

**Powell River Regional District**  
**DRAFT Solid Waste Management Plan**

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Prepared by:

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Project Number:

107752

Date:

October, 2009



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October 9, 2009

Project Number: 107752

Frances Ladret  
Administrator  
Powell River Regional District  
5776 Marine Avenue  
Powell River, BC V8A 2M4

Dear Frances:

**Re: DRAFT Solid Waste Management Plan**

We are pleased to submit a DRAFT Regional Solid Waste Management Plan – which is an update to replace the 1996 Plan. This plan, upon full implementation, will increase the waste diversion rate of the Regional District to approximately 59% of the amount of waste generated. Much of this diversion will be achieved through waste reduction, increased recycling and the implementation of a composting strategy.

We appreciate this opportunity to be of service.

Sincerely

Sincerely,  
**AECOM Canada Ltd.**

Sarah Wilmot, M.Sc.  
sarah.wilmot@aecom.com

SW:gc  
Encl.  
cc: File



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## Glossary/Acronym List

Term	Definition/Description
AC	Advisory Committee
Aseptic Containers	Juice boxes, dairy and dairy substitute containers, soup boxes, etc.
C&D Waste	Construction and demolition (C&D) materials consist of the waste generated during the construction, renovation, and demolition of buildings, roads, and bridges. C&D materials often contain bulky, heavy materials, such as concrete, wood, metals, glass, and salvaged building components.
Carpet	Carpet, rugs
Clean wood waste	Dimensional lumber, construction waste
Composite materials	Packaging (Dog food bags, food packaging such as cylindrical cardboard and metal tubes) Household Goods (children's toys) Diapers, Sanitary products Bulky Items (luggage, sporting goods)
Compostable Products	Paper Compostable packaging, coffee cups, paper bags, kleenex, paper towel
Dirty wood waste	Treated wood, painted wood.
Disposal	Waste that is sent to landfill
Diversion	Waste that is generated but that is handled through recycling or reuse instead of being disposed.
E-waste	Electronic waste  Includes items covered by stewardship programs (such as televisions, CRT Monitors) and items not covered by stewardship programs (such as microwaves and small appliances).
Extended Responsibility (EPR)	Producer An environmental policy approach in which a producer's responsibility (physical and/or financial) for a product is extended to the post-consumer stage of a product's life cycle. There are two key features of EPR policy: (1) the shifting of responsibility (physically and/or economically, fully or partially) upstream to the producer and away from local governments, and (2) to provide incentives to producers to take environmental considerations into the design of the product.
Fines	Cigarette butts, bottle caps, bits and pieces, etc.
Glass	Beverage containers (deposit and non-deposit bearing containers) Glass food containers (jars) Non-container glass (broken glass, picture frames etc)
Gypsum	Drywall
HHW	Household Hazardous Waste
ICI waste	Includes items covered by stewardship programs (such as CFLs, paint, solvents, used oil and containers, batteries) and items not covered by stewardship programs Waste generated by institutions (such as schools), commercial establishments (such as stores, restaurants) and industrial establishments (light manufacturing)
Inert Waste	Dirt, rocks, ash
Metal	Beverage containers(deposit and non-deposit bearing containers) Metal food containers (cans) Household metal (keys, nails, hangers etc) Non-household metal (siding, pipes)
MPP	Mixed paper products
MSW	Municipal solid waste Includes predominantly household and commercial waste. MSW generally excludes hazardous wastes. In the PRRD, MSW is distinct from construction and demolition waste (see C&D waste)
OCC	Old corrugated cardboard
ONP	Old newsprint (including flyers)
Other	Items not covered in the categories above
Organics	Food waste Yard waste (grass clippings, yard trimmings)
Pet Waste	Dog waste, cat litter box waste

Term	Definition/Description
Plastics #1-7	<p><b>#1 PET:</b> soda bottles and water bottles  <b>#2 HDPE:</b> milk bottles, detergent bottles and grocery/trash/retail bags  <b>#3 PVC:</b> loose-leaf binders and plastic pipes  <b>#4 LDPE:</b> dry cleaning bags, produce bags and squeezable bottles  <b>#5 PP:</b> medicine bottles, aerosol caps, drinking straws and food containers (such as yogurt, ketchup bottles and yogurt tubs)  <b>#6 PS:</b> compact disc jackets, packaging Styrofoam peanuts and plastic tableware  <b>#7 Other:</b> reusable water bottles, certain kinds of food containers, plastic consumer goods</p>
Product Stewardship	<p>A term used in British Columbia to describe a government strategy to place the responsibility for end of life product management on the producer and consumers of a product and not the general taxpayer or local government.</p>
Reduction	<p>Waste that is prevented from being generated. This may be achieved through changes in consumption habits or changes in the way products are sold.</p>
Residential waste	<p>Waste generated by households</p>
Textiles	<p>Clothing, rags, cloth material</p>
Waste management hierarchy	<p>A concept that refers to the 5Rs of waste management: reduce, reuse, recycle, recover, residuals management. The hierarchy places greater emphasis on up-stream waste management activities, such as reduce and reuse.</p>

# 1. Background

In British Columbia, Regional Districts are mandated by the Provincial *Environmental Management Act* to develop Solid Waste Management Plans that are long term visions of how each regional district would like to manage their solid wastes, including waste diversion and disposal activities. These plans are updated on a regular basis to ensure that the plan reflects the current needs of the regional district, as well as current market conditions, technologies and regulations.

The Powell River Regional District (PRRD) has undertaken a review of the 1996 Regional Solid Waste Management Plan to ensure that the plan reflects current public and political direction. This document outlines the status of solid waste operations in 2007, and presents an updated plan for solid waste management in the PRRD. The plan includes programs, policies and infrastructure to meet the following objectives:

- reduce the production of waste;
- increase producer responsibility;
- improve education activities with regards to solid waste management;
- improve participation in waste diversion;
- increase commercial waste diversion; and
- address closed disposal facilities.

## 1.1 Guiding Principles

The guiding principles for the Solid Waste Management Plan are:

- the use of material and energy resources should reach a level which is ecologically sustainable;
- the regional solid waste stream should be reduced to the greatest extent feasible, in accordance with the hierarchy of reduce, reuse, and recycle;
- the waste management policy is to be designed with the intention of minimizing pollution to the greatest extent feasible in order to protect the health and well-being of all living things;
- individuals and firms should be encouraged to make environmentally sound choices about how they use resources and generate waste. Useful information and financial incentives and consequences such as “user pay” programs should be used whenever feasible;
- the general public will be consulted and informed about reduction policies and strategies. These policies and strategies should be widely understood by the public;
- policies and strategies should be cost-effective and include a full accounting of both monetary and non-monetary costs and benefits; and
- the public will be consulted, in a manner acceptable to the Ministry of Environment on future facility siting and implementation, in the context of social acceptability, technical suitability, regulatory compliance, and cost-effectiveness.

## 2. The Planning Process

The process to update the plan was conducted in three phases. The first phase was an assessment of the current system and a report on the implementation status of the 1996 Plan. The second phase was a review of options to address the region's future solid waste management needs and the selection of preferred options. The final phase, planned for January and February 2009, will be a community consultation process to obtain input into the selected options.

The planning process has involved a number of stakeholders and the general public through a variety of different activities. These are outlined below. Due to the lack of physical connections between Lasqueti Island and the remainder of the PRRD, Lasqueti Island (Area E) was considered through a separate process and is covered by a separate sub-plan.

The PRRD hired Gartner Lee Limited as their technical consultant for the duration of the process to update the plan. Gartner Lee guided the process, provided technical input on the options, wrote the planning documents, and assisted with the consultation process.

A Solid Waste Management Plan Review Advisory Committee (referred to as the Advisory Committee, or AC) was formed by the PRRD to provide community and technical input into the planning process and provide recommendations to the Regional Board through the Intergovernmental Community Planning Steering Committee. The AC includes representatives from the Regional District, Sliammon First Nation, City of Powell River, local waste service providers, the School District, citizens from around the PRRD, and the Ministry of Environment. This committee met regularly throughout the planning process. Committee members are shown in Table 1.

**Table 1. Advisory Committee Members**

Organization	Role	Appointee
City of Powell River	Elected Official (City Councillor)	Patricia Aldsworth (until August, 2008) Ted Rodonets (August 2008 – November, 2008) Jim Palm November 2008 – end of process
City of Powell River	Staff	Larry Price
Sliammon First Nation	Elected Official	Chief Paul
Sliammon First Nation	Staff	Eugene Louie Cathy Galligos
Powell River Regional District	Elected Official (Area Director)	Patrick Brabazon
Powell River Regional District	Staff (Administrator)	Frances Ladret
Sunshine Disposal	Owner	Daryl McCormack
Augusta Recyclers	Owner	Craig Long
School District No. 47	Representative	Len Crivea
Chamber of Commerce	Representative	Don Krompocker
Ministry of Environment	Representative	Ashley Smith
General Public		Diana Wood Sandra Macklem Ronnie Uhlmann Harold Diggon (Texada Island) Laurie Chambers Ted Belyea

The committee first established the objectives of the plan review as shown in Section 1 of this plan. These objectives helped to shape the options that were considered for waste management. The committee then established and ranked a set of criteria by which to evaluate potential waste management activities. In order of importance (highest to lowest ranked), these criteria are:

- minimize the amount of waste disposed;
- minimize impacts on local air and water quality;
- maximize convenience to system users;
- minimize contribution to climate change;
- minimize the cost of waste management;
- conserve resources; and
- create jobs / local economic development.

The general public was also engaged in the early stages of the planning process. At the start of the process, the public was given the opportunity to respond to a survey to assist with the identification of key issues. One hundred and seventy-five surveys were received. The results indicated general satisfaction with current services, but a desire for increased waste diversion opportunities. More specifically, the survey results indicated a demand for increased capacity at the recycling depots and changes to the curbside recycling program to make it simpler to use. Respondents also noted that backyard composting is difficult (due to rodents and bears), and that they are not making full use of existing product stewardship programs..

In addition to providing feedback on the current waste management system, survey respondents were asked to rank the criteria for the selection of plan options. This provided a way of confirming that the AC’s priorities reflected the community’s main concerns. The ordering of the criteria returned by the public was fairly similar to the ordering established by the AC, as shown in Table 2.

**Table 2 Relative Importance of Criteria for Selecting Waste Management Options**

Criteria	AC Rank	General Public Rank
Minimize the amount of waste disposed	1	1
Minimize impacts on local air and water quality	2	2
Maximize convenience to system users	3	5
Minimize contribution to climate change	4	6
Minimize the cost of waste management	5	4
Conserve resources	6	3
Create jobs / local economic development	7	7

Additional public consultation will be conducted once the draft plan is finalized. This consultation will include public meetings, a newsletter, presentations to the Intergovernmental Community Planning Steering Committee, updates to the PRRD website, press coverage and a second survey.

