SQUAMISH

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ZERO WASTE STRATEGY

TETRA TECH

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EXECUTIVE SUMMARY

Developing the District of Squamish's Zero Waste Strategy has included public engagement, surveys, industry consultation, innovation and lessons learned from other communities who are striving for zero waste. The process has assessed current initiatives to see how they can be improved and expanded upon, as well as new programs, incentives and regulations that should be considered. Recycling and waste reduction are interwoven into the fabric of what makes Squamish, Squamish. As a community surrounded on all sides by mountains and the ocean, environmental stewardship is integral to building a resilient and thriving city.

Tetra Tech EBA Inc. (Tetra Tech) was retained by the District of Squamish (District) to develop a Zero Waste Strategy. This report summarizes the information and data obtained for the development of a Zero Waste Strategy for the District. The report outlines the actions necessary to achieve a diversion rate above 75% by 2020 with a corresponding 350 kg per capita per year disposal rate, as well as identify long-term actions that the District can take to work towards zero waste.

The proposed District targets are to achieve the provincial targets by 2020, and become zero waste by 2040. Table A outlines the approximate amount of time that would be required to meet the targets based on the level of programs put into place, as identified in Section 4.2 Priority Initiatives and Section 4.4 Detailed Implementation Plan. Figure A outlines the additional diversion and waste reduction that will be necessary to reach the 350 kg per capita and 120 kg per capita targets.

Table A: Estimated Years to Achieve Target Based on Strategy Implementation

Target	Attainable	Committed	Ambitious
350 kg per capita	2032	2026	2020
120 kg per capita	unknown	unknown	2040

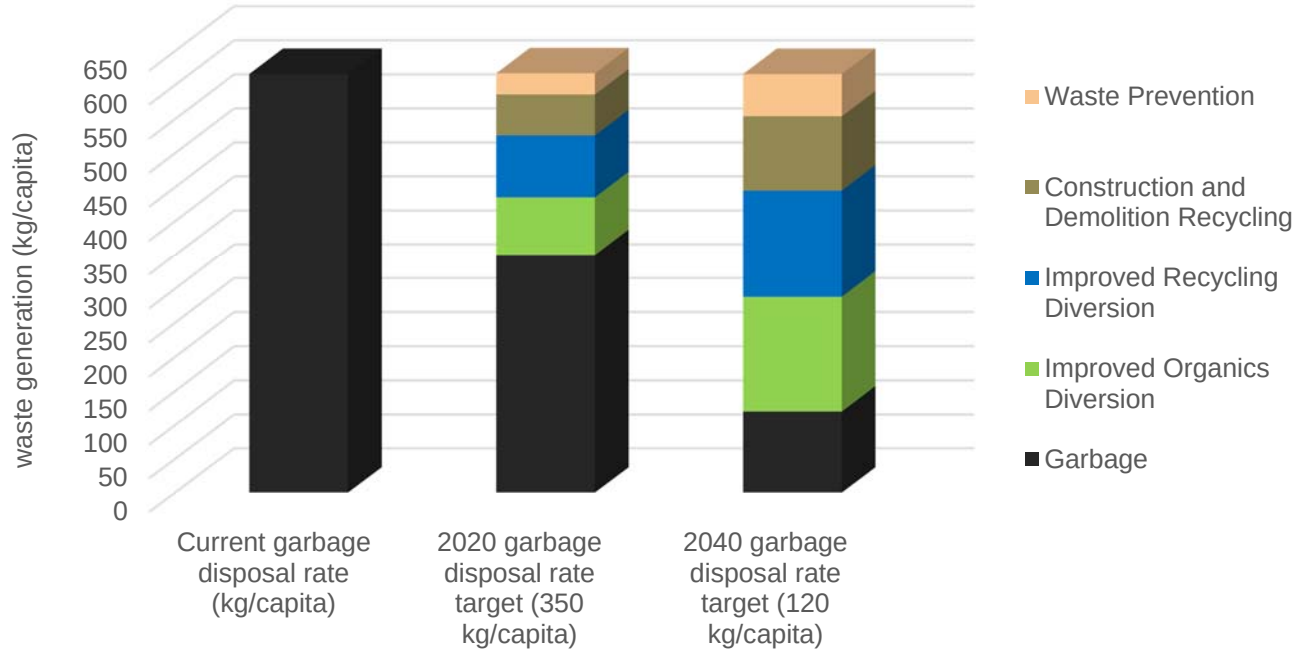

Figure A: Projected Disposal Changes with Generation Rate Targets

The proposed 2020 target includes: Garbage disposal rate of 350 kg per person. This corresponds to a waste diversion rate of 75%.

The proposed 2040 target includes: Garbage disposal rate of 120 kg per person. This corresponds to a waste diversion rate of 90%.

To achieve a 350 kg per capita diversion rate, the immediate focus of the strategy is to target and optimize the existing diversion programs and services. This includes improving diversion of organics and recycling (packaging and printed paper). Ensuring improved access, coverage, service and participation in organics and recycling programs can be achieved through instituting the following top four priorities in 2017.

Priority No. 1 – Implement an Organics Disposal Ban

- Implement an organics disposal ban as a regulatory tool to actively promote and reinforce organics diversion. Ensure enforcement mechanisms are in place to monitor and enforce the ban as required. The ban can be enforced at the landfill by phasing in a system where the surcharge (e.g., fee) increases over time as the threshold (e.g., amount of organics permitted in a load) is reduced. For optimal compliance, this regulatory tool needs to be backed by other initiatives that promote infrastructure changes to ensure collection and behaviour change programs are in place.

Priority No. 2 – Ensure Recycling and Organics Diversion Programs and Services are Available and Convenient for Everyone at Home, at Work and on the Go

- Ensure mandatory service is in place for recycling and organics diversion at apartments, condos, institutions and businesses in the District. While recycling infrastructure continues to grow, requiring three stream collection (e.g., recycling, organics, and garbage) at all residence types, in institutions and across the commercial sector will support increased participation and overall diversion. This regulatory tool needs to be reinforced by other high priority initiatives including adjusting the Solid Waste Bylaw to include size requirements for recycling and waste service rooms and technical assistance programs.

Priority No. 3 – Institute Construction and Demolition Waste Diversion Guidelines

- Develop recycling targets as part of the construction, renovation and demolition permit process. Establish waste diversion guidelines to set specific recycling goals for construction and new build sites, set up a rebate program to link to construction permits and add incentives for on-site diversion systems, develop an enhanced fee structure for sorting at the landfill site (or other off-site location), and establish an advanced deconstruction permit option. This initiative coincides with future disposal bans on construction-related recyclable materials including clean wood and product stewardship materials such as paint and electrical products.

Priority #4 – Promote Waste Minimization

- This priority is reinforced by other waste reduction initiatives including ongoing educational efforts, food waste reduction, mini-grant programs to support reuse and repair programs, and procurement shifts within a corporate zero waste management plan. This includes the lobbying of senior government for additional extended producer responsibility (EPR) materials to be included and the ability to implement product bans for single use items. Additional products – such as mattresses, furniture and carpet – are slated for stewardship programs where manufacturers rather than the tax payer are charged with end of life management of their products.

There are an additional 30 initiatives summarized in Section 4.4 of the Strategy that would need to be implemented to meet the ambitious targets. Ongoing monitoring and target refinement based on available resources and the public's ability to participate and use the programs will be required.

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ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
AWARE	Association of Whistler Area Residents for the Environment
CBSM	Community Based Social Marketing
CCRY	Carney's Cheekeye Recycling Yard
C&D	Construction and Demolition
EPR	Extended Producer Responsibility
FTE	Full Time Equivalent
IAP2	International Association for Public Participation
ICI	Industrial, Commercial and Institutional
Ministry	Ministry of Environment
MF	Multi-family Residential Housing
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
OCP	Squamish Official Community Plan
PPP	Packaging and Printed Paper
Residual Waste	Garbage that remains after the removal of organics and recyclables
RMOW	Resort Municipality of Whistler
SLRD	Squamish Lillooet Regional District
Squamish CAN	Squamish Climate Action Network
SWOT	Strengths, Weaknesses, Opportunities and Threats

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of the District of Squamish and their agents. Tetra Tech EBA Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than the District of Squamish, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Tetra Tech's General Conditions are provided in Appendix A of this report.

1.0 INTRODUCTION

Tetra Tech EBA Inc. (Tetra Tech) was retained by the District of Squamish (District) to develop a Zero Waste Strategy. This report summarizes the information and data obtained for the development of a Zero Waste Strategy for the District. The report outlines the actions necessary to achieve a diversion rate above 75% by 2020 with a corresponding 350 kg per capita per year disposal rate, as well as identify long-term actions that the District can take to continually work towards zero waste.

1.1 PROJECT OBJECTIVES

The objective and scope of work for the development of the Zero Waste Strategy included:

- Review of key data including:
  - Annual solid waste metrics (quantity and composition);
  - Current contracts and pricing for collection and disposal;
  - Information on recent waste-related projects; and
  - Policies and bylaws.
- Site visits to review facilities, infrastructure, and operations.
- Waste composition study of residential and commercial waste.
- Public engagement through:
  - Focus groups with key stakeholders including district staff, schools, compost facility operators, Squamish businesses (including grocery stories, builders, developers, recyclers and haulers), Squamish First Nation representatives, Squamish Lillooet Regional District (SLRD) staff, and community groups; and
  - A public survey administered both online and in-person at the farmers' market and grocery stores.
- Identification of options for consideration and evaluation.
- Development of a Zero Waste Strategy with targets, indicators, performance monitoring, and implementation plan.

1.2 PROJECT BACKGROUND

The District is part of the SLRD and is guided by the region's Solid Waste and Resource Management Plan which was adopted by the SLRD Board on March 16, 2016, and submitted to British Columbia Ministry of Environment (Ministry) on June 21, 2016. The District operates a municipal landfill that will reach its current capacity in 2017. Annual per capita waste generation in the District has historically been high, with a disposal rate over 1,000 kg per capita in 2008. The waste generation rate has dropped since 2009 due to recycling improvements and new opportunities for waste diversion. Due to these measures, the waste generation rate has lowered to around 680 kg per capita where it has remained since 2012. Most recently the District launched year-round residential curbside organics collection which has further improved the District's diversion and waste generation rates.

1.2.1 What is Zero Waste

The SLRD has adopted zero waste as the guiding principal in the Solid Waste and Resource Management Plan developed for the region. The term 'zero waste' has been adopted by a wide range of institutions, municipalities, businesses, non-profits, and even countries (e.g., Zero Waste New Zealand). These organizations and institutions use a broad range of definitions for pursuing zero waste; for some, it is an overarching policy framework for materials management, others consider it to be an aspirational or actual goal to pursue (generally considered to be 90% or 95% diversion and above). The District will not consider the thermal treatment of mixed waste as part of its waste recovery strategies as it is not considered a part of zero waste by the District[1].

The common thread across zero waste initiatives is the intent to optimize waste management systems by employing approaches such that:

- Waste prevention is the key message with a focus on approaches such as improved product design, food waste prevention, and green purchasing;
- A strong emphasis is placed on reuse, repair, and the sharing-economy to reduce consumption of raw materials; and
- Diversion of materials, in the form of recycling, composting and anaerobic digestion, is maximized before sending materials for disposal.

This Strategy has been developed to create a series of policies and tools that will guide the District to become a zero waste District. The approaches developed consider District-specific variables such as demographics, geography, industry and infrastructure. There are a range of zero waste approaches that can be implemented by introducing regulatory and economic tools, education and outreach programs, and by ensuring that collection programs and processing infrastructure are set up to maximize diversion. These tools, programs and initiatives are presented in Section 4 of this report.

1.2.2 Pollution Prevention Hierarchy

The 5 R pollution prevention hierarchy (reduce, reuse, recycle, recovery, and residuals management) is a useful tool for local governments to use when looking at opportunities to improve their solid waste management system (see Figure 1). The order of preference in the pollution prevention hierarchy is for waste management at one level to only be undertaken when all feasible opportunities for pollution prevention at a higher level have been taken. For example, opportunities for recycling should be explored only after all opportunities for reduction and reuse of materials have been exhausted. There benefits to this approach are as follows:

- Actions taken at higher levels in the pollution prevention hierarchy can eliminate or reduce the environmental management costs of actions at lower levels. For example, waste prevention programs can reduce costs associated with handling wastes in the first place.
- The pollution prevention hierarchy can potentially reduce the environmental impacts of product manufacturing and distribution. For example, reuse and, to a lesser degree, recycling, will reduce the environmental impact of extracting and processing primary resources while the use of recycled material can reduce the energy cost of manufacturing new products.

[1] On December 15, 2015, Council supported the elimination of the option for waste incineration of mixed municipal waste in the SLRD Solid Waste and Resource Management Plan (Item 9A) https://squamish.civicweb.net/FileStorage/6A7C396870F8486387A3B3AC95C1AABB-1215%20Regular.pdf

- Adherence to the highest level of performance under the pollution prevention hierarchy can encourage innovation and investment of industry to improve product design and reduce waste.

Figure 1: The Pollution Prevention Hierarchy

Source: (BC Ministry of Environment, n.d.[2])

Reduce includes the redesign of products and packaging to use recycled materials, use less material overall, and to be designed for ease of repair, disassembly and remanufacturing. Materials that cannot be reused or reprocessed should be phased out of production over time. Polices should be encouraged that promote shared use or leasing over ownership to reduce the need for individual product ownership and unnecessary consumption. Reduction also applies to strategies that reduce food waste along different parts of the supply chain.

Reuse refers to maximizing the useful life of products to their full extent. Examples include repairing or refurbishing products to retain their value and function or dismantling and keeping usable parts for reuse in other products. Reuse also refers to the donation of clothes and goods such as children's books and toys that can be resold at thrift stores, or donation of food that cannot be used by distributors to food banks for human consumption or used for animal feed instead of composting.

Recycle involves supporting collection and processing systems that enable materials to be recycled to their highest and best use. Organic material, including food scraps, is composted or processed in an anaerobic digester as near as possible to where the organic material is generated. Providing support for local processing facilities and markets for recycled material facilitates recycling.

Recovery generally refers to sorting and removing recyclable materials from mixed waste in a materials recovery facility (MRF). It can also denote a variety of energy recovery processes and technologies such as waste to energy facilities (incinerators), which produce thermal energy, or refuse devised fuel facilities, which take the combustible

[2] http://www2.gov.bc.ca/gov/content/environment/waste-management/zero-waste

components of the municipal waste stream (e.g., plastics) and co-fire them in a boiler or kiln to replace virgin fossil fuels.

Residuals management is the final step in the hierarchy and refers to the environmentally safe disposal of remaining materials in a landfill.

The pollution prevention hierarchy has been used to help set priority to actions and approaches that can be taken to achieve zero waste.

1.2.3 Circular Economy

The pollution prevention hierarchy is an educational tool and framework which is used worldwide to facilitate change in the way wasted materials are viewed. However, it could be argued that it still takes a linear approach to materials management, and that implementing zero waste approaches requires a transition to a circular economy. The term circular economy refers to an alternative model that *"shifts from the current one-way linear resource use and disposal culture to a closed-loop circular system" (The National Zero Waste Council).* In the circular economy, materials are reused or recycled to produce new products, in contrast to typical industrial processes that begin with mining a raw material and end with a waste product that requires disposal.

Figure 2: Closing the Loop

Source: (Lee et al. 2013)

The circular economy aims to keep products, components, and materials at their highest utility or value (Ellen MacArthur Foundation 2015). It aims to decouple economic development from consumption of raw materials (the linear model) by describing an alternative approach in which economic growth is generated and jobs are created while simultaneously reducing environmental impacts. This requires a paradigm shift, particularly for businesses, that always focus on metrics such as sales, revenue and profit but generally do not measure material inputs, pollution or waste.

2.0 CURRENT SYSTEM OVERVIEW

2.1 INTRODUCTION

In 2015, 12,983 tonnes of waste were disposed at the District's landfill from residents and businesses. This translates to 634 kg of total waste disposed per year per capita. This includes the total waste disposed through the curbside residential collection program which accounts for 20% of the total, and all other waste that arrives at the landfill including waste from apartments, condos, commercial businesses, institutions, and the construction and demolition sector. Another 13,589 tonnes of material were recycled through the existing recycling and composting programs that operate in the District. Figure 3 shows the waste disposal rate since 2004 in the District. In 2008, the waste disposal rate peaked at over 1,100 kg per capita. Since the implementation of residential recycling programs and enhanced recycling opportunities in the District, the disposal rate has declined to less than 680 kg per capita, where it has stayed fairly constant since 2012.

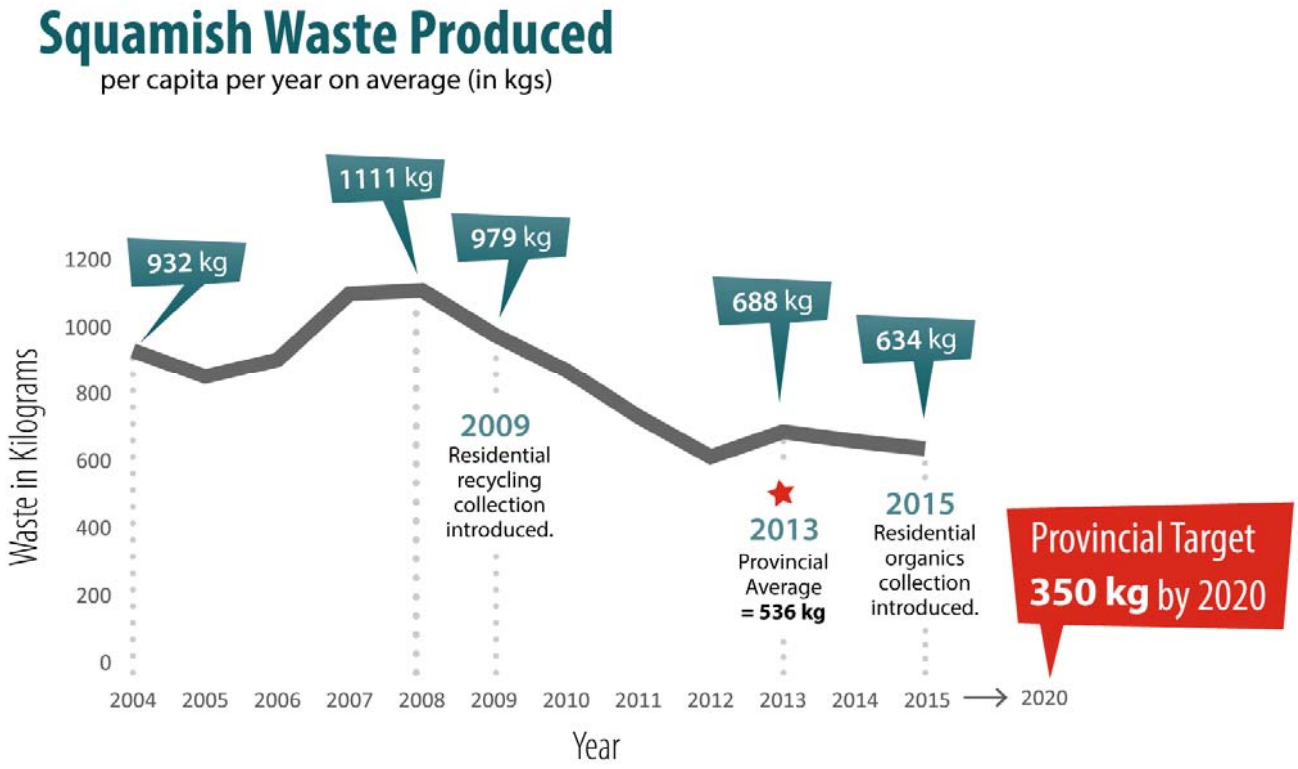

Figure 3: Squamish Waste Produced Per Person

2.1.1 Community Population and Growth Projections

The District has a current population size estimated at approximately 20,000, and is expected to increase to approximately 33,000 by 2031, with a growth rate of over 3% per year over the next 20+ years. The following sections outline the current waste generation, and the forecasted waste generation using per capita generation rates. Per capita measures of waste disposal provide a way of examining changes in disposal while accounting for the effects of population. It is assumed that the amount of waste being sent for disposal can be attributed to population growth and not necessarily to an increase in the intensity of waste production per capita.

