic Bags
	039 - Rigid Plastic Cups
	050 - Foam Cups
	051 - Foam Takeout Containers
	057 - Rigid Plastic takeout Containers
	059 - Plastic Straws
	060 - Plastic Utensils
	063 - Rigid Plastic Cups Labeled Compostable
	064 - Plastic Takeout Containers Labeled Compostable
	065 - Other Foodware Labeled Compostable
	066 - Plastic Bags Labeled Compostable
	084 - Wood Utensils
PPE	163 - Masks
	164 - Gloves
	165 - Wipes

Appendix C

All Waste Composition by Sector

DILLON CONSULTING

Category	SF	MF	CI	SL	Combined (n=101)
01-Paper	**17.5%**	**22.0%**	**19.5%**	**7.2%**	**17.2%**
1-Junk Mail, Flyers, Unaddressed Mail	0.5%	0.4%	0.6%	0.1%	0.4%
2-Other Fine Office Paper or Envelopes	0.8%	0.8%	1.0%	2.4%	1.2%
3-Newsprint	0.3%	0.4%	0.3%	0.0%	0.2%
4-Clean Recyclable OCC	0.3%	1.1%	2.1%	0.4%	1.2%
5-Waxed OCC	0.0%	0.3%	0.8%	0.8%	0.5%
6-Other Soiled OCC	0.3%	0.5%	0.9%	0.1%	0.5%
7-Cereal Boxes and Other Box Packaging	1.8%	2.1%	1.5%	0.4%	1.4%
8-Telephone Books	0.0%	0.2%	0.0%	0.0%	0.0%
9-Magazines	0.1%	1.0%	0.2%	0.0%	0.3%
10-Books	0.7%	0.7%	0.1%	0.5%	0.4%
11-Dairy or Dairy Substitute	0.1%	0.2%	0.1%	0.0%	0.1%
12-Non-Dairy/Deposit	0.1%	0.1%	0.1%	0.0%	0.1%
13-Plastic-Lined Paper Hot Cups	0.3%	0.4%	0.8%	0.1%	0.4%
14-Plastic-Lined Paper Cold Cups	0.1%	0.5%	0.3%	0.0%	0.2%
15-Plastic-Lined Paper Cups Labeled Compostable	0.0%	0.0%	0.1%	0.0%	0.0%
16-Paper Straws	0.0%	0.0%	0.0%	0.0%	0.0%
17-Unlined Paper Takeout Containers	0.2%	0.3%	0.1%	0.0%	0.2%
18-Plastic-Lined Paper Takeout Containers	0.5%	0.7%	0.3%	0.1%	0.4%
19-Plastic-Lined Paper Takeout Containers	0.2%	0.2%	0.2%	0.0%	0.2%
20-Paper bags	1.1%	1.0%	0.8%	0.2%	0.8%
21-Paper Party Décor	0.0%	0.3%	0.1%	0.0%	0.1%
22-Other Recyclable Paper	0.4%	0.6%	0.6%	0.6%	0.6%
23-Other Compostable Paper	8.8%	8.7%	6.5%	1.0%	6.4%
24-Non-compostable, non-recyclable paper	0.8%	1.5%	2.1%	0.4%	1.4%
02-Plastic	**19.5%**	**17.7%**	**16.1%**	**8.7%**	**15.6%**
25-Re-Used HDPE & LDPE Plastic Bags	0.3%	0.2%	0.1%	0.0%	0.1%
26-Empty HDPE & LDPE Plastic Bags	0.2%	0.2%	0.1%	0.0%	0.1%
27-HDPE & LDPE Consumables Packaging Bags and Film	6.3%	4.2%	2.4%	0.8%	3.2%
28-Other Flexible Plastic Packaging (Multi-Layered and Other Flexible Resin)	1.6%	1.9%	2.3%	0.5%	1.7%
29-Garbage & Recycling Bags	1.3%	1.7%	1.9%	0.4%	1.5%
30-Freezer and Sandwich Bags	0.3%	0.2%	0.2%	0.1%	0.2%
31-Deposit Beverage Pouches	0.0%	0.0%	0.0%	0.0%	0.0%
32-Other Plastic Film	0.2%	0.0%	1.2%	0.1%	0.6%
33-Clothing and accessories	0.0%	0.0%	0.2%	0.0%	0.1%
34-Household	0.3%	0.2%	0.1%	0.1%	0.2%
35-Reusable bags	0.2%	0.2%	0.0%	0.0%	0.1%