### 3. Plan Area

The PRRD covers 5,092 km<sup>2</sup> (2006 boundaries) and includes the City of Powell River (CPR), three electoral areas ('A', 'B', and 'C') situated around the City on the mainland, and two island electoral areas – Texada Island (Area 'D'), which is linked by ferry service, and Lasqueti Island (Area 'E'), which is linked by a passenger-only ferry service to Vancouver Island. There is also one Indian reserve (Sliammon First Nation) and a portion of the Sechelt Indian Governmental District. Please refer to Figure 1 for the boundaries of these areas.

As noted in Section 2, Lasqueti Island is covered by a separate planning process, which will be documented in a sub-area plan. As such, this document does not make reference to options for Lasqueti Island.

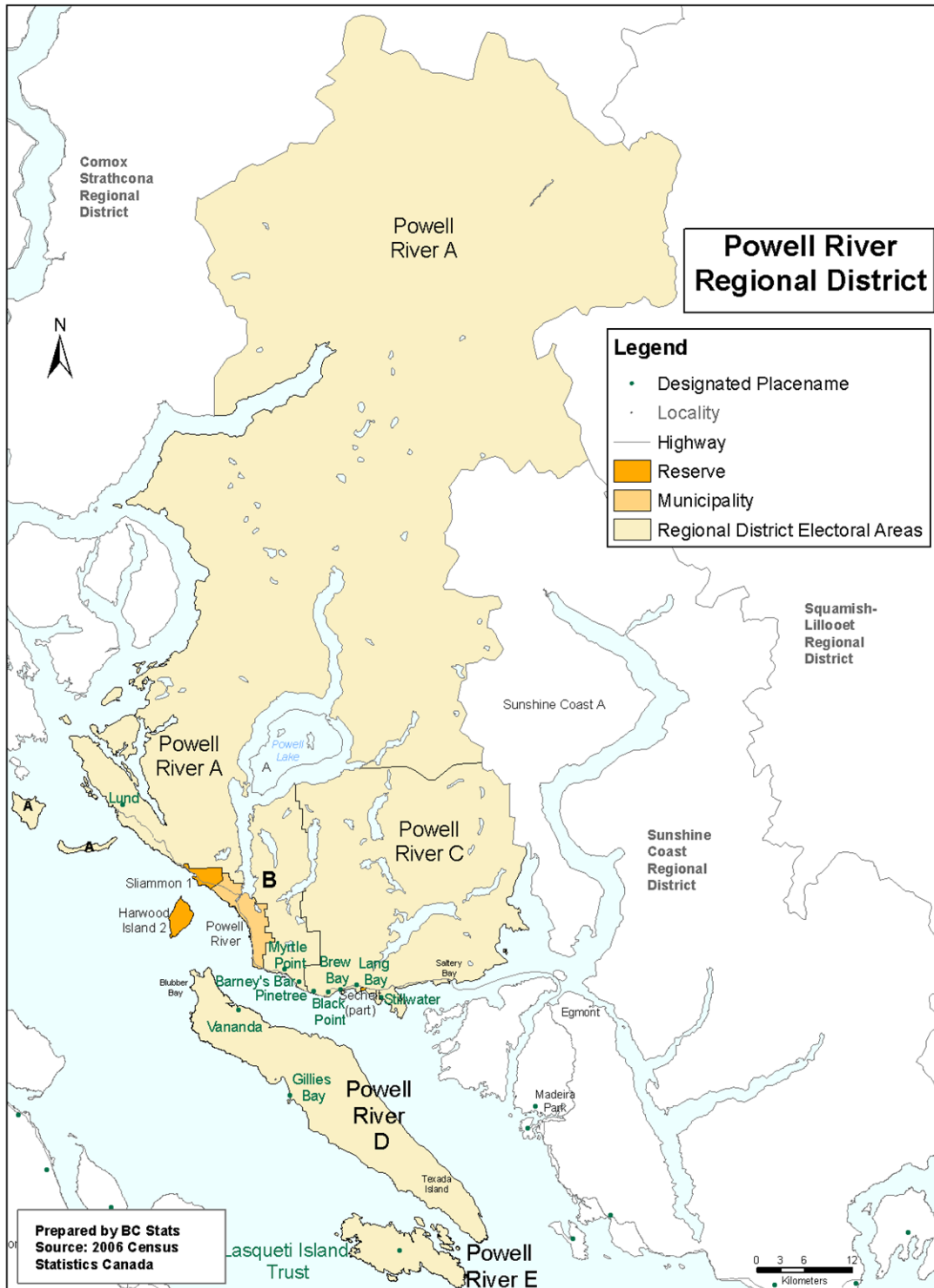
The PRRD is located in on the southern coast of British Columbia. It is bound by the Sunshine Coast Regional District to the south, the Squamish Lillooet Regional District to the northeast, the Comox-Strathcona Regional District to the northwest, and the Pacific Ocean to the west. The PRRD is home to Desolation Sound Marine Provincial Park, a popular yachting destination.

The PRRD experiences a moderate coastal climate, with daily average temperatures of 4°C in January temperature of 18°C in July. The area receives little snowfall; the heaviest rainfall occurs in November (160.3 mm). Winds are generally from the west in late summer and from the east during the remainder of the year. <sup>1</sup>

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<sup>1</sup> Climate data from <http://www.climate.weatheroffice.ec.gc.ca>.

Figure 1. PRRD Map





### 3.1 Population

As shown in Table 3, the 2006 census count for the region in 2006 was 19,599, including the CPR, electoral areas and Indian reserves. The population has fallen 0.8% since 2001; BC Statistics predicts a further decrease in population over the next twenty-five years to 18,682 in 2032 (a 4.7% decrease). The estimated population in 2007 was 20,820, a 6% increase over 2006<sup>2</sup>.

**Table 3. PRRD Population**

Area	2006 Population <sup>3</sup>	% of PRRD Total
City of Powell River	12,957	66.1%
Electoral Area A, north of City (excluding Sliammon First Nation)	914	4.7%
Sliammon First Nation (Part of Area A)	682	3.5%
Electoral Area B	1,489	7.6%
Electoral Area C	2,074	10.6%
Small area of Sechelt Indian Government	17	0.1%
Electoral Area D – Texada Island	1,107	5.6%
Electoral Area E – Lasqueti Island	359	1.8%
<b>Total</b>	<b>19,599</b>	<b>100%</b>

### 3.2 Economic Data

In 2006, there were 8,774 households in the PRRD; 86.6% of these dwellings were single-detached, semi-detached, row houses or duplexes, with the remainder being apartments and movable dwellings.<sup>4</sup> The average number of people per household was 2.2, which is below the BC average of 2.5.

According to BC Statistics’ 2006 census data, the main industries (by labor force) for the region are logging and forest products, manufacturing, retail trade, health care and social assistance, and paper manufacturing.<sup>5</sup> Powell River is also home to a large pulp mill.

<sup>2</sup> <http://www.bcstats.gov.bc.ca/data/pop/pop/dynamic/PopulationStatistics/Query.asp?category=Census&type=RD&topic=Estimates&agegroup=Standard&subtype=&region=27000&year=2007&agegroup=totals&gender=t&output=browser&rowsperpage=all>

<sup>3</sup> [http://www.bcstats.gov.bc.ca/data/cen06/mun\\_rd.asp](http://www.bcstats.gov.bc.ca/data/cen06/mun_rd.asp)

<sup>4</sup> Source: 2006 Census Profile of Powell River Regional District, BC Stats [www.bcstats.gov.bc.ca/data/cen06/profiles/detail\\_b/59027000.pdf](http://www.bcstats.gov.bc.ca/data/cen06/profiles/detail_b/59027000.pdf)

<sup>5</sup> Source: 2006 Census Profile of Powell River Regional District, BC Stats [www.bcstats.gov.bc.ca/data/cen06/profiles/detail\\_b/59027000.pdf](http://www.bcstats.gov.bc.ca/data/cen06/profiles/detail_b/59027000.pdf)

## 4. Existing Solid Waste Management System

This section provides a description of the current solid waste management system in the PRRD, which includes an overview of the major infrastructure, services, and programs in place in the PRRD that contribute to the management of solid waste. A more detailed description of the current solid waste management system is provided in Appendix B.

### Education and Promotion Activities

- Education and promotion is the responsibility of the PRRD's contractor, Augusta Recyclers. Under the terms of the contract, Augusta is required to post information on waste reduction and recycling in the local paper on a monthly basis.
- Some information about the City's curbside recycling and garbage collection programs is provided on the City's website. There is no waste or recycling information on the PRRD's website. Augusta Recyclers and Sunshine Disposal do not have websites.
- Many of the education initiatives outlined in the 1996 Waste Management Plan were not implemented or are not currently offered.

### Waste Reduction and Reuse Programs

- There are minimal waste reduction programs in the PRRD. The primary driver of waste reduction is the high tipping fee at the transfer station, and the user-fee model for waste collection.
- Backyard composting is another means of waste reduction that is used by many communities to reduce the quantity of organic waste disposed. The PRRD previously promoted backyard composting by offering subsidized compost bins. This program is not currently active.

### Recycling Programs

- Curbside Recycling:
  - The City of Powell River provides curbside collection of recyclables to single family households. The program collects five streams: mixed paper, cans, newsprint, glass, and plastics (numbers 1, 2, 4, 5, 7, and 6, except styrofoam); and
  - In 2007, the City collected 134 tonnes through the curbside recyclables collection program.
- Recycling Depots:
  - Rural residents' primary access to recycling is through recycling depots. There are 6 depots distributed throughout the PRRD;
  - The depots consist of roll-off bins with compartments for mixed paper, cans, glass and mixed plastics;
  - The total amount of material collected through the depots in 2007 was 492 tonnes; and
  - Glass collected through the depots and the curbside system is not currently recycled, as it has little market value. It is exported as inert waste and landfilled at the Ecowaste Landfill.

- Recycling Activities at the Transfer Station:
  - The transfer station operated by Augusta Recyclers receives the following additional materials for recycling: gypsum, concrete/asphalt and scrap metal. 3942 tonnes of these materials were collected in 2007;
  - The transfer station operated by Augusta Recyclers also accepts household recyclables (the same materials as the depots and curbside programs). 58 tonnes of household recyclables were dropped off at Augusta Recyclers in 2007;
  - The transfer station also accepts materials covered by product stewardship programs, such as paint, solvents, pesticides, anti-freeze, lead-acid batteries, tires, and used oil and oil filters. The quantities of these materials are reported under the Product Stewardship heading.
- Industrial, Commercial and Institutional (ICI) Recycling:
  - Collection of recyclables from the ICI sector is generally provided by private sector collection companies on a subscription basis. In addition, some large generators handle their own cardboard recycling. An estimated 614 tonnes of recycling was conducted by the ICI sector, including materials delivered to Augusta Recyclers.
- All processing and marketing of recyclables is done by the private sector. The PRRD receives 50% of the revenue from the sale of recyclables from the depots and the curbside collection program.

