TETRA TECH

TECHNICAL MEMO

ISSUED FOR USE

To:	Shannon White, M.Sc., PMP	**Date:**	November 14, 2024
c:	-	**Memo No.:**	01
From:	Wilbert Yang, P.Eng.	**File:**	704-SWM.PLAN03159-03
Subject:	District of Squamish 2024 Waste Composition Study		

NOTE TO THE READER

The samples collected and characterized for this study are "snapshots" in time, meaning the reported quantities are estimates and only represent the conditions for the period in which they were collected. Annual variability, weather, and other factors can affect the amount and composition of waste and recyclables generated by the various sectors at any given time. Even with combined educational, regulatory, and financial initiatives the reader should not assume that it is necessarily easy, practical, or economical to recover a substantial portion of a disposed material from a mixed waste stream or at its source.

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by the District of Squamish (District) to conduct a waste composition study at the Squamish Landfill (the Landfill) to characterize the waste streams from various sectors. The purpose of this study was to:

1. Quantify and characterize the materials present in the multi-sector waste disposal streams received at the Landfill;
2. Monitor the progress of the District's Waste Diversion Targets and Zero Waste Strategy;
3. Obtain data for Single-Use Items (SUIs) in the waste stream; and
4. Compare the 2024 waste composition results with 2016, 2018, 2020, and 2022 results.

The waste sampling and sorting was conducted from September 9, to September 17, 2024, at the Landfill. A sampling plan was developed in conjunction with the District to characterize the waste from residential curbside collection (RES), multi-family residential (MF), industrial, commercial, and institutional (ICI), construction and demolition (C&D), and streetscape (STR) sectors. The total number of samples that was analyzed by sector is summarized in Table 1-1.

Table 1-1: Number of Samples Characterized by Sector

Sector	2018	2020	2022	2024
Residential Curbside Collection (RES)	7	8	8	8
Multi-Family Home (MF)	5	6	6	7
Industrial, Commercial, and Industrial (ICI)	8	6	6	7
Construction and Demolition (C&D)	7	6	6	7
Streetscape (STR)	0	4	4	4
Total	**27**	**30**	**30**	**33**

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The District launched a Zero Waste Strategy in 2016 which was updated through a Zero Waste Action Plan in 2022. The strategy was developed to support the community's commitment to environmental sustainability and preserving landfill capacity. The update to the Zero Waste Strategy involved setting out short-term and long-term strategic visions, framework, objectives, and targets to continue the District's ongoing transition towards zero waste and a circular economy.

The goal of the strategy is to reduce the District's waste disposal rate to 120 kg/capita/year by 2040. In 2019, the District's annual disposal rate was 542 kg per capita and reduced to 507 kg per capita in 2021.[1]

The 2024 waste composition study was undertaken to understand disposal habits and behaviours of each sector and to monitor how waste diversion programs are progressing towards the District's Zero Waste Strategy goal.

2.0 METHODOLOGY

This section discusses the process for undertaking this study, provides an overview of how waste was collected and characterized, and outlines the key factors and considerations for the study. Sampling and sorting were conducted in accordance with the methodology set out in the Provincial Waste Characterization Framework that was prepared by the **Canadian Council of Ministers of the Environment.**[2]

The waste characterization study was performed with an on-site field supervisor and three environmental technicians who were trained on safety and material sorting procedures prior to the fieldwork. Personal protective equipment was used by staff according to the specifications of Tetra Tech's Health and Safety Plan, which factored in special requirements for working at the Landfill. Safety meetings were conducted daily to review key concerns including how to handle material hazards, such as sharps or hazardous materials, safe lifting practices, working around large industrial vehicles, and weather conditions.

2.1 Load Identification and Sample Selection

Sampling and sorting were conducted in accordance with the sampling plan that was reviewed with the District. Tetra Tech's field supervisor worked directly with the District's landfill operations contractor to identify loads for sampling. Collection trucks selected for sampling tipped their load next to the active face of the Landfill (Figure 2-1). Tetra Tech staff characterized the contents of the truck loads using a combination of approaches – depending on the percentage of bagged garbage relative to the total volume in the pile. If the load was found to have less than 30% bagged garbage, a volume-based visual estimate was conducted, but if the load was found to have more than 70% bagged garbage then a sample that was approximately 100 kg would be collected and hand sorted.

Figure 2-1: Example of a Load from the Residential Sector

[1] WCS Engagement + Planning, Ecoinspire, Tamara Shulman, Alces Technologies Inc. 2022. Squamish Zero Waste Action Plan.

[2] Canadian Council of Ministers of the Environment. 1999. Recommended Waste Characterization Methodology for Direct Waste Analysis Studies in Canada. Prepared under contract by SENES Consultants Limited.

In general, loads to be hand sorted were identified as part of the RES, MF, STR, and ICI sectors, while visual estimates were conducted only on loads from the C&D sector. For hand sorted samples, Tetra Tech field staff collected 100 kg of material from the entire load to be sorted and weighed. For visually assessed loads, visual estimates were conducted on the entire load.

2.2 Sample Sorting and Analysis

2.2.1 Hand Sorting

A random sample of 100 kg was sorted by hand into 12 primary categories, which were then further sorted into 54 secondary material subcategories (Figure 2-2). The categories were approved by the District for optimal comparability with past waste composition studies. The primary categories were:

- Paper;
- Plastic;
- Metal;
- Glass;
- Organics;
- Building materials;
- Electronic waste;
- Household hazardous waste;
- Household hygiene;
- Bulky objects;
- Textiles; and
- Fines.

Figure 2-2: Hand Sorting a Sample at the Landfill

Additionally, 16 secondary categories of SUIs were counted and weighed. A complete list of the categories along with their descriptions are included in Appendix B. Once the samples were sorted, materials in each category were weighed and entered into Tetra Tech's waste composition spreadsheet tool.

2.2.2 Visual Estimates

For this study, all visually assessed loads were from the C&D sector and consisted of less than 30% bagged garbage. The material categories for visual estimates were generally the same as hand-sorted materials but included six additional secondary material categories within the building materials category such as:

- Gypsum/drywall plaster;
- Masonry;
- Rocks/sand/dirt/ceramic/porcelain;
- Rigid asphalt products;
- Carpet waste and underlay; and
- Other inorganics.

Figure 2-3: Conducting a Visual Estimate at the Landfill

A complete list of the categories along with their descriptions is included in Appendix B. To conduct visual estimates, two staff members walked around the load (Figure 2-3) to visually estimate the composition by volume, first by primary categories and then by secondary categories. Staff recorded their estimates individually, then compared their results so that an average could be determined. The average results were then recorded on a data form. Bagged garbage was not opened to determine their contents due to safety considerations.

2.3 Data Analysis

Data analysis was performed using Tetra Tech's waste composition spreadsheet tool. Data was compiled into primary and secondary categories by weight. For visual estimates, standard densities of waste materials were used to convert volume estimates to weight estimates. All results are presented on a weight basis. The weighted average composition for each sector was calculated for each material category. The overall composition was calculated by extrapolating the weighted average composition by sector to estimated tonnages of waste by sector. The estimated tonnages of waste were extrapolated from data from the first half of 2024. Data was also compared with results from 2016, 2018, 2020, and 2022. Waste composition results were compared at the primary material category level for each sector. Data was then compiled and analyzed further to calculate the diversion potential of each sector.

2.4 Health and Safety

A Health and Safety Plan was prepared for this project to identify potential hazards in advance of the waste composition study field work. Tetra Tech staff conducting field work were required to have up-to-date safety certifications and training for waste sorting activities. Upon arrival at the Landfill to initiate the field work, Tetra Tech staff conducted a site safety orientation with the landfill operator to identify site-specific hazards and controls. A safe working location was selected and clearly demarcated. A safety meeting was also conducted at the beginning of each sorting day to remind staff of hazards from the previous day and identify new hazards and controls as applicable.

3.0 WASTE CHARACTERIZATION RESULTS

The following summarizes the waste composition results for the various sectors that were sampled. A complete list of the categories along with their descriptions is included in Appendix B. Waste composition results for all material categories are presented in Appendix C. Selected photographs of the samples are included in Appendix D.

Results are presented by primary category and weight-based percentages. Primary category percentages were calculated by aggregating all sample data for each sector. An average percentage by weight was determined for each material type. For samples where visual estimates were conducted, the volume-based percentages were converted into weight-based percentages (see Appendix B for specific densities for each material category). For each sample, SUIs were quantified by weight and counted by individual piece.

Diversion potential was determined for each sector based on secondary material category composition results. Classifications for what can be diverted through recycling or composting are listed in Appendix B. The diversion potential is calculated based on an ideal scenario. It is important to note that each primary category could have multiple diversion options such as paper (e.g., recycling for mixed paper and composting for food soiled paper). This is also the theoretical maximum and represents the upper boundary of what is possible given the current waste composition. This is a hypothetical analysis and does not consider different diversion potentials for specific materials from different sectors. Reusable materials were not included as a diversion potential option within this study however there is the potential for items considered reusable to have been categorized in the below options.

Diversion potential of materials in the waste stream was divided into five options:

- **Recyclable**: materials acceptable in the blue bin for curbside recycling, or as part of other recycling programs;
- **Compostable**: materials acceptable in the green bin for curbside organics, or as part of other composting or organics programs. Compostable wood includes clean wood that is not painted or treated, such as pallets, skids, and wooden utensils;
- **Depot/drop-off materials**: divertible materials that can be dropped off at a depot, donation, or Landfill including textiles accepted by the National Association for Charitable Textile Recycling (NACTR);
- **Cogen**: materials dropped off at landfill sites for potential use as a fuel at a biomass energy facility for cogeneration[3]. Cogen wood includes plywood, glue-laminated timber, and lightly stained or painted wood; and
- **Residual**: materials that would not fall within the above diversion options that would be landfilled. Landfill wood is wood unsuitable for composting or cogeneration, such as heavily painted or stained wood, treated lumber, or wood that contains a large amount of non-wood material.

[3] Cogeneration is a process by which both electricity and heat is produced from a single source of energy.

3.1 Residential Sector

The following presents the results for the RES sector, which consisted of the garbage stream from curbside collection from Single Family (SF) residences. Eight samples were collected and sorted by hand.

3.1.1 Waste Composition Results

Figure 3-1 represents the weighted average of primary categories from the residential sector. The largest components were organics (25.7%), plastics (15.6%), textiles (14.1%), household hygiene (10.4%), and paper (10.1%). These five primary categories represent 75.9% of the overall weight of the RES samples.