Category	SF	MF	CI	SL	Combined (n=101)
36-Other	0.6%	0.3%	0.2%	0.3%	0.3%
37-Deposit Containers - Dairy or Dairy Substitute	0.2%	0.3%	0.1%	0.0%	0.1%
38-Deposit Containers – Water	0.1%	0.1%	0.1%	0.0%	0.1%
39-Deposit Containers – Other	0.2%	0.2%	0.2%	0.0%	0.1%
40-Rigid Plastic Cups	0.2%	0.3%	0.3%	0.0%	0.2%
41-Other	0.0%	0.0%	0.0%	0.0%	0.0%
42-# 1 PETE – Bottles and Jars	0.3%	0.4%	0.2%	0.0%	0.2%
43-#1 PETE – Other Packaging	0.5%	0.5%	0.4%	0.1%	0.4%
44-#2 HDPE – Bottles and Jugs	0.3%	0.4%	0.4%	0.1%	0.3%
45-#2 HDPE – Tubs and Lids	0.0%	0.2%	0.0%	0.0%	0.1%
46-#3 PVC	0.0%	0.0%	0.0%	0.0%	0.0%
47-#4 LDPE	0.0%	0.0%	0.0%	0.0%	0.0%
48-#5 PP	0.6%	0.6%	0.4%	0.1%	0.4%
49-#6 PS – Non-Foam	0.1%	0.2%	0.2%	0.0%	0.1%
50-#6 PS – Packing Foam	0.2%	0.2%	0.2%	0.2%	0.2%
51-Foam Cups	0.0%	0.0%	0.0%	0.0%	0.0%
52-Foam Takeout Containers	0.0%	0.0%	0.0%	0.0%	0.0%
53-#6 PS – Foam foodware	0.5%	0.3%	0.1%	0.1%	0.2%
54-#6 PS – Other PS Foam	0.0%	0.1%	0.0%	0.1%	0.1%
55-Other Foam	0.0%	0.1%	0.1%	0.1%	0.1%
56-#7 Mixed Resin Plastic	0.0%	0.0%	0.0%	0.0%	0.0%
57-Uncoded Packaging/Containers	1.2%	0.4%	0.4%	0.3%	0.5%
58-Rigid Plastic takeout Containers	0.7%	0.8%	0.5%	0.1%	0.5%
59-Non-durable Plastic Food Containers	0.1%	0.1%	0.1%	0.0%	0.1%
60-Durable Plastic Products	2.0%	2.5%	2.7%	3.7%	2.7%
61-Plastic Straws	0.0%	0.0%	0.0%	0.0%	0.0%
62-Plastic Utensils	0.1%	0.1%	0.1%	0.0%	0.1%
63-Coffee Pods	0.5%	0.5%	0.2%	0.1%	0.3%
64-Other/Mixed Plastics	0.2%	0.3%	0.6%	1.1%	0.6%
03-Compostable Plastic	**0.1%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**
65-Rigid Plastic Cups Labeled Compostable	0.0%	0.0%	0.0%	0.0%	0.0%
66-Plastic Takeout Containers Labeled Compostable	0.0%	0.0%	0.0%	0.0%	0.0%
67-Other Foodware Labeled Compostable	0.0%	0.0%	0.0%	0.0%	0.0%
68-#7 Bio Flexible - Plastic Bags Labeled Compostable	0.1%	0.1%	0.0%	0.0%	0.0%
69-#7 Bio Flexible - Bags and Liners	0.0%	0.0%	0.0%	0.0%	0.0%
70-Packaging , Bottles	0.0%	0.0%	0.0%	0.0%	0.0%