### **Organics Management**

- There are no large-scale composting facilities in the region;
- Source-separated yard waste and clean wood waste are received at Augusta. These materials are stockpiled on site, and then moved offsite to a contractor, who grinds it and sends it to the pulp mill for use as hog fuel:
  - In 2007, 1,900 tonnes of yard waste and clean wood waste were delivered to the contractor for grinding.
  - The PRRD is not directly involved in this system and does not pay for the system or receive any revenue for the hog fuel

### **Garbage Collection Services**

- City workers provide curbside garbage collection to residents of the City of Powell River.
- In the electoral areas, waste collection is privately contracted or self-hauled to the transfer station.
- Most businesses have privately contracted waste collection; if they do not subscribe to a waste collection service, they may bring garbage directly to the transfer station.

### **Transfer Stations**

- There is one transfer station in the PRRD that accepts mixed waste. All municipal solid waste and construction and demolition waste that is exported from the region goes through this transfer station.
- The transfer station is privately owned and is operated under contract to the PRRD
- There is also a “transfer site” on Texada Island that is used to collect and store scrap metal and tires. The PRRD tenders the removal of scrap metal and tires from the site as needed.

## Landfills

- There are no operating landfills in the portion of the PRRD covered by this part of the plan. The Lasqueti Landfill is addressed in the Lasqueti Area sub-plan. All waste is exported for disposal to either the Cache Creek Landfill (for municipal solid waste) or to the Ecowaste Landfill (for construction and demolition waste).
- The Cache Creek Landfill is operated under contract to Metro Vancouver. The PRRD's contract with Metro Vancouver is until December 31, 2009. It is yet clear where Metro Vancouver and PRRD will dispose of their MSW after this date.
- The Ecowaste Landfill is privately owned and operated. Its estimated closure date is 2013.
- There are two known closed sites that were used as dumpsites in the past. These sites need to be closed and/or remediated. The locations and status of these sites are:
  - *Municipal Airport Site* – This site operated under Permit 5067, and was designated to receive inert waste. The site has not been properly closed, although it is believed that disposal at the site ceased in the 1990s.
  - *Squatters Creek Landfill* – This is a former ravine dump, which never had a permit. Current developments on top of the site are experiencing issues with methane release from the dump.
  - There are also other closed disposal sites within the region which may require attention.

## Incinerators

- There is one known site that was used for an incinerator in the past (including disposal of incinerator ash).
- The site has not undergone final closure.

## Product Stewardship/Extended Producer Responsibility

- The following BC product stewardship programs are active in the PRRD and contribute to reducing the burden of waste management on the PRRD and City of Powell River:
  - Beverage Container Stewardship Program (325 tonnes were collected in 2007, representing 0.4% of the quantity collected in BC. Despite being a small percentage of the total, an average of 219 containers were collected per capita in the PRRD, which is only slightly below the provincial average of 227 containers per capita);
  - BC Lead Acid Battery Collection Program (30 tonnes through Augusta in 2007);
  - Tire Stewardship BC (13 tonnes through Augusta in 2007);
  - Product Care (for paints, solvents/ flammable liquids, gasoline and pesticides) (weight not available);
  - Medications Return Program (weight not available);
  - BC Used Oil Management Program (2 tonnes through Augusta in 2007), and
  - Electronics Product Stewardship (26 tonnes were collected in 2007, representing 1% of the quantity collected in BC. Data on units returned per capita is not available for this program).

## 5. Current Waste Stream Characterization

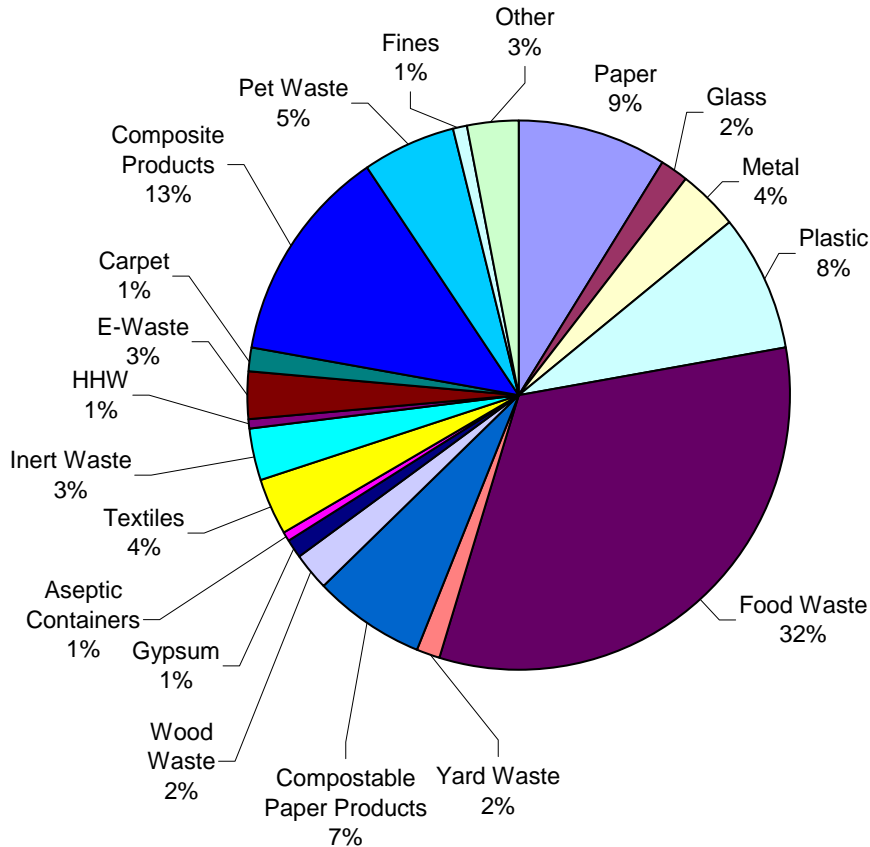
This section provides a general description of the solid waste generated in the PRRD in 2007, including the composition of the waste stream and the quantities of waste recycled and disposed. This information, along with the system description in Section 4, provided the baseline for the solid waste management planning process.

### 5.1 Composition of Waste Disposed

Two distinct waste streams are disposed of from the PRRD. The first consists of municipal solid waste (MSW); this waste is exported to the Cache Creek Landfill, located in the interior of BC. MSW is general household and business garbage, such as packaging and food scraps. The Cache Creek Landfill is operated under contract to Metro Vancouver (previously the Greater Vancouver Regional District), and MSW from the PRRD is disposed of along with waste from Metro Vancouver. The second waste stream is the inert waste stream (also known as the construction and demolition stream, or the C&D stream). C&D waste includes items such as roofing, flooring, concrete, and land clearing debris. The C&D waste is exported to the Ecowaste Landfill, in Richmond BC. This landfill is privately owned and operated, and can only accept inert waste (i.e., waste that does not breakdown quickly).

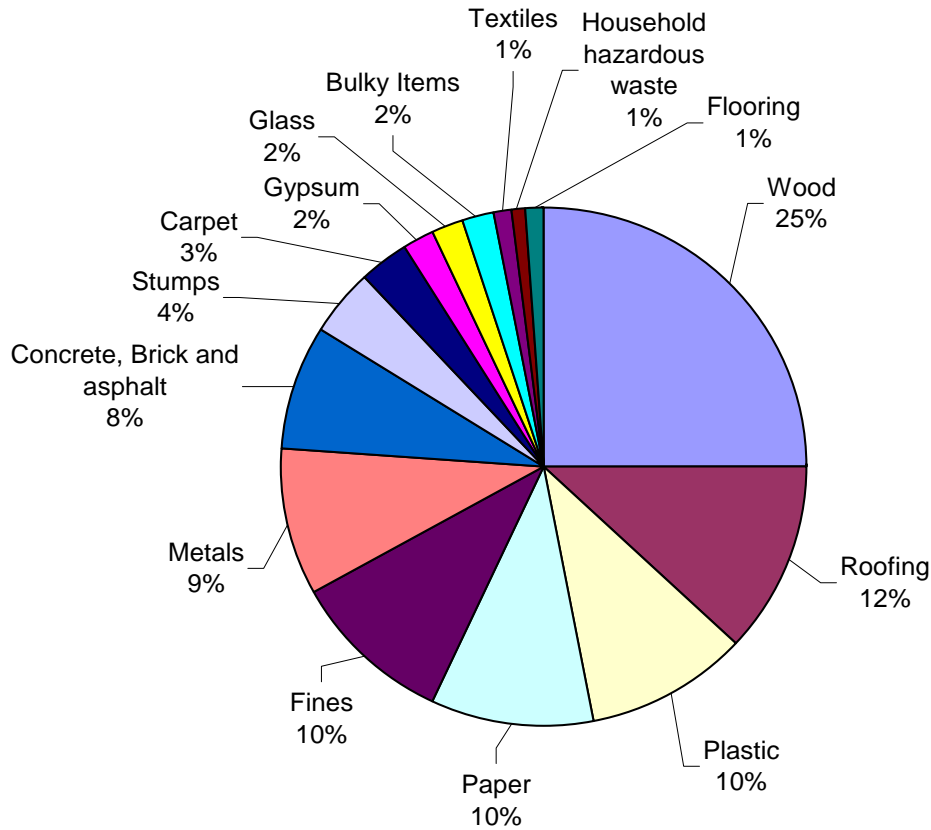
Figure 2 shows the composition of the MSW disposed of at the transfer station, based on data collected during a waste composition study in September 2008. For an explanation of terms used in the pie chart, please refer to the glossary at the front of the report.

**Figure 2. Estimated Composition of Municipal Solid Waste Disposed of at the Transfer Station (2008)**



The handling of C&D waste is not covered by the transfer station's contract with the PRRD, and was not analyzed as part of the waste composition study. The composition of the C&D waste stream was estimated using the results of studies conducted for the Greater Vancouver Regional District (2004), the Regional District of Central Okanagan (2002) and the Whistler landfill (2003). The results of the other studies were adjusted to account for the separation and reuse of clean wood waste in the PPRD (clean wood waste is separated, ground and used as hog fuel). Details on the studies used to generate this estimate can be found in Appendix A. The estimated composition of the C&D stream is shown in Figure 3.

Figure 3. C&D Waste Estimated Composition



## 5.2 Disposal and Diversion in 2007

In 2007, the PRRD disposed of 10,624 tonnes of MSW and C&D waste. It is estimated that 7,537 tonnes of material were recycled in the region in 2007, resulting in a recycling rate of 42%. Table 4 outlines the main activities that contribute to the PRRD's disposal and diversion rates.