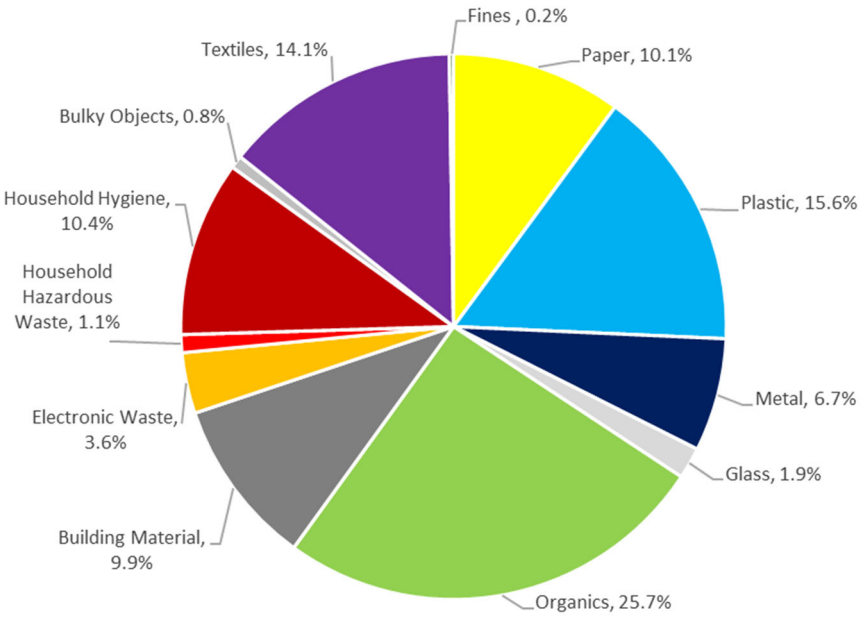

Figure 3-1: Waste Composition of the Garbage Stream from the Residential Sector

The organics primary category consisted of avoidable food waste (9.1%), yard waste (3.7%), cogen wood (3.5%), landfill wood (3.2%), compostable wood (2.7%), unavoidable food waste (2.2%), and non-compostable organics (1.2%) such as rubber and wax candles.

For plastics, the largest components were durable plastic (7.1%), film packaging and flex packaging (3.6%), rigid plastic packaging (1.9%), and film product (1.8%). Plastic SUIs (e.g., plastic retail bags, takeout cups and containers, straws, and utensils) comprised 0.8% by weight of the RES samples. SUIs are generally lightweight, so even though plastic SUIs do not represent a substantial portion of the samples by weight, there may be many individual items (see Section 3.7 for further details on SUIs).

Textiles included household textiles (5.6%), footwear (2.7%), accessories (2.3%), clothing (1.6%), and materials not accepted by the NACTR, (1.3%). Materials not accepted by NACTR comprised of items such as sports gear, tents, mop heads, car floor mats, and rugs.

Household hygiene (10.4%) consisted of diapers, feminine hygiene products, pet waste, and wipes.

Paper products comprised mainly of compostable paper (4.1%), followed by recyclable paper (3.9%), and non-recyclable paper (0.7%). Compostable paper includes paper towels, tissues, food-soiled paper packaging with no wax or plastic linings, and paper straws. Examples of recyclable paper include office paper, newsprint, magazines, paper packaging, boxboard, and cardboard. Paper SUIs (e.g., paper retail bags, takeout cups, and takeout containers) comprised 1.3% by weight of the RES samples.

3.1.2 Diversion Potential

The diversion potential for the RES garbage stream is presented on Figure 3-2. This represents materials that could be diverted from disposal using the District's existing programs. Approximately 72.6% of the waste could theoretically be diverted. 38.6% of the materials could be diverted at a depot or drop-off location, 19.6% of materials could be diverted using the District's existing curbside organics collection program, 8.1% of the waste stream could be recycled through the curbside recycling program, and 6.3% could be used as a fuel in cogeneration plants.

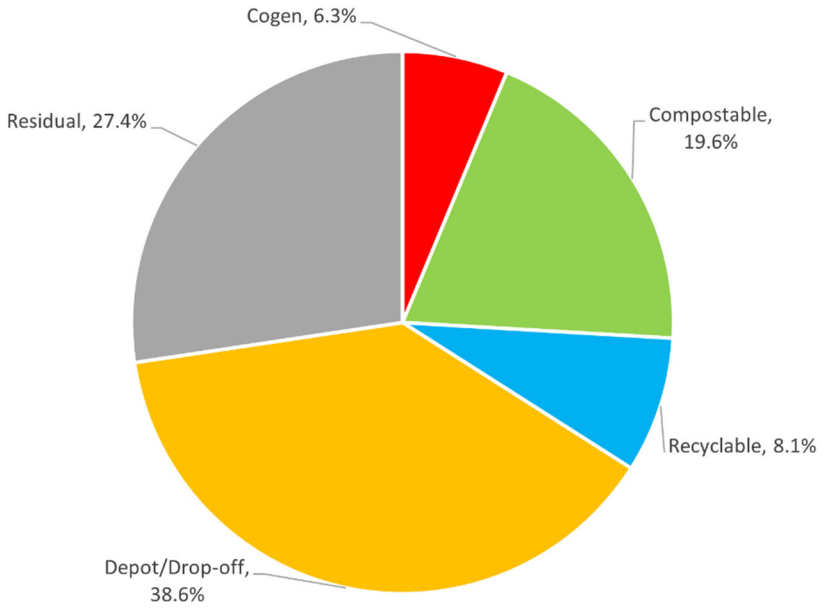

Figure 3-2: Diversion Potential of the Garbage Stream from the Residential Sector

3.2 Multi-Family Residential Sector

The following section represents the waste composition results from the MF residential sector. In the District, the MF and ICI waste streams were collected together in the same truck. To obtain a representative MF residential sample, Tetra Tech's field lead communicated with the truck driver to estimate the percentage of the load that was from MF or ICI sources. Truck loads identified as being primarily collected from MF residences were sampled. If the load was considered mixed MF and ICI, the field lead determined which end of the load contained mostly MF material and collected the sample from that end. Seven samples from the MF sector were collected and hand sorted.

3.2.1 Waste Composition Results

Figure 3-3 represents the weighted average of primary categories for the MF samples. The largest components of this stream were organics (28.1%), plastic (17.2%), paper (17.1%), textiles (12.9%), and household hygiene (8.9%). These five primary categories represent 84.2% of the overall weight of the MF samples.

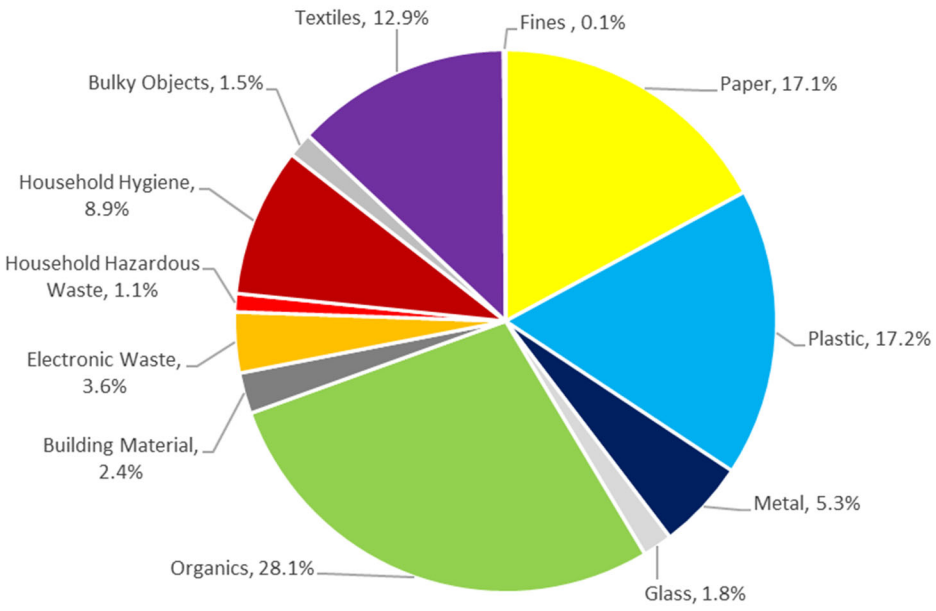

Figure 3-3: Waste Composition of the Garbage Stream from the Multi-Family Sector

Organics were made up mostly of avoidable food waste (9.6%), landfill wood (7.0%), compostable wood (6.8%), unavoidable food waste (3.1%), and yard waste (1.1%).

Plastics were comprised of durable plastic (7.3%), film and flex packaging (3.5%), film products (2.8%), and rigid plastic packaging (1.9%). Plastic SUIs (e.g., plastic retail bags, takeout cups and containers, straws, and utensils) comprised 1.2% by weight of the MF samples.

For paper, the main secondary categories represented were recyclable paper (7.1%), compostable and food-soiled paper (6.7%), lined/polycoat takeout containers (0.9%), and lined/polycoat paper cups (0.8%). Paper SUIs (e.g., paper retail bags, takeout cups, and takeout containers) comprised 2.6% by weight of the MF samples.

Textiles were composed of clothing (5.2%), household textiles (4.8%), accessories (1.8%), and footwear (0.9%).

Household hygiene materials included items such as diapers, feminine hygiene products, dental floss, and Q-tips.

3.2.2 Diversion Potential

The diversion potential for the MF waste stream is presented on Figure 3-4. Approximately 71.2% of the waste could theoretically be diverted from the Landfill. 30.5% of materials could be diverted at a depot or drop-off location such as the Landfill. Compostable materials divertible through an organics collection program made up 21.4% of the waste stream. Additionally, recyclable materials divertible through a recycling program made up 12.2% of the waste stream, and 7.1% could be used as fuel in cogeneration plants.

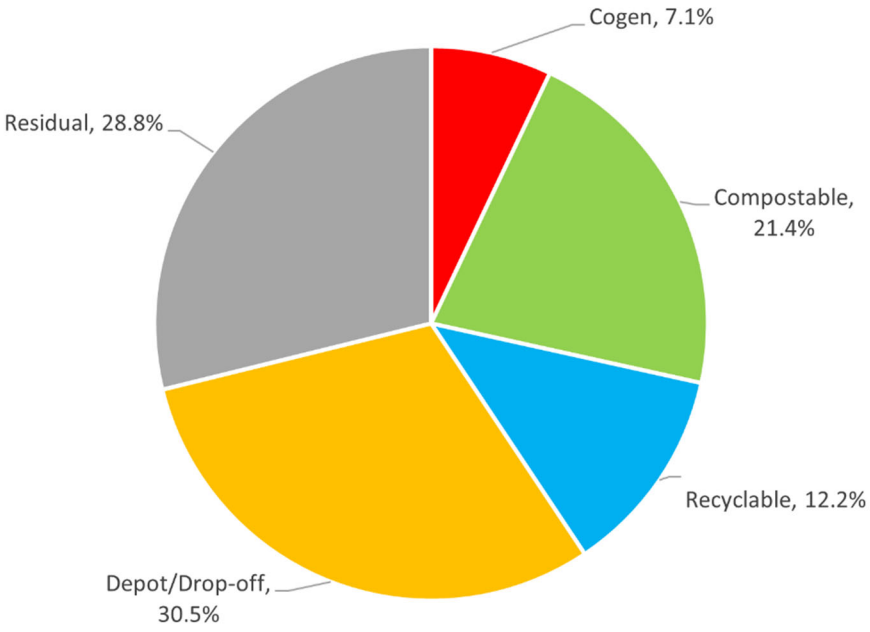

Figure 3-4: Diversion Potential of the Garbage Stream from the Multi-Family Sector

3.3 Industrial, Commercial, and Institutional Sector

The following summarizes the waste composition results and diversion potential from the ICI sector. In the District, the MF and ICI waste streams were collected together in the same truck. To obtain a representative ICI sample, Tetra Tech's field lead communicated with the truck driver to estimate the percentage of the load that was from MF or ICI sources. Truck loads identified as being primarily collected from ICI sources were sampled. Seven ICI samples were collected and hand sorted.