Category	SF	MF	CI	SL	Combined (n=101)
04-Compostable Organics	**28.6%**	**28.5%**	**27.5%**	**13.9%**	**25.3%**
71-Small Yard Waste	1.4%	2.3%	0.8%	1.4%	1.3%
72-Large Yard Waste	1.1%	0.9%	1.0%	0.1%	0.8%
73-Unavoidable Food Waste	12.5%	11.5%	5.8%	0.2%	7.3%
74-Plate Scrapings, Unfinished Meals	3.2%	2.7%	1.7%	0.4%	1.9%
75-Whole Fruits and Vegetables	1.8%	3.5%	2.7%	0.5%	2.2%
76-Whole Meats, Fish	1.0%	0.7%	1.1%	0.2%	0.8%
77-Full/Unused Ready-Made	0.5%	0.5%	0.4%	0.1%	0.4%
78-Baked Goods	2.0%	1.6%	0.9%	0.4%	1.2%
79-Dairy	0.6%	0.4%	0.7%	0.1%	0.5%
80-Liquids (drinks, oil in package)	0.7%	0.3%	0.6%	0.5%	0.5%
81-Candy and snacks	1.1%	0.7%	0.3%	0.0%	0.5%
82-Condiments and sauces	0.9%	0.7%	0.4%	0.4%	0.5%
83-Pet food	0.0%	0.0%	0.0%	0.0%	0.0%
84-Wood Pallets	0.0%	0.0%	5.8%	0.0%	2.3%
85-Unfinished Wood Furniture	1.6%	2.4%	3.0%	7.8%	3.5%
86-Wood Utensils	0.1%	0.1%	0.1%	0.0%	0.1%
87-Other Wood	0.1%	0.3%	2.2%	1.7%	1.3%
88-Manure, Slaughterhouse, Animals	0.0%	0.0%	0.0%	0.0%	0.0%
05-Non-Compostable Organics	**8.5%**	**8.6%**	**16.1%**	**44.2%**	**18.5%**
89-Pressure Treated Wood	0.0%	0.0%	0.2%	2.5%	0.6%
90-Finished Wood	0.2%	0.5%	7.2%	13.9%	5.7%
91-Finished Wood Furniture	2.4%	0.2%	5.5%	25.3%	7.7%
92-Natural Fiber Clothing	3.5%	4.0%	1.3%	0.9%	2.2%
93-Household	0.9%	1.8%	0.9%	0.3%	1.0%
94-Reusable bags	0.0%	0.0%	0.0%	0.0%	0.0%
95-Other	0.1%	0.7%	0.3%	0.1%	0.3%
96-Tires	0.0%	0.0%	0.0%	0.0%	0.0%
97-Other Rubber	0.2%	0.2%	0.0%	0.4%	0.2%
98-Leather	0.1%	0.1%	0.1%	0.1%	0.1%
99-Composite Organic Materials (shoes)	1.0%	1.1%	0.6%	0.6%	0.8%
100-Other	0.0%	0.0%	0.0%	0.0%	0.0%
06-Metal	**3.2%**	**4.1%**	**3.2%**	**1.7%**	**3.1%**
101-Food Containers	0.5%	0.7%	0.1%	0.1%	0.3%
102-Spiral-Wound Containers	0.0%	0.1%	0.0%	0.0%	0.0%
103-Other Ferrous	0.0%	0.1%	0.0%	0.1%	0.1%
104-Food Containers	0.1%	0.1%	0.0%	0.0%	0.0%
105-Alcoholic	0.0%	0.1%	0.0%	0.0%	0.0%