**Table 4. 2007 Disposal and Diversion**

	<b>Tonnes</b>
MSW exported to Cache Creek Landfill	4,982
Inert waste exported to Ecowaste Landfill	5,642
<b>Total Disposal</b>	<b>10,624</b>
<b>Diversion</b>	
<b>Government funded diversion</b>	
Multi-material recycling depots (net of contamination)	453
Curbside recycling (City of Powell River) (net of contamination)	124
Household recycling self-hauled to Augusta Recyclers	58
Backyard composting (@ 250 kg per unit/year, assume 200 active units)	50
<b>Private Sector Recycling</b>	
Estimate of ICI recycling of paper and cardboard (includes some drop off at Augusta)	614
Gypsum (to New West Gypsum)	309
Concrete/Asphalt (to Three Leaf)	397
Scrap metal recycling (marketed directly)	3,236
Yard waste & clean wood waste (chipped to hog fuel used at mill)	1,900
<b>Extended Producer Responsibility (Product Stewardship)</b>	
Beverage Containers (through Encorp system)	325
Oil (2,111 litres)	2
Tires (based on average of 10kg per tire)	13
Lead acid batteries (to Metalex Products Ltd)	30
Product Care (paint, flammables, gasoline and pesticides)	Not available
Electronics (display devices, CPUs, peripherals)	26
<b>Total Diversion in 2007</b>	<b>7,537</b>
<b>Total Waste Generation (Disposal + Diversion)</b>	<b>18,161</b>
<b>Recycling Rate (Diversion/Generation)</b>	<b>42%</b>

Based on the composition of the MSW and the quantity of waste recycled and landfilled in 2007, it is possible to calculate capture rates for the materials included in the recycling programs. These capture rates indicate which materials are being recycled at a high rate, and which materials are not. The results of the waste composition study can also help to identify which types of waste make up a large portion of the waste stream and should be targeted by waste reduction and diversion programs. The generation and capture information is presented in Table 5.



**Table 5. Generation and Capture Rates**

Waste Type	% Contribution to Waste Stream	Annual Tonnes in Waste Stream (a)	Annual Tonnes Captured by Recycling Programs (b)	Annual Tonnes Generated (a + b) =c	Estimated Capture Rate b/c = d
Paper Products	9.1%	453	775.5	1229	63%
Glass <sup>1</sup>	1.6%	80	154	234	66%
Metal	3.7%	184	95.6	280	34%
Plastic	8.1%	404	158.9	562	28%
Yard Waste <sup>2</sup>	1.6%	80	950	1030	92%
Wood Waste <sup>2</sup>	2.3%	115	950	1065	89%
Food Waste	32.0%	1594	0	1594	0%
Compostable Paper Products	6.7%	334	0	334	0%
Gypsum	0.9%	45	0	45	0%
Aseptic	0.5%	25	0	25	0%
Textiles	3.5%	174	0	174	0%
Inert Waste	3.0%	149	0	149	0%
HHW	0.6%	30	0	30	0%
Electronic Waste	2.5%	125	0	125	0%
Carpet	1.5%	75	0	75	0%
Composite Materials	13.0%	648	0	648	0%
Other	3.1%	154	0	154	0%
Pet Waste	5.4%	269	0	269	0%
Fines	0.9%	45	0	45	0%
<b>Totals</b>	<b>100.0%</b>	<b>4982</b>	<b>3084</b>	<b>8066</b>	<b>38%<sup>3</sup></b>

Notes:

- <sup>1</sup>: Glass is currently sent to an inert waste landfill, rather than being recycled.
- <sup>2</sup>: Currently 1,900 tonnes of yard waste and wood waste are separated and used as hog fuel. The split between yard waste and wood waste is not known.
- <sup>3</sup>: The diversion rate in Table 5 differs from that shown in Table 4, because the diversion rate in Table 5 is based on MSW, whereas the diversion rate in Table 4 was calculated for both MSW and C&D waste. Furthermore, Table 4 includes recycling outside of the PRRD's programs (such as private sector and product stewardship programs).

Table 5 shows that the capture rates of paper is reasonably high, but that additional diversion could be achieved by increased use of the existing system. Diversion of metal and plastic could be increased significantly by increased use of the existing system. Yard waste and wood waste are already diverted at a high rate. Glass is captured at a fairly high rate, but as noted above, it is not currently recycled; before any programs are implemented to increase capture of glass, a use for the separated glass must be found.

## 6. Key Issues

Through the compilation of data on the current system, it has become clear that the PRRD waste management system is effective and achieves a significant degree of waste diversion. This is particularly true in light of its small population and relative isolation from larger population centres. The main concern with the system is its expense: waste export costs are currently in the range of \$160/tonne, and recycling costs are in the range of \$310/tonne for the depot system and \$640/tonne for the curbside system. The breakdown of these costs is shown in Tables 6 through 9.

**Table 6. Waste Export Costs (2007)**

Cost Category	Total Cost	Average Cost per tonne
Handling (Augusta)	\$135,851.29	\$26.64
Disposal (GVS&DD)	\$693,204.87	\$135.91
Freight Savings	\$(10,058.94)	\$-1.97
Total Costs	\$818,997	\$160.57

**Table 7. Recycling Collection Costs (2007)**

System/ Area	Total Cost of Depots	Tonnes Collected	Collection Cost per tonne
<b>Drop-off Depots</b>			
Mainland	\$63,527	438	\$145
Texada	\$20,743	53	\$391
Total Region	\$84,270	491	\$172
<b>Curbside</b>			
City	\$67,681	134	\$505
<b>Public Drop-off at Augusta</b>			
All regions	No additional charge	469	Not applicable

**Table 8. Recycling Processing Costs (2007)**

	Total Payment to Augusta	Sales Revenue	Net Cost	Tonnes Received	Cost per Tonne Received
Receiving / Processing / Marketing	\$184,224	\$35,800	\$148,424	1,094	\$136

**Table 9. Total Recycling Costs (2007)**

Program	TOTAL COSTS			COSTS PER TONNE		
	Collection	Net Receiving/ Marketing	Total	Collection	Net Receiving / Marketing	Total \$ / tonne
<b>Depots</b>						
Mainland	\$63,527	\$59,424	\$122,951	\$145	\$136	\$281
Texada	\$20,743	\$7,191	\$27,934	\$391	\$136	\$527
Total Region	\$84,270	\$66,614	\$150,884	\$172	\$136	\$308
<b>Curbside</b>	\$67,681	\$18,180	\$85,861	\$505	\$136	\$641
<b>Public Drop-off at Augusta</b>	No additional charge	\$63,630	\$63,630	N/A	\$136	\$136

The PRRD's challenge is to maintain or improve its waste management system (including increasing waste reduction and diversion), without incurring significantly higher costs. The PRRD faces a number of fundamental issues that limit the types of waste management programs that can be offered. These issues include:

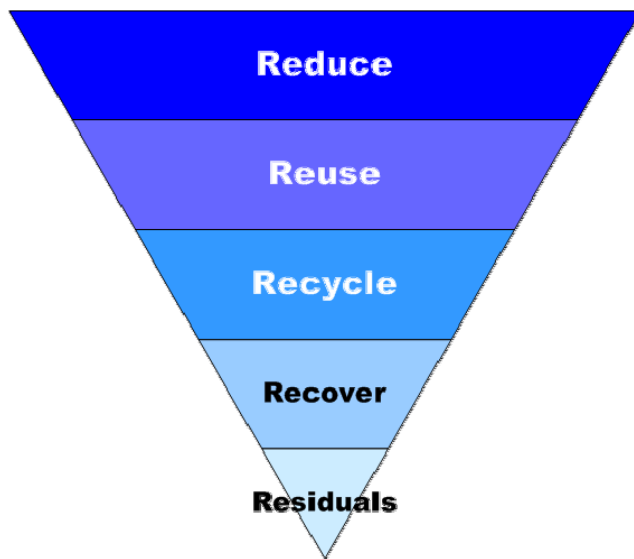
- small population and corresponding tonnage (loss of economies of scale);
- large/dispersed geography (makes program delivery a challenge);
- isolation requiring water transport to access markets (represents an added expense); and
- rural location/wildlife issues (limits programs that handle organics).

Connected to the issue of cost, is the question of how best to handle glass. Glass is currently accepted at the depots and through the curbside recycling program, but the PRRD has not been able to find an economically feasible way of having the glass recycled. The glass is therefore disposed of with the C&D waste at the Ecowaste Landfill. The AC indicated that finding a way of handling glass was a priority for the planning process.

## 7. Future Solid Waste Management System

The solid waste system in the PRRD will build on the existing framework of services and programs while seeking to improve the delivery of those services and continue to reduce the quantity of waste sent to landfill. The programs, infrastructure and policies that comprise the updated Solid Waste Management Plan are outlined in this section and presented in accordance with the waste management hierarchy, as shown in Figure 4.

**Figure 4. Waste Management Hierarchy**



### 7.1 Plan Goal - “Working Towards Zero”

Many regional districts in BC have adopted a goal of “Zero Waste.” Zero Waste is a philosophy that views solid wastes as resources, and recognizes the importance of closing the loop. Zero waste requires that products and processes be designed so that “their components can be dismantled, repaired and recycled. It means linking communities, businesses and industries so that one's waste becomes another's feedstock. It means preventing pollution at its source. It means new local jobs in communities throughout British Columbia.”<sup>6</sup>

<sup>6</sup> This definition of Zero Waste has been adapted from the Recycling Council of British Columbia ([http://www.rcbc.bc.ca/resources/hot\\_topics/zerowaste.htm](http://www.rcbc.bc.ca/resources/hot_topics/zerowaste.htm))

The AC supports the philosophy of Zero Waste but is concerned that the public may see it as unattainable and, therefore may be unwilling to support a Zero Waste goal and related programs. As an alternative, the AC has recommended a two-step approach towards Zero Waste:

- The AC recommends that the plan be based on a philosophy of “Working Towards Zero.” This identifies the ultimate target of Zero Waste, but acknowledges that it is not easily or immediately attainable.
- The AC further recommends that a more immediate goal be set to help track progress towards Zero Waste. For the duration of this plan, the waste diversion target is 60%. Achievement of this target will result in nearly 3,450 tonnes less being landfilled (based on current waste disposal rates).

It should be noted that the waste reduction and diversion strategies and programs outlined in this plan are estimated to result in a diversion rate of 59%, 1% less than the target. The most cost-effective way to close the gap will be through greater waste reduction through changing consumer habits. Once the target of 60% diversion is reached, a new goal will be developed leading towards zero waste.

## 7.2 Plan Strategies

The waste diversion target will be achieved through the implementation of a variety of programs. These programs are explained in the following sections of the plan, and each program supports one or more of the following overall strategies:

- **Re-instate waste reduction education and promotion programs.**
- **Implement a composting strategy.**  
There is a preference for a local in-vessel system; if this is cost-prohibitive, other composting alternatives will be considered.
- **Simplify the recycling system to increase participation.**  
The level of service must be maintained.
- **Continue to export residual waste.**  
Development of a local disposal option may be considered in the future, but not until composting is up and running.