2.2 WASTE GENERATION

In 2015, 12,983 tonnes of waste were landfilled, and 13,589 tonnes of material were diverted from landfill for recycling, composting and beneficial uses. This corresponds to an overall diversion rate in 2015 of 51% for all waste streams in the District. Currently to date in 2016 the diversion rate has increased to 55% due to increase in residential organics collection, and the diversion of larger amounts of wood from landfill disposal.

As the population of the District increases, the total waste generated is expected to proportionally increase with every new resident in the District. Based on the current population growth forecast of 2.9% per year, and assuming no improvements are made to the current waste diversion and recycling programs, the total amount of materials and waste generated will continue to increase as outlined on Figure 4. If no improvements are made to diversion programs and population growth occurs as predicted, the total amount of waste disposed by 2040 would more than double to 27,124 tonnes per year. This amount of waste generation would have a large impact on the landfill, filling the existing *and* proposed capacity at twice the current rate. If a waste generation rate of 350 kg/capita was achieved, the total amount of waste generated in the District in 2040 would be similar to the current amount of total waste disposed. Further details on new targets are in Section 4.1 and Table 7 and Table 8.

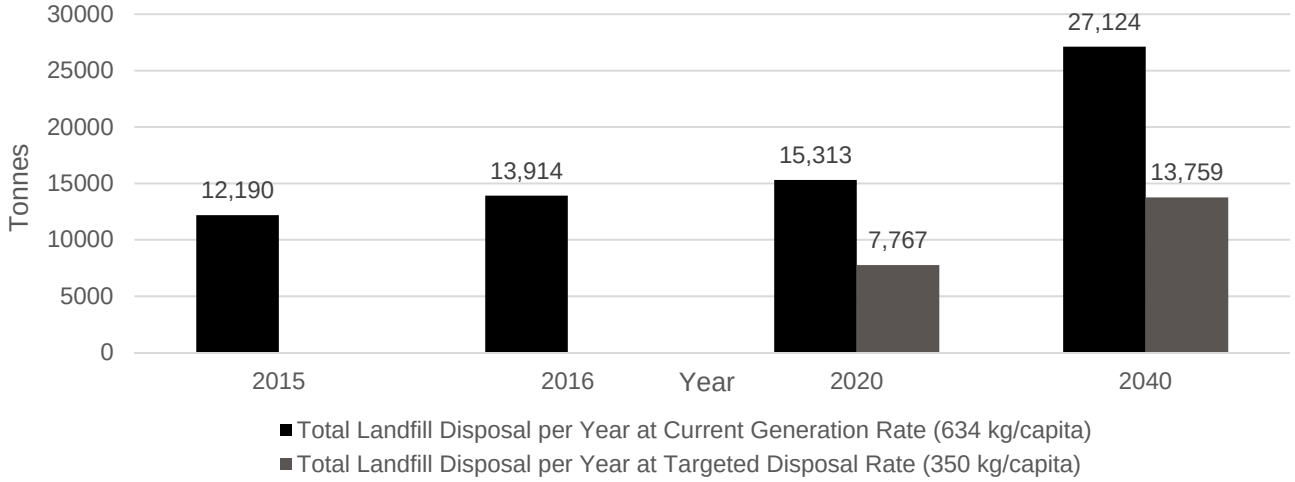

Figure 4: Total Waste Disposed – No Diversion Program Improvements and Population Growth

2.2.1 Residential Collection

The District provides every other week collection of residential garbage, recycling, and organics to ground-oriented homes. The total quantity of materials collected in the curbside program is summarized in Table 1. In 2009, a diversion rate of 22% was achieved with the introduction of the curbside recycling program.

Table 1: Residential Curbside Collection (tonnes/year)

		2009	2014	2015	2016 (Projected)
Garbage (tonnes)		2,818	2,829	2,651	2,500
Recycling (tonnes)		785	914	934	974
Organics / Food Scraps (tonnes)		0	0	989[1]	1,614
Diversion Rate for Residential Collection		22%	24%	42%	51%

1. 2015 represents a partial year, May-September

In 2015, the diversion rate increased to 42% with the introduction of the curbside organics collection program, and this has further increased in 2016 with the introduction of weekly summer organics collection, increased residential uptake, and ongoing community engagement. In 2016, the District piloted weekly organics collection from June to September. Based on the total amount of organics collected, it is estimated that the weekly organics collection pilot will result in the collection of an additional 600 tonnes of organics compared to 2015.

2.2.2 Industrial, Commercial, and Institutional

The largest portion of waste generated in the District is from the industrial, commercial and institutional (ICI) waste sector, accounting for 59% of the waste arriving at the landfill in 2015. This includes waste that is picked up by private haulers around the District from dumpsters, compacter and roll-off bins, and includes residential waste from multi-family apartment and condo buildings, as this waste is collected by the same trucks that service commercial businesses and institutions. Figure 5 summarizes the breakdown of waste that arrives at the landfill from the sectors that are tracked by the scales at the landfill.

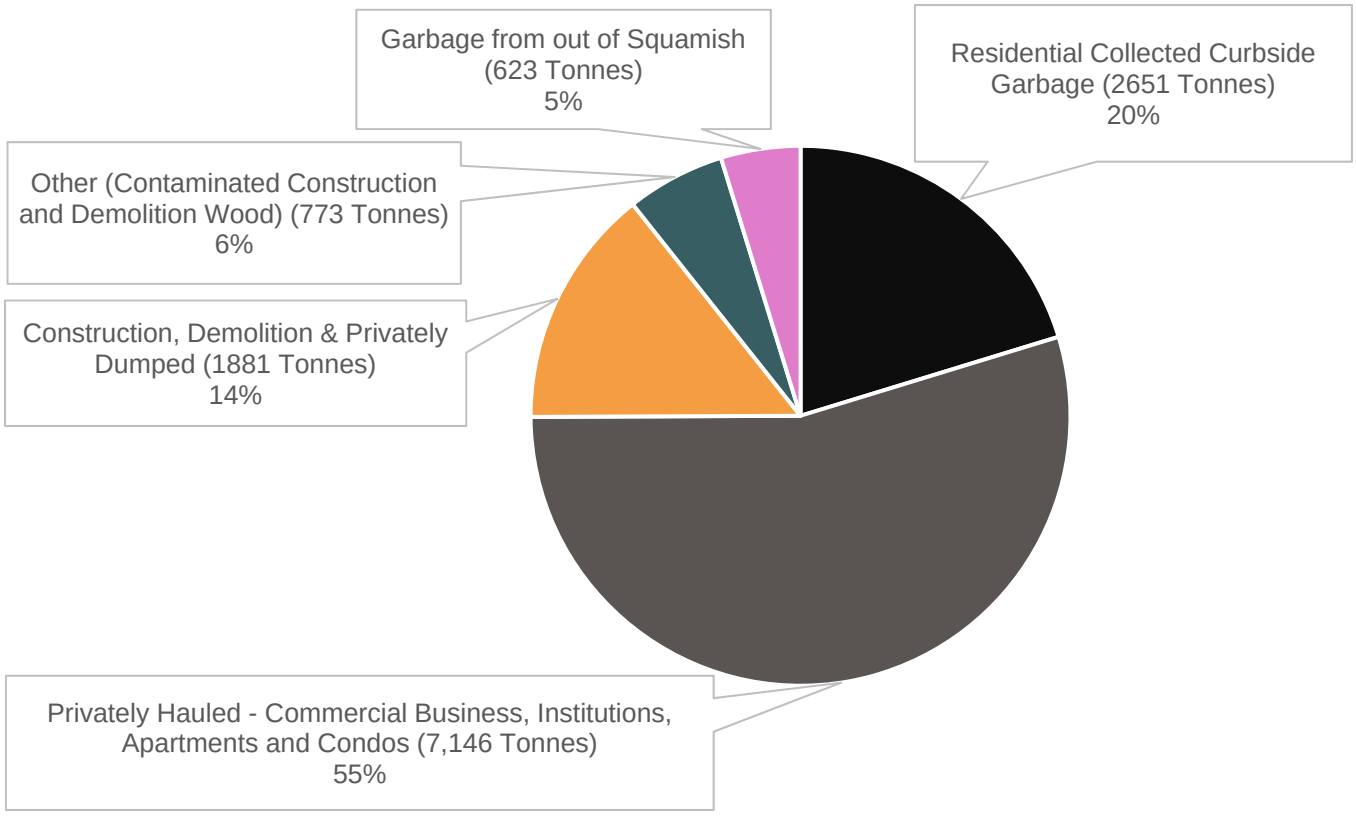

Figure 5: Source of Disposed Material in the Landfill (2015)

The Zero Waste Strategy has identified a number of items that target the commercial and multi-family sector, as improving the performance of this waste sector will be crucial to achieving improved results.

2.2.3 Construction, Demolition and Privately Dumped

The amount of construction and demolition waste arriving at and disposed in the landfill has increased significantly in the District. As shown ion Figure 6, there was an 11% increase in the waste tonnage received in 2015 over 2014.

In 2016, there has been an 80% increase in the quantity of demolition waste compared to 2015. The total tonnage of construction and demolition waste arriving at the landfill continues to increase as the rate of construction activities and development have increased in the District.

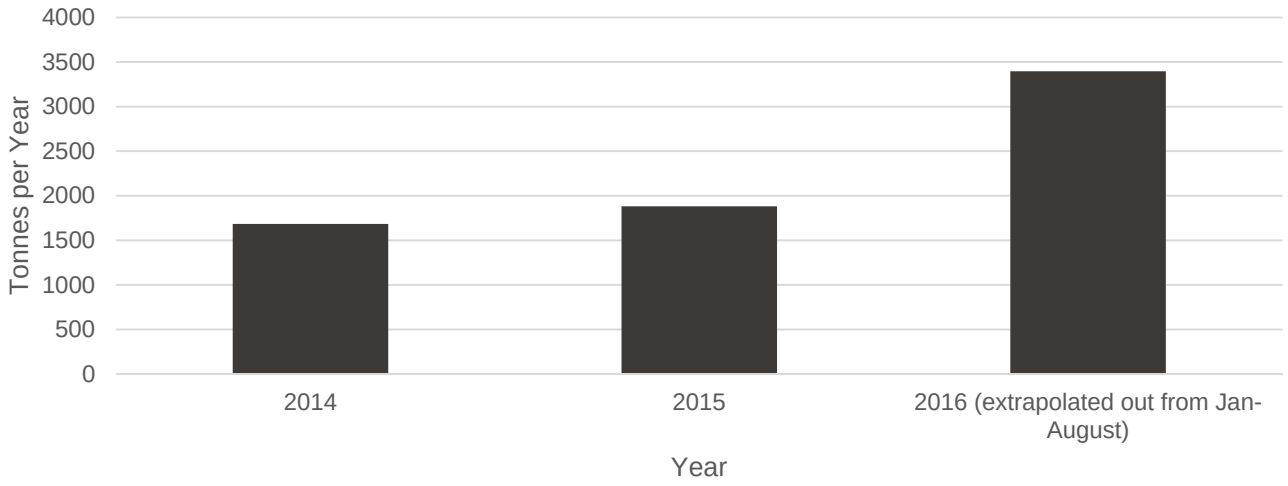

Figure 6: Construction and Privately Dumped Waste Disposed

2.3 WASTE COMPOSITION

Tetra Tech conducted a waste composition study to inform the development of the Zero Waste Strategy. The waste composition study took place on May 2 to May 4, 2016, at the District landfill. A full copy of the technical memo, including a summary of all results, is included in Appendix B.

The composition of solid waste was determined from the following sources:

- Single family residential;
- Multi-family residential; and
- Industrial, commercial and intuitional (ICI).

Table 2 outlines the overall waste composition by primary category. Appendix B includes a detailed table of results by primary and secondary categories. The composition of garbage from the combined sectors is presented on Figure 7 by primary material category. The largest category was organics (35%), comprised of avoidable food waste (18%), unavoidable food waste (9%), wood (5%) and yard waste (2%). Due to the large volume of diapers and pet waste observed, household hygiene was the second largest category (17%). Other prominent categories were paper (13%) and plastic (13%). Most paper was recyclable (7%) or compostable (6%), while plastic included film packaging (4%), durable plastic products (3%) and rigid packaging (2%), film products (2%), Styrofoam (1%) and beverage containers (<1%).

Table 2: Summary of Primary Material Composition

Primary Category	Single Family Residential (N=4)	Multi-Family Residential (N=4)	Industrial, Commercial and Institutional (N=4)	All Samples Combined (N=12)
Building Material	1%	5%	14%	6%
Bulky Objects	<1%	<1%	2%	1%
Electronic Waste	1%	3%	4%	2%
Fines	1%	1%	2%	1%
Glass	2%	2%	3%	3%
Household Hazardous Waste	1%	1%	<1%	<1%
Household Hygiene	17%	30%	4%	17%
Metal	3%	2%	3%	2%
Organics	40%	30%	33%	35%
Paper	11%	9%	20%	13%
Plastic	15%	11%	13%	13%
Textiles	8%	7%	4%	6%

N = number of samples completed
Due to rounding of the presented results, all values may not add to 100%

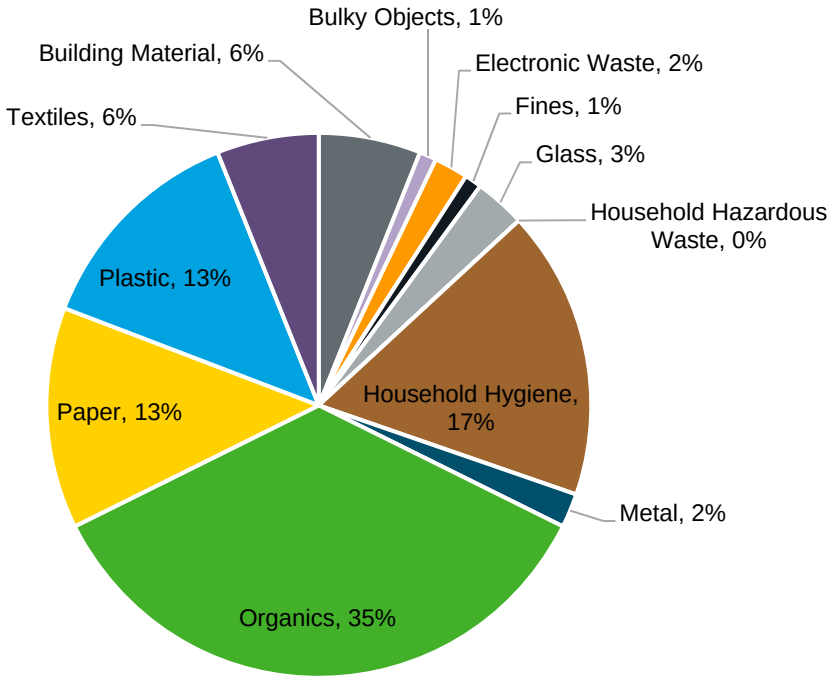

Figure 7: Summary of Primary Category Composition

Based on the combined waste composition results, the quantity and percentages of materials that are recyclable (can be put in the curbside blue tote), depot drop-off (can be recycled at a depot or transfer facility), compostable (can be put in the curbside green tote), and residual (needs to be landfilled or disposed) were extrapolated using commercial and residential waste tonnages from 2015. The estimates are presented in Table 3.

Table 3: Waste Quantity Extrapolations (Residential and Commercial Sectors)

Type	Percent of Waste Stream	Estimated Quantity (tonnes/year)[1]
Compostable (Curbside Program)	37%	3,780
Recyclable (Depot Drop-Off)	18%	1,830
Recyclable (Curbside Program)	10%	1,050
Residual	36%	3,670
Total	**100%**	**10,330[1]**

[1] Based on curbside residential and privately hauled commercial and multi-family waste disposal in 2015, does not include construction and privately dumped tonnage (2,654 tonnes).

2.4 DIVERSION PROGRAMS

2.4.1 Organics and Recycling

Figure 8 summarized the current materials that are diverted and recycled through recycling and organics collection, diversion programs at the recycling depots and the landfill, and materials collected through the extended producer responsibility (EPR) programs in the District. Organics including food scraps, wood, and biosolids represent a large quantity of materials that are diverted from the landfill. The total quantity of recyclable and divertible materials that will need to be managed by the District will increase as the population grows in the District.

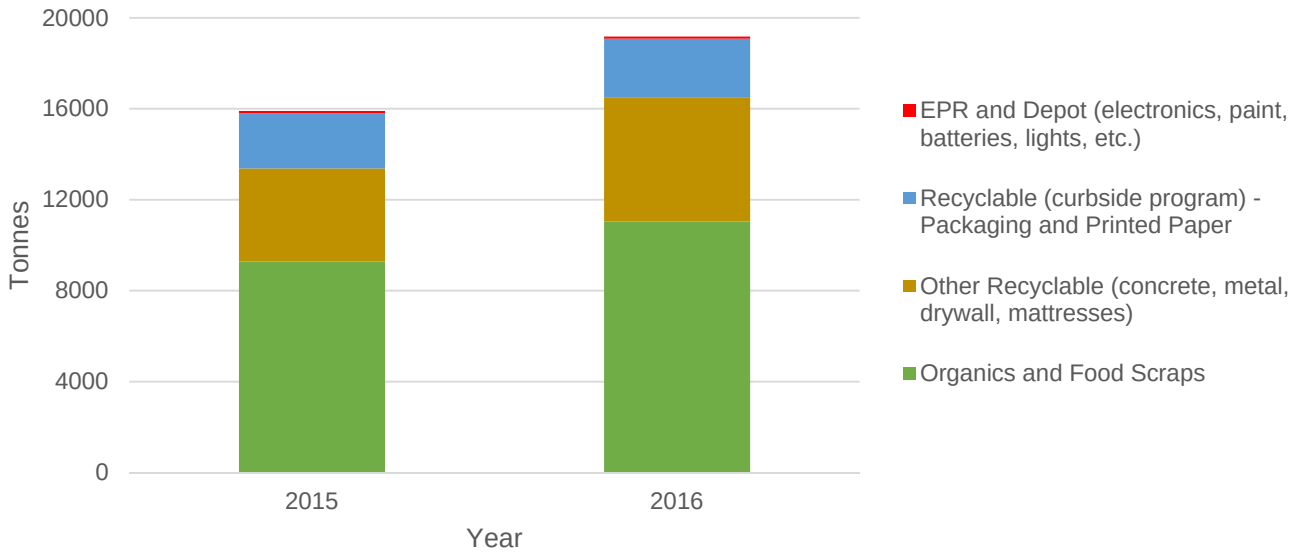

Figure 8: Recycled and Diverted Materials

2.4.2 Extended Producer Responsibility Programs

There are 24 EPR product categories for programs for products such as electronics, beverage containers, paint, lights, used oil, and antifreeze, which are collected at depots in the District by product stewards. Overall, most programs have shown an increase in either the total tonnage, or number of units of materials collected in 2015 versus 2014. It will be necessary to continue to request this data from EPR stewards and track this data to determine how well EPR programs are performing in the District.