3.3.1 Waste Composition Results

Figure 3-5 illustrates the composition of the ICI garbage stream. The largest components of this stream were organics (38.6%), paper (17.1%), and plastic (13.9%). These three primary categories represent 69.6% of the overall weight of the ICI samples.

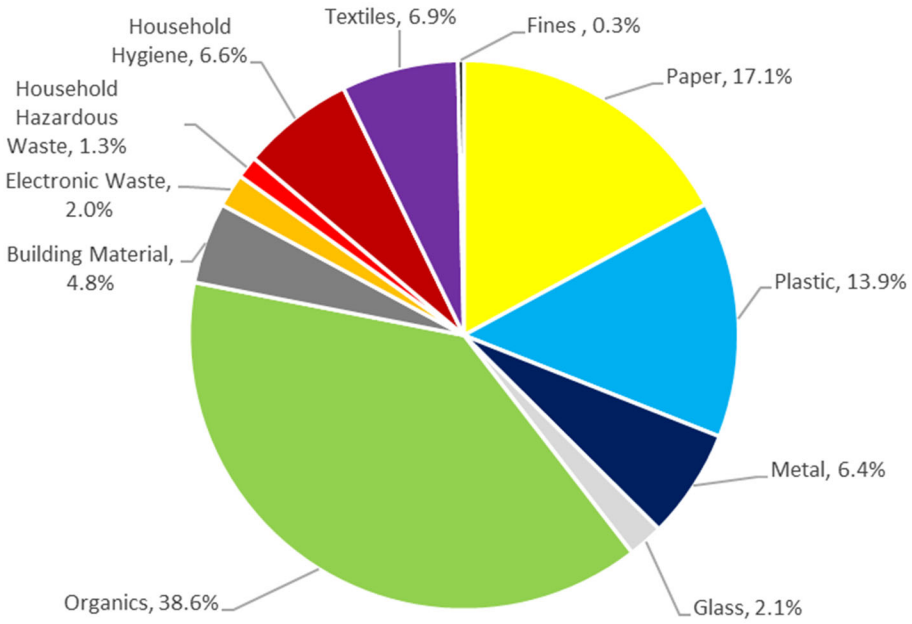

Figure 3-5: Waste Composition of the Garbage Stream from the Industrial, Commercial, and Institutional Sector

The organics category was comprised of landfill wood (10.5%), avoidable food waste (9.7%), yard waste (7.0%), cogen wood (6.8%), and unavoidable food waste (3.7%).

Plastics consisted mainly of durable plastic (3.5%), film packaging and flex packaging (3.2%), film product (2.5%), and rigid plastic packaging (2.2%). Plastic SUIs (e.g., plastic retail bags, takeout cups and containers, straws, and utensils) comprised 1.6% by weight of the ICI samples. Durable plastics included various plastic products, such as fences, pylons, and tarps.

The paper category was mostly composed of recyclable paper (8.5%), and compostable and food-soiled paper (6.2%). Paper SUIs (e.g., paper retail bags, takeout cups, and takeout containers) comprised 1.6% by weight of the ICI samples.

3.3.2 Diversion Potential

The diversion potential for the ICI waste stream is presented on Figure 3-6. Approximately 72.4% of the waste could theoretically be diverted from the Landfill. Materials divertible through composting (27.1%) and recycling (24.3%) programs were the top categories, and depot/drop-off materials represented 13.7% of the waste stream that could be diverted at a depot or drop-off location. In addition, 7.3% of the waste stream could be used as a fuel in cogeneration plants.

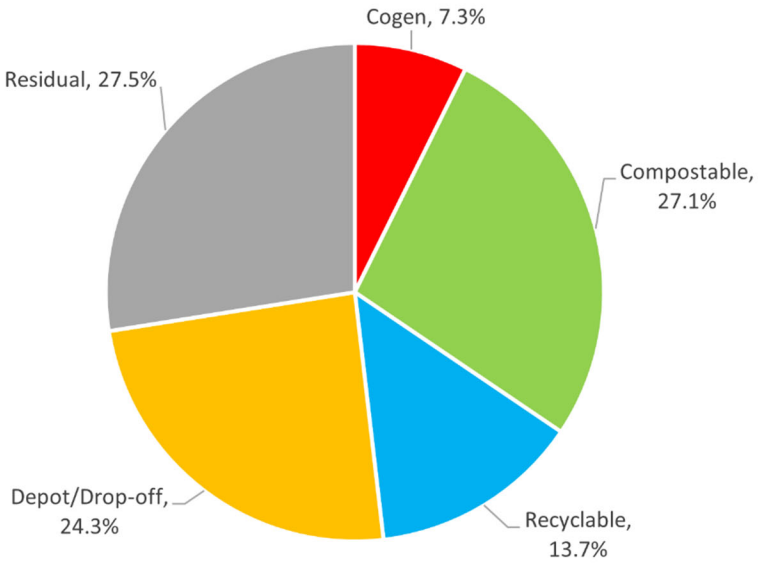

Figure 3-6: Diversion Potential of the Garbage Stream from the Industrial, Commercial, and Institutional Sector

3.4 Construction and Demolition Sector

The following summarizes the waste composition results and diversion potential for the C&D sector. Visual estimates were conducted for seven C&D loads.

3.4.1 Waste Composition Results

Figure 3-7 illustrates the composition for the C&D garbage stream. The C&D garbage stream was comprised mainly of organics (46.7%), building material (33.3%), and paper (7.9%). These three primary categories represented 87.9% of the garbage stream for the C&D sector. Bagged garbage, which was not opened to determine their contents, comprised an additional 7.6% of this garbage stream. Bagged garbage was not opened during visual estimates due to safety considerations.

The organics category was comprised of wood waste, including landfill wood (33.5%), cogen wood (7.9%), and compostable wood (5.2%).

Building materials consisted of rigid asphalt products (13.8%), other inorganics (9.5%), rock, sand, dirt, ceramic, and porcelain (8.3%), and masonry (1.6%). The other inorganics subcategory included linoleum, insulation, and pipes.

Paper was mainly composed of recyclable paper (7.7%).

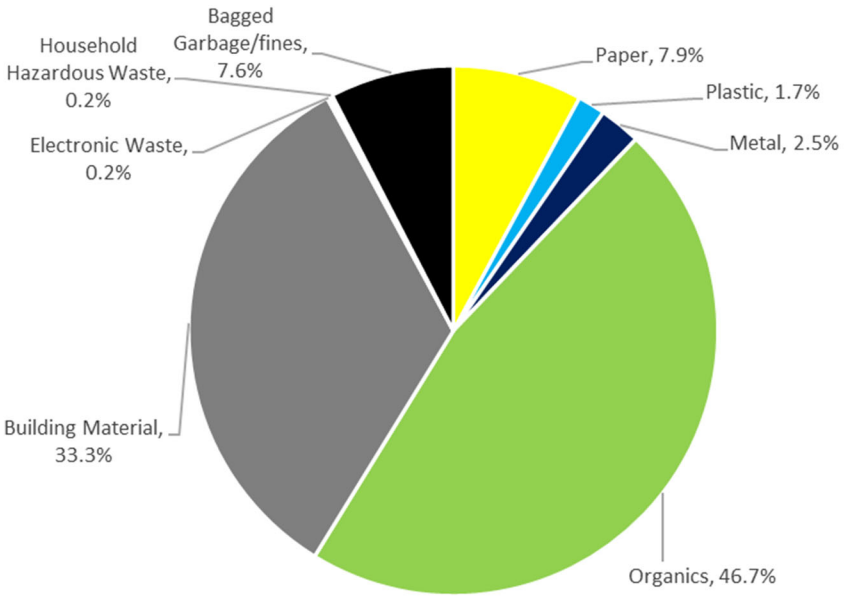

Figure 3-7: Waste Composition of the Garbage Stream from the Construction & Demolition Sector

3.4.2 Diversion Potential

The diversion potential of the C&D waste stream is presented on Figure 3-8. Approximately 57.2% of the waste could theoretically be diverted from the Landfill. The types of divertible materials include depot/drop-off materials (36.2%), materials that could be used as fuel for cogeneration (13.0%), and recyclable materials (7.8%). Depot/drop-off materials included roofing shingles, concrete, PVC pipes, insulation, tiles, siding, and piping. Cogen materials include wood waste and off-cuts of dimensional lumber. Some of the C&D waste could be diverted through composting (such as land clearing wood) or recycling (such as metal and cardboard).

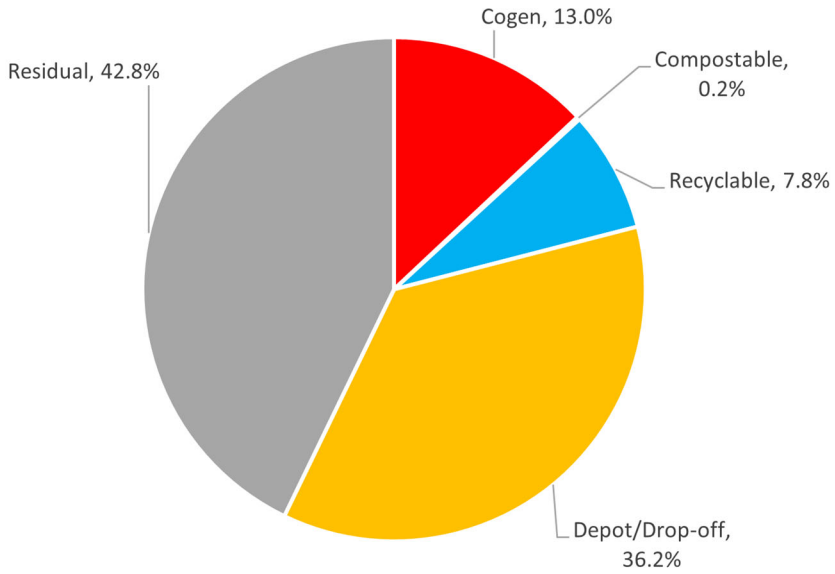

Figure 3-8: Diversion Potential of the Garbage Stream from the Construction & Demolition Sector

3.5 Streetscapes

STR samples were obtained from garbage cans set up in various public areas in the District. Four samples were collected by District staff, delivered to the sorting area, and hand sorted.

3.5.1 Waste Composition Results

The waste composition for STR samples is illustrated on Figure 3-9. Most of the STR waste consisted of household hygiene (40.6%), organics (21.4%), paper (17.1%), and plastics (11.1%). These four primary categories represented 90.2% of the STR garbage stream.