## 7.3 Waste Reduction Program

Waste reduction refers to both reducing the quantity of waste generated (by changing consumption habits) and reducing the amount of waste disposed (by reusing and recycling waste products). Waste reduction is the cornerstone of this plan, and offers the PRRD an opportunity to significantly improve its waste management system. Due to the high cost of waste disposal and recycling, commitment to waste reduction can result in cost savings from reduced transportation costs and reduced tipping fees at the landfill. Waste reduction also offers environmental benefits from the conservation of resources, reduced emissions from exporting waste, and reduced impacts from landfilling waste.

Waste reduction programs have an educational and social-marketing focus. On-going promotion of reduction and reuse ensures that these aspects of sustainable waste management become an integral part of the everyday activities of residents and businesses in the PRRD. Examples of reduction and reuse promotion include:

- education about the impact of purchasing habits (for example, encouraging consumers to avoid products with excessive packaging, leave packaging at the store, and buy bulk goods).
- providing businesses with advice on practices that would reduce their waste (for example, double-sided copying, and increased use of electronic distribution of information for meetings)
- lobbying senior governments to expand product stewardship programs to cover additional materials, such as packaging
- promotion of existing electronic swap boards (e.g., Freecycle);
- promotion of existing local reuse opportunities (i.e., second hand/charity shops) and repair operations;
- campaigns in favour of reusables (e.g., shopping bags, coffee cups);
- grass-cycling campaigns and “how to” information; and
- backyard composting promotion and “how to” information.

For these activities to be effective, they must be directed to the appropriate ‘audience’, carried out regularly, visibly, and over time (i.e., not a one-off delivery) and accompanied by follow-up support.

In order to implement a waste reduction program, the PRRD will hire a full time equivalent waste reduction coordinator on a contract basis. The waste reduction coordinator will use various media to promote the messages, and will and work together with other organizations, such as the school district and chamber of commerce. The waste reduction coordinator will also support specific programs, as described in the sections below.

## 7.4 Residential Recycling

### 7.4.1 Improving Cost-Effectiveness and Capture Rates

Changes to the residential recycling system are recommended to improve convenience and cost effectiveness. This may be achieved through various measures. One approach to meet both of these objectives is to change to a 1 or 2 stream system. With a 1 stream system, all recyclables are collected together; with a 2 stream system, there is one stream for fibres (papers, boxboard, cardboard) and one stream for containers (plastic, tin, aluminum). Glass cannot be included in either of these systems as it can contaminate other products, making them unmarketable. It also poses a safety risk for sorters when it is combined with other recyclables.

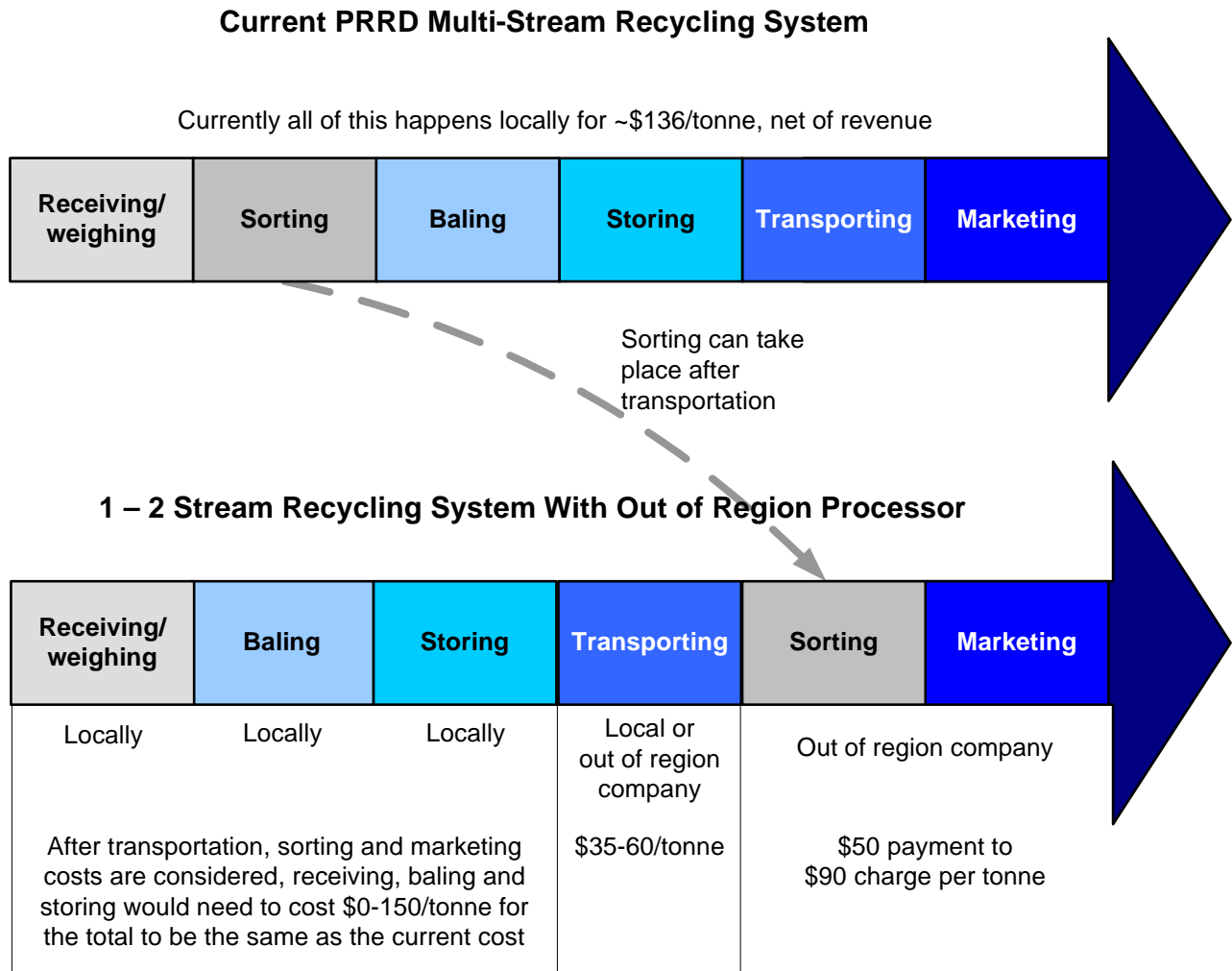
Switching to a 1 or 2 stream system would have implications for both the depot system and the curbside collection system, and so the PRRD and the CPR will need to work together to investigate the impact of these changes on the curbside collection system.

The following paragraphs outline the potential for cost savings on recycling processing if the PRRD moves to a 1 or 2 stream system.

The PRRD currently pays over \$200/tonne for the receiving, sorting, baling, storage, transportation and marketing of recyclables other than glass (glass is handled separately and is discussed later). The PRRD receives half of the revenue from the sale of recyclables, so the net cost in 20076 was approximately \$136/tonne.

Some recycling processors outside the PRRD are currently paying \$50/tonne for mixed recyclables; other processors are accepting recyclables for a charge of \$0-\$90/tonne (with no revenue sharing). These rates are for recyclables in 1 or 2 streams (and excluding glass). With a 1 or 2 stream system, unsorted recyclables could be shipped to these out-of-region processors, and no local sorting would be required. The only remaining tasks to be carried out locally would be receiving, baling and storing the recyclables until ready for transport. Transportation could be undertaken by the same firm responsible for these tasks, by another local firm, or the processor may arrange for transportation. Figure 5 illustrates the differences between the current system and the 1 or 2 stream system described above.

**Figure 5. Steps in Recycling Processing**



It may make financial sense to send mixed recyclables out of the region to a processor who charges less than the current cost for sorting and marketing. The PRRD will issue a Request for Proposals (RFP) to get firm costs on a 1 or 2 stream recycling system, which it can then compare to the costs of its current system. Other convenient and cost effective recycling systems will also be considered. The RFP will be structured to allow proponents to offer one or more of the following services: receiving/baling/storing, transporting, and processing.

Switching to a 1 or 2 stream system will also have implications for the collection system (both depots and curbside programs). These implications will need further assessment before any decisions are made.



## 7.4.2 Collection – Depot System

The drop-off depot system currently services all residents in the PRRD except Lasqueti Island; this will remain unchanged. The following changes will be made to the depot system to improve service and efficiency:

- **Operational Improvements to Depot System**

As described above, the PRRD will explore options for shifting the depots to a 1 or 2 stream system. Under either of these options, glass would be excluded from the depots as it cannot be safely sorted. (See bullet points towards the end of this section for further discussion on glass recycling.)

In addition to reduced processing costs and increased convenience, it is anticipated that shifting to a 1 or 2 stream system will effectively increase the capacity of the depots, by reducing or eliminating un-even filling of bin compartments. This may reduce the depot operating costs. The PRRD will also investigate the potential cost savings associated with owning the bins used as depots, rather than including a bin leasing cost in the depot operations contract. Over ten years, it is estimated that this could result in a cost savings of \$35,000. This estimate is based on the purchase of eight bins at a cost of \$7,000 each, amortized over ten years at 7% interest, and maintenance costs of 25% of the annual capital cost.

If the 1 or 2 stream system does not prove to provide cost savings, the PRRD will need to find alternate ways of increasing the capacity of the depots. This may include using larger bin, reconfiguring the compartments to reduce un-even filling, and adding capacity for cardboard recycling.

- **Include Service of Texada as Separate Item in RFP for Depot Services**

Texada's recycling depots should offer the same type of service as bins on the mainland (i.e., accept the same materials in the same number of streams). However, there may be a more cost-effective way to move recyclables off the island than the current system can provide. By offering this contract separately from the mainland, a local solution to capacity and cost issues may be developed, such as using smaller bins that can be emptied at a secured storage facility on-island. The recyclables could then removed from the island less frequently. Savings on transportation costs will have to be weighed against the cost of having to develop on-island storage capacity.

- **Encourage Texada Residents to Make Use of Depots on Mainland**

Recognizing the costs and logistics associated with bulk transfer of recyclables off Texada Island, the PRRD will encourage Texada residents to return recyclables to the mainland (i.e., return materials to place of purchase) whenever possible. The intent of this campaign will be to reduce the costs associated with the Texada depot system; however, there is currently no plan to reduce the capacity of the recycling depots on Texada. This approach will be implemented regardless of the possible changes to the recycling system.

- **Retain Flexibility to Add or Move Depots as Required**

The RFP for depot operation will include provisions for adding or removing or changing the location of depots as required. Depots will continue to be located in places that are frequented on a regular basis by depot users. Co-locating depots with other services helps to reduce the number of trips made by

residents, which increases convenience and reduces the amount of fuel to bring recyclables to the depot. It also means that there is some oversight of the depots, which reduces the likelihood of mess. Depending on depot availability and cost, the PPRD will consider seasonal depot service where there is sufficient demand.