2.5 EXISTING POLICIES AND TARGETS

With the implementation of organics collection and diversion programs including food scraps, clean wood, and demolition debris across the province, it has been recognized that aggressive waste generation targets can be achieved with full roll-out of these programs to all waste sectors in a community. This includes ensuring that all commercial businesses, institutions, multi-family buildings, and the construction and demolitions waste sectors have access to and implement organics diversion programs.

2.5.1 District of Squamish

The District's Council Strategic Plan (2015-2018) includes a number priority focus areas that list actions and outcomes that solid waste impacts. Most specifically is the inclusion of the environment objective and the specific action for the District to develop policies that support zero waste. In 2016, the District is updating the Official Community Plan (OCP). During Phase Two of the public input there have been recommendations to include measurable zero waste goals within the OCP, as policy directions around climate and adaptation, neighbourhood planning, energy efficient planning, setting density targets and food security all have zero waste management considerations that can help achieve the policy directions that are under consideration.

2.5.2 British Columbia Ministry of Environment

The Ministry has set an average provincial waste disposal target of 350 kg per capita, along with 75% of British Columbia's population to be covered by an organics disposal ban by 2020. In 2013, the garbage generated in British Columbia was equal to 536 kg per capita; the target for 2013 was 550 kg per capita. For local and provincial planning to be successful – and for British Columbia to continue to be recognized as a world leader on environmental issues – a cooperative approach to solid waste management planning across all levels of government is essential.

2.5.3 Squamish Lillooet Regional District Solid Waste and Resource Management Plan

The SLRD has recently updated the Solid Waste and Resource Management Plan that guides waste management in the region. The Solid Waste and Resource Management Plan was adopted by the SLRD Board on March 16, 2016, and submitted to the Ministry on June 21, 2016. The plan includes the following goals:

- All discards to be regarded as resources;
- Resources are used locally, moving the SLRD towards a closed-loop economy;
- Citizens are actively engaged in behaviors that reflect the waste management hierarchy; and

- Infrastructure used to manage residual waste meets or exceeds provincial guidelines and regulatory requirements[3].

Targets include:

- Increase diversion to 63% and reduce per capita disposal rate to 350 kg/year by 2020; and
- 75% of SLRD's population will be actively engaged in organic waste diversion by 2020.

The District's targets developed in this strategy are complementary to the SLRD plan and help achieve the identified priorities using the decision-making criteria of a) collaboration, b) affordable and realistic, and c) supporting the local economy and local job creation.

2.6 FACILITIES AND INFRASTRUCTURE

Zero waste infrastructure that currently exists in the region includes the following:

- Two recycling depots for drop-off of recyclable materials (The Landfill Public Depot and the Squamish Recycle Centre).
- Squamish Recycle Centre – Material Recovery Facility for sorting of recyclable materials for bailing and distribution.
- Bottle depots and stores that accept EPR take-back materials.
- Two in-region composting facilities.
- Squamish Re-Build Store, and other used/donated material reselling stores.
- Carney's Cheekeye Recycling Yard (CCRY) used to sort and stockpile recycled materials prior to recycling and transport to end markets. This is a 15-acre site located adjacent to the District landfill where wood waste, drywall, asphalt, and glass is stockpiled.

Two composting facilities exist in the Sea to Sky corridor – the Whistler facility and Sea to Sky Soils near Pemberton. The Whistler facility is owned by the Resort Municipality of Whistler and operated by Carney's Waste Systems. It accepts biosolids from Whistler and Squamish as well as organic waste from the Sea to Sky region and currently operates at or near capacity. The Sea to Sky Soils is a private facility that has the ability to expand and handle additional flows of organic materials for composting. Additionally, some commercial compost is hauled out of region for processing in the Lower Mainland.

It has been identified during the study that there is no location close to the District for drop-off and transfer of larger loads that require sorting such as construction and demolition debris. Effective construction, demolition, and wood debris management requires property that has the space to stockpile all of these materials for the sorting necessary for recycling prior to transporting the materials to end markets.

[3] On December 15, 2015, Council supported the elimination of the option for waste incineration of mixed municipal waste in the SLRD Solid Waste and Resource Management Plan (Item 9A) https://squamish.civicweb.net/FileStorage/6A7C396870F8486387A3B3AC95C1AABB-1215%20Regular.pdf

3.0 OPTIONS DEVELOPMENT

3.1 PUBLIC PARTICIPATION

Public engagement is an important component of the solid waste management planning process. As part of the strategy development process, Tetra Tech worked closely with District staff to engage key stakeholders including community members, commercial businesses, First Nations, and producers throughout each project phase. The International Association of Public Participation (IAP2) consultation framework was used to inform engagement options. As shown on Figure 9, levels of engagement can range from informing and consulting through involving, collaborating and empowering the public in the decision making process.

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives and/or solutions.	To obtain public feedback on analysis, alternatives and/or decision.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

Figure 9: IAP2 Spectrum of Public Participation

(Source: IAP2 http://iap2canada.ca/page-1020549)

The options used to engage key stakeholders and general public fit into the central categories of the IAP2 framework as outlined below. Targeted stakeholder engagement and interviews were used to actively involve businesses and key stakeholders in the community to better understand concerns and aspirations and were captured and incorporated into outcomes. The general public was also involved through public engagement surveys and discussion to capture feedback. Once the plan was developed, an open house was held to share outcomes with all stakeholders and vet initial outcomes.

- **Targeted Stakeholder Engagement** – Three stakeholder focus groups were completed that focused on organics bans and recycling programs, construction and demolition debris recycling and event waste management.
- **Interviews** – One-on-one interviews, both in-person and via phone, to gather feedback and opinions from stakeholders without the external influences present in workshops and focus groups.
- **Public Engagement and Surveys** – A public survey was developed to engage the community in the strategy development including determining the publics current use of waste and recycling services, and what is needed

to make Squamish a zero waste community. Surveys were completed in-person at the farmers' market and grocery stores in the District, and online through the District website.

- **Open House** – All stakeholders previously invited to or involved in the process were invited to an open house on September 16th to review the draft Strategy and discuss the outcomes with the project team.

3.2 STAKEHOLDER FOCUS GROUPS

Three stakeholder focus groups were held, including two in the morning and afternoon on June 27, 2016 and one on July 27, 2016. An additional stakeholder open house was held on September 16, 2016. The focus of the stakeholder meetings included:

- Organics and recycling disposal bans and related programs;
- Construction and demolition waste diversion – recycling targets and service requirements;
- Event waste management; and
- Review of the draft Zero Waste Strategy.

Invites for the focus groups were sent out to 56 organizations that were identified representing a variety of businesses, manufacturers, developers, and institutions in the District. In total, 27 people attended, including 17 at the organics and recycling disposable bans focus group, 16 at the construction and demolition waste diversion focus group and 7 at the event waste management workshop. These people represented 25 different organizations within the District, including the Downtown Business Improvement Association, developers, manufacturers, construction companies, schools and the school board retail and building supply stores, grocery stories, demolition and waste haulers, the Squamish First Nation and food service providers. Participants were also given a survey to capture ideas discussed, a copy of the survey is available in Appendix D.

Stakeholders were asked to summarize all the materials they generate, and if there was a program in place to divert the material. The results are summarized on Figure 10. The most commonly generated and recycled items included paper, cardboard, mixed containers, beverage containers, and EPR materials such as electronics and batteries. Note that the businesses surveyed had recycling in place for electronics and batteries although they are likely not representative of all businesses in the District. It was identified that only 50% of those that generated organic waste and food scraps at their business had an organics diversion program in place. Outcomes indicated that implementing and improving organics diversion programs will help enhance organics recycling program performance. Additionally, materials such as plastic film and Styrofoam, which are typically not picked up by waste haulers, have fewer businesses participating in these programs.

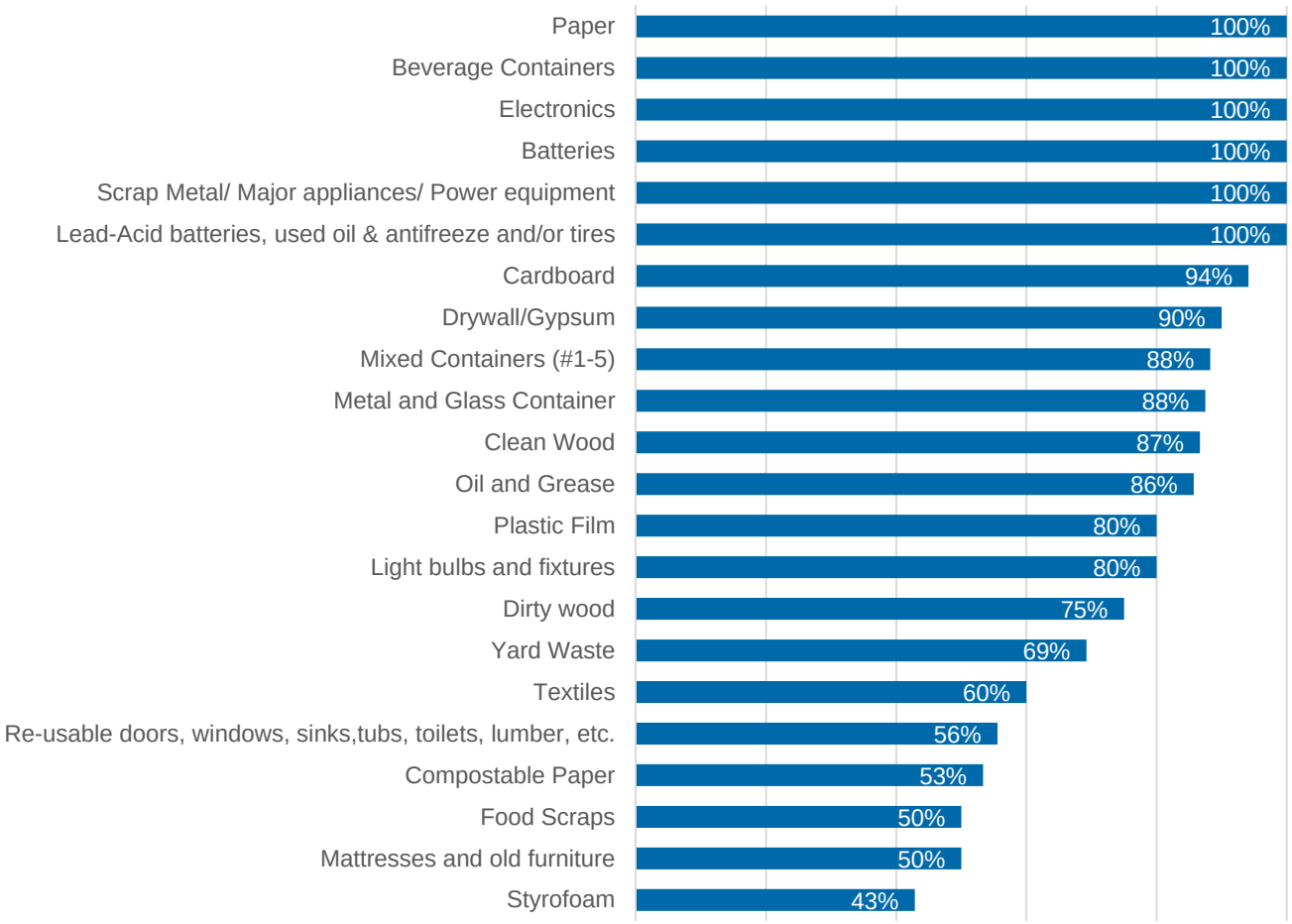

Figure 10: Businesses that have a Diversion Program in Place to Separate Identified Materials

The top barriers to implementation of additional recycling programs included:

- Space for recycling bins and storage or materials prior to hauler pickup;
- Staff and customer education about recycling programs including bin signage and training;
- Cost associated with programs, and in some cases availability and awareness of what recycling programs are available for businesses;
- Effort and time required to separate materials;
- Bin signage and communication; and
- Lack of regulatory requirements or enforcement to require programs.

A long list of options and tools for the Zero Waste Strategy were presented to participants who ranked the options from one to ten. These results are summarized on Figure 11. The top ranking Zero Waste Strategy tools include the establishment of material disposal bans, ensuring recycling services are required and provided equally across the District, and working with buildings to ensure they have support for zero waste programs. It was also considered important to ensure that new bans and bylaws have the necessary enforcement and penalties to ensure compliance and participation in programs.

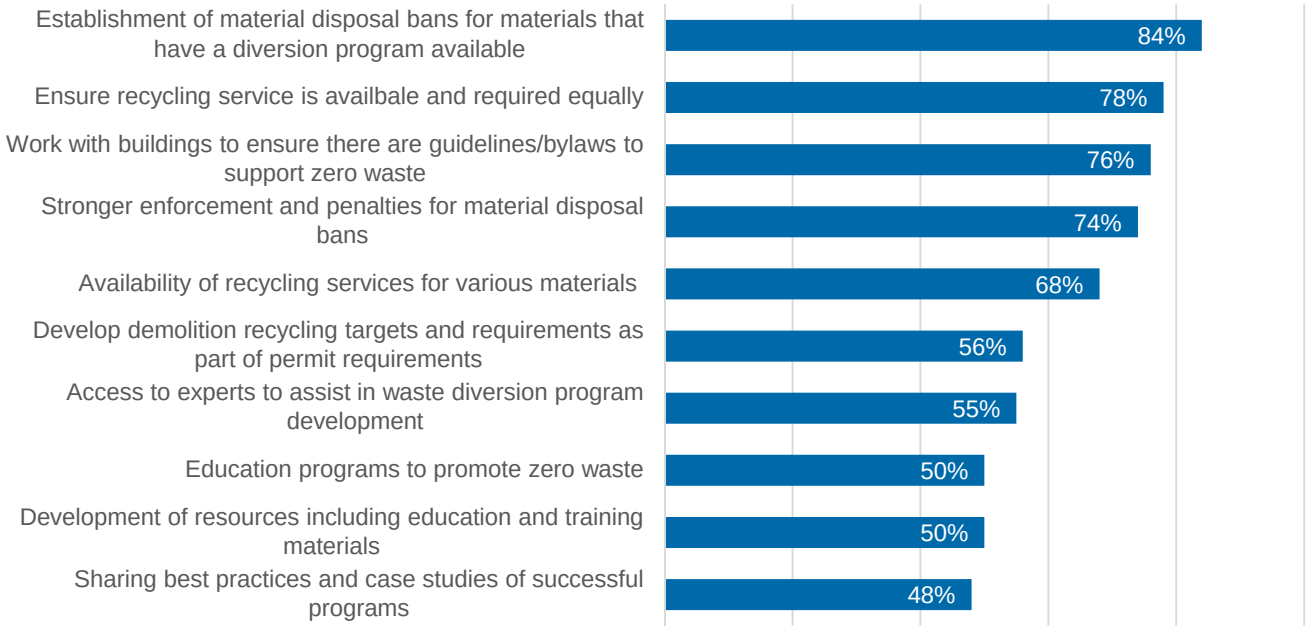

Figure 11: Ranking of Programs to Assist and Encourage Expanding Waste Diversion Programs

3.3 SURVEY RESULTS

Residents from the District completed 365 surveys during the months of June and July. The overall total number of responses was higher than anticipated and overall, showed the communities excitement and support for ongoing zero waste program improvements. Approximately 100 surveys were completed in one day at various locations including the farmers' market, Save-on-Foods, Craig's Your Independent Grocer and Junction Park and O'Sivam Pavilion. The remaining surveys were completed using the District's website and advertised through the ReCollect electronic reminder where the link was posted for approximately a month. A copy of the survey is included in Appendix C.

To create comparative results, the short answer responses were categorized based on common themes. Responses that discussed multiple themes were placed into each respective category, therefore, there are more responses than the number of surveys. The results for the key questions are summarized below.

3.3.1 Collection Services

The completed surveys indicate that 97% of respondents live in the District, 56% of whom work in the District. Questions about living situations revealed the following results.

Services at Home (Residential)

Of the survey responses, 82% lived in single family home or townhouse, 17% in apartment or condos, and 1% in other. The most common house size reported by 49% of respondents was 1 to 2 people, followed by 45% who have a household size of 3 to 5 people, 5% with 6 to 8 people and 0.5% with 8 or more people.

Those that reside in the District were asked to choose all types of collection service offered, and which they use. Table 4 represents a percentage of those that indicated they use the corresponding collection service type.

Table 4: Collection Services Offered and Used by Residents

Waste Collection Service Type	Services Offered at Home	Services Used at Home
Recycling	97%	97%
Organics	87%	81%
Garbage	98%	98%
Other	4%	4%

A short answer response was requested for “Comment on the garbage, recycling and/or organics collection services at home.” This was responded to by 72% of respondents who indicated that they were District residents. The top three response themes are outlined below:

- **Theme: Everything is going well with the current collection program, happy with the composting program, and increased waste awareness.**
  - “Glad the organics are being picked up weekly. We have very little actual garbage now.”
  - “Works well. Conscious of garbage with every other week collection.”
- **Theme: The desire for more comprehensive recycling pickup such as glass, soft plastics and Styrofoam.**
  - "The packaging that isn't included in recycling is the biggest challenge. Whomever makes the packaging should have to take it back."
  - “I wish there was a bin to put plastic bags, etc., in. I currently save them all and have to drop them off.”
- **Theme: Problems with garbage and/or compost storage, such as: smell, limited storage, attracting vectors, less frequent pickup, seasonal varying pickup times or cost of liners.**
  - "Organics have been a challenge due to the pests/bugs they attract. Paper liner bags help, but their cost and the act of acquiring them can be a barrier."

Services at Work

Respondents who indicated that they work in the District (56%) were asked to indicate all collection services provided to them in their workplace and the ones they use. Table 5 represents a percentage of those that indicated they use the corresponding collection service type.

Table 5: Collection Services Offered and Used at Workplaces

Waste Collection Service Type	Services Offered	Services Used
Recycling	66%	66%
Organics	39%	37%
Garbage	81%	80%
Cardboard	50%	48%
Other	14%	12%

For those that responded to the collection services questions, only 42% proceeded to answer the short answer response of “Please comment on the garbage, recycling and/organics collection services at work”. The top three response themes are respectively below.