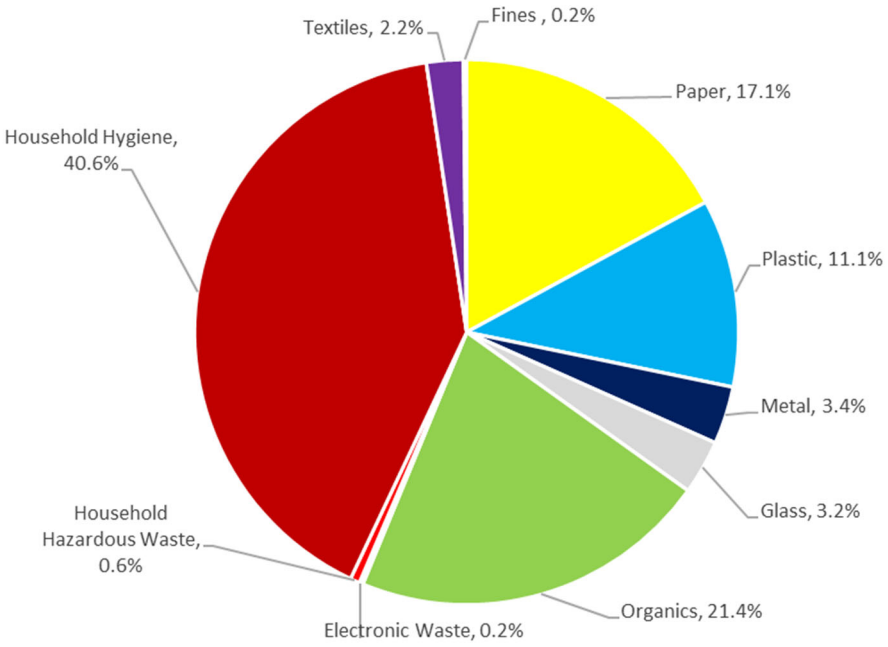

Figure 3-9: Waste Composition of the Streetscape Garbage Stream

Household hygiene (40.6%) was predominantly comprised of pet waste, although diapers were occasionally observed. Figure 3-10 shows the household hygiene sorting bin from one sample.

Organics was mostly made up of avoidable food waste (13.3%), unavoidable food waste (4.8%), and yard waste (2.4%).

For the paper primary category, recyclable paper (5.3%) was the largest component, followed by compostable paper (5.2%), and lined/polycoat single-use paper cups (2.4%). Paper SUIs (e.g., paper retail bags, lined/polycoat single-use paper cups, and takeout containers, unlined paper cups and takeout containers) comprised 5.7% by weight of the STR samples.

Figure 3-10: Example of Household Hygiene Sorting Bin

Plastics included film packaging and flex packaging products (2.5%), film product (2.3%), rigid plastic packaging (2.1%), and plastic takeout cups (1.5%). Plastic SUIs (e.g., plastic retail bags, takeout cups and containers, straws, and utensils) comprised 2.8% by weight of the STR samples.

3.5.2 Diversion Potential

The diversion potential of the sampled STR garbage stream is presented on Figure 3-11. From the STR waste, approximately 54.2% of the waste could theoretically be diverted from the Landfill. Materials that could be potentially diverted include compostable materials (28.2%), recyclable materials (14.3%), and depot/drop-off materials (11.4%).

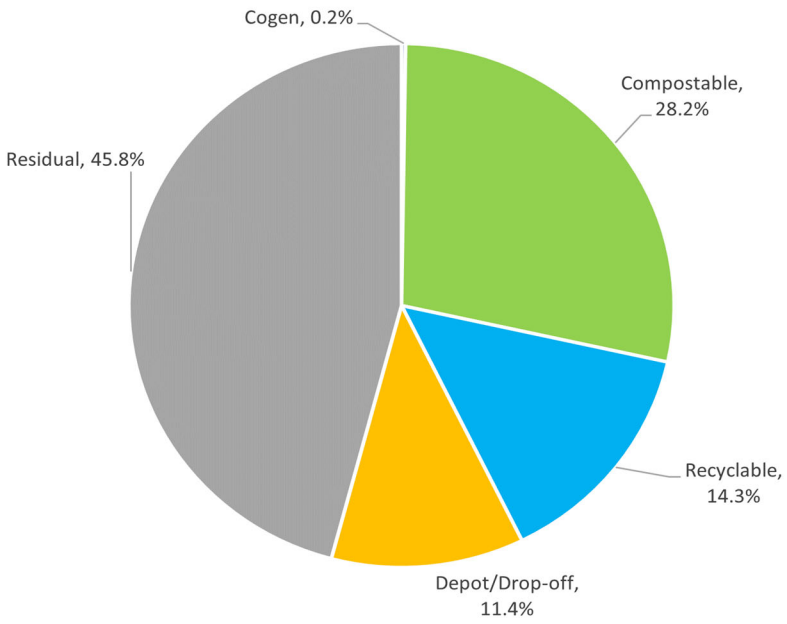

Figure 3-11: Diversion Potential of Landfilled Material from the Streetscapes Waste Stream

3.6 Combined Waste Composition

The 2024 disposal tonnages by sector are summarized in Table 3-1. The tonnage data was extrapolated from the District's data from January to September 2024. It should be noted that MF and ICI loads are typically collected in the same truck. It was estimated that the two-thirds of the combined ICI/MF loads were from the ICI sector and the other one-third was from the MF sector.

Table 3-1: Disposal Tonnage in 2024 by Sector

Sector	2024 Disposal Tonnage (Estimated)
SF Residential	3,372
MF Residential	2,126
ICI	5,010
C&D	1,755
STR	134
Total	**12,397**

Figure 3-12 presents a weighted average of the material composition from the RES, MF, ICI, C&D and STR sectors. A weighted average for the 2024 study was calculated based on 2024 disposal tonnages in Table 3-1. Organics (34.3%) made up the largest percentage of the primary categories, followed by paper (13.9%), plastics (13.2%), and building materials (9.7%). The organics primary category, which was the largest component of the waste stream, can be broken down into secondary categories as summarized in Table 3-2. Examples of materials included in the secondary categories can be found in Appendix B.

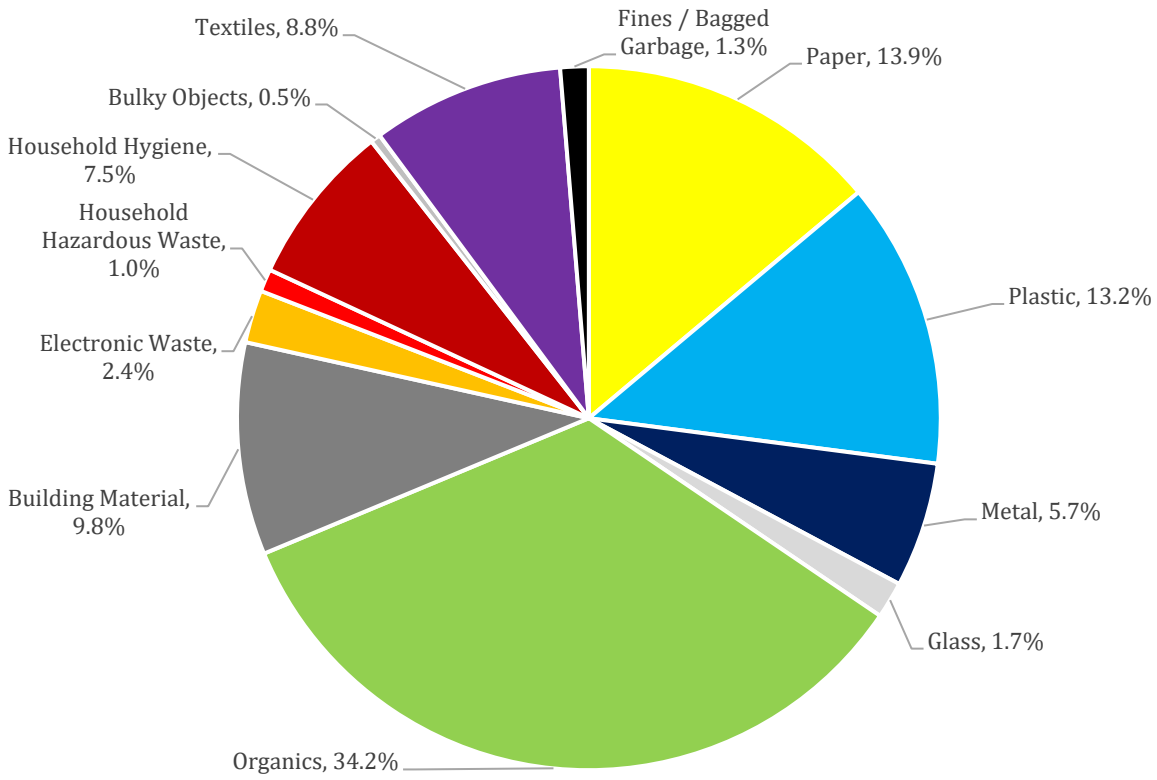

Figure 3-12: Waste Composition of the Combined Garbage Stream

Table 3-2: Composition of the Organics Primary Category in the Combined Waste Stream

Organics Category	Overall Percent Composition
Yard Waste	4.1%
Avoidable Food Waste	8.2%
Unavoidable Food Waste	2.7%
Non-Compostable Organics	0.5%
Compostable Wood	2.8%
Cogen Wood	4.9%
Landfill Wood	11.1%
Total Organics	34.2%

3.6.1 Diversion Potential

Based on the combined waste composition results, the percentage of materials that could be diverted from the Landfill was estimated and presented on Figure 3-13. Theoretically, 69.9% of material could have been diverted from the Landfill. Recyclable (30.8%) and compostable materials (20.3%) represent the largest opportunities for diversion, followed by depot/drop-off materials (11.1%) and materials that could be used as fuel for cogeneration (7.7%).

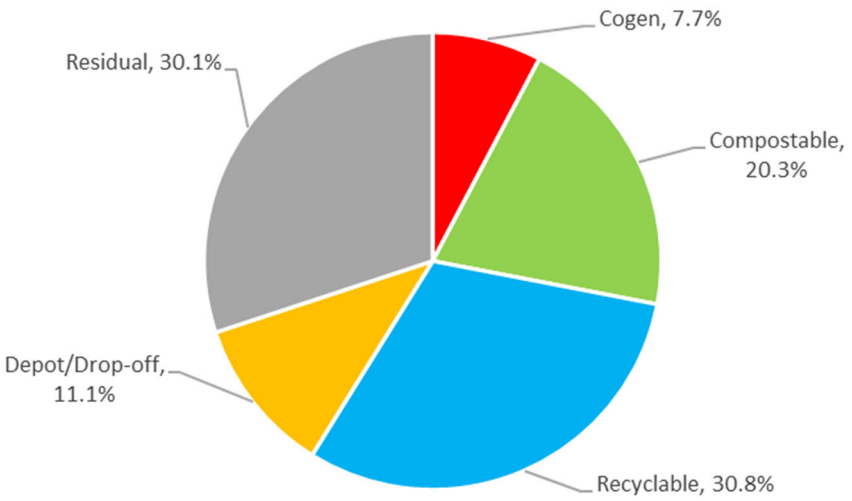

Figure 3-13: Diversion Potential of Landfilled Material from the Combined Waste Stream

3.7 Single-Use Items

After each sample was weighed and recorded, Tetra Tech staff counted and weighed SUIs in 16 secondary categories. Descriptions of all SUIs analyzed are included in Appendix B. SUIs were not quantified for the C&D samples that were visually characterized.

Weight percentages of SUIs by sector are presented in Table 3-3. In general, the weight of SUIs were lowest in the RES garbage stream and highest in the STR garbage stream, but there was considerable variation in the weight of SUIs between samples. Table 3-3 also shows the variation, with the column labeled “lowest percent weight of SUIs for one sample” showing the lowest percentage of SUIs found in each sector by weight, and the column labelled “highest percent weight of SUIs for one sample” showing the highest percentage by weight.