- **Remove the Glass Stream from all Depots**

Currently there is only one glass recycling plant in British Columbia, and it is located near Vernon. Glass from the Encorp (bottle return) system is currently not processed back into glass containers; it is used in sand-blasting applications. Glass from the PPRD and CPR's collection systems was being stockpiled for future use, but is now being landfilled with the C&D waste.

As it is not currently financially feasible to recycle glass from the PPRD into new glass products, glass will be removed from the depot system. It is also not advisable to include glass with a fully or partially commingled recycling program. Signage (see next item) will be placed at each depot to instruct depot users on how to handle their glass.

- **Place Signage at Depots Encouraging Use of Container Return Programs**

The PPRD or its depot operations contractor will erect signage at the depots to inform and encourage residents to make full use of container-return services at the bottle depots, grocery stores and liquor stores. The signs will also inform depot users that non-deposit glass can be taken to the transfer station for re-use projects (see next item).

- **Non-Deposit Glass will be Accepted at the Transfer Station**

Source-separated glass will be accepted at the transfer station for re-use projects. Crushed glass is suitable for use in drainage and fill projects, although it is not approved in BC for use as road base or sub-base. The intent is for this glass to be crushed and used locally. The net cost of handling and processing the glass must be less than current cost of disposal (\$170/tonne) or this program will be discontinued. If the reuse program is discontinued, non-deposit glass will **not** be collected separately and will be disposed of with the MSW.

### 7.4.3 Collection – Curbside Recycling

The CPR currently offers bi-weekly curbside collection of recyclables to residential customers. The PPRD will work with the City to identify ways to simplify the sorting requirements, so that the requirements for the depots and the curbside program are the same. This is anticipated to increase participation in the curbside program. As a result, City residents may make less use of in-town depots, which will help to alleviate the over-loading that occurs at some depot sites.

Making the curbside program easier to use and increasing participation may also increase the capture rate for recyclables.

- **The PRRD will Work with the CPR to Implement Simplified Sorting Requirements (1 or 2 streams) that are the same as Depot Requirements**

The City's current curbside recycling collection system makes use of separately bagged recyclables, so that many streams can be collected in a single compartment vehicle. If 1 stream recycling is adopted, no changes will be required to the City's collection vehicle or costs. A 2 stream recycling system may result in additional collection or processing costs, depending upon how the materials are collected. Under a 2 stream system, each stream could be bagged separately and collected in a single compartment vehicle, but this may result in costs for de-bagging the streams at the local baling and storage facility. A 2 stream system could also be implemented using a new two compartment truck, which would have a capital cost to the City. The City and the PRRD, together, will have to consider the overall cost implications for collection and processing when determining the preferred recycling system. These deliberations should also consider the collection of source-separated organics, as discussed in Section 7.6.

#### 7.4.4 Policies and Programs Supporting Recycling

Residential recycling programs must be supported by policies and education to achieve maximum success in terms of participation and diversion. For regular garbage, it is common to recommend the adoption of a user-pay system or to implement a can limit. The PRRD and City of Powell River are leaders in this area, since the current waste disposal systems are already fully user-pay.

When it comes to recycling, user-pay systems are less attractive as they run counter to the objective to increase recycling rates and, consequently, waste diversion [i.e., reducing the amount of material requiring disposal]. Support for residential recycling programs comes from promotion and education, and the implementation of bans on the disposal of recyclable materials in the garbage.

- **Promotion and Education**

The success of waste management programs and policies requires that people understand why and how to effectively participate. Promotion and education, therefore, are critical to all components of the solid waste management system.

Through its contracted waste reduction coordinator, the PRRD will be responsible for promotion and education efforts primarily related to waste reduction and reuse, composting, household hazardous waste and product stewardship programs. Promotion and education activities will include:

- the use of print media (newsletters, newspaper column, advertising campaigns);
- the use of other media (radio, TV, web);
- community liaison activities (participation in community events, offering tours of facilities);
- promotional activities (contests, recognition programs);
- easy to access information (directories and brochures that are available in hard copy and online in a searchable format);
- maintenance of an information phone line; and
- support of a school education program.

The PRRD program will also provide some education regarding the overall regional recycling system and services, but contracts for recycling services will place some responsibility on the contractors to inform the public of the particular services they offer and how to use them (e.g., what materials accepted and how to prepare them). The City will continue to be responsible for keeping City residents informed about the requirements of its curbside collection service.

- **Implement Disposal Bans on Residential Recyclables**

Over time recyclables that are included in the depot and curbside recycling systems will be banned from disposal with garbage. The bans will likely focus on plastic, metal, paper, and yard waste. Before any bans are introduced, the PRRD will undertake a comprehensive information and education campaign to ensure the public is well-informed and to foster public support. The campaign may include a phase-in period for the bans, during which loads of garbage containing banned materials are collected, but a notice is left explaining the infraction.

Municipal waste collection staff, private sector waste collection staff and transfer station staff will need to play a role in enforcing the bans. The City of Powell River's garbage collection bylaw already bans the disposal of a number of items, including corrugated cardboard, yard waste, land clearing debris, and scrap metal. With sufficient education and a well-designed implementation plan, the expansion of the bans to other commonly recycled household materials is not anticipated to be difficult to implement in the City. The PRRD will need to work closely with private sector waste collection staff and transfer station staff to ensure that the bans are respected in the electoral areas and by residents who self-haul waste to the transfer station.

## 7.5 Commercial Recycling

In both the CPR and the electoral areas, businesses will continue to have their recyclables picked up by a private contractor or will self-haul their recyclables to local recycling facilities (in the case of large generators, they may choose to haul their recyclables directly to market in the Lower Mainland). To encourage businesses to engage in recycling, the PRRD will introduce bans on recyclable materials in the garbage and conduct a promotion and education program. These two actions are described below.

- **Bans on Recyclable Materials**

Disposal bans for commercial waste generators may be different from those for residential waste generators. Banned materials will be those materials with established recycling markets and collection infrastructure such as cardboard and metal, or that are covered under product stewardship programs, such as tires and beverage containers. These disposal bans will be enforced at the point of disposal, i.e., the staffed transfer station. As applied to commercial loads, bans may take the form of increased tipping fees (for example, loads containing over a certain percentage of recyclables may be charged a tipping fee that is double the regular fee).

- **Business-Focused Promotion and Education**

As with the residential recycling programs, encouraging businesses to participate in recycling requires education to achieve maximum success in terms of participation and diversion. Educational materials and promotional programs targeting the needs and interests of employers and employees of local businesses will be developed by the PRRD's waste reduction coordinator. These materials may include instructions on how to conduct a waste audit and a list of local diversion opportunities for businesses.

## 7.6 Organics Management

The AC highlighted composting as a key means of reducing the environmental impact of waste management. Composting will reduce the negative environmental impacts of transporting the material to somewhere else and will create a beneficial product instead of landfilling organics.

The waste audit conducted in conjunction with the SWMP update indicated that food waste and compostable paper products represent a large portion of the waste stream. In conjunction with yard waste (that is currently chipped and used as hog fuel) there is therefore feedstock available for a composting facility. The AC indicated a preference for a two phased approach to managing organics. The first phase would focus significant resources on education and promotion of backyard composting. While bears are an issue in the region and may deter some residents from backyard composting, a well-managed and strongly constructed backyard composting bin can be used successfully. The waste reduction program has been allocated a full time equivalent coordinator position in order to achieve strong uptake of backyard composting.

In parallel with the promotion of backyard composting, the practice of having clean yard and wood waste chipped and used at the mill will continue.

The second phase of the organics management strategy is the establishment of an in-vessel composting facility. The AC preferred an in-vessel facility over an open windrow facility, because in-vessel facilities reduce the potential for odours and leachate generation, and are therefore more likely to gain public acceptance

There are many in-vessel composting technologies available, and there are many similarities between systems. Compostable materials are blended to balance the carbon and nitrogen content of the feedstocks, and are then placed into the vessel; moisture content may also be adjusted at this time. Depending on the system in place, once in the vessel, the organics may be rotated, turned, agitated, or moved from pile to pile to improve aeration and ensure uniform decomposition. After the in-vessel processing is complete (the length of time in the vessel varies widely depending on the technology), the organic matter must finish decomposing. For systems that use a short in-vessel duration, this further decomposition may take place using windrows and require some turning; for systems that spend a longer time in-vessel, the compost may be stored in a large pile and not require turning.

The following steps will be undertaken in support of establishing a centralized composting facility.

- **Conduct a pre-design study for centralized composting**

The study will identify sites and appropriate technologies for a centralized composting system. The study will also determine the organic waste collection method that is best suited to the PRRD and CPR. The study will provide the PRRD with the necessary information to make a decision about the best way to proceed with organics diversion.

While the feasibility study will generate much more detailed cost estimates than is currently possible, a rough estimate has been developed to assist with planning. Details of this estimate are provided in Appendix B.

Based on the waste composition study results, the current quantity of waste disposed, and the current handling of yard waste and clean wood waste, the required capacity for the composting facility is approximately 4,100 tonnes (Table 10). Of this amount, 2,200 tonnes represents “new” diversion. 1,300 tonnes is new diversion from the MSW stream, which is currently exported to the Cache Creek Landfill at a cost of \$160/tonne (funded by the PRRD and paid for through tipping fees), and 900 tonnes is new diversion from the C&D waste stream, which is currently exported to the Ecowaste Landfill in Richmond (paid for by waste generators; the PRRD is not involved in the C&D waste system).

**Table 10. Composting Feedstock**

Feedstocks	Tonnes Available	% Captured	Tonnes Diverted	Current Handling	Current Funding Mechanism	Status
Food Waste	1,594	65%	1,036	Exported as MSW	Tipping fees	New diversion
Yard Waste	100	75%	75	Exported as MSW	Tipping fees	New diversion
Compostable Paper	349	50%	174	Exported as MSW	Tipping fees	New diversion
Clean wood waste from C&D stream (estimated)	1,410	65%	917	Exported as C&D waste	Tipping fees	New diversion
Yard waste & Clean Wood Waste	1,900	100%	1,900	Diverted as hog fuel	Tipping fees (lower than MSW or C&D due to lower costs)	Existing diversion
<b>Total</b>	<b>5,353</b>		<b>4,102</b>			

One type of in-vessel composting system that is well suited to the PRRD’s feedstock and climate is the Gore™ in-vessel composting system. This type of system uses large industrial-grade Gore-Tex tarps to cover the composting piles, to keep odours in and reduce runoff. This type of system is classified as in-vessel, and is less expensive to build and maintain than other technologies.