- **Theme: The desire to have collection programs be implemented at their place of work.**
  - "Want recycling and organics.” “No plastic recycling, so we are still throwing out recyclable plastics. Recycling would be nice”
- **Theme: Limited use of the organics/recycling in the workplace due to lack of ease, knowledge or incentives, smell/vectors, or inconvenient pickup times.**
  - "Since we operate on a tight budget, having to pay for various waste services isn't affordable. If all the services were provided by the district, we would absolutely use them"
- **Theme: Not utilizing the collection because they either work from home, have limited organics waste, have alternate waste pickup arrangements, or it is biohazardous.**
  - "No recycling services. Staff collect it and either take it to Carney's directly or just take it home each day."

3.3.2 Zero Waste Community

Those that live in the District were asked to indicate all types of waste they produce at home and the responses are summarized on Figure 12.

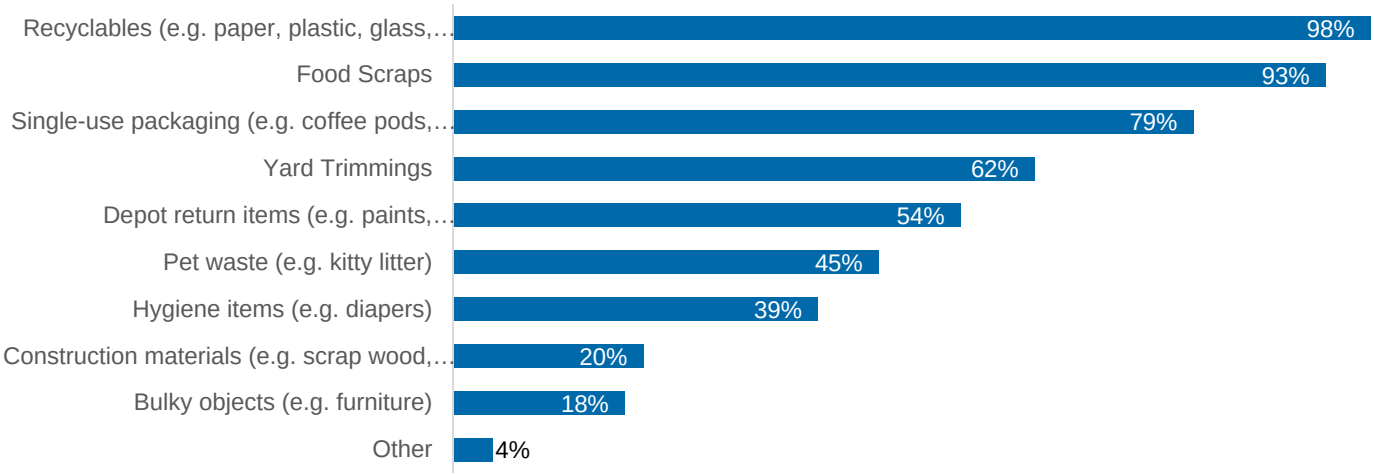

Figure 12: Common Waste Produced by Residents

Most residents generate and try to participate in recycling and food scraps programs. Over 40% of residents indicate that pet waste and diapers are also a common component of the garbage, and this is consistent with the large proportion of diapers and pet waste that were identified during the waste composition study.

The same group of people was also asked to indicate the type of items they drop-off at a depot or collection point, the results are on Figure 13.

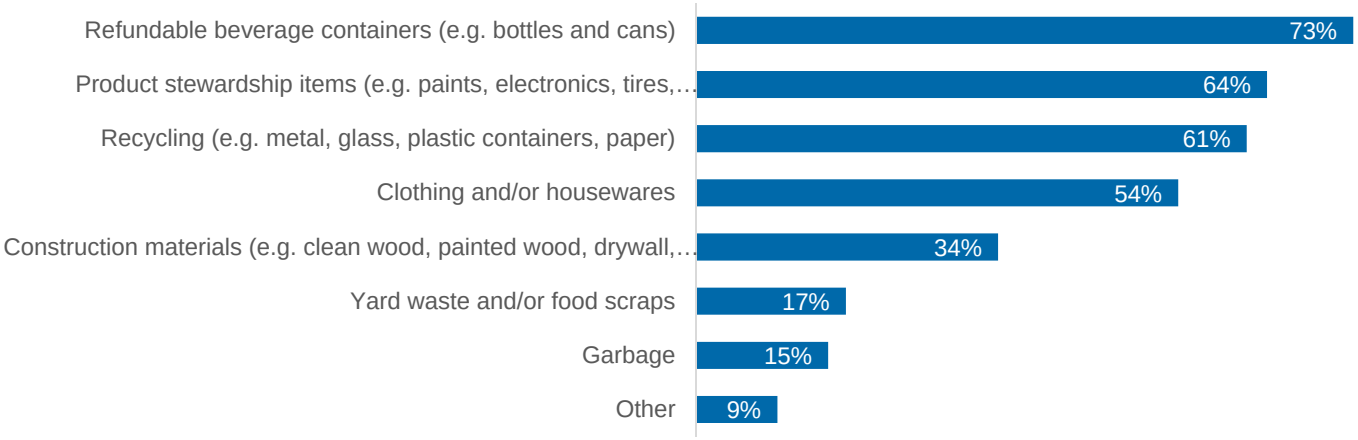

Figure 13: Common Waste Brought to Depots

Seventy-four percent of the respondents who were District residents answered the question “What do you think it would take to make our community a zero waste community?” The top four themes are below; two themes are combined at the third bullet.

- **Theme: Improve the current facilities and ease of use, such as clear and consistent signage, more access points, increased number of receptacles in different parts of the city, increase the capacity to recycle different products such as plastic bags or Styrofoam.**
  - "No plastic community! All stores cannot give plastic bags out anymore."
  - "Colour coding waste receptacles would be helpful in public places or around apartment dwellings. These should be visible throughout the corridor. If I am in Whistler I see the same colours on receptacles."
- **Theme: Increase public education for recycling, composting and other zero waste initiatives.**
  - "Another idea is training people on the 'reuse' of items. I think Squamish has many options on 'reuse' items like toys and housewares but wonder if everyone in the community is aware of this."
  - "Informing and educating the community. Schools could run programs about how to recycle properly."
- **Theme: Reduce packaging and have incentives or bans in order to reduce waste in the community.**
  - "Many suggestions for policy change, such as bans on plastic bags, water bottles, and different products. Creating incentive systems that make it more expensive to produce waste than to recycle. Potentially creating punitive or debilitating justice laws to regulate repeat offenders."

At the end of the survey the responders were asked to state what they believe should be the highest priority. Fifty five percent of the respondents who were Squamish residents provided feedback for this question. The results are summarized into themes outlined on Figure 14.

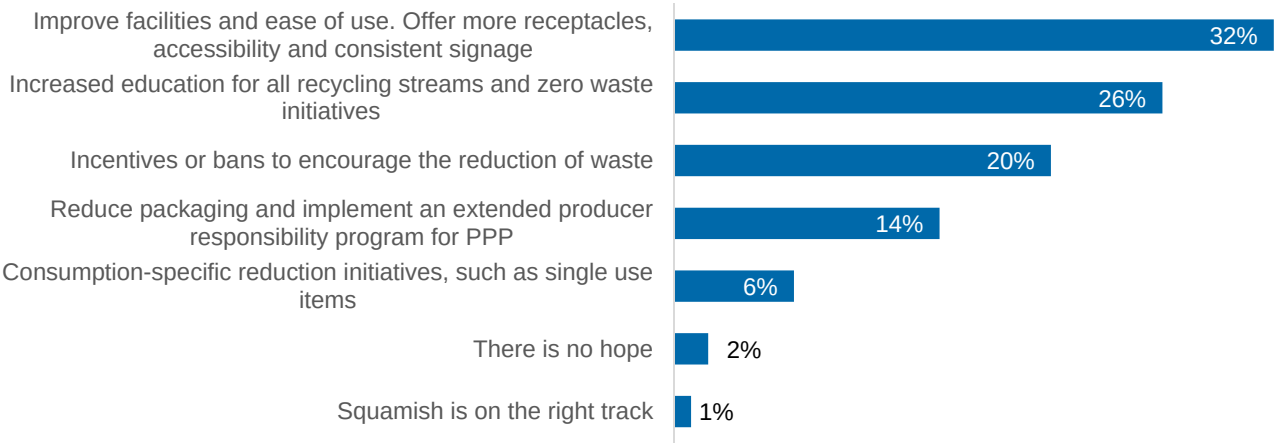

Figure 14: Priorities for Zero Waste Strategy

Additionally the survey allowed respondents to provide additional open-ended comments, some of which had similar themes as is outline below.

- **Theme: Being more thoughtful and discerning in consumption choices, such as buying less, using second hand products, purchasing products with less packaging or in bulk.**
  - "Avoid buying things with excessive packaging, especially those that can't be recycled."
  - "Reuse as many items as possible. Try to buy items with minimal packaging. Use the buy and sell to get rid of unwanted items."
- **Theme: Actively improving waste diversion practices through organics and recycling management.**
  - "I am composting and reusing items as well as supporting local farmers and gardeners. Less packaging, more environmentally friendly."
- **Theme: Already doing all that they can.**
  - "Already do all that is available in the community."

3.4 STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS ANALYSIS

As part of the evaluation, a strengths, weaknesses, opportunities and threats (SWOT) analysis was completed to evaluate the current zero waste systems. This exercise was done to highlight the key priorities and risks that exist in the process of achieving the targets set out in the Zero Waste Strategy. Table 6 summarizes the identified variables from the SWOT analysis.

Table 6: Decision Making Considerations – SWOT Analysis

Strengths	Weaknesses
▪ Residential garbage, recycling and organics collection program ▪ Utility fee structure promoting users to pay for the garbage they generate based on the size of waste collection container ▪ Regional organics processers with additional capacity ▪ Every other week garbage collection ▪ Strong community engagement in zero waste programs ▪ Quantity of diversion options available at the landfill depot ▪ Providing service to townhome developments ▪ Political and staff support for ongoing zero waste policy and program development and implementation ▪ Regional District support for zero waste initiatives	▪ Commercial participation in recycling and organics collection programs ▪ Multi-family buildings not offering organics collection services ▪ Increased participation in curbside programs to achieve better material diversion ▪ Weekly organics collection is currently a pilot program and should be made a permanent program ▪ Organics service weekly on a seasonal basis only can be improved if made a permanent weekly service year round ▪ District operations and corporate waste reduction plans ▪ Funding for new initiatives; funding dependent in part from landfill tipping fees where volume may need to decrease over time given limited air space
Opportunities	**Threats**
▪ Product steward funding or operation of recycling programs including future opportunity to allow Multi-Material BC to operate and fund curbside recycling program. ▪ As the owner of the landfill, opportunities for strong disposal bans and controlling what material is accepted for disposal versus diversion ▪ Additional EPR programs (mattresses, textiles, furniture, construction and demolition materials) ▪ Leverage existing and new programs from SLRD and Whistler ▪ OCP is being updated and can include new targets and goals for zero waste	▪ Lack of markets for dirty wood and other construction and demolition (C&D) materials ▪ Reliance on contractor for material stockpiling yard and finding reliable end markets for materials ▪ Land space available for sorting and stockpiling of materials destined for end markets

4.0 ZERO WASTE STRATEGY

The core focus of the Zero Waste Strategy is setting the vision and targets along with identifying the policies and initiatives by the common skill sets and organizational responsibilities that will help the District achieve the targets. The strategies have been organized by key elements including:

- Vision and strategic policies;
- Management systems and tools;
- Operational infrastructure and services; and
- Zero waste promotion and education programs.

Each element is critical to leverage system change across the District. As part of the ongoing planning process, any new options should be filtered through the waste prevention hierarchy to ensure "upstream solutions" are prioritized and promote a circular economy in the District.

The information from this strategy can be used and aligned with the targets and outcomes in the OCP and the Solid Waste Strategy. This includes both the short-term and long-term targets for the reduction of waste in the District that are aligned with the regional SLRD and provincial Ministry goals and targets. Long-term targets require continuous improvement of programs, and ongoing evaluation of new opportunities as they appear.

The highest priority items to be implemented by 2018 are summarized in Section 4.2 Priority Initiatives. All initiatives across short, medium and long-term are listed in Section 4.2.3 with proposed timeframe and corresponding potential impact on waste generation. A more detailed implementation plan delineating order of tasks, key considerations, resource needs, and roles and responsibilities is provided in Section 4.4.

Table 9 and Table 10 delineate all of the proposed initiative within each of the four elements of the waste management system: vision and policy, management tools, operations and infrastructure, and education and promotion. Figure 16 also shows the priority actions for 2016-2020. For each initiative in the detailed implementation plan, the table lists key considerations, resource needs, and roles and responsibilities to ensure the District has the information and tools needed to effectively and efficiently implement prioritized actions and measure results over time against updated targets.

4.1 VISION AND TARGETS

Traction for change tends to grow once policies and target have been established to set the direction for the actions to be implemented. A 2040 zero waste target is included in this strategy, along with a short term 2020 target to reach a waste generation rate of 350 kg/capita, in line with the provincial and regional target.

Targets such as zero waste are being adopted by many jurisdictions to demonstrate their commitment to waste diversion. Zero waste can be used as a target or a way of planning for waste reduction. Communities that reduce their waste or divert it by over 90% (from both landfill and waste incineration) are considered to have met the zero waste goal. Zero waste has been achieved by commercial business and manufacturers; however, there is currently no municipality in North America that has achieved zero waste to date. However, striving to achieve zero waste is a concept and philosophy that municipalities are taking to establish the overall approach for implementing waste management programs. There are municipalities in Europe that are achieving over 85% waste diversion and are on track to reach zero waste targets by 2020[4]. Having a clear definition of zero waste can be helpful for the District and organization to assist in evaluating options and decision making.

Setting targets is a very important task as it provides an indication of the direction and commitment to achieving its goals. It is also important to recognize whether the goals being set are visionary or attainable. The target will measure the District's success in environmental stewardship through increasing the percentage of waste that is recycled, reused, or composted, and decreasing the amount of waste that is landfilled. The proposed targets are ambitious and will require a strong commitment to new programs to make them happen. The regular review and updating of the targets is necessary as new programs are developed and data is collected to determine their effectiveness as participation in the programs increases over time. The proposed targets are to achieve the provincial targets by 2020, and zero waste by 2040. Table 7 outlines the approximate amount of time that would likely be required to meet the targets based on the level of programs put into place, as identified in Section 4.2

[4] Zero Waste Case Studies on communities are available at https://www.zerowasteeurope.eu/zw-library/case-studies/

Priority Actions and Initiatives and Section 4.4 Detailed Implementation Plan. Figure 15 outlines the additional diversion and waste reduction that will be necessary to reach the 350 kg per capita and 120 kg per capita targets.

Table 7: Estimated Years to Achieve Target Based on Strategy Implementation

Target	Attainable	Committed	Ambitious
350 kg per capita	2032	2026	2020
120 kg per capita	unknown	unknown	2040

The proposed 2020 target includes: Garbage disposal rate of 350 kg per person. This corresponds to a waste diversion rate of 75%.

The proposed 2040 target includes: Garbage disposal rate of 120 kg per person. This corresponds to a waste diversion rate of 90%.

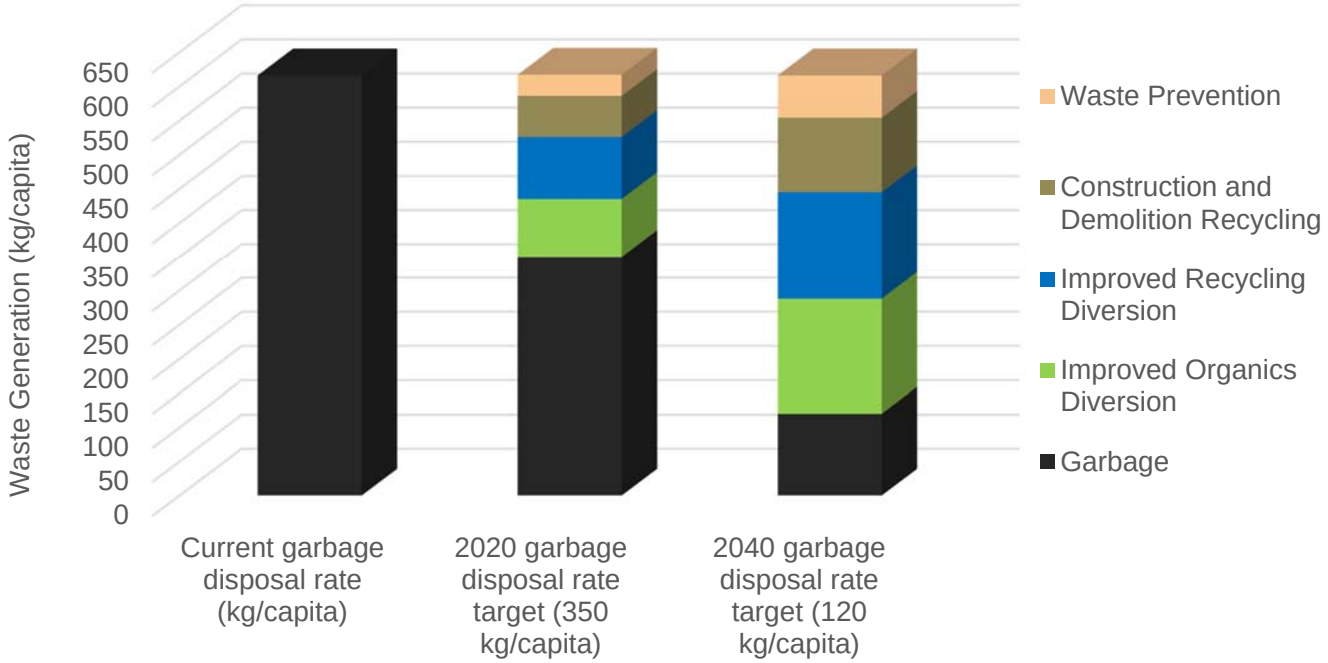

Figure 15: Projected Disposal Changes with Generation Rate Targets

Note: Per Capita Garbage Disposal Rate = Total tonnes disposed in the landfill/Total population

The disposal rates reported include waste from the residential sector, institutional, commercial, and light industrial sources as well as waste from construction, demolition and renovation activities.

Note: Waste Diversion Rate = Total materials diverted/Total materials generated (diverted + landfill).

The waste diversion rate is accepted as material diverted from the landfill for recycling and composting. Achieving a low garbage disposal rate is the primary goal of the strategy. The waste diversion rate is used as an indicator to evaluate the performance of diversion programs but the ultimate success is measured by decreased material use and achieving a lower garbage disposal rate.

The ongoing monitoring of the strategy performance towards the identified targets can be achieved by tracking specific metrics for various programs identified. Metrics are developed to establish baselines and gauge performance and progress. For solid waste management functions, examples of metrics that the District should consider include the following:

- Annual waste disposed, recycled and composted (tonnes per year);
- Annual waste disposal per sector; and
- Waste generation per capita.

It is accepted that what gets measured gets managed. In order to determine if the actions are effective in reducing and diverting waste, the District should adopt internal performance targets along with systems to measure progress. These can be quantitative targets such as:

- Recycling rate (including recyclables and organic waste);
- Residential disposal rate per capita;
- Participation rates in programs (bin set-out rates, compliance rates with programs); and/or
- Contamination levels in recycling and organic diversion options.