Table 3-3: SUI Percentages by Sector

Sector	Average Percent Weight of SUIs	Lowest Percent Weight of SUIs for One Sample	Highest Percent Weight of SUIs for One Sample
RES	2.1%	1.0%	3.2%
MF	3.9%	2.6%	6.2%
ICI	3.2%	1.7%	5.5%
STR	8.6%	7.2%	10.5%

Table 3-4 presents the average number of SUIs per category per 100 kg of waste. The number of each SUI varied greatly between samples. In general, SUI counts were lowest in the RES garbage stream and highest in the STR garbage stream. For example, plastic takeout cups ranged from an average of 13 per 100 kg for RES samples to 154 per 100 kg for the STR samples.

Table 3-4: Average Number of SUIs per 100 kg Sample

SUI Category	SUI Material	RES	MF	STR	ICI
Retail Bags	Compostable/Biodegradable Plastic	0	1	2	2
	Paper	1	2	2	1
	Plastic (empty)	0	1	0	1
	Plastic (re-used)	0	1	2	0
Takeout Cups	Compostable/Biodegradable Plastic	0	5	7	22
	Foam	0	0	0	0
	Lined/Polycoat Paper	19	35	131	24
	Plastic	13	46	154	25
	Unlined Paper	0	2	8	3
Takeout Containers	Compostable/Biodegradable Plastic	0	0	0	0
	Foam	0	0	0	0
	Lined/Polycoat Paper	10	33	29	13
	Plastic	13	16	32	20
	Unlined Paper	6	18	40	4
Straws	Plastic	4	2	1	2
Utensils	Plastic	3	2	14	11
Average Number of SUIs per 100 kg		**72**	**164**	**422**	**128**

Estimated numbers of SUIs disposed in 2024 are presented in Table 3-5. The numbers are based on the SUI counts during the 2024 waste composition study and the extrapolated 2024 disposal data. It is estimated that over 2 million plastic takeout cups were disposed of in the Landfill in 2024. Other items of note include single-use polycoat paper cups (1.9 million) and plastic takeout containers (1.4 million).

It should be noted that these estimations are based on the snapshot of waste sampled from September 9 to September 17, 2024, so some fluctuations in composition can be expected over the year. In addition, SUIs were not quantified for the samples from the C&D sector, so the numbers presented in Table 3-5 are likely an underestimate of the actual numbers of SUIs disposed at the Landfill.

Table 3-5: Estimated Numbers of SUIs Disposed in 2024 per Sector

SUI Category	SUI Material	RES	MF	STR	ICI	Combined
Retail Bags	Compostable/Biodegradable Plastic	12,543	23,471	2,592	96,999	**135,604**
	Paper	37,629	41,074	2,592	69,285	**150,579**
	Plastic (empty)	4,181	11,735	648	48,500	**65,064**
	Plastic (re-used)	16,724	17,603	2,268	13,857	**50,452**
Takeout Cups	Compostable/Biodegradable Plastic	4,181	111,486	9,070	1,087,775	**1,212,512**
	Foam	-	2,934	648	-	**3,582**
	Lined/Polycoat Paper	648,060	742,259	175,578	1,177,845	**2,743,742**
	Plastic	447,370	985,767	206,029	1,267,916	**2,907,082**
	Unlined Paper	8,362	38,140	10,690	173,213	**230,405**
Takeout Containers	Compostable/Biodegradable Plastic	-	-	324	-	**324**
	Foam	-	-	-	-	**-**
	Lined/Polycoat Paper	342,844	704,119	39,521	651,279	**1,737,764**
	Plastic	447,370	340,324	42,761	1,025,418	**1,855,874**
	Unlined Paper	204,870	384,332	53,775	187,070	**830,047**
Straws	Plastic	125,431	32,272	972	96,999	**255,674**
Utensils	Plastic	112,888	46,941	18,141	526,566	**704,536**
Estimated Number of SUIs (2024)		**2,412,454**	**3,482,456**	**565,609**	**6,422,722**	**12,883,240**

4.0 COMPARISON TO PREVIOUS WASTE COMPOSITION STUDIES

The waste composition studies from 2016, 2018, 2020, 2022, and 2024 were compared and analyzed to determine whether there were any trends in the waste management practices in the District. T-Tests were conducted on the 2022 and 2024 data to determine if there were any differences that would be considered significant (p-value < 0.05).

4.1 Per Capita Disposal Rate

Table 4-1 below depicts the estimated per capita disposal rate in 2016, 2018, 2020, 2022, and 2024. The 2024 per capita disposal rate was calculated based on 2024 tonnage data and divided by the estimated population of the District of Squamish (30,666). The District is continuing to move towards their goal of 350 kg/capita.

Table 4-1: Per Capita Disposal Rate

Year	Per Capita Disposal Rate (kg/capita)
2016	680
2018	580
2020	500
2022	520
2024	404

Note: The 2024 per capita disposal rate is an estimate based on prorated tonnage from January to September 2024.

Figure 4-1 illustrates how the weighted composition of the waste stream has changed from 2016 to 2024. Overall, there is a decrease in annual per capita disposal rate across the years. Note that the increased amount of bagged garbage in 2022 may be due to the increased waste from the ICI sector (see a more detailed discussion in Section 4.4) since COVID-19 restrictions were being lifted.

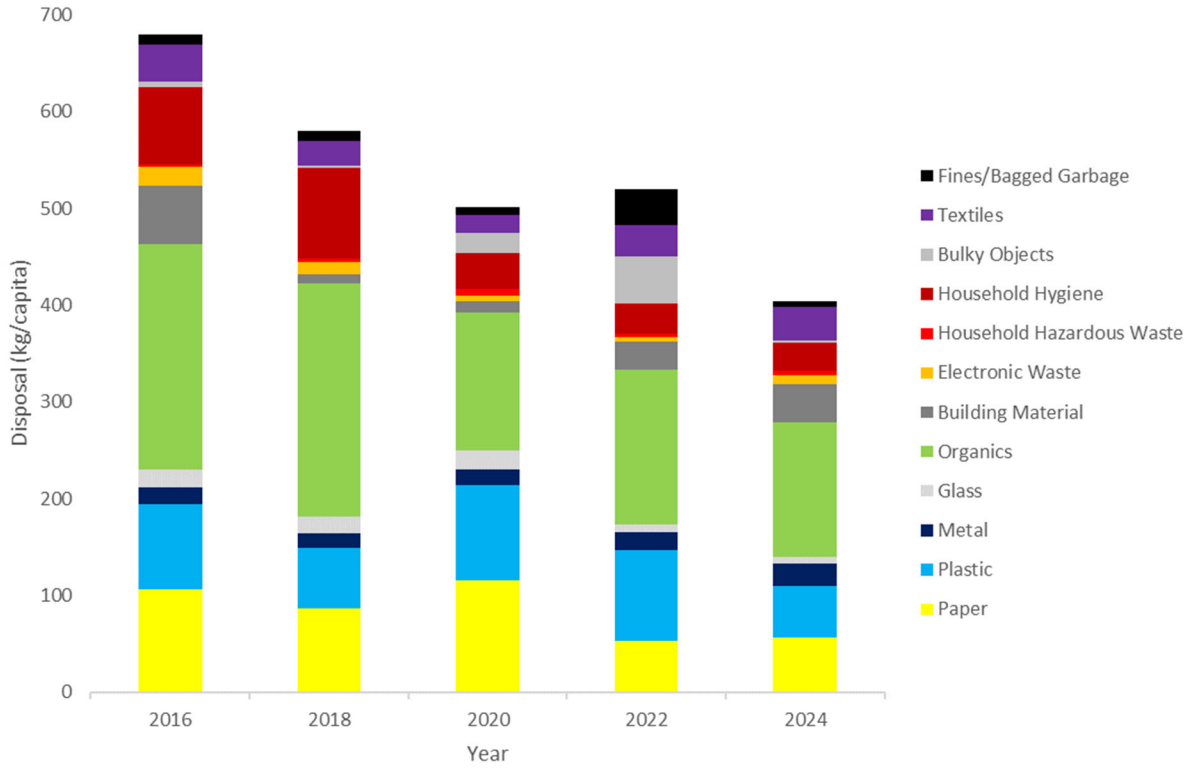

Figure 4-1: Annual Per Capita Disposal Rate from 2016 to 2024

4.2 Residential Sector

Figure 4-2 depicts the average changes in composition from 2016 to 2024. Generally, the composition of the RES garbage stream was similar across the five sorting events. Majority of the materials found were plastics, organics, household hygiene, and textiles. There appears to be some variability in paper, where the percent composition varies from 6.4% to 16.8%.

T-Test analysis comparing the 2022 and 2024 results indicated that there was no significant change for 11 of the 12 primary categories. Paper was the only primary category that showed significant change ($p = 0.0003$), decreasing from 16.8% in 2022 to 9.0% in 2024.

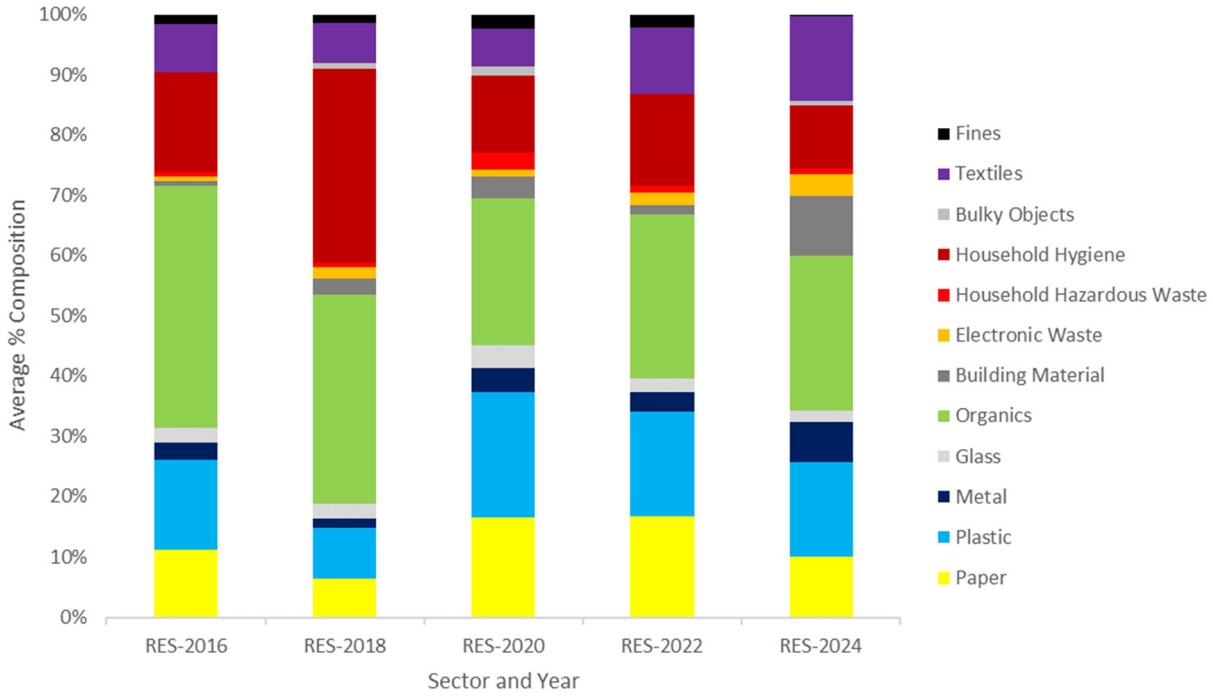

Figure 4-2: Comparison of the Residential Garbage Stream from 2016 to 2024

4.3 Multi-Family Sector

Figure 4-3 depicts the changes in composition from 2016 to 2024. Generally, the composition of the MF garbage stream was similar across the five sorting events. Majority of the materials found were paper, plastics, and organics. There appears to be some variability in textiles and household hygiene, where the percent composition varies from 4.0% to 12.9% and 3.7% to 29.8%, respectively.