Category	SF	MF	CI	SL	Combined (n=101)
106-Non-Alcoholic	0.1%	0.2%	0.2%	0.0%	0.1%
107-Food Containers	0.0%	0.2%	0.0%	0.0%	0.1%
108-Foil Trays, Wrap	0.7%	0.6%	0.4%	0.0%	0.4%
109-Other Non-Ferrous	0.2%	0.1%	0.1%	0.0%	0.1%
110-Household	1.3%	2.0%	1.2%	0.8%	1.3%
111-Machine Parts	0.2%	0.0%	0.2%	0.0%	0.1%
112-Construction/Industrial	0.0%	0.1%	0.8%	0.6%	0.5%
07-Glass	**2.1%**	**2.9%**	**2.7%**	**9.6%**	**4.0%**
113-Beer	0.2%	0.0%	0.1%	0.0%	0.1%
114-Other Alcohol	0.1%	0.3%	0.1%	0.0%	0.1%
115-Non-Alcoholic & Non-Dairy	0.2%	0.2%	0.3%	0.2%	0.3%
116-Dairy or Dairy Substitute	0.1%	0.0%	0.1%	0.0%	0.0%
117-Food Containers	0.6%	0.8%	0.2%	0.1%	0.4%
118-Other Glass and Ceramics	0.9%	1.5%	1.9%	9.2%	3.0%
119-Light bulbs (Non-hazardous)	0.1%	0.1%	0.0%	0.0%	0.1%
08-Building Material	**1.1%**	**1.0%**	**8.3%**	**11.1%**	**5.9%**
120-Gypsum/Drywall	0.0%	0.2%	1.4%	0.0%	0.6%
121-Masonry	0.0%	0.0%	0.0%	1.4%	0.3%
122-Rock, Sand, Dirt	0.1%	0.3%	0.5%	1.0%	0.5%
123-Rigid Asphalt	0.0%	0.0%	0.9%	1.9%	0.7%
124-Carpet	0.5%	0.0%	1.0%	0.0%	0.5%
125-Underlay	0.0%	0.0%	0.3%	0.1%	0.2%
126-Other Inorganics	0.5%	0.5%	4.1%	6.7%	3.1%
09-Electronic Waste	**2.1%**	**1.3%**	**1.5%**	**0.6%**	**1.4%**
127-Desktop Computers	0.0%	0.0%	0.0%	0.0%	0.0%
128-Notebook Computers	0.0%	0.0%	0.0%	0.0%	0.0%
129-Computer Peripherals	0.1%	0.1%	0.0%	0.1%	0.1%
130-Computer Monitors	0.0%	0.0%	0.0%	0.0%	0.0%
131-Printers, Scanners	0.4%	0.4%	0.3%	0.0%	0.3%
132-Televisions	0.0%	0.0%	0.0%	0.0%	0.0%
133-Other Audio/Video	0.1%	0.1%	0.0%	0.0%	0.0%
134-Mobile Phones & Accessories	0.0%	0.1%	0.0%	0.0%	0.0%
135-Other	0.1%	0.1%	0.0%	0.0%	0.0%
136-Small Appliances & Floor Care Appliances	1.2%	0.2%	0.3%	0.2%	0.5%
137-Electronic Toys	0.1%	0.0%	0.0%	0.1%	0.0%
138-Smoke Detectors	0.0%	0.0%	0.0%	0.0%	0.0%
139-Other Electronics	0.2%	0.3%	0.7%	0.3%	0.4%