The capital cost for a Gore system capable of processing 4,500 tonnes per year is in the order of \$2.3 million (2008 dollars). If this capital payment was amortized over 15 years at 5% interest, the annual cost would be \$224,000. The annualized capital cost per tonne would be \$50. These costs assume that the

full capital cost will be financed through borrowing. The PRRD may have access to substantial grants, and also has reserves available that could be used to fund some of the capital cost.

The annual operating costs for a Gore system of this size is in the order of \$295,000, or \$65/tonne (see Appendix B for details).

In order to operate the composting facility, clean food and yard waste is needed as feedstock. This material is best obtained through a collection system that maintains source-separation of the organics (i.e., waste destined for the composting facility should be kept separate from waste destined for a landfill). Keeping the organics separate will reduce contamination of the feedstock and result in a much higher quality product that can be sold more easily.

A regular organics collection service will be required for City residents in order to maximize participation in the composting program. Collection of organics should be as simple and convenient as the collection of garbage, or participation may be reduced. The organics collection service could be operated directly by the City using its own employees and vehicles, or by a private sector collector who may operate under contract to the City. The cost of a collection service is not included in the operating costs described above. See Appendix C for a rough estimate of collection costs for City residents (based on current waste collection costs)

Residents of the electoral areas and Sliammon do not currently receive waste collection services from the PRRD. The PRRD may choose to become involved with organics collection through contractors or by directly providing the collection service. Alternately, the PRRD may choose to leave organics collection as an optional service provided by the private sector to residents on a subscription basis; this will likely reduce the quantity of organics recovered for composting. Under either scenario, the transfer station should allow residents to self-haul organics, much as garbage is currently self-hauled.

Commercial food waste generators, such as grocery stores and restaurants will also need to be serviced with an organics collection program. Small businesses in the CPR that can use the same collection system as residents may be serviced by the same service provider as residents; businesses generating larger volumes of organics will require different service using front-end load bins or compactors.

- **Implement Recommendations from Pre-design Study**

Once the pre-design study is complete, the PRRD will implement the preferred approach to organics management. The options examined may include building a local in-vessel facility, building a local windrow facility, and exporting organics to an existing composting facility outside the region.

When the composting facility is operational, any wood waste in excess of the facility's capacity may be chipped and used as hog fuel according to the current practice.

## 7.7 Extended Producer Responsibility

Extended Producer Responsibility (EPR) programs generally put the responsibility for the management of waste in the hands of the manufacturer, retailer and consumer of the product. This removes the responsibility, cost and infrastructure for collection, recycling and disposal from local governments and taxpayers. In BC, EPR has been applied to many products that are seen to be particularly problematic for local governments, either because of their toxic nature, or because of their prevalence as litter. In BC, there are EPR programs in place for:

- Used motor oil;
- Tires;
- Lead-acid batteries;
- Pharmaceuticals;
- Paint;
- Pesticides;
- Electronic waste;
- Compact fluorescent light bulbs;
- Solvents;
- Fuels; and
- Beverage containers.

The City of Powell River, the Sliammon First Nation and the PRRD support EPR as a waste management tool. The following actions will be undertaken by the PRRD (through its waste reduction coordinator) in support of current EPR programs and to encourage the expansion of EPR to other waste products and materials:

- promote and educate the public about existing EPR programs and how they can be accessed in the PRRD;
- work with program stewards to ensure residents of the PRRD have reasonable access to collection programs;
- participate on BC Product Stewardship Council; and
- lobby the Province and the federal government for improved/expanded Extended Producer Responsibility and enforcement of existing regulations.

## 7.8 Residuals Collection

This section of the plan outlines the system for collection of residual waste (garbage) and the transfer of residual waste to the final disposal site(s)

There are no planned changes to the methods of garbage collection in the short term. The City may look at changes to its tag system to improve convenience for residents and to reduce administration costs. Municipal crews will continue to provide service to residential customers in the City of Powell River. The City should undertake a review of its collection service to identify the best way of providing simplified recyclables collection system and source-separated organics collection. Strong uptake on the organics collection and a simplified recyclables collection would enable the City to offer an integrated collection system as described in Section 7.6.

Sliammon currently offers curbside collection of garbage to residents. This service is funded through the band's resources, and does not extend to leasehold properties. Currently recyclables are not collected.



Slammon is interested in enhanced environmental management opportunities, and may consider offering curbside collection of recyclables and organics in the future.

Collection services in the electoral areas will continue to be provided by the private sector on a subscription basis. Commercial waste generators will also continue to be serviced by the private sector. Self-haul will continue to be accepted at the transfer station.

The PRRD will continue to make use of a transfer station to facilitate the export of waste. The transfer station will continue to be operated by the private sector, under contract to the PRRD.

## 7.9 MSW Residuals Disposal

The PRRD does not have any local disposal capacity. MSW is currently exported to the Roosevelt Landfill in Washington State.

The current waste export model is serving the region well, and the PRRD does not intend to look for local waste disposal capacity in the short term. This plan focuses on increasing diversion through the introduction of organics management, by improving the recycling system and by implementing disposal bans. If these strategies are successful, the amount of waste requiring disposal will decrease from the current 10,624 tonnes, to 7,494 tonnes. The PRRD will wait to observe the impacts of the new waste reduction and diversion programs before making a long term disposal commitment.

The PRRD therefore intends to maintain its practice of exporting waste for disposal. The PRRD will only export waste to facilities that meet, at a minimum, Provincial environmental standards or the equivalent. This may include international disposal facilities.

The PRRD considered the development of a local incineration or waste-to-energy facility. Although technologies exist that would have minimal impact on local air quality, the PRRD does not intend to develop local waste-to-energy capacity, as modern systems with good air pollution control systems cannot be cost-effectively operated with the small quantity of waste available in the PRRD.

If the glass re-use program is not successful, the PRRD may conduct a feasibility study for the development of a selected waste landfill. This landfill would be used for the disposal of inert waste only. It is recommended that the PRRD work closely with the Ministry of Environment before making any significant steps in this direction.

## 7.10 Construction and Demolition Waste

### 7.10.1 Diversion

Construction and demolition waste (C&D waste) represents approximately half of the waste exported annually from the PRRD. This waste stream also includes land-clearing waste, and some bulky items, such as furniture. Much of this waste is recyclable or compostable, including cardboard, plastic, metal, and wood, and therefore this waste stream represents a significant waste diversion opportunity.

The primary driver for diverting C&D waste from disposal is economics. Tipping fees can be set to encourage waste separation, so that recyclables or compostable waste are kept separate from waste that requires disposal. It is more effective to conduct this separation at source than at the transfer station. Therefore, to encourage source separation, the PRRD will require its transfer station contractor to set differential tipping fees for C&D waste loads, with fees for mixed C&D loads that include recyclables and compostables being higher than fees for C&D loads that do not contain recyclables. The PRRD may eventually work up to a ban on the disposal of mixed loads of C&D waste. This change in tipping fee structure will be accompanied by an extensive consultation and education campaign, carried out by the waste reduction coordinator.

### 7.10.2 Disposal

C&D waste that is not recovered through separation is currently exported from the region and disposed of at a private landfill in Richmond, BC. No change is planned for this practice, although the proportion of C&D waste recovered is expected to rise. There is currently no cost to the PRRD for this, as the tipping fees charged at the transfer station cover the costs of material receiving, stockpiling, transfer, and the tipping fees at the receiving landfill. It is recommended that this system be maintained. However, the PRRD should require the transfer station operator to submit records of the quantity of C&D waste exported each time a shipment is sent. This will enable the PRRD to more accurately gauge the total waste generation in the region.

The landfill that receives the C&D waste is expected to close around 2013. The PRRD will work with its contractor to find a suitable replacement landfill that, at a minimum, meets Provincial requirements. The C&D waste stream should be considered during the feasibility study for a selected waste landfill, described in Section 7.9. By 2013, the quantity of C&D waste requiring disposal should be reduced by approximately 1,000 tonnes, due to the variable tipping fee structure.

## 7.11 Former Facility Sites

As described in Section 4, there are three or more former waste management sites in the PRRD: the old incinerator site and at least two former landfills. These sites require closure and may require remediation. The details of the closure and remediation requirements will be defined through a separate process, and must be negotiated between the PRRD and the CPR.

## 7.12 Illegal dumping

Illegal dumping of waste is a common affliction of rural areas in the PRRD and throughout British Columbia. The PRRD will implement the following programs to reduce illegal dumping:

- waive tipping fees for community groups that clean up dumpsites;
- promote the provincial RAPP system (a toll-free line for reporting poachers and polluters);
- encourage Ministries of Forests/ Environment/ Highways to enforce illegal dumping regulations;
- establish a system for members of the public to report the location of illegal dumpsites through the PRRD website;
- organize regular community clean-up events involving the governments (CPR, Sliammon, PRRD) schools, youth groups and the Ministry of Forests; and
- educate the public about illegal dumping regulations and impacts of dumping on the community and recreation areas.

The PRRD will also take a proactive role in reducing illegal dumping by eliminating the tipping fee on small loads of yard waste brought to the transfer station. The intent is to allow loads <50kg to be disposed of for no cost to the resident. The PRRD will have to requisition funds from the general taxpayer to cover the tipping fee revenue that the contractor loses as a result of this policy. This program is primarily intended to reduce illegal dumping rather than increase diversion, as yard waste is already charged a significantly lower tipping fee than regular MSW.

## 7.13 Policies

The following policies will be implemented to support the PRRD's programs and infrastructure and to aid in achieving the waste diversion targets set out in this Plan:

- **Disposal Ban Policy**  
Once a material or product has readily available recycling or composting alternatives in the PRRD, this material/product will be banned from disposal as garbage. At present recyclable plastic, metal, paper, and yard waste have readily available recycling opportunities, and therefore, these items will be the first set of materials banned from the garbage in the PRRD. It should be noted that disposal bans will be phased in, with the first phase being promotion and education, the second phase being notifications given to haulers bringing in garbage containing banned materials, and the final phase being a ramp-up of financial penalties.
- **Walk-the-Talk Policy**  
The PRRD will establish its office and worksites as models of waste reduction to ensure that their activities support and reflect the PRRD's waste reduction and climate change goals, and to demonstrate diversion opportunities in the workplace.

- **Cooperation Policy**

The PRRD will work cooperatively with other regional districts where feasible. This cooperation may take the form of shared infrastructure, sharing “soft resources” such as promotion and education materials, and sharing lessons learned.

As the PRRD is fairly isolated in terms of physical linkages to neighbouring regional districts, there are fewer opportunities to harmonize policies and to conduct collaborative studies. However, the PRRD remains open to exploring opportunities as they arise.

- **Coordination Policy**

The SWMP is one of several management plans within the PRRD. The PRRD will work to coordinate the content and execution of this plan with other management plans that are developed during the life of this plan.

## 7.14 Bear-Human Conflict Management

The PRRD is home to a large population of bears that are integral to the local ecosystem. Developing and maintaining a solid waste management system that minimizes the potential for human-bear conflict will enhance public safety and prevent the unnecessary destruction of bears.