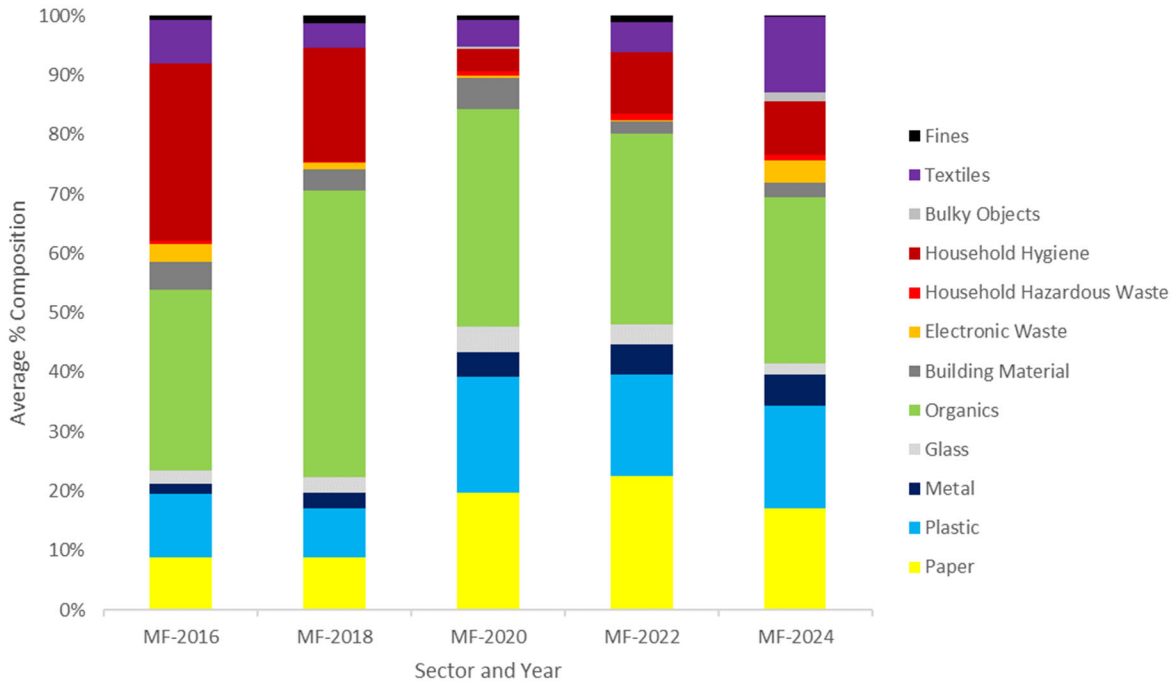

Figure 4-3: Comparison of the Multi-family Garbage Stream from 2016 to 2024

4.4 Industrial, Commercial, and Institutional Sector

Figure 4-4 depicts the changes in composition from 2016 to 2024 for the ICI sector. T-Test analysis comparing the 2022 and 2024 results indicated that there were significant differences for two of the 12 primary categories, which included paper and household hygiene. The proportion of paper increased from 2.4% in 2022 to 15.0% in 2024 ($p = 0.0003$). Household hygiene increased from 0.0% in 2022 to 5.9% in 2024 ($p = 0.004$).

Metal materials increased from 1.8% in 2022 to 6.4% in 2024, plastic materials decreased from 24.7% in 2022 to 18.1% in 2024, and fines/bagged garbage decreased from 7.1% in 2022 to 2.8% in 2024; however, T-Test analysis did not find these changes to be significant. The changes in metal, plastic materials, and bagged garbage may be due to the change in the type of ICI loads that were characterized in 2024.

It should be noted that the ICI samples were hand sorted in 2024 instead of visually assessed as in 2022. This change was due to ICI loads in 2024 having more than 30% bagged garbage, allowing these loads to be hand sorted according to the methodology for this study. Due to this change, the ICI composition for 2024 is similar to those from 2016, 2018, and 2020 where the ICI samples were also hand sorted. The change in the overall composition of the ICI loads may be due to source of origin and could have affected the composition found for the ICI sector.

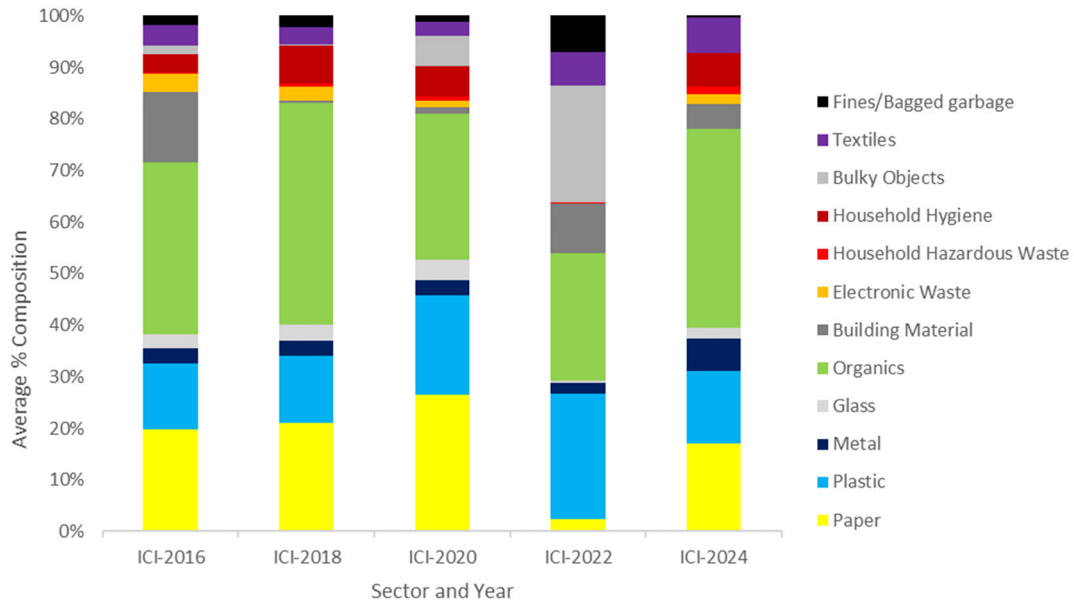

Figure 4-4: Comparison of the ICI Garbage Stream from 2016 to 2024

5.0 INTERESTING FINDS

Table 5-1 lists some of the notable, unexpected, and unusual materials found during the waste composition study. These materials will not necessarily skew the results as it is not atypical to have these types of materials present in the various waste sectors and streams.

Table 5-1: List of Uncommon Materials Found During This Study

Stream	Sample ID	Description	Photo
Garbage	SU24-MF-G-02	Snowboard binding mounts	

Stream	Sample ID	Description	Photo
Garbage	SU24-SF-G-01	Fire extinguisher	
Garbage	SU24-MF-G-05	Printer	
Garbage	SU24-ICI-G-03	Power tool	
Garbage	SU24-SF-G-03	Tablet	

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We trust this technical memo meets your present requirements. If you have any questions or comments, please contact the undersigned.

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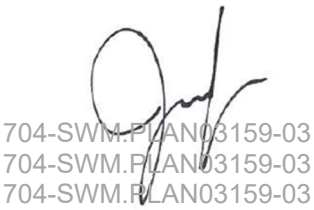

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Enclosure: Appendix A: Limitations on the Use of this Document
Appendix B: Material Categories
Appendix C: Waste Composition Results
Appendix D: Selected Photographs

APPENDIX A

LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

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APPENDIX B

MATERIAL CATEGORIES

Description of Material Categories for Hand Sorting

#	Secondary Category	Description and/or Examples	Diversion Potential Stream
Paper			
01	Paper Deposit Beverage Container	Paper refundable beverage container, paper milk container, milk alternative, milk container	Depot/Drop-off
02	Recyclable Paper	Cardboard boxes, boxboard, cartons, fine paper, newsprint, receipts, magazines, paper packaging, etc.	Recyclable
03	Compostable & Food-Soiled Paper	Paper towels, tissue, table napkins, food-soiled paper packaging (without wax or plastic lining), paper straws	Compostable
04	Non-Recyclable Paper	Paper lined or coated with other material including plastic, foil and wax, laminated paper, paper and tissue soiled with cleaning products (not appropriate for composting)	Residual
05[1]	Retail Paper Bag	Single-use paper retail bags, paper takeout bags	Recyclable
06	Lined/Polycoat Paper Cup	Single-use polycoat/plastic lined paper cups – hot and cold beverage	Recyclable
07	Lined/Polycoat Paper Takeout Container	Single-use plastic lined/polycoat paper takeout containers	Recyclable
08	Unlined Paper Cup	Unlined paper cups, clearly marked compostable	Compostable
09	Unlined Paper Takeout Container	Unlined paper takeout containers, clearly marked compostable	Compostable
Plastic			
10	Plastic Deposit Beverage Container	Plastic refundable beverage containers, plastic milk container, plastic milk alternative container	Depot/Drop-off
11	Rigid Plastic Packaging	Plastic packaging #1-7, clamshells, shampoo bottles, yogurt tubs, rigid flexible plastic packaging, rigid plastic packaging, plastic jars, etc.	Recyclable
12	Durable Plastic	Plastic products, toys, food storage containers, coat hangers, storage bins	Residual
13	Styrofoam	Meat trays, egg cartons, electronic packaging, peanuts	Depot/Drop-off
14	Film Packaging and Flex Packaging	Plastic bag and overwrap, dry cleaning bags, bread bags, diaper overwrap, toilet paper overwrap, water softener Other flexible plastic packaging, zipper lock pouches, stand-up pouches, chip bags, candy wrappers, net fruit bags, padded envelope, deli meat bags, shrink wrap	Depot/Drop-off
15	Film Product	Purchased film product, black garbage bags, blue recycling bag, tarps	Residual
16	Reused Plastic Retail Bag	Plastic retail bag reused as a garbage bag	Residual
17	Empty Plastic Retail Bag	Empty and not reused plastic retail bag	Depot/Drop-off
18	Compostable/Biodegradable Plastic Bag	Plastic bag clearly marked/labelled as compostable or biodegradable	Residual
19	Plastic Takeout Cup	Single-use plastic cup – cold drink, bubble tea cup	Recyclable
20	Foam Takeout Cup	Single-use foam cup – cold or hot drinks	Depot/Drop-off
21	Compostable/Biodegradable Plastic Takeout Cup	Single-use compostable or biodegradable cup – cold or hot drinks	Residual
22	Plastic Takeout Container	Single-use plastic takeout container	Recyclable

[1] Categories highlighted orange are considered single-use items.