There are also qualitative targets such as compliance with local and provincial mandates and targets, ensuring waste management options that are consistent with regional waste management practices, resident satisfaction and/or minimizing the District's carbon footprint.

A summary of the target calculation based on tonnes disposed of material, and population growth forecasts is included in Table 8 and on Figure 16 shows the cumulated waste that will be generated under the scenarios presented in Table 7.

4.1.1 Target Setting – Top Priorities to Achieve Results

To achieve a 350 kg per capita waste disposal rate, significant new waste reduction and division will be required. These efforts can be framed using these four primary target areas, which are outlined below with estimated diversion anticipated from full implementation. See Section 4.2 for priority actions that fit into each priority.

4.1.1.1 Improved Organics Diversion

Capture 50% of the food scraps and food soiled paper currently in the garbage including:

- An additional 530 tonnes from the residential sector (this is a 50% increase over 2015 where 989 tonnes were collected and diverted); and
- An additional 1,215 tonnes from the commercial sector (this is more than a 400% increase over 2015 where 258 tonnes were collected and diverted).

4.1.1.2 Improved Recycling Diversion

Capture 50% of the recycling (paper, metal, plastic) in the garbage including:

- An additional 135 tonnes from the residential sector (this is a 14% increase over 2015 where 934 tonnes were collected and diverted); and
- An additional 1,075 tonnes from the commercial sector (this a 100% increase over 2015 where 1,058 tonnes were collected and diverted).

Capture 695 tonnes of additional materials at the recycling depots (glass, electronics, metals, building materials, etc.). This is a 20% increase over 2015 where 3,480 tonnes were collected and diverted.

4.1.1.3 Construction and Demolition

Capture 50% of the construction and demolition materials in the garbage including:

- An additional 1,200 of material (this is an 17% increase over 2015 where 6,870 tonnes of wood, asphalt shingles, concrete, drywall and steel were collected and diverted.

4.1.1.4 Waste Reduction

Reduce total waste generated by 5%

- Reduce the total amount of waste generated by 610 tonnes.

4.1.2 Waste Generation Summary

The waste reduction targets have been applied against the current 2015 waste generation rate to develop a forecast for the remaining total waste generated per year in the District as shown in Table 8.

Table 8: Waste Generation Rate Projections

Year	Population (With growth of 2.9% per year)	Tonnes Disposed per Year		
		Current 55% diversion rate (634 kg per capita)	If 75% diversion achieved (350 kg per capita)	If 90% diversion achieved (120 kg per capita)
2015	19,237	12,983	-	-
2016	19,294	13,914	-	-
2020	22,192	15,313	6,716	-
2040	39,311	27,124	11,897	4,759

Based on the waste reduction targets presented in Table 7, the total waste generated per year was calculated, and the results are displayed on Figure 16. Each set of diversion targets will require a one to three year period prior to achieving results. Early achievements in waste reduction can put the District on a path to reducing the total quantity of waste disposed per capita, which will significantly slow the cumulative waste disposed in the landfill.

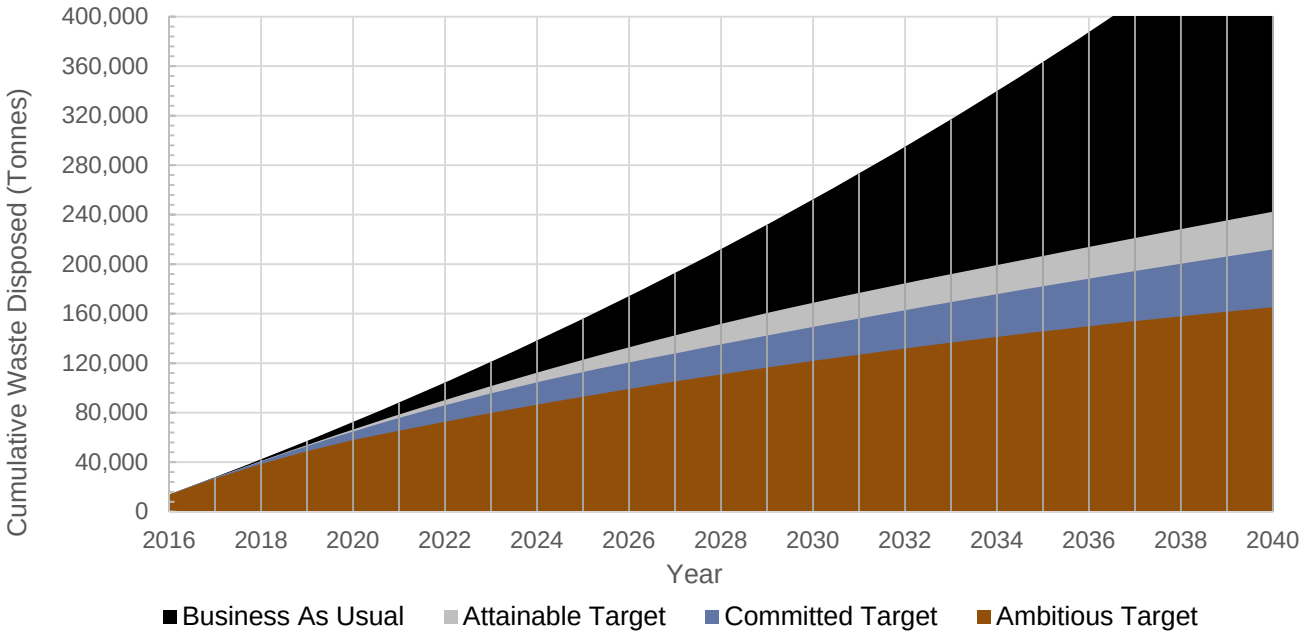

Figure 16: Projected Cumulative Waste Disposed

4.2 PRIORITY INITIATIVES

To achieve a 350 kg per capita diversion rate, the immediate focus of the strategy is to target and optimize the existing diversion programs and services. This includes improving diversion of organics and recycling (packaging and printed paper). Ensuring improved access, coverage, service and participation in organics and recycling programs can be achieved through instituting the following top four priorities in 2017 and 2018.

4.2.1 Top Four Priority Zero Waste Initiatives

Priority No. 1 – Implement an Organics Disposal Ban

- Implement an organics disposal ban as a regulatory tool to actively promote and reinforce organics diversion. Ensure enforcement mechanisms are in place to monitor and enforce the ban as required. The ban can be enforced at the landfill by phasing in a system where the surcharge (e.g., fee) increases over time as the threshold (e.g., amount of organics permitted in a load) is reduced. Over time the ban enforcement can be strengthened by promotion of a clear bag policy to better enforce lower thresholds of organics in the waste stream. Options exist at the municipal level to enforce disposal bans at sources of generation, in the longer term. Next steps include working with staff and stakeholders to review and decide upon implementation options, map out the plan to inform the public about the ban, adjust operations and train staff as needed, create a system to track the ban impact, and launch with an educational phase in period. For optimal compliance, this regulatory tool needs to be backed by other initiatives that promote infrastructure changes to ensure collection and behaviour change programs are in place. Timeframe: 2017

Priority No. 2 – Ensure Recycling and Organics Diversion Programs and Services are Available and Convenient for Everyone at Home, at Work and on the Go

- Ensure mandatory service is in place for recycling and organics diversion at apartments, condos, institutions and businesses in the District. While recycling infrastructure continues to grow, requiring three stream collection (e.g., recycling, organics, and garbage) at all residence types, in institutions and across the commercial sector will support increased participation and overall diversion. Consistent source separation systems across sectors will reduce potential confusion about material streams. Next steps include conducting a scan of similar legislation to draft the appropriate amendments, submit the bylaw changes for review and approval, publicize the requirement, and put a system in place to monitor and enforce compliance after an educational grace period. This regulatory tool needs to be reinforced by other high priority initiatives including adjusting the Solid Waste Bylaw to include size requirements for recycling and waste service rooms and technical assistance programs. Timeframe: 2017

Priority No. 3 – Institute Construction and Demolition Waste Diversion Guidelines

- Develop recycling targets as part of the construction, renovation and demolition permit process. Establish waste diversion guidelines to set specific recycling goals for construction and new build sites, set up a rebate program to link to construction permits and add incentives for onsite diversion systems, develop an enhanced fee structure for sorting at the landfill site (or other off-site location), and establish an advanced deconstruction permit option. Consideration should be given to making sure facilities exist to handle volume of demolition material for sorting, stockpiling, and recycling. Next steps include conducting a scan of existing C&D diversion programs, engaging key stakeholders as guidelines are being established and bylaw changes are drafted, getting those bylaw changes approved, and working with the appropriate internal staff to set up and enforce the guidelines. This initiative coincides with future disposal bans on construction-related recyclable materials including clean wood and product stewardship materials such as paint and electrical products. Timeframe: 2017

Priority No. 4 – Promote Waste Minimization

- This priority is reinforced by other waste reduction initiatives including ongoing educational efforts with the public and at schools with an educator program, food waste reduction[5], mini-grant programs to support reuse and repair programs, and procurement shifts within the corporate zero waste management plan. This includes lobbying senior government for additional EPR materials to be included and the ability to implement product bans for single use items. Additional products – such as mattresses, furniture and carpet – are slated for stewardship programs where manufacturers, rather than the tax payer, are charged with end of life management of their products. The intent of the BC Recycling Regulation is to enforce a 75% recovery rate for products under the regulation and ultimate support industry to adopt a 'Design for Environment' approach so products are more easily disassembled and recycled or composted to minimize waste. Ensuring local systems are in place for current EPR products and promoting adoption of new products are two approaches to support EPR programs. Currently the BC Community Charter prevents municipalities from legislating product bans for single use items. While voluntary product bans for items such as plastic bags and polystyrene take out containers – in partnership with area business associations and other key players – is a recommended initial step, promoting an adjustment to the Chart so that municipalities can more actively promote these actions is key to avoiding waste generation. Next steps include ongoing tracking of senior government actions to identify windows for promoting and requesting waste minimization-related initiatives. Timeframe: Ongoing

[5] Residential Food Waste Reduction Toolkit is available at: www2.gov.bc.ca/assets/gov/environment/waste-management/recycling/organics/resources/food_waste_reduction_toolkit.pdf

4.2.2 Other Short-Term High Priority Zero Waste Initiatives

The short-term high priority items to be implemented by 2018 are summarized in this section. They reinforce the top four priorities noted above and group key initiatives from detailed implementation table to reinforce synergies.

Updated Waste Diversion and Garbage Disposal Reduction Targets

- Adopting updated waste diversion and garbage disposal reduction targets sets the stage for other zero waste initiatives and establishes the District's commitment to moving towards zero waste. The 2020 target of 350 kg per person (for materials across all sectors) aligns with the British Columbia provincial goal and corresponds to a 75% diversion rate while the 2040 target of 120 kg per person corresponds to a 90% diversion rate and strives for the next level of excellence and is of particular importance given the District's anticipated population growth. By providing specific targets, the District can monitor progress over time by setting up performance measurement tracking systems to gauge the success of specific programs as well as overall progress. Next steps include submitting the targets for approval as part of the Zero Waste Strategy, and continuing to hone existing programs, develop new diversion programs, and refine tracking systems to move towards these targets. Timeframe: 2016

Official Community Plan Update to Include Zero Waste Elements

- Ensuring that key District policies specifically outline goals and targets for zero waste is key to reinforcing an ongoing commitment to establishing and maintaining waste reduction and diversion programs long-term. As the OCP is finalized, work with staff to include key elements from this strategy. Timeframe: 2016

Establish Disposal Bans for all Recyclable Materials and Products

- Adjust the Solid Waste Bylaw to include all applicable recyclable items to the disposal ban list based on what is easily recyclable as well as materials and products covered by current EPR programs. While an organics ban (Priority No. 1) will have a considerable impact, adding other materials to a disposal ban list reinforces the necessity for diversion and reinforces other system-wide changes to set service and behaviour norms for diversion. As with the organics disposal ban, a system for implementing and enforcing the bans will need to be developed. Timeframe: 2016-2018

Oversee and Staff Initiatives: Zero Waste Working Group and District Zero Waste Manager

- Put staffing and a governance structure in place to support zero waste implementation programs. Given the programs needed to meet the District's ambitious targets, it is essential to have management and staff support on board for planning, implementation, maintenance, and measurement of zero waste programs. While the existing zero waste manager position is in place and can serve as a driving force to oversee changes and be a knowledgeable resource for identifying efficiencies and best practices, a supporting governance structure is also essential. Establishing a zero waste working group consisting of key staff across the organizational structure institutionalizes support for zero waste initiatives, and can have some membership flex to adjust for needs over time. Membership should reflect leadership as well as operations, planning, and communications staff. Depending on the initiative, external members could be considered from Squamish CAN or other community members. Next steps include establishing the working group membership, meeting frequency, their first terms of reference, and other logistics. This component is key to drive zero waste planning and monitor performance across the District. Timeframe: 2016-2018

Performance Measurement and Monitoring

- Further hone performance measurement and monitoring to gauge progress against zero waste targets. Maintain results in a consolidated data base, conduct waste audits at regular intervals, and establish metrics to be used for monitoring results (e.g., waste generation and composition, participation rate, bylaw compliance counts from site visits and enforcement fines). This initiative also includes switching to on-board scales for hauling trucks for corporate facility waste monitoring, and, in line with contract renewals, the residential collection program. Next steps include establishing a monitoring plan to be vetted and approved through the zero waste working group. Timeframe: 2016-2018

Corporate Leadership to Develop a Zero Waste Management Plan

- Establish a formal District corporate waste reduction program for corporate activities and facilities to ensure key waste reduction and diversion programs are in place by facility type (e.g., parks, library, offices, operations and works yard, fire station, city hall, etc.). Develop performance measures to track progress by facility subset as fittings; for example, for public facing facilities garbage generation can be tracked per visitor while offices would have a per employee metric. Monitor through visual audits and periodic more comprehensive waste characterization studies to assess contamination and capture; continue to adjust operational systems to optimize the user experience and refine behaviour change programs accordingly. Address procurement policies as part of the plan to actively promote waste minimization through reuse, and seek recycled-content items to displace virgin material use and reduce carbon footprint. The program should be in line with expectations set for businesses with consistent branding across the District. Next steps include determining how and when the plan will be developed and setting the course for implementation to build on existing efforts. Timeframe: 2016-2018

Multi-family (Apartment and Condominium) Bylaws to Include Size Requirements for Waste Service Rooms

- Require appropriate storage space for multiple material streams generated in multi-family units as based on building size. By addressing one of the key structural challenges to apartment and condominium diversion challenges, systems can be upgraded to accommodate the appropriate recycling and organics collection streams. Next steps include completing an external scan to determine the size norms by unit type, drafting bylaw adjustments, engaging strata property managers for input and feedback – particularly to overcome challenges in existing buildings, and conducting ongoing engagement and phasing in inspection with fines to ensure compliance across the District. This initiative closely aligns with mandatory recycling and organics collection for multi-family businesses and can be supported through technical and engagement assistance (outlined below). Timeframe: 2016-2018

Multi-family Buildings, Institutional and Commercial Business Education and Technical Assistance

- Develop educational materials including toolkits and use for technical assistance support for multi-family buildings, institutions and commercial businesses. Prioritize direct engagement with follow-up and measurement as part of a comprehensive approach to ensure infrastructure is established and diversion capture is maximized. Build off best practices including use of community-based social marketing principles to provide appropriate prompts, gain buy in, and target specific behaviours to yield concrete behaviour change. Consider engaging the nonprofit group AWARE to leverage their relevant education experience along the Sea to Sky Corridor. Offer in suite kitchen containers for multi-family units as part of engagement efforts; provide colour-coded, suitable back of house containers and/or sources for businesses to customize collection infrastructure and increase capture of recyclable and compostable items. Other tools to be provided include

guidance for procurement, performance-based hauling contracts, signage incorporating SLRD zero waste branding, and random incentives for staff and other users to promote diversion behaviours. Other supporting initiatives include educational efforts to support a District-wide culture shift across generations and sectors. Timeframe: 2016-2018

4.2.3 Summary of Implementation Plan Initiatives

During the development of the strategy a number of initiatives were highlighted as ways to improve the diversion and reduction of waste in the District. These actions incorporate information obtained from the residents and stakeholders during the surveys, workshops and an open house. To achieve the ambitious 2020 and 2040 targets set out in Section 4.1, all initiatives would need to be implemented. A number of the strategies are interdependent on each other and the overall level of effort put into the initiative will determine the impact on the waste generation rate and progress towards the targets as indicated in Table 10.

The timeline summary aligns with the detailed implementation provided in Section 4.4. Each initiative is summarized using the following timeframe:

- 2016-2018 – Short-term Priorities
- 2018-2020 – Medium-term Priorities
- 2020 Onward – Longer-term Priorities

These timeframes are mapped out below along with the estimated impact on waste generation when the initiative is fully implemented. The descriptions for various impacts are defined below:

- **Implied** – There is no direct waste reduction or diversion from the initiative; however, the action drives development of programs and actions that will improve waste diversion and reduction.
- **Reinforces Impact** – These initiatives are not directly quantifiable, but will lead to better performance in other waste reduction and diversion initiatives.
- **Percentage of Potential Garbage Reduction** – This is the total amount of waste that can be reduced if the program achieved close to 100% capture of the materials in the garbage. Initiatives have overlap in the materials and sectors they target from the garbage, therefore, the total will not add up to 100%. New programs tend to start with lower capture rates and improve over time.