Category	SF	MF	CI	SL	Combined (n=101)
10-Household Hazardous	**1.0%**	**0.9%**	**0.6%**	**0.3%**	**0.7%**
140-Lead Acid	0.0%	0.0%	0.0%	0.0%	0.0%
141-Household Batteries (Non Lithium-Ion)	0.2%	0.1%	0.0%	0.0%	0.1%
142-Lithium Ion Batteries	0.0%	0.0%	0.0%	0.0%	0.0%
143-Sharps	0.0%	0.0%	0.0%	0.0%	0.0%
144-Animal Carcass	0.0%	0.1%	0.0%	0.0%	0.0%
145-Other	0.2%	0.1%	0.1%	0.0%	0.1%
146-Stains/Preservatives	0.0%	0.0%	0.0%	0.0%	0.0%
147-Latex Paint	0.0%	0.0%	0.0%	0.0%	0.0%
148-Oil-Based Paint	0.1%	0.0%	0.0%	0.0%	0.0%
149-Paint Aerosols	0.0%	0.0%	0.0%	0.0%	0.0%
150-Solvents	0.0%	0.0%	0.0%	0.0%	0.0%
151-Cleaners, Soaps etc.	0.0%	0.1%	0.0%	0.0%	0.0%
152-Pesticides/Herbicides/Preservatives	0.2%	0.0%	0.0%	0.0%	0.0%
153-Motor Oil	0.0%	0.0%	0.0%	0.0%	0.0%
154-Oil Filters	0.0%	0.1%	0.2%	0.0%	0.1%
155-Antifreeze	0.0%	0.0%	0.0%	0.0%	0.0%
156-Pharmaceuticals	0.1%	0.3%	0.2%	0.1%	0.2%
157-Other Petroleum Based Products	0.0%	0.0%	0.0%	0.0%	0.0%
158-Other	0.1%	0.0%	0.0%	0.1%	0.0%
159-Thermostats and Switches	0.0%	0.0%	0.0%	0.0%	0.0%
160-CFLs	0.0%	0.0%	0.0%	0.0%	0.0%
161-Other HHW or Containers	0.0%	0.0%	0.0%	0.0%	0.0%
11-Household Hygiene	**14.8%**	**11.0%**	**3.8%**	**1.1%**	**7.0%**
162-Diapers	8.5%	6.2%	1.6%	0.0%	3.6%
163-Pet Waste	3.9%	2.7%	0.9%	0.4%	1.8%
164-Other (sanitary products, condoms)	1.5%	1.0%	0.2%	0.3%	0.6%
165-Masks	0.1%	0.1%	0.1%	0.0%	0.1%
166-Gloves	0.2%	0.5%	0.6%	0.0%	0.4%
167-Wipes	0.0%	0.1%	0.1%	0.0%	0.1%
168-Personal Care	0.5%	0.4%	0.3%	0.4%	0.4%
12-Bulky Objects	**0.2%**	**0.3%**	**0.0%**	**1.3%**	**0.4%**
169-Large Appliances	0.2%	0.3%	0.0%	1.3%	0.4%
170-Mattresses, Box Springs	0.0%	0.0%	0.0%	0.0%	0.0%
171-Other Upholstered Furniture	0.0%	0.0%	0.0%	0.0%	0.0%
172-Other Furniture	0.0%	0.0%	0.0%	0.0%	0.0%
13-Fines	**1.5%**	**1.6%**	**0.7%**	**0.3%**	**0.9%**
173-Fines	1.5%	1.6%	0.7%	0.3%	0.9%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Appendix D

Selected Site Photos

Photo 1: Sorting area at Metro Vancouver Waste-to-Energy facility.

Photo 2: Sorting area at Metro Vancouver North Surrey facility.

Photo 3: Sorting area at Metro Vancouver United Boulevard facility.

Photo 4: Sorting area at Metro Vancouver South Vancouver facility.

Photo 5: Waste load being unloaded for sampling at Metro Vancouver Waste-to-Energy Facility.

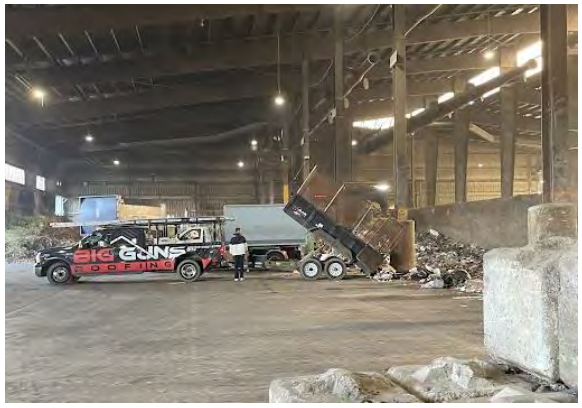


Photo 6: Waste load being unloaded for sampling at Metro Vancouver North Surrey location.