#	Secondary Category	Description and/or Examples	Diversion Potential Stream
23	Foam Takeout Container	Single-use foam takeout container	Depot/Drop-off
24	Compostable/Biodegradable Plastic Takeout Container	Single-use compostable takeout container	Residual
25	Plastic Straw	Single-use plastic straw Paper straws are not defined as a separate category and are included in the Paper – Compostable category	Recyclable
26	Plastic Utensil	Single-use plastic utensil	Recyclable
Metal			
27	Metal Deposit Beverage Container	Metal refundable beverage containers, ferrous and non-ferrous, non-alcoholic, alcoholic (beer)	Depot/Drop-off
28	Recyclable Metal	Ferrous and non-ferrous metal packaging, aluminum cans and lids, foil, pie trays, empty aerosol containers (food, personal hygiene)	Recyclable
29	Non-Recyclable Metal	Coat hangers, baking pans, scrap metal	Depot/Drop-off
Glass			
30	Glass Deposit Beverage Container	Glass refundable beverage containers, milk containers, alcohol containers	Depot/Drop-off
31	Recyclable Glass	Clear and coloured non-deposit glass bottles and jars	Depot/Drop-off
32	Non-Recyclable Glass	Drinking glasses or dishes, ceramics, mirrors, broken glass	Residual
Organics			
33	Yard Waste	Grass, leaves, branches, mulch	Compostable
34	Avoidable Food Waste	Full uneaten food waste, edible fruit peels (e.g., apple peels)	Compostable
35	Unavoidable Food Waste	Bones, shells, fat and grease, coffee grounds, tea leaves, inedible fruit peels (e.g., banana peels)	Compostable
36	Non-Compostable Organics	Rubber, wax	Residual
37	Compostable Wood	Clean with no paint, stain or glue, unpainted pallets or skids, chopsticks	Cogen
38	Cogen Wood	Plywood, glue-lam, flakeboard, lightly stained or painted wood	Cogen
39	Landfill Wood	Treated, heavily painted or stained, composites or contains large amounts of other material	Residual
Building Material			
40	Building Material	Construction material, carpet, gypsum, asphalt, insulation, aggregate	Depot/Drop-off
Electronic Waste			
41	Extended Producer Responsibility (EPR) Electronic Waste	Electronic waste accepted by EPR programs (e.g., computers, cell phones, small appliances, power tools, electronic toys, light fixtures, smoke/CO alarms)	Depot/Drop-off
42	Non-EPR Electronic Waste	Electronic waste not accepted by EPR programs (e.g., vapes, ink cartridges)	Residual
Household Hazardous Waste (HHW)			
43	EPR HHW	Batteries, lightbulbs, paints, pesticides, oil, antifreeze, medications	Depot/Drop-off
44	Non-EPR HHW	Sharps, glue, craft paint, cleaners	Residual
Household Hygiene			
45	Household Hygiene	Diapers, sanitary napkins, tampons, dental floss, Q-tips, etc.	Residual

#	Secondary Category	Description and/or Examples	Diversion Potential Stream
Bulky Objects			
46a	Furniture	Furniture	Residual
46b	Appliances, Mattress	Appliances, mattress	Depot/Drop-off
Textiles			
47	Clothing	Includes all clothing, lingerie, socks, costumes, snowsuits, swimwear, etc.	Depot/Drop-off
48	Household Textiles	Includes all linens, towels, curtains, tablecloths, pet clothes, etc.	Depot/Drop-off
49	Footwear	Includes all footwear, sport shoes, insoles, etc.	Depot/Drop-off
50	Accessories	Includes all bags, purses, backpacks, gloves, mittens, hats, scarves, wallets, etc.	Depot/Drop-off
51	Soft Toys	Stuffed toys and animals	Depot/Drop-off
52	Other Textiles	Masks, pet collar and leashes	Depot/Drop-off
53	Non-Accepted Textiles by the National Association for Charitable Textile Recycling (NACTR)	Canvas tarps, car floor mats, ice cleats/crampons, clothing in bulk (retail dump), fabric bolts, hard luggage, hard toys, hospital bedding and linens, hotel bedding and linens, cut-offs, rice bags, ski and snowboard boots, sports protection, tents, umbrellas, wigs	Residual
Fines			
54	Fines	Fines and misc. garbage <1"	Residual

Description of Material Categories for Visual Estimates

#	Secondary Category	Description and/or Examples	Diversion Potential Stream	Density (kg/yd^3)
Paper				
01	Paper Deposit Beverage Container	Paper refundable beverage container, paper milk container, milk alternative, milk container	Depot/Drop-off	70.34
02	Recyclable Paper	Cardboard boxes, boxboard, cartons, fine paper, newsprint, receipts, magazines, paper packaging, etc.	Recyclable	56.83
03	Compostable & Food-Soiled Paper	Paper towels, tissue, table napkins, food-soiled paper packaging (without wax or plastic lining), paper straws	Compostable	42.05
04	Non-Recyclable Paper	Paper lined or coated with other material including plastic, foil and wax, laminated paper, paper and tissue soiled with cleaning products (not appropriate for composting)	Residual	70.34
Plastic				
05	Plastic Deposit Beverage Container	Plastic refundable beverage containers, plastic milk container, plastic milk alternative container	Depot/Drop-off	55.05
06	Rigid Plastic Packaging	Plastic packaging #1-7, clamshells, shampoo bottles, yogurt tubs, rigid flexible plastic packaging, rigid plastic packaging, plastic jars, etc.	Recyclable	55.05
07	Durable Plastic	Plastic products, toys, food storage containers, coat hangers, storage bins	Residual	160.00
08	Styrofoam	Meat trays, egg cartons, electronic packaging, peanuts	Depot/Drop-off	10.70
09	Film Packaging and Flex Packaging	Plastic bag and overwrap, dry cleaning bags, bread bags, diaper overwrap, toilet paper overwrap, water softener Other flexible plastic packaging, zipper lock pouches, stand-up pouches, chip bags, candy wrappers, net fruit bags, padded envelope, deli meat bags, shrink wrap	Depot/Drop-off	29.82
10	Film Product	Purchased film product, black garbage bags, blue recycling bag, tarps	Residual	29.82
Metal				
11	Metal Deposit Beverage Container	Metal refundable beverage containers, ferrous and non-ferrous, non-alcoholic, alcoholic (beer)	Depot/Drop-off	10.00
12	Recyclable Metal	Ferrous and non-ferrous metal packaging, aluminum cans and lids, foil, pie trays, empty aerosol containers (food, personal hygiene)	Recyclable	91.75
13	Non-Recyclable Metal	Coat hangers, baking pans, scrap metal	Depot/Drop-off	106.27
Glass				
14	Glass Deposit Beverage Container	Glass refundable beverage containers, milk containers, alcohol containers	Depot/Drop-off	191.14
15	Recyclable Glass	Clear and coloured non-deposit glass bottles and jars	Depot/Drop-off	191.14
16	Non-Recyclable Glass	Drinking glasses or dishes, ceramics, mirrors, broken glass	Residual	191.14
Organics				
17	Yard Waste	Grass, leaves, branches, mulch	Compostable	69.57

#	Secondary Category	Description and/or Examples	Diversion Potential Stream	Density (kg/yd^3)
18	Avoidable Food Waste	Full uneaten food waste, edible fruit peels (e.g., apple peels)	Compostable	262.24
19	Unavoidable Food Waste	Bones, shells, fat and grease, coffee grounds, tea leaves, inedible fruit peels (e.g., banana peels)	Compostable	262.24
20	Non-Compostable Organics	Rubber, wax	Residual	103.98
21	Compostable Wood	Clean with no paint, stain or glue, unpainted pallets or skids, chopsticks	Cogen	119.27
22	Cogen Wood	Plywood, glue-lam, flakeboard, lightly stained or painted wood	Cogen	119.27
23	Landfill Wood	Treated, heavily painted or stained, composites or contains large amounts of other material	Residual	119.27
Building Material				
24	Gypsum and Drywall Plaster		Depot/Drop-off	212.27
25	Masonry	Bricks, blocks, concrete, etc.	Depot/Drop-off	390.91
26	Rock, Sand, Dirt, Ceramic, Porcelain		Depot/Drop-off	390.91
27	Rigid Asphalt Products		Depot/Drop-off	332.27
28	Carpet Waste (and Underlay)		Depot/Drop-off	66.82
29	Other Inorganics	Linoleum, Polyvinyl Chloride (PVC) pipes, insulation, etc.	Depot/Drop-off	66.82
Electronic Waste				
30	Extended Producer Responsibility (EPR) Electronic Waste	Electronic waste accepted by EPR programs (e.g., computers, cell phones, small appliances, power tools, electronic toys, light fixtures, smoke/CO alarms)	Depot/Drop-off	80.28
31	Non-EPR Electonric Waste	Electronic waste not accepted by EPR programs (e.g., vapes, ink cartridges)	Garbage	80.28
Household Hazardous Waste (HHW)				
32	EPR HHW	Batteries, lightbulbs, paints, pesticides, oil, antifreeze, medications	Depot/Drop-off	129.97
33	Non-EPR HHW	Sharps, glue, craft paint, cleaners	Residual	129.97
Household Hygiene				
34	Household Hygiene	Diapers, sanitary napkins, tampons, dental floss, Q-tips, etc.	Residual	173.55
Bulky Objects				
35a	Furniture	Furniture,	Residual	80.28
35b	Appliances, Mattress	Appliances, mattress	Depot/Drop-off	80.28
Textiles				
36	Textiles	Clothing, linens, bags, shoes, etc.	Depot/Drop-off	69.58
Bagged Garbage/Fines				
37	Bagged Garbage		Residual	523.19
38	Fines	Fines and misc. garbage <1"	Residual	129.97

APPENDIX C

WASTE COMPOSITION RESULTS

Table C-1: Waste Composition Results for Residential, Multi-Family, Streetscape, and Industrial, Commercial, and Institutional Sectors