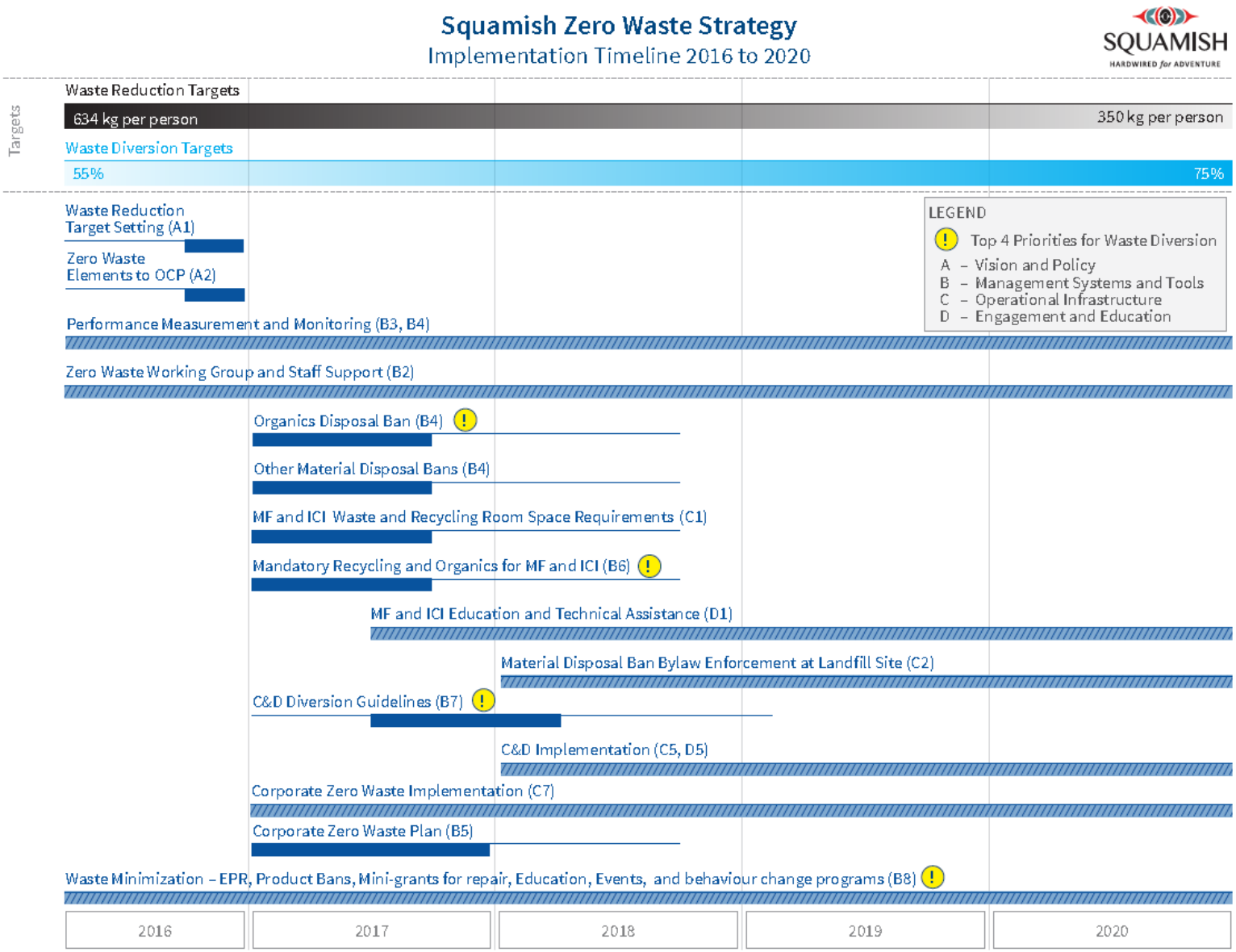

Figure 17: Implementation Time 2016-2020

Table 9: Strategic Plan Implementation Timeline Summary

No.	Initiative	Short-Term (2016-2018)	Medium-Term (2018-2020)	Longer-Term (2020 onward)	Estimated Impact on Waste Generation
VISION AND STRATEGIC POLICIES					
1	Updated Waste Diversion and Waste Generation Reduction Targets				Implied
2	Official Community Plan (OCP)				Implied
3	Corporate Leadership				Up to 5% of garbage
4	Lobby Senior Government for Additional EPR Materials to be Included and Ability to Implement Single Use Item Bans				Over 15% of garbage
5	Materials and Solid Waste Policy at Senior Government Levels				Reinforce impact
MANAGEMENT SYSTEMS AND TOOLS					
1	District Zero Waste Manager				Reinforce impact
2	Zero Waste Working Group				Reinforce impact
3	Performance Measurement and Monitoring				Reinforce impact
4	Bylaw Development: Establishment of Material Disposal Bans at Squamish Landfill				Up to 40% of garbage
5	Corporate Zero Waste Management Plan				Up to 5% of garbage
6	Bylaw Development: Mandatory Material Separation for Multi-unit and Commercial Businesses				Over 50% of garbage
7	Bylaw Development: Mandatory Construction and Demolition Recycling Targets for Building Construction and Demolition Permits				Up to 15% of garbage
8	Develop and Support Waste Reduction Tools				Up to 10% of garbage
9	Provincial and Municipal Programs				Reinforce impact
10	Special Events				Up to 2% of garbage
11	Small Funding Grant Program				Reinforce impact
12	Waste Service Contracts				Reinforce impact

No.	Initiative	Short-Term (2016-2018)	Medium-Term (2018-2020)	Longer-Term (2020 onward)	Estimated Impact on Waste Generation
OPERATIONAL INFRASTRUCTURE AND SERVICES					
1	Multi-family (Apartment and Condominium) Bylaws to Include Size Requirements for Waste Service Rooms				Up to 10% of garbage
2	Material Disposal Ban Enforcement				Reinforce impact
3	Multi-family In suite Food Scraps Collection Containers				Up to 5% of garbage
4	Technology Upgrades to Improve Monitoring and Measurement				Reinforce impact
5	Construction and Demolition Sorting and Recycling (capacity to handle in region)				Up to 15% of garbage
6	ICI Recycling Services and Depot Use, C&D Depot in Town				Up to 15% of garbage
7	Corporate Waste Reduction and Diversion Implementation				Up to 5% of garbage
8	Increase Opportunities to Recycle Existing and New Items				Over 15% of garbage
ENGAGEMENT AND EDUCATION PROGRAMS					
1	Multi-family Buildings and Commercial Business Education and Technical Assistance				Reinforce impact
2	Educational Programming – General				Reinforce impact
3	Recognition and Certification Programs for Zero Waste Businesses and Institutions				Reinforce impact
4	School Programs				Reinforce impact
5	Education – Toolkits				Reinforce impact
6	Community Connection				Reinforce impact
7	Education Programming – Prevention Focus				Reinforce impact
8	Engagement - Special Events				Reinforce impact
9	Community Based Social Marketing (CBSM)				Reinforce impact

4.3 PARTNERSHIP APPROACH

Achieving zero waste requires the participation of everyone in the community, and partnerships are key to making successful programs. Key partnership opportunities are highlighted in Table 10, and further information about their role in the Strategy are outlined below.

Regional (Public-Public Partnerships)

To achieve zero waste, the District will need to continue to explore partnerships and resource sharing arrangements with neighbouring jurisdictions including the SLRD, The Resort Municipality of Whistler, and the Village of Pemberton. These partnerships can increase the amount of materials and programs developed. This can include program guides, education and training, and sharing of ideas and successful programs. Resources can also be shared for time-intensive programs such as education and communications campaigns. The strategy has a number of shared zero waste goals with the SLRD, and the matched expectations and mutual political support can allow for collaboration when working towards the goals.

Community Partnerships

The District can also benefit financially, socially and environmentally from establishing close working relationships with community groups such as Squamish CAN that have mutual objectives during zero waste program development and implementation. Benefits include higher acceptance and support for zero waste initiatives in the community, achieving social objectives such as providing labour opportunities for people who may need to overcome employment barriers, and community involvement by working with volunteers.

In many places, non-governmental organizations (NGOs) are already playing a significant role in managing materials more sustainably. Organizations such as Squamish ReBuild and Squamish CAN are involved in promoting and educating the public on issues of waste, recycling and reuse.

4.4 DETAILED IMPLEMENTATION PLAN

The primary stages to strategy implementation can be defined as:

- **Commitment –** These include setting targets and policies that each department can commit to adopting, and show that they as a department are following through on their commitment to adopt the principles of zero waste in compliance with the corporate strategy. This would include determining key policies that need to be adopted to make commitment and programs happen.
- **Implementation** – Examples of how each department is implementing policies and practices to support the Strategy. For example, in the short-term this can include developing bylaws as well as tools and resources that will be needed to support the new bylaws.
- **Accountability** – Indicators that each department has mechanisms in place to measure and report on program performance.

The detailed implementation plan table in Section 4.4 lists the strategies, highlights the proposed action, indicates prerequisite steps and recommends an implementation timeline for future planning purposes. The table also discusses some noteworthy considerations in addition to resource requirements and role and responsibilities of personnel and entities that are vital to the success of the Zero Waste Strategy.

This implementation plan is a framework that the District could use as a starting point for defining the actions that will be taken in the coming years. The prioritization of actions including key bylaw changes and the implementation of an organics disposal ban are needed to assist with prioritizing subsequent actions that are intended for site or system improvements that are implemented to match the new bylaws and programs.

Generally, over the lifespan of a particular project, commitment will give way to implementation. Accountability will need to be in place to show progress and create opportunities for program refinement to achieve original commitments.

As strategies are operationalized, it is recommended that key stakeholders throughout the managerial zero waste working groups convene to clearly specify how action items are to be implemented. This more in-depth implementation process will include identifying and securing resources, developing and implementing pilot projects to field test and assess new programs, allocating budgets, tracking performance measure elements, and setting out a detailed implementation schedule.

Table 10: Detailed Implementation Plan

	Strategies	Action Highlights	Pre-requisite	Timeframe	Noteworthy Considerations	Resource Requirements		Roles and Responsibilities	
						Capital (One time)	Operational (Annual)	Dedicated Staff	Partners
A.	**VISION AND STRATEGIC POLICIES**								
1	Updated Waste Diversion and Waste Generation Reduction Targets	▪ Adopt updated targets (short-term [2020] and long-term [2040]) that provide the District with goals and options for moving forward	First step since target setting precedes action items	Q4 - 2016, Ongoing	▪ Commitment that outlines the direction for the District	-	.25 Full Time Equivalent (FTE) from existing position; additional short term FTE for 2016-2018 implementation $3,000 for conferences for waste diversion, EPR and policy advocacy	Zero Waste Manager and other managers as assigned to advocate for strong policy framework	Other District staff and departments
2	Official Community Plan (OCP)	▪ Ensure updated plan includes key elements from this strategy ▪ Guidance for solid waste management goals and targets	Policy informs other solid waste components	Q4 - 2016, Ongoing	▪ Existing policy framework that solid waste management plans and strategy can build on.	-			District staff
3	Corporate Leadership	▪ Establish a formal District corporate waste reduction program to ensure key waste reduction and diversion programs are in place by facility type (parks, library, offices, operations and works yard, fire station, city hall, etc.) with performance measures in place	A1. A2.	2017, Ongoing	▪ Shows leadership to help increase awareness and shift corporate and staff culture ▪ Lead by example - incorporates best practices as recommended to District businesses and operations including providing organics and recycling infrastructure, tracking progress and diversion and waste generation rates.	-			District staff
4	Lobby and Pressure Senior Government for Additional EPR Materials to be Included and Ability to Implement Single Use Item Bans	▪ Lobby provincial government for the continued implementation of additional EPR programs including mattresses, furniture and carpet. ▪ Lobby provincial government for ability to implement bans at a District level including single use items such as plastic bags and polystyrene take out containers	Provincial government legislation	Ongoing	▪ Work with industry groups to develop interim measures such as plastic bag fees at stores ▪ Presenting at industry conferences and working with the Regional District to inform senior government	-			SLRD staff, Product stewards, businesses and provincial government staff
5	Materials and Solid Waste Policy at Senior Government Levels	▪ Actively assess, collaborate and advocate as pertains to regional, provincial and municipal solid waste programs, carbon offset opportunities and other waste-related policy issues.	Policy development at higher levels of government	Ongoing	▪ Participate in regular Regional District planning sessions ▪ Keeping abreast of new initiatives that can affect the District	-			SLRD, BC Ministry of Environment staff
B.	**MANAGEMENT SYSTEMS AND TOOLS**								
1	District Zero Waste Manager (Existing position)	▪ Ensure the organizational structure includes the necessary support for implementing zero waste in all departments ▪ Driving force who can oversee changes, be a knowledgeable resource, implement new programs, monitor performance and identify efficiencies and best practices	A.B.C.D. Requirement for backing policy, management and other initiatives as relevant	Q4 - 2016	▪ Point of contact District senior management to assess waste reduction goals and program costs ▪ Consider reallocating landfill management duties to another staff position, or a new position, to ensure expanding zero waste initiatives are effectively managed	-	0.25 FTE from existing position; additional short term FTE for 2016-2018 implementation Time from additional staff as needed for Working Group participation	0.25 FTE to build management systems and tools for garbage reduction efficiencies and corresponding monitoring systems	Department managers
2	Zero Waste Working Group	▪ Convenes core staff from across departments to sequence and coordinate initiatives, overcome potential institutional barriers (e.g., financial, political), monitor performance of both corporate and community actions.	B1.		▪ Meet on a quarterly basis. ▪ Adjust group composition and Terms of Reference to reflect priorities ▪ Include community partners as relevant to specific initiatives	-			District managers from key department groupings (e.g., Community Planning & Infrastructure, Corporate Services, Recreation and Culture)

Strategies		Action Highlights	Pre-requisite	Timeframe	Noteworthy Considerations	Resource Requirements		Roles and Responsibilities	
						Capital (One time)	**Operational** (Annual)	**Dedicated Staff**	**Partners**
3	Performance Measurement and Monitoring	▪ Metrics to monitor waste reduction and progress towards targets and goals ▪ Results maintained in database ▪ Support for on-board waste hauling truck scales for pay-by-weight corporate contracts ▪ Visually monitor system and conduct regular waste audits	B1.	Q4 - 2016	▪ Metrics can include participation rate, bylaw compliance, number of fines/surcharges paid at the landfill ▪ Instrumental in determining progress and where more support is required ▪ Bi-annual waste audits to track changes in waste characterization	$20,000 for every other year waste composition studies TBD for other monitoring resources			District managers and waste hauling contractors
4	Bylaw Development: Establishment of Material Disposal Bans at the District Landfill	▪ Ban materials from disposal at landfill – from all sectors - that have a viable diversion option in Squamish ▪ Enforcement mechanisms including tipping fee surcharges and fines	Ensure viable material diversion and recycling infrastructure is in place	2017 – food scraps and recycled materials collected in the District 2018 – clean wood 2018 – other C&D materials as diversion options are developed	▪ Provides necessary direction to residents and industry to plan for and implement diversion program ▪ Further implementation planning needed to establish threshold and surcharges, education and enforcement				District staff, local businesses and industry
5	Corporate Zero Waste Management Plan	▪ Zero waste management plan for corporate activities and facilities ▪ Include procurement policies, diversion infrastructure and initiatives	Ensure waste diversion infrastructure is available to staff and facility users	2017 - 2020	▪ Opportunity to lead by example and incorporate waste diversion initiatives into corporate operations ▪ Ensure diversion infrastructure is provided by the District's corporate facilities, parks, streets etc. ▪ Plan development to specify capital and operational resources needed to build and maintain the corporate zero waste systems over time	$50,000 for consultant or staff equivalent			▪ District staff ▪ Municipal staff from nearby jurisdictions – to build from best practices and lessons learned
6	Bylaw Development: Mandatory Material Separation For Multi-family and Commercial Businesses	▪ Ensure all residents and businesses provide garbage, recycling and organics collection services	Prior to bylaw, ensure that: 1. corporate zero waste plan is underway with some visible results (that emulate what is expected from businesses); and 2. best practices tools and technical assistance services are in place to support those affected by bylaw	2017	▪ Regulatory tool to complement ban ▪ Develop requirements for size and space for waste/recycling/organics bins in new residential and commercial developments ▪ Sample bin size and number calculators depending on the number of residents ▪ Assess education and technical assistance resources needed to ensure bylaw compliance and seek implementation funding along with the bylaw	-			Developers, strata councils, businesses, haulers, recyclers, District staff.

Strategies		Action Highlights	Pre-requisite	Timeframe	Noteworthy Considerations	Resource Requirements		Roles and Responsibilities	
						Capital (One time)	**Operational** (Annual)	**Dedicated Staff**	**Partners**
7	Bylaw Development: Mandatory Construction and Demolition Recycling Targets for Building Construction and Demolition Permits	▪ Mandatory waste management plans for permit application and refundable fees based on diversion targets achieved ▪ Development of an enhanced fee structure for sorting at the landfill (or recycling yard) ▪ Advanced deconstruction permit option	Ensure facilities exist to handle additional volume of demolition material for sorting, stockpiling and recycling	2018	▪ Assist site managers in identifying best practices, local government programs and cost saving measures	-			Contractors, Developers, District staff, Haulers, Recyclers.
8	Develop and Support Waste Reduction Tools	▪ Purchasing guidelines and program support for programs that reduce the quantity of waste generated ▪ Actively seek opportunities to shift procurement practices towards more durable reusable goods, require recycled content, and when single use items are need, ensure that products are easily recyclable or compostable ▪ Develop strategies to manage and reduce the number of bags generated and used by District businesses and residents	A5, B5.	Ongoing	▪ Food waste reduction and recovery, plastic bag or product fees, re-usable diapers, pet waste etc. ▪ Voluntary reduction strategies for bag fees developed in conjunction with retail sector can be highly effective ▪ Note that bag bans are not standard public policy in BC as this falls under Provincial jurisdiction	To be determined (TBD)			District Staff
9	Provincial and Municipal Programs	▪ Pro-actively monitor and promote new and existing government programs, such as MMBC, to offset costs where possible ▪ Understand SLRD programs that are usually more cost-effective and have educational material that would inform residents	A4, A5	Ongoing	▪ Develop and adopt strategies for working with SLRD and product stewards to retain services that are cost-effective and meet District goals/targets	-			Regional Districts, Product stewards, and Provincial government
10	Special Events	▪ Develop and implement protocol guide to increase waste avoidance and diversion at events held by or within the District ▪ Purchasing requirements or conditions such as banning Styrofoam at events	A1-3. B1-2.	2017	▪ Event permits to promote zero waste events with a priority on waste prevention (e.g., reuse, type and size of 'swag' given out) and easily recyclable/compostable greenware as needed ▪ Goals, education and support for event organizers	$5K for signage, training materials, and other supplies.		Zero Waste Manager, Corporate Services, Recreation and Culture event staff	Event organizers and vendors, District staff, waste haulers
11	Small Funding Grant Program	▪ Setup to support residents/neighborhoods/and non-profits for starting community-led waste reduction programs (sharing economy and reuse programs)	Development of zero waste fund	Ongoing	▪ Support for programs including development of a toy library, tool library, repair café, Squamish rebuild, zero waste events, food waste reduction, kitchen catcher give-away etc. ▪ As part of grant program development, conduct further inquiry to determine the expected impact/return for the type and amount of grants ▪ Can be added as part of the existing Community Grant Program.	-	$30,000 (6-15 $2-5,000 grants)	Zero Waste Manager	Grant foundations, community non-profits, residents