Photo 7: Load UB-CI-048 at United Boulevard Recycling and Waste Centre. (Commercial/Institutional)

Photo 8: Load VA-SL-098 at South Vancouver Transfer Station. (Small Load)

Photo 9: Weigh In.

Photo 10: Sorting.

Photo 11: Weigh Out.

Photo 12: Sorted Non-Ferrous Food Trays/Wraps (106) and Non-Alcoholic (104).

	
Photo 13: Sorted Plastics (27, 42, 56 and 57) and HHW Pharmaceuticals (156).	**Photo 14:** Paper Bags (20).
	
Photo 15: Paper Cold Cups (14) and Paper Takeout Container (18).	**Photo 16:** Liquids (78).
	
Photo 17: Masks (163).	**Photo 18:** Building Materials, Gypsum (118).

Photo 19: Paper Hot Cups (13).

Photo 20: Household Hygiene, Diapers (160).

Photo 21: Sample VA-SL-101 of Bulky Items, Other Upholstered Furniture (169).

Photo 22: Sample SU-CI-044 of Clean Wood (85).

Photo 23: Gloves collected from one week of sorted samples.

Photo 24: Straws collected from one week of sorted samples.

Appendix E

All Counts by Sector

Category	Regional Disposal Count (millions of units)				
	SF	MF	CI	SL	Total
Retail Bags	**118**	**159**	**119**	**14**	**392**
20-Paper bags	53	82	85	8	217
25-Re-Used HDPE & LDPE Plastic Bags	35	37	16	2	87
26-Empty HDPE & LDPE Plastic Bags	22	31	12	3	64
35-Reusable Bags (synthetic - washable)	3.00	4.69	1.79	0.87	9.92
35-Reusable Bags (synthetic - non-washable)	1.13	1.41	1.04	0.07	3.49
68-#7 Bio Flexible - Plastic Bags Labeled Compostable	4	4	2	0	8
94-Reusable Bags (non-compostable organics)	<1	<1	1	<1	1
Cups	**48**	**161**	**270**	**6**	**451**
13-Plastic-Lined Paper Hot Cups	20	40	122	3	176
14-Plastic-Lined Paper Cold Cups	8	79	70	1	140
15-Plastic-Lined Paper Cups Labeled Compostable	1	3	18	<1	21
40-Rigid Plastic Cups	17	37	57	2	107
51-Foam Cups	2	1	3	0	6
65-Rigid Plastic Cups Labeled Compostable	0	0	0	0	0
Takeout Containers	**72**	**133**	**127**	**7**	**320**
17-Unlined Paper Takeout Containers	8	23	15	1	42
18-Plastic-Lined Paper Takeout Containers	20	49	39	3	103
19-Plastic-Lined Paper Takeout Containers	14	16	32	1	60
52-Foam Takeout Containers	2	3	2	0	6
58-Rigid Plastic takeout Containers	28	42	41	2	108
66-Plastic Takeout Containers Labeled Compostable	0	<1	0	0	<1
Straws	**27**	**78**	**64**	**3**	**158**
16-Paper Straws	13	51	50	2	106
61-Plastic Straws	14	27	14	1	52
Utensils	**78**	**138**	**177**	**5**	**375**
62-Plastic Utensils	30	65	86	2	172
67-Other Foodware Labeled Compostable	0	1	1	<1	1
86-Wood Utensils	48	72	90	2	202

Category	Regional Disposal Count (millions of units)				
	SF	MF	CI	SL	Total
PPE	**121**	**379**	**583**	**16**	**1022**
165-Masks	47	81	54	5	175
166-Gloves	47	213	359	7	578
167-Wipes	26	85	170	4	268
Other	**0**	**0**	**0**	**0**	**0**
85-Unfinished Wood Furniture	0	0	0	0	0