Category	RES	MF	STR	ICI
Paper	**10.1%**	**17.1%**	**17.1%**	**17.1%**
01. Paper Deposit Beverage Container	0.1%	0.1%	0.4%	0.2%
02. Recyclable Paper	3.9%	7.1%	5.3%	8.5%
03. Compostable & Food-Soiled Paper	4.1%	6.7%	5.2%	6.2%
04. Non-Recyclable Paper	0.7%	0.7%	0.5%	0.7%
05. Retail Paper Bag	0.2%	0.3%	0.2%	0.2%
06. Lined/Polycoat Paper Cup	0.3%	0.8%	2.4%	0.5%
07. Lined/Polycoat Paper Takeout Container	0.4%	0.9%	0.9%	0.5%
08. Unlined Paper Cup	0.0%	0.0%	0.2%	0.1%
09. Unlined Paper Takeout Container	0.4%	0.6%	2.0%	0.3%
Plastic	**15.6%**	**17.2%**	**11.1%**	**13.9%**
10. Plastic Deposit Beverage Container	0.2%	0.4%	0.6%	0.5%
11. Rigid Plastic Packaging	1.9%	1.9%	2.1%	2.2%
12. Durable Plastic	7.1%	7.3%	0.6%	3.5%
13. Styrofoam	0.1%	0.1%	0.1%	0.4%
14. Film Packaging and Flex Packaging	3.6%	3.5%	2.5%	3.2%
15. Film Product	1.8%	2.8%	2.3%	2.5%
16. Reused Plastic Retail Bag	0.0%	0.0%	0.1%	0.0%
17. Empty Plastic Retail Bag	0.0%	0.1%	0.0%	0.0%
18. Compostable/Biodegradable Plastic Bag	0.0%	0.1%	0.1%	0.1%
19. Plastic Takeout Cup	0.3%	0.5%	1.5%	0.5%
20. Foam Takeout Cup	0.0%	0.0%	0.0%	0.0%
21. Compostable/Biodegradable Plastic Takeout Cup	0.0%	0.1%	0.2%	0.4%
22. Plastic Takeout Container	0.5%	0.4%	0.8%	0.5%
23. Foam Takeout Container	0.0%	0.0%	0.0%	0.0%
24. Compostable/Biodegradable Plastic Takeout Container	0.0%	0.0%	0.0%	0.0%
25. Plastic Straw	0.0%	0.0%	0.0%	0.0%
26. Plastic Utensil	0.0%	0.0%	0.1%	0.1%
Metal	**6.7%**	**5.3%**	**3.4%**	**6.4%**
27. Metal Deposit Beverage Container	0.5%	0.4%	1.2%	0.6%
28. Recyclable Metal	0.8%	0.5%	1.2%	0.9%
29. Non-Recyclable Metal	5.5%	4.4%	1.1%	5.0%
Glass	**1.9%**	**1.8%**	**3.2%**	**2.1%**
30. Glass Deposit Beverage Container	0.4%	0.4%	1.4%	1.0%
31. Recyclable Glass	0.9%	0.6%	1.5%	0.5%

Category	RES	MF	STR	ICI
32. Non-Recyclable Glass	0.5%	0.7%	0.3%	0.6%
Organics	**25.7%**	**28.1%**	**21.4%**	**38.6%**
33. Yard Waste	3.7%	1.1%	2.4%	7.0%
34. Avoidable Food Waste	9.1%	9.6%	13.3%	9.7%
35. Unavoidable Food Waste	2.2%	3.1%	4.8%	3.7%
36. Non-Compostable Organics	1.2%	0.3%	0.1%	0.3%
37. Compostable Wood	2.7%	6.8%	0.2%	0.5%
38. Cogen Wood	3.5%	0.3%	0.0%	6.8%
39. Landfill Wood	3.2%	7.0%	0.4%	10.5%
Building Material	**9.9%**	**2.4%**	**0.0%**	**4.8%**
40. Building Material	9.9%	2.4%	0.0%	4.8%
Electronic Waste	**3.6%**	**3.6%**	**0.2%**	**2.0%**
41. Extended Producer Responsibility (EPR) Electronic Waste	3.4%	3.6%	0.1%	1.9%
42. Non-EPR Electronic Waste	0.2%	0.1%	0.1%	0.1%
Household Hazardous Waste (HHW)	**1.1%**	**1.1%**	**0.6%**	**1.3%**
43. EPR HHW	0.3%	0.3%	0.2%	0.7%
44. Non-EPR HHW	0.7%	0.7%	0.3%	0.6%
Household Hygiene	**10.4%**	**8.9%**	**40.6%**	**6.6%**
45. Household Hygiene	10.4%	8.9%	40.6%	6.6%
Bulky Objects	**0.8%**	**1.5%**	**0.0%**	**0.0%**
46a. Furniture	0.8%	1.5%	0.0%	0.0%
46b. Appliances, Mattress	0.0%	0.0%	0.0%	0.0%
11.Textiles	**14.1%**	**12.9%**	**2.2%**	**6.9%**
47. Clothing	1.6%	5.2%	0.9%	1.9%
48. Household Textiles	5.6%	4.8%	0.7%	2.7%
49. Footwear	2.7%	0.9%	0.4%	0.4%
50. Accessories	2.3%	1.8%	0.2%	0.7%
51. Soft Toys	0.5%	0.0%	0.0%	0.0%
52. Other Textiles	0.0%	0.0%	0.1%	0.0%
53. Non-Accepted Textiles by the National Association for Charitable Textile Recycling (NACTR)	1.3%	0.1%	0.0%	1.2%
Fines	**0.2%**	**0.1%**	**0.2%**	**0.3%**
54. Fines	0.2%	0.1%	0.2%	0.3%

Notes:
ICI – Industrial, Commercial, and Institutional.
MF – Multi-Family.
RES – Residential.
STR – Streetscape.

Table C-2: Waste Composition Results for the Construction and Demolition Sector

Category	C&D
Paper	**7.9%**
01. Paper Deposit Beverage Container	0.0%
02. Recyclable Paper	7.7%
03. Compostable & Food-Soiled Paper	0.0%
04. Non-Recyclable Paper	0.2%
Plastic	**1.7%**
05. Plastic Deposit Beverage Container	0.0%
06. Rigid Plastic Packaging	0.1%
07. Durable Plastic	1.0%
08. Styrofoam	0.0%
09. Film Packaging and Flex Packaging	0.0%
10. Film Product	0.6%
Metal	**2.5%**
11. Metal Deposit Beverage Container	0.0%
12. Recyclable Metal	0.0%
13. Non-Recyclable Metal	2.5%
Glass	**0.0%**
14. Glass Deposit Beverage Container	0.0%
15. Recyclable Glass	0.0%
16. Non-Recyclable Glass	0.0%
Organics	**46.7%**
17. Yard Waste	0.2%
18. Avoidable Food Waste	0.0%
19. Unavoidable Food Waste	0.0%
20. Non-Compostable Organics	0.0%
21. Compostable Wood	5.2%
22. Cogen Wood	7.9%
23. Landfill Wood	33.5%
Building Material	**33.3%**
24. Gypsum/Drywall Plaster	0.0%
25. Masonry (Bricks, Blocks, Concrete, etc.)	1.6%
26. Rock, Sand, Dirt, Ceramic, Porcelain	8.3%
27. Rigid Asphalt Products	13.8%
28. Carpet Waste (and Underlay)	0.1%
29. Other Inorganics (Linoleum, etc.)	9.5%

Category	C&D
Electronic Waste	**0.2%**
30. Extended Producer Responsibility (EPR) Electronic Waste	0.2%
31. Non-EPR Electronic Waste	0.0%
Household Hazardous Waste (HHW)	**0.2%**
32. EPR HHW	0.2%
33. Non-EPR HHW	0.0%
Household Hygiene	**0.0%**
34. Household Hygiene	0.0%
Bulky Objects	**0.0%**
35a. Furniture	0.0%
35b. Appliances, Mattress	0.0%
Textiles	**0.0%**
36. Textiles	0.0%
Bagged Garbage/Fines	**7.6%**
37. Bagged Garbage/Fines	7.6%

Notes:
C&D – Construction and Demolition.

Table C-3: Overall Waste Composition Results by Primary Category (2024)

Primary Category	RES	MF	ICI	C&D	STR	Overall Weighted Average
Weight Assigned to Sector[1]	27.2%	17.1%	40.4%	14.2%	1.1%	**100.0%**
01.Paper	10.1%	17.1%	17.1%	7.9%	17.1%	13.9%
02.Plastic	15.6%	17.2%	13.9%	1.7%	11.1%	13.2%
03.Metal	6.7%	5.3%	6.4%	2.5%	3.4%	5.7%
04.Glass	1.9%	1.8%	2.1%	0.0%	3.2%	1.7%
05.Organics	25.7%	28.1%	38.6%	46.7%	21.4%	34.2%
06.Building Material	9.9%	2.4%	4.8%	33.3%	0.0%	9.8%
07.Electronic Waste	3.6%	3.6%	2.0%	0.2%	0.2%	2.4%
08.Household Hazardous Waste	1.1%	1.1%	1.3%	0.2%	0.6%	1.0%
09.Household Hygiene	10.4%	8.9%	6.6%	0.0%	40.6%	7.5%
10.Bulky Objects	0.8%	1.5%	0.0%	0.0%	0.0%	0.5%
11.Textiles	14.1%	12.9%	6.9%	0.0%	2.2%	8.8%
12.Bagged Garbage/Fines	0.2%	0.1%	0.3%	7.6%	0.2%	1.3%

Notes:
C&D – Construction and Demolition.
ICI – Industrial, Commercial, and Institutional.
MF – Multi-Family.
RES – Residential.
STR – Streetscape.

[1]The weight assigned to each sector to calculate the overall weighted average was based on the tonnage received at the Squamish Landfill in 2024 for each sector (extrapolated from averaging the data from the first half of 2024):

Sector	2024 Tonnage Disposal (Estimated)
Single Family Residential	3,372
MF Residential	2,126
ICI Sector	5,010
C&D Sector	1,755
STR	134
Total	**12,397**

It should be noted that MF and ICI loads are typically collected in the same truck. It was estimated that the two-thirds of the combined ICI/MF loads were from the ICI sector and one-third of the ICI/MF loads were from the MF sector.

APPENDIX D

SELECTED PHOTOGRAPHS

Photo D-1: Garbage Truck Tipping a Garbage Load

Photo D-2: Example of an Industrial, Commercial, and Institutional Load

Photo D-3: Example of a Construction and Demolition Load

Photo D-4: Example of a Streetscape Load

Photo D-5: Example of a Residential Curbside Collection Garbage Load

Photo D-6: Example of a Multi-family Garbage Load

Photo D-7: Example of a 100 kg Garbage Sample

Photo D-8: Field Staff Conducting a Visual Estimate of a Construction and Demolition Load

Photo D-9: Field Staff Sorting a Collected Sample

Photo D-10: Example of Paper Deposit Beverage Containers

Photo D-11: Example of Recyclable Paper

Photo D-12: Example of Compostable and Food-Soiled Paper

Photo D-13: Example of Single-Use Items (SUI) – Lined/Polycoat Paper Cup

Photo D-14: Example of SUI – Unlined Paper Takeout Container

Photo D-15: Example of Rigid Plastic Packaging

Photo D-16: Example of Durable Plastic

Photo D-17: Example of Styrofoam

Photo D-18: Example of Flim Packaging and Flex Packaging

Photo D-19: Example of Film Product

Photo D-20: Example of SUI – Compostable/Biodegradable Plastic Bag

Photo D-21: Example of SUI – Plastic Takeout Container

Photo D-22: Example of Recyclable Metal

Photo D-23: Example of Non-Recyclable Metal

Photo D-24: Example of Recyclable Glass

Photo D-25: Example of Yard Waste

Photo D-26: Example of Avoidable Food Waste

Photo D-27: Example of Unavoidable Food Waste

Photo D-28: Example of Compostable Wood

Photo D-29: Example of Landfill Wood

Photo D-30: Example of Building Material

Photo D-31: Example of Extended Producer Responsibility Electronic Waste

Photo D-32: Example of Household Hygiene

Photo D-33: Example of Clothing

Photo D-34: Example of Non-Accepted Textiles by the National Association for Charitable Textile Recycling