Strategies		Action Highlights	Pre-requisite	Timeframe	Noteworthy Considerations	Resource Requirements		Roles and Responsibilities	
						Capital (One time)	Operational (Annual)	Dedicated Staff	Partners
12	Waste Service Contracts	▪ Ensure ongoing service delivery includes program successes including weekly organics collection, every other week garbage collection	B4,6,7 To be updated based how material management changes result from policy and management tool shifts	2017, Ongoing	▪ Ensure minimum service levels for recycling and organics ▪ Explore opportunity for the District to provide service, or Franchise services areas for waste hauling ▪ Include performance metrics in service contracts	To be determined as contract bids and updates occur (consulting and/or staff equivalent costs)	As per contract	Zero Waste Manager, Engineering Director	Outside support as required
C. OPERATIONAL INFRASTRUCTURE AND SERVICES									
1	Multi-family (Apartment and Condominium) Bylaws to Include Size Requirements for Waste and Recycling Service Rooms	▪ Develop size requirements and organics and recycling bin requirements based on occupancy of building ▪ Work with stratas, property managers and/or product stewards (where applicable) to ensure changes comply with their requirements	A1-4. B6.	2016, Ongoing	▪ Based on recommendation from an infrastructure assessment ▪ Design elements should be discussed with stratas, landlords and/or product steward for consistency ▪ Recycling services should follow product steward requirements	-	-	Zero Waste Manager	Stratas, property managers and/or product stewards, waste haulers
2	Material Disposal Ban Enforcement	▪ Ensure enforcement mechanisms are put in place to reinforce desired behaviour and encourage participation in programs	B4.	2017	▪ Residential collection routes can include cameras installed on collection trucks, staff/bylaw bin checks, and reminder notifications to offenders ▪ Technical assistance for businesses can include spot audits and inspections ▪ Landfill audits of materials and clear bag pilots and bin checks for enforcement	0.25 FTE Bylaw Support and Enforcement Officer	TBD	Engineering Director, Zero Waste Manager	Contractors, District staff – including Bylaws, Engineering and Public Works
3	Multi-family In suite Food Scraps Collection Containers	▪ Distribution of waste diversion containers (food scrap kitchen containers) at multi-family sites to promote more active participation in organics diversion programs	C1. In conjunction with D2.	2017, Ongoing	▪ Implemented in conjunction with hauler ▪ Services as a physical prompt to accompany educational information distribution and outreach efforts	$8,000-11,000 (based on 1560 apartments/condos @ $5-7 per unit)	Contracted hauler to distribute and replace as needed (include in contract requirements	Zero Waste Manager	Local government, private hauler
4	Technology Upgrades to Improve Monitoring and Measurement	▪ Technology including on-board cameras, scales and RFID tags can optimize collection routes and provide feedback to the District and residents and to monitor participation and compliance with collection programs	B12.	2017	▪ On-board cameras photograph each collection as the bin is tipped ▪ RFID technology integrated with GPS will notify the District as collection occurs ▪ Require technology inclusion as part of contract updates as relevant ▪ Consider on-board scale to provision for ICI/MF working in conjunction with the hauler – in voluntary capacity or through a (potential) future franchise agreement	Estimated $20,000 per truck for built in RFID readers	$1,000 per year estimate for contracts for cellular data transmission and data hosting	Zero Waste Manager, Engineering Director	
5	Construction and Demolition Sorting and Recycling (capacity to handle in region)	▪ Assess capacity and explore opportunities to process or recycle C&D materials in the region	B7.	2018	▪ Consider what outputs from C&D can be reused, recycled for commodity value, and/or used as inputs to local industrial processes	TBD	TBD	Zero Waste Manager, Engineering Director	Contractors, processors, entrepreneurs

Strategies		Action Highlights	Pre-requisite	Timeframe	Noteworthy Considerations	Resource Requirements		Roles and Responsibilities	
						Capital (One time)	Operational (Annual)	Dedicated Staff	Partners
6	ICI Recycling Services and Depot Use, C&D Depot in Town	▪ Assess capacity and explore opportunities to provide additional recycling services, including depots, within the District	B6, B7.	2019	▪ Consider collaborations with businesses and other municipalities along the Sea to Sky corridor	TBD	TBD	Zero Waste Manager, Engineering Director	Contractors, processors, entrepreneurs
7	Corporate Waste Reduction and Diversion Implementation	▪ Implement zero waste collection systems appropriate by facility type (e.g., offices, recreational centres - front and back of house, public works yard, etc.)	A4. B5.	2017	▪ Use best practices as developed for District businesses ▪ Consider short-term staff resources for implementation period and implement an ongoing maintenance and monitoring program	TBD as per B5.	TBD as per B5.	Facilities	District staff
8	Increase opportunities to Recycle Existing and New Items	▪ Pilot new deconstruction and recycling opportunities for materials including furniture and carpet	A4, B5.	2018	▪ Align with anticipated and/or upcoming EPR stewardship programs (i.e., carpet, furniture) and materials that can potentially serve as inputs to new processes locally (e.g., asphalt shingles into paving)	TBD	TBD	Zero Waste Manager, Engineering Director	Contractors, processors, entrepreneurs
D. ENGAGEMENT AND EDUCATION PROGRAMS									
1	Multi-family Buildings and Commercial Business Education and Technical Assistance	▪ Develop educational materials including toolkits and technical assistance support MF and commercial businesses compliance with mandatory recycling bylaw (e.g., space, bins, storage, signage)	A1-2. B6. C1.	2017	▪ Engage AWARE contractors to leverage existing resources as developed for the Resort Municipality of Whistler ▪ Build off best practices ▪ Prioritize direct engagement with follow up and measurement as part of a comprehensive approach to ensure infrastructure is established and diversion capture is maximized	TBD as part of B5.	TBD as part of B5.	Zero Waste Manager and Communication staff	▪ District staff ▪ SLRD ▪ AWARE/RMOW
2	Educational Programming – General	▪ Reginal brand and signage	Consistent with vision and strategic policies	Ongoing	▪ Align with SLRD established zero waste branding	Promotional materials as relevant to projects	Contracted support or staff equivalent	Zero Waste Manager and Communication staff	▪ SLRD ▪ District staff ▪ Local contractors and recyclers
3	Recognition and Certification Programs for Zero Waste Businesses and Institutions	▪ Recognize business champions and individuals that are helping Squamish reach its zero waste goals/targets.	B3.	Ongoing	▪ Zero hero programs ▪ Link it to Squamish CAN's Green Business Awards.	TBD – assess and update annual budget and phase programming as is appropriate	TBD	Zero Waste Manager	▪ SLRD ▪ Squamish CAN
4	School Programs	▪ Engage with schools and youth through school programs and outreach	A 1-2. Identify barriers to participation in zero waste programs		▪ AWARE's existing in class education program, DreamRider Productions Zero Waste Planet Protector classroom program ▪ Link to SLRD education plans	-	$10,000 for educator to develop and deliver workshops to schools		▪ SLRD ▪ School District
5	Education – Toolkits	▪ Develop resource guides, training toolkits for Multi-family and construction and demolition waste diversion implementation			▪ Construction and renovation recycling guides ▪ Multi-family building recycling and organics collection ▪ Commercial and institutional organics programs and education	-	TBD		▪ SLRD ▪ District staff - Communications

Strategies		Action Highlights	Pre-requisite	Timeframe	Noteworthy Considerations	Resource Requirements		Roles and Responsibilities	
						Capital (One time)	Operational (Annual)	Dedicated Staff	Partners
6	Education – Community Connection	▪ Develop and promote success stories form the District			▪ Profiles and case studies of businesses ▪ Video series highlighting resident initiative	-	TBD		District staff – Communications
7	Education Programming – Prevention Focus	▪ Promote waste prevention through initiatives such as no junk mail, free newsprint, onsite composting (where applicable) and reuse/share shed			▪ Reinforce cost savings that can result from waste avoidance, also quality of life value resulting from community-based initiatives	$25,000 for construction of share shed	TBD		District staff - Communications
8	Engagement - Special Events	▪ Support ongoing public events that foster participation in zero waste programs			▪ ReUse-It Fair, food recovery breakfast with the Mayor, repair café, upcycle contest, etc.	-	$500 - $3000 per event		▪ District staff – Recreation ▪ Squamish CAN
9	Community Based Social Marketing (CBSM)	▪ Leverage and support CBSM principals of identifying and removing barriers to behaviour change, piloting programs to overcome barriers			▪ Partner with organizations that can assist in developing successful programs ▪ Pilot programs to remove structural barriers and use tools such as prompts, reminders, norms and vivid communication tools ▪ Evaluate effectiveness of programs	TBD	TBD		▪ SLRD ▪ Non-profit organizations ▪ Quest University

5.0 CLOSURE

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

Respectfully submitted,
Tetra Tech EBA Inc.

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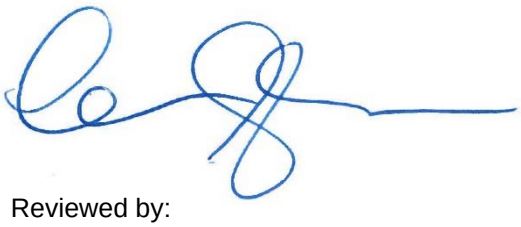

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APPENDIX A

TETRA TECH'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEOENVIRONMENTAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.1 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of TETRA TECH’s client. TETRA TECH does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than TETRA TECH’s Client unless otherwise authorized in writing by TETRA TECH. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the report, if required, may be obtained upon request.

1.2 ALTERNATE REPORT FORMAT

Where TETRA TECH submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed TETRA TECH’s instruments of professional service); only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by TETRA TECH shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of TETRA TECH’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except TETRA TECH. The Client warrants that TETRA TECH’s instruments of professional service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

1.3 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

1.4 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of the report, TETRA TECH may rely on information provided by persons other than the Client. While TETRA TECH endeavours to verify the accuracy of such information when instructed to do so by the Client, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

2016 WASTE COMPOSITION STUDY TECH MEMO

TETRA TECH

OQM | Organizational Quality Management Program

ISSUED FOR USE

To:	Shannon White Rod MacLeod	**Date:**	July 14, 2016
c:		**Memo No.:**	001
From:	Belinda Li Avery Gottfried Tamara Shulman	**File:**	704-SWM.SWOP03073
Subject:	Waste Composition Study Results		

1.0 INTRODUCTION

Tetra Tech EBA Inc. (Tetra Tech) was retained by the District of Squamish (DoS) to conduct a waste composition study to inform the development of the DoS's Solid Waste Strategy.

The composition of solid waste was determined from the following sources:

- Single Family Residential;
- Multi-Family Residential; and
- Industrial, Commercia,l and Institutional.

This technical memo summarizes the methodology used for the waste composition study and results.

2.0 METHODOLOGY

The waste composition study took place on May 2 to 4, 2016 at the DoS landfill.

Tetra Tech worked closely with the collection contractor and landfill staff to arrange garbage collection routes so that our sorting staff at the landfill could receive load that were isolated from each sector. The sectors included: Single Family (SF); Multi-Family (MF); and Industrial, Commercial and Institutional (ICI). Upon delivery of the waste to the DoS landfill, the sector type was identified and the loader operator collected one loader bucket, approximately 300 kg to 500 kg on average to deliver to the sorting area located in the public drop-off area. Identifying information about the load was recorded and a copy of a scale receipt was obtained from the scale house, with the exception of one sample that came through when the scale computer was not in operation, and data was captured manually.

Prior to collecting the sample, a photo was taken. For each sample, the field team collected approximately 100 kg of garbage from a random location within the load. The sample was then weighed prior to sorting its contents. The materials from the samples were sorted into bins based on the pre-determined categories. There were 12 primary categories and a total of 31 subcategories. A complete list of the categories along with their descriptions can be found in Appendix A. The primary categories were similar to what is commonly used by other Cities and Regional Districts in British Columbia, allowing for comparable data at the primary level. The primary categories included: paper, plastic, metal, glass, organics, building material, bulky objects, electronic waste, household hazardous waste, household hygiene, textiles, and fines. Some composite or multi-material items would fall under more than one category. These items were placed in the category for whichever material had the greatest amount of a single

primary material category by weight. At the end of the sample sorting, each categorized bin was weighed and the bin tare weight was subtracted to obtain the net sample weight. Select sample photographs can be found in Appendix B.

Data was manually recorded into a spreadsheet. For quality assurance, the pre-sorting weight and sorted weight were compared in order to ensure all weights were accounted for and within 3%. The data was compiled to calculate an average percent composition of each category to generate results for the individual sectors and overall.

In total over the 3 days or sorting 12 samples were completed totalling 1,215 kg of garbage. The samples were equally distributed from the three sectors (SF, MF, and ICI), with four samples per sector.

3.0 RESULTS

Table 1 outlines the overall waste composition by primary category. Appendix C includes a detailed table of results by primary and secondary categories. Results by sector and for the overall waste composition study are presented in the following sections.

Table 1: Summary of Primary Material Composition

Primary Category	Single Family Residential (N=4)	Multi-Family Residential (N=4)	Industrial, Commercial and Institutional (N=4)	All Samples Combined (N=12)
Building Material	1%	5%	14%	6%
Bulky Objects	<1%	<1%	2%	1%
Electronic Waste	1%	3%	4%	2%
Fines	1%	1%	2%	1%
Glass	2%	2%	3%	3%
Household Hazardous Waste	1%	1%	<1%	<1%
Household Hygiene	17%	30%	4%	17%
Metal	3%	2%	3%	2%
Organics	40%	30%	33%	35%
Paper	11%	9%	20%	13%
Plastic	15%	11%	13%	13%
Textiles	8%	7%	4%	6%

N = number of samples completed
Due to rounding of the presented results, all values may not add to 100%

3.1 SINGLE FAMILY RESIDENTIAL

The composition of SF residential garbage is presented in Figure 1 by primary material category. The greatest component was organics (40%), followed by household hygiene (17%), plastic (15%), and paper (11%). The largest portion of the garbage was organics, and the majority was classified as avoidable food waste (18%), which consists of food that could have been eaten such as leftovers, spoiled food, or intact (whole) foods. Unavoidable food waste (peelings, bones, coffee grounds and shells) totaled 12%. The remainder of the organics included dirty wood (5%) and yard waste (4%). The second largest category was household hygiene, and this mainly consisted of diapers and pet waste including rabbit or hamster nesting material and cat litter. For plastics, film packaging (retails bags and wrap) was the largest component of plastic (6%), followed by durable plastic products (4%) film products (2%), plastic packaging (2%), and Styrofoam (1%). Paper primarily included recyclable (fine, office, cardboard, coffee cups) paper (5%) and compostable (food-soiled paper, pizza boxes, paper towels) paper (5%).

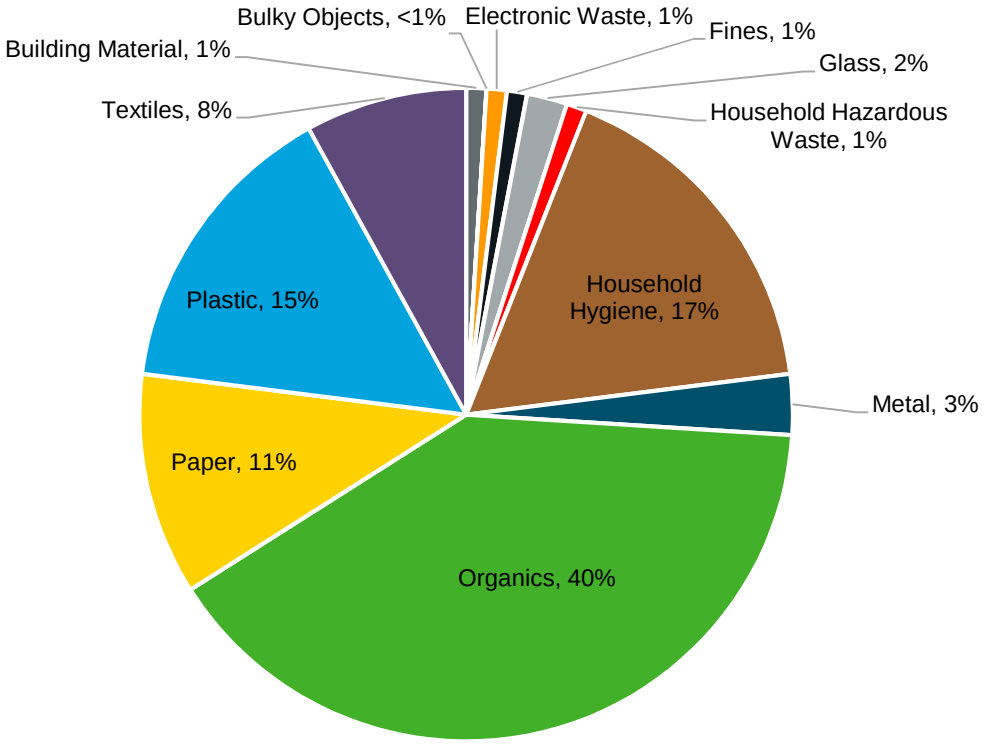

Figure 1: Primary Category Composition - Single Family Residential Garbage (N=4)

In 2012, the Squamish Lillooet Regional District (SLRD) conducted a waste composition study while completing the regions organics strategy. That study noted that the residential compostable organics totaled 50% of the garbage, and all recyclables totaled 12%. Comparing to 2012, the organics percentage has dropped by approximately 10%, and the amount of recyclables remaining the garbage including recyclable paper, plastic, metal and glass is similar remaining at 12%.

3.2 MULTI-FAMILY RESIDENTIAL

The composition of MF residential garbage is presented in Figure 2 by primary material category. The largest components for this sector were organics (30%) and household hygiene (30%). For organics, avoidable food waste (17%) was the greatest followed by unavoidable food waste (9%). There were also small amount of dirty wood (2%) and clean wood (1%). Household hygiene consisted primarily of diapers and pet waste that was identified as primarily as cat litter. Other categories of note were plastic (11%) and paper (9%). Plastic comprised mostly of film packaging (4%) and durable plastic products (3%), such as straws, toys, cutlery and other household objects. The largest paper categories included compostable paper at (5%) and recyclable paper at (4%).

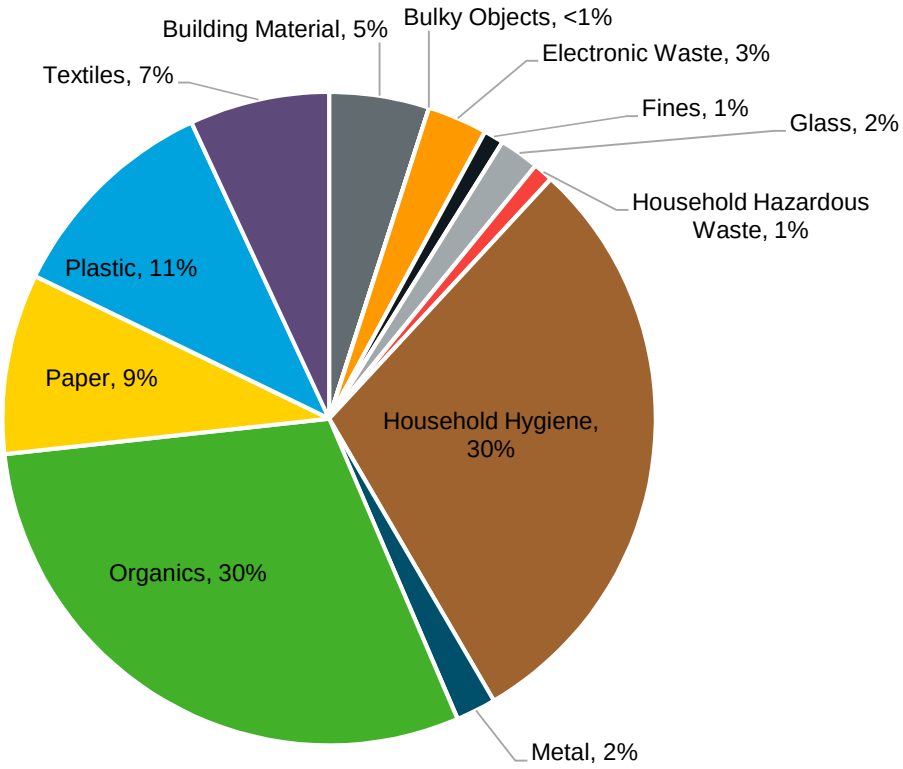

Figure 2: Primary Category Composition - Multi-Family Residential Garbage (N=4)

3.3 INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL

The composition of ICI garbage is presented in Figure 3 by primary material category. The largest primary categories were organics (33%), paper (19%), building materials (14%), and plastic (13%). Organics were primarily avoidable food waste (20%). A large number of items from the food service and retail sector appeared to be culls or surplus products such as full bakery items or boxes of produce. Other organics included a small amount of dirty wood (3%), clean wood (2%), and yard waste (1%). The majority of paper was recyclable (11%) and compostable (9%). The quantity of building materials in this sector was large (14%), however one sample had 36% roof shingles. Since four samples were completed, this impacts the overall average. The ICI sector is highly variable, and more samples would need to be completed to determine the occurrence of building materials in the ICI waste stream. The detailed Excel datasheets outline the sources and sample by sample data for the four ICI samples, which included garbage from grocery stores, hotels, gas stations, restaurants, bakeries, and child care facilities. The plastic subcategories were generally evenly divided between rigid (excluding Styrofoam) packaging (3%), durable plastic products (3%), film packaging (3%), and film products (e.g., Ziploc bags and tarps) (3%).

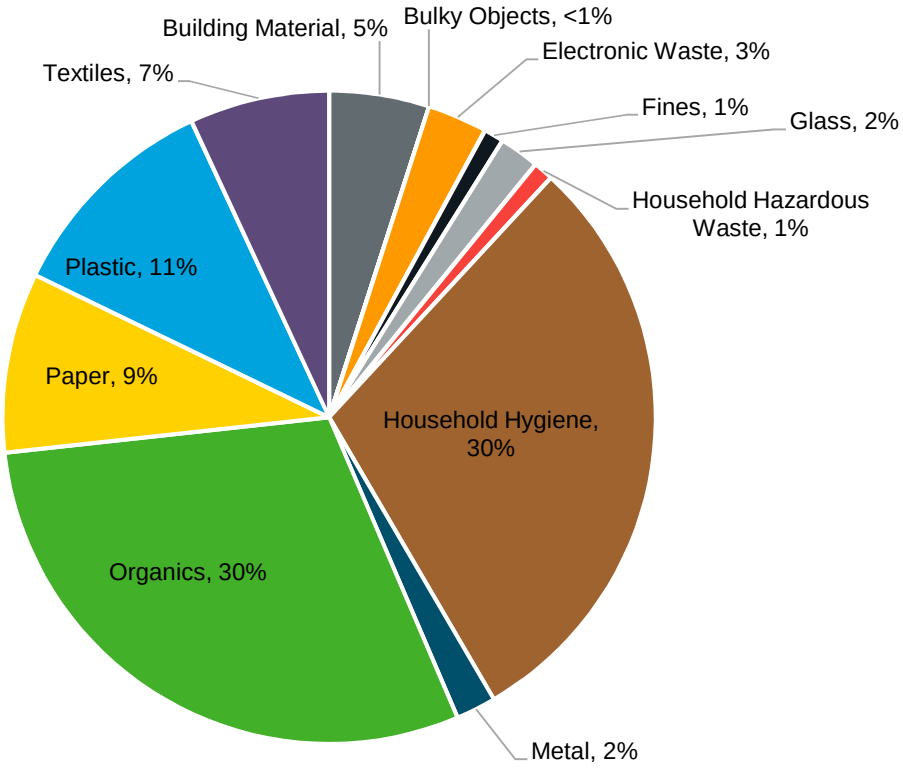

Figure 3: Primary Category Composition - Industrial, Commercial and Institutional (N=4)

In 2012, the SLRD conducted a waste composition study while completing the regions organics strategy. That study noted that the compostable organics totaled 37% of the garbage stream, and all recyclables totaled 24%. Comparing to 2012, the organics percentage has dropped by approximately 5%, and the amount of recyclables remaining the garbage including recyclable paper, plastic, metal and glass has dropped approximately 6% to a total of 18% in 2016.

3.4 COMBINED WASTE COMPOSITION RESULTS

The composition of garbage from the combined sectors is presented in Figure 4 by primary material category. The largest category was organics (35%), comprised primarily of avoidable food waste (18%), and unavoidable food waste (9%). Due to the large volume of diapers and pet waste observed, household hygiene was the second largest category (17%). Other prominent categories were paper (13%) and plastic (13%). Most paper was recyclable (7%) or compostable (6%), while plastic included film packaging (4%), durable plastic products (3%) and rigid packaging (2%).

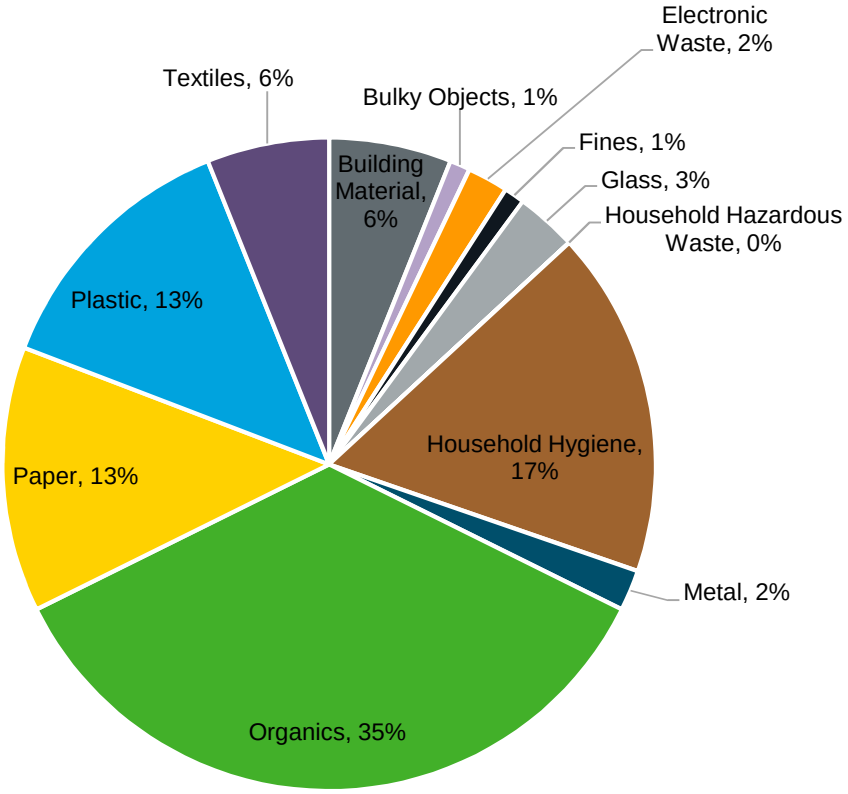

Figure 4: Primary Category Composition - Combined (N=12)

Based on the combined waste composition results, the quantity and percentage of materials that are recyclable (can be put in the curbside blue tote), depot drop-off (can be recycled at a depot or transfer facility), compostable (can be put in the curbside green tote), and residual (needs to be landfilled or disposed) was extrapolated using commercial and residential waste tonnages from 2015. The estimates are presented in Table 2.

Table 2: Waste Quantity Extrapolations (Residential and Commercial Sectors)

Type	Percent of Waste Stream	Estimated Quantity (tonnes/year)[1]
Compostable (Curbside Program)	37%	3,780
Recyclable (Depot Drop-Off)	18%	1,830
Recyclable (Curbside Program)	10%	1,050
Residual	36%	3,670
Total	**100%**	**10,330**

[1] Based on curbside residential and commercial waste disposal in 2015.

4.0 CLOSURE

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

Respectfully submitted,
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Attachments: Appendix A – Waste Composition Material Categories
Appendix B – Selected Sorting Photos
Appendix C – Waste Composition Results Summary

APPENDIX A: WASTE COMPOSITION MATERIAL CATEGORIES

Waste Composition Material Categories

	Category	Description
1	Paper - refundable	tetrapaks, bottle deposit
2	Paper - recyclable	fine, office, cardboard, coffee cups
3	Paper - compostable	food-soiled paper, pizza boxes, paper towels
4	Paper - other/non-MMBC	non-recyclable, books, tar paper, composites
5	Plastic - refundable	bottle deposit plastic
6	Plastic - rigid packaging	#1-7, uncoded, excludes styrofoam
7	Plastic - durable products	non-packaging such as tapes, toys, straws, cutlery, household objects, biodegradable/compostable plastics
8	Plastic - styrofoam	styrofoam
9	Plastic - film packaging	retail bags and wrap
10	Plastic - film products	non-packaging such as ziploc bags, tarps, pallet wrap, biodegradable/compostable plastics
11	Metal - refundable	bottle deposit metal
12	Metal - recyclable	metal containers
13	Metal - non-MMBC	metal objects
14	Glass - refundable	bottle deposit glass
15	Glass - recyclable	glass containers
16	Glass - non-MMBC	glass and ceramic objects
17	Organics - yard waste	yard trimmings, manure
18	Organics - avoidable food waste	food that could have been eaten
19	Organics - unavoidable food waste	peelings, bones, coffee grounds, shells
20	Organics - non-compostable	Leather, rubber, wax - non-clothing, non-hygiene
21	Organics - clean wood	pallets, plywood (no paint, no treatment, compostable)
22	Organics - dirty wood	plywood, gluelam, flakeboard, stained or painted wood - co-gen
23	Organics - treated wood	treated, need to landfill
24	Building Material	construction material - carpet, gypsum, asphalt, insulation, aggregate
25	Electronic Waste	anything with a cord or battery operated
26	Household Hazardous Waste - EPR	batteries, products, mercury containing, paints, oil
27	Household Hazardous Waste - non-EPR	sharps, glues, caulking
28	Household Hygiene	diapers, hygiene products, personal care, pet waste
29	Bulky Objects	furniture, appliances, mattresses
30	Textiles	clothing, linens, bags, shoes
31	Fines	<1" size

APPENDIX B – SELECTED SORTING PHOTOS

Photo 1: Sorting set-up at District of Squamish Landfill

Photo 2: Single Family Residential Sample

Photo 3: Multi-Family Residential Sample

Photo 4: Industrial, Commercial & Institutional Sample

Photo 5: Paper - Recyclable

Photo 6: Plastic - Film Packaging

Photo 7: Organics – Avoidable food waste

Photo 8: Household Hygiene (Diapers)

APPENDIX C – DETAILED WASTE COMPOSITION RESULTS SUMMARY

Waste Composition Results Summary

	Category	ICI (n = 4)	MF (n = 4)	SF (n = 4)	Combined Sectors (n = 12)
1	Paper - refundable	<1%	<1%	<1%	<1%
2	Paper - recyclable	11%	4%	5%	7%
3	Paper - compostable	9%	5%	5%	6%
4	Paper - other/non-MMBC	<1%	<1%	1%	<1%
5	Plastic - refundable	1%	<1%	<1%	<1%
6	Plastic - rigid packaging	3%	2%	2%	2%
7	Plastic - durable products	3%	3%	4%	3%
8	Plastic - styrofoam	1%	1%	1%	1%
9	Plastic - film packaging	3%	4%	6%	4%
10	Plastic - film products	3%	1%	2%	2%
11	Metal - refundable	1%	<1%	<1%	<1%
12	Metal - recyclable	1%	1%	1%	1%
13	Metal - non-MMBC	2%	1%	2%	2%
14	Glass - refundable	2%	1%	1%	1%
15	Glass - recyclable	<1%	1%	1%	1%
16	Glass - non-MMBC	<1%	1%	1%	1%
17	Organics - yard waste	1%	<1%	4%	2%
18	Organics - avoidable food waste	20%	17%	18%	18%
19	Organics - unavoidable food waste	7%	9%	12%	9%
20	Organics - non-compostable	1%	1%	2%	1%
21	Organics - clean wood	2%	1%	<1%	1%
22	Organics - dirty wood	3%	2%	5%	3%
23	Organics - treated wood	<1%	<1%	<1%	<1%
24	Building Material	14%	5%	1%	6%
25	Electronic Waste	4%	3%	1%	2%
26	Household Hazardous Waste - EPR	<1%	1%	1%	<1%
27	Household Hazardous Waste - non-EPR	<1%	<1%	<1%	<1%
28	Household Hygiene	4%	30%	17%	17%
29	Bulky Objects	2%	<1%	<1%	1%
30	Textiles	4%	7%	8%	6%
31	Fines	2%	1%	1%	1%

APPENDIX C

SQUAMISH RESIDENT SURVEY PRINT VERSION

District of Squamish Zero Waste Strategy Survey

Squamish residents produce an average of 650 kg of waste per person per year. Over 65% of what we're throwing in the trash is recyclable or compostable. Because of this, the District of Squamish is developing a Zero Waste Strategy with the actions necessary to achieve a 350 kg per person per year, disposal rate and a corresponding diversion rate of 75% by 2020. And we can't do it without your help! Your answers to the following questions will be factored into the development of solutions in the District's Zero Waste Strategy. Thank you for taking a few minutes to complete this survey

Are you a resident or do you work in Squamish?

- ❒ Yes – Please continue the survey
- ❒ No – Thank you, this survey is only for people who live or work in Squamish

Please check all that apply:

- ❒ I am a resident of Squamish
- ❒ I work in Squamish

If you are a resident, what type of dwelling do you live in?

- ❒ Single family home or townhouse (individual curbside waste collection)
- ❒ Apartment or condo (shared waste collection)

What are examples of waste you produce? Check all that apply.

- ❒ Recyclables (e.g. paper, plastic, glass, metal)
- ❒ Single-use packaging (e.g. coffee pods, chip bags, Styrofoam)
- ❒ Food Scraps
- ❒ Yard Trimmings
- ❒ Hygiene items (e.g. diapers)
- ❒ Pet waste (e.g. kitty litter)
- ❒ Construction materials (e.g. scrap wood, drywall, tiles)
- ❒ Depot return items (e.g. paints, electronics, appliances, tires)
- ❒ Bulky objects (e.g. furniture)
- ❒ Other: _____

Please answer the following questions if you are a resident of Squamish

How many people live in your household?

- ❒ 1 to 2
- ❒ 3 to 5
- ❒ 6 to 8
- ❒ More than 8

Which of the following waste collection services do you <u>have</u> at home? Check all that apply.

- ❒ Recycling (e.g. plastic/metal/glass containers, paper)
- ❒ Organics
- ❒ Garbage
- ❒ Cardboard
- ❒ Other, specify: _____

Which of the following waste collection services do you <u>use</u> at home? Check all that apply.

- ❒ Recycling (e.g. plastic/metal/glass containers, paper)
- ❒ Organics
- ❒ Garbage
- ❒ Cardboard
- ❒ Other, specify: _____

Please comment on the garbage, recycling, and/or organics collection services at home. *What aspects work well? What is challenging? What could you do to overcome challenges?*

Flip to next page →

Please answer the following questions if you work in Squamish

Approximately how many employees do you have at your workplace?

- ❒ 1 to 10
- ❒ 11 to 25
- ❒ 26 to 50
- ❒ 51 to 100
- ❒ More than 100

Which of the following waste collection services do you <u>have</u> at work? Check all that apply.

- ❒ Recycling (e.g. plastic/metal/glass containers, paper)
- ❒ Organics
- ❒ Garbage
- ❒ Cardboard
- ❒ Other, specify: _____

Which of the following waste collection services do you <u>use</u> at work? Check all that apply.

- ❒ Recycling (e.g. plastic/metal/glass containers, paper)
- ❒ Organics
- ❒ Garbage
- ❒ Cardboard
- ❒ Other, specify: _____

Please comment on the garbage, recycling, and/or organics collection services at work. *What aspects work well? What is challenging? What could you do to overcome challenges?*

The following questions are for all survey participants

Which of the following items do you drop-off at a depot or collection point (e.g. Carney's, Squamish Landfill, Bottle Depot, ReBuild, thrift stores)? Check all that apply.

- ❒ Yard waste and/or food scraps
- ❒ Recycling (e.g. metal, glass, plastic containers, paper)
- ❒ Product stewardship items (e.g. paints, electronics, tires, mattresses, lightbulbs, Styrofoam, power tools)
- ❒ Construction materials (e.g. clean wood, painted wood, drywall, tiles)
- ❒ Clothing and/or housewares
- ❒ Garbage
- ❒ Other: _____

What do you think it would take to make our community a zero waste community?

What can you do in your day to day to reduce waste?

Thank you for your participation. Public input is key to building a system that runs smoothly and provides the services that Squamish residents need to move Squamish towards Zero Waste. You can learn more about recycling, composting and garbage at the District of Squamish's website: www.squamish.ca/our-services/garbage-and-waste-diversion/

APPENDIX D

SQUAMISH FOCUS GROUP SURVEY PRINT VERSION

WASTE MANAGEMENT FOCUS GROUP WORKSHOP SURVEY

Please complete this survey as part of the focus group discussion. Please bring a copy on Monday June 27th to the Focus Group. All comments will be kept confidential and not linked to a specific company or organization.

1. **Check all materials that you generate at your workplace, and if you have a recycling or waste reduction program in place for the material**.

Material Category	Generate		Do you separate these materials for a recycling program?	
	Yes	No	Yes	No
Organics				
Food scraps				
Paper Towel/Napkins/Food soiled paper				
Cooking oil and grease				
Yard and garden debris				
Clean wood and pallets				
Dirty wood (painted wood/plywood)				
Other organics (please specify) _____				
General Recycling				
Cardboard				
Paper				
Mixed Containers (Plastic #1-7, Metal and Glass Containers – Typical Blue Box)				
Beverage containers				
Soft plastics - plastic film				
Styrofoam				
Other recycling (please specify) _____				
Additional Recycling Programs				
Electronics (computers, small appliances and power tools)				
Batteries				
Scrap metal and/or major appliances / power equipment				
Lead-acid batteries, used oil & antifreeze, and/or tires				
Light bulbs and fixtures				

Material Category	Generate		Do you separate these materials for a recycling program?	
Mattresses and old furniture				
Textiles				
Drywall/Gypsum				
Re-usable doors, windows, sinks tubs, toilets, lumber, etc.				
Other recycling (please specify) _____				

2. **What are some of the challenges or barriers that prevent you from separating and recycling more materials?**

   Select all that apply; number the top 3 that are most significant

Apply?	Top 3	Challenge or barrier
		Space for recycling bins and storage
		Availability of services for various materials
		Awareness of programs available for recycling
		Effort and time to separate the materials for recycling
		Bin signage and communication of recycling programs
		Staff /Customer education about recycling programs
		Customer/Staff compliance leading to low participation or contamination of materials
		No regulatory requirements
		Lack of enforcement of regulatory requirements
		Costs associated with any of the above
		Other: Please describe in the comments below

Comments:

3. **What could you do to overcome challenges related to maximizing recycling or waste reduction/avoidance at work?**

4. **What can be done to expand existing waste diversion programs in the District?**

(Rank from 1 through 10) 1 being the most important, 10 being the least important.

Ranking	Idea
	Development of resources including education and training materials
	Work with buildings to ensure there are guidelines/bylaws to support zero waste (space, bins, storage, signage)
	Sharing best practices and case studies of successful programs
	Access to experts to assist in waste diversion program development
	Establishment of material disposal bans for materials that have a diversion program available
	Stronger enforcement and penalties for material disposal bans
	Ensure recycling service is available and required equally (Mandatory recycling/organics for all residences and business)
	Develop demolition recycling targets and requirements as part of permit requirements
	Availability of services for various materials
	Education Programs to Promote Zero Waste

5. **What comments or ideas do you have about how to expand and/or further improve garbage, organics, or recycling programs?**

SQUAMISH

HARDWIRED *for* ADVENTURE

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