The PRRD will work with local Bear Aware groups and the Province to establish and fund on-going awareness and education campaign for waste generators that addresses “bear awareness”. The City of Powell River and the private sector waste collection companies servicing the electoral areas will ensure that their waste collection bylaws require containerization of garbage and enforced set out times for curbside collection to minimize wildlife access opportunities. Backyard composting education materials will address how to compost in a manner that does not attract wildlife into residential areas.

## 7.15 First Nations Linkages

To ensure proper and cost-effective management of municipal solid waste generated in the Sliammon First Nation–community and lands within the PRRD, the PRRD will liaise on an on-going basis with Sliammon to identify opportunities to work together for waste management servicing and to develop service agreements. The PRRD will also liaise with the Sechelt First Nation to ensure the residents on its leasehold properties on the Coqueneets Reserve have equitable access to the PRRD waste management services and programs provided to the surrounding electoral area.

## 8. Implementation Schedule

Table 10 outlines the implementation schedule for the Regional Solid Waste Management Plan from 2009 to 2019. For most of the new programs, a year or more is allocated for program development and start-up (as shown in yellow on the table). As shown in the table, all of the diversion-related activities could be implemented by 2012.

**Table 11. Implementation Schedule**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Waste Reduction Program</b> Education programs on waste reduction, reuse, backyard composting, and how to use extended producer responsibility programs											
<b>Residential Recycling</b> Depots (simplified system and assumes new bins purchased by PRRD using reserve) Curbside recyclables collection (PR City) Recycling processing (net) Glass crushing and reuse Implement disposal bans											
	Education		Enforcement								
<b>ICI Recycling</b> Business-focused education programs Implement disposal bans											
	Education		Enforcement								
<b>Organics Management</b> Build composting facility Organics collection (PR City) Promotion and education of organics management facility and collection service											
<b>Residual Waste Collection</b> Powell River City - Commercial Powell River City - Residential Electoral Areas											
<b>Transfer Station &amp; Export</b> Transfer station operations Waste export contract											
<b>Other Policy Initiatives</b> Illegal Dumping Prevention Program Bear-Human Conflict Mngmt - Bear Aware Program Advocacy for Extended Producer Responsibility Intergovernmental Cooperation Policy Coordination with other PRRD plans PRRD operations - Walk-the-Talk Policy											
	Included in general promotion and education costs (above)										
	To be incorporated into PRRD corporate management budget										
	To be incorporated into PRRD corporate management budget										
	To be incorporated into PRRD corporate management budget										
<b>Miscellaneous Components</b> Waste composition study Solid Waste Management Plan updates											

Program development and start up  
 Program launch  
 Ongoing programs

## 9. Diversion and Targets

### 9.1 Diversion Potential

The potential for additional diversion based on the actions outlined in this document is primarily due to disposal bans and centralized composting. Table 12 outlines the additional diversion potential associated with the plan components described in this document.

**Table 12. Additional Diversion Potential**

Plan Component	Diversion Potential (additional Tonnes)
Waste reduction and reuse programs	30
Residential and ICI recycling programs <ul style="list-style-type: none"> <li>• Disposal bans</li> <li>• Education programs</li> <li>• Simplified system</li> </ul>	850
DLC <ul style="list-style-type: none"> <li>• Bans</li> <li>• Variable tipping fees</li> </ul>	1000
Organics <ul style="list-style-type: none"> <li>• Home and Centralized composting</li> </ul>	1,300
<b>Total Additional Diversion</b>	<b>3,130</b>
<b>Total Current Diversion</b>	<b>7,537</b>
<b>Total Future Diversion</b>	<b>10,667</b>
<b>Total Future Generation</b>	<b>18,191</b>
<b>Future Diversion Rate</b>	<b>59%</b>

### 9.2 Targets

Based on the schedule provide in Table 11 and the diversion listed in Table 12, 59% diversion can be achieved by 2019 (the end of the plan period). This figure is based on static population and little economic growth in the area.

The AC has recommended the adoption of a 60% diversion target by the end of the plan period. It should be noted that the waste reduction and diversion programs outlined in this plan are estimated to result in a diversion rate of 59%, 1% less than the target. The most cost-effective way to close the gap will be through greater waste reduction through changing consumer habits. The AC has also recommended the adoption of an ultimate goal of zero waste as described in Section 7.1.

## 10. Costs and Financing

### 10.1 Staffing

To implement the Plan, the PRRD will engage a waste reduction coordinator, primarily for the purposes of promotion and education on waste reduction and composting. Additional technical staff may be required to manage and maintain solid waste management infrastructure, such as the proposed composting facility. It is expected that contractors and consultants will also be required to undertake some elements of this Plan. Enforcement staff for the disposal bans have not been included in this estimate of additional staffing needs since the enforcement mechanism is not defined at this time.

### 10.2 Estimated Expenditures

Table 13 shows a summary of the capital costs associated with the activities in the plan.

Table 14 provides an estimate of the capital and operating expenditures associated with the solid waste management system from 2009 to 2019, based on the programs, policies and infrastructure outlined in this Plan. These expenditures include annual debt payments where applicable. A 2% annual inflation factor has been included in all costs. 2008 costs have been shown for comparison. The costs are conservative, and do not include the receipt of any grants, or the use of any reserves. The costs shown also do not account for potential revenue from compost sales.

The recycling system costs are based on a switch to a 1 or 2 stream recycling system; under this scenario, there will be no revenue from recycling, but costs are anticipated to be lower than the current net cost. If the current recycling system remains in place, some revenue can be expected to offset recycling costs.

As shown in the table, the annual expenditure on solid waste management is estimated to increase slightly from the 2008 costs of \$1.36 million to \$1.42 million in 2009. Costs will rise again in 2012 with the construction and operation of a centralized composting facility, and the associated organics collection.

Not included in these costs are the costs of final closure of former landfill sites and the former incinerator site, as the investigations to determine the extent and nature of the work required have yet to be undertaken.



**Table 13. Capital Plan**

CAPITAL ITEM	Cost to	Estimated Cost & Implementation Schedule					Term	Annual Payment
		2009	2010	2011	2012	Total		
<b>Residential Recycling</b>								
<b>Depots</b>								
Purchase drop-off bins	PRRD		\$ 56,000				10	\$7,000.00
Depot Signage	PRRD	\$ 2,000			\$ 2,000			\$ 2,000
<b>Curbside Recyclables Collection</b>								
New Vehicle	City				\$ 125,000		8	\$ 19,000
<b>Organics Management</b>								
<b>Pre-design study for centralized composting</b>								
	PRRD	\$ 60,000						\$ 60,000
<b>Composting Facility</b>								
Capital Costs	PRRD			\$ 1,725,000			15	\$ 166,000
Site acquisition	PRRD			\$ 400,000			15	\$ 39,000
Permitting, training etc	PRRD			\$ 200,000			15	\$ 19,000
<b>Organics Collection</b>								
Purchase new collection vehicle	City			\$ 125,000			8	\$ 16,000
Purchase containers, including container delivery and program roll out	City				\$ 341,100		8	\$ 43,000
<b>Residual Waste Collection</b>								
<b>Powell River City</b>								
New Vehicle	City				\$ 125,000		8	\$ 19,000
<b>Total Capital</b>								
		\$ 62,000	\$ 56,000	\$ 2,450,000	\$ 593,100	\$ 3,161,100		
PRRD Capital		\$ 62,000	\$ 56,000	\$ 2,325,000	\$ 2,000	\$ 2,445,000		
City Capital				\$ 125,000	\$ 591,100	\$ 716,100		

5% interest rate used for all capital purchases

**Table 14..Solid Waste Management System Costs (Regional District and Municipal Expenditures)**

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Waste Reduction Program</b>												
Promotion of Reduction and Reuse	15,000	65,000	66,300	67,626	68,979	70,358	71,765	73,201	74,665	76,158	77,681	79,235
<b>Residential Recycling</b>												
Depots (simplified system assumes new bins purchased through borrowing)	89,500	81,000	87,580	89,192	92,835	92,512	94,222	95,967	97,746	99,561	101,412	96,301
Curbside Recyclables Collection (PR City)	72,555	73,000	74,460	75,949	96,468	98,018	99,598	101,210	102,854	104,531	106,242	107,987
Recycling Processing (net)	177,920	92,000	65,000	66,300	67,626	68,979	70,358	71,765	73,201	74,665	76,158	77,681
Glass Crushing and Reuse	-	20,000	20,400	20,808	21,224	21,649	22,082	22,523	22,974	23,433	23,902	24,380
Disposal Bans	-	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
<b>Subtotal Residential Recycling</b>	<b>339,975</b>	<b>269,000</b>	<b>250,440</b>	<b>255,249</b>	<b>281,154</b>	<b>284,157</b>	<b>289,260</b>	<b>294,465</b>	<b>299,774</b>	<b>305,190</b>	<b>310,714</b>	<b>309,348</b>
<b>ICI Recycling</b>												
Business-Focused Promotion and Education	-	Included in Waste Reduction Program										
Disposal Bans	-	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
<b>Organics Management</b>												
Composting Facility	-	60,000	-	224,000	519,000	524,900	530,918	537,056	543,317	549,704	556,218	562,862
Organics Collection	-	-	-	19,000	197,000	199,500	202,050	204,651	207,304	210,010	212,770	215,586
<b>Subtotal Organics Management</b>	<b>-</b>	<b>60,000</b>	<b>-</b>	<b>243,000</b>	<b>716,000</b>	<b>724,400</b>	<b>732,968</b>	<b>741,707</b>	<b>750,622</b>	<b>759,714</b>	<b>768,988</b>	<b>778,448</b>
<b>Residual Waste Collection</b>												
Powell River City - Commercial	33,807	34,000	34,680	35,374	36,081	36,803	37,539	38,290	39,055	39,836	40,633	41,446
Powell River City - Residential	128,910	129,000	131,580	134,212	155,896	158,634	161,426	164,275	167,180	170,144	173,167	176,250
Electoral Areas	-	Serviced by private sector										
<b>Subtotal Residual Waste Collection</b>	<b>162,717</b>	<b>163,000</b>	<b>166,260</b>	<b>169,585</b>	<b>191,977</b>	<b>195,436</b>	<b>198,965</b>	<b>202,564</b>	<b>206,236</b>	<b>209,980</b>	<b>213,800</b>	<b>217,696</b>
<b>Transfer Station &amp; Export</b>												
Transfer Station Operations	140,415	135,000	137,700	140,454	106,015	108,135	110,298	112,504	114,754	117,049	119,390	121,778
Export Contract	702,970	670,000	683,400	697,068	526,147	536,670	547,403	558,351	569,518	580,909	592,527	604,377
<b>Subtotal Transfer Station &amp; Export</b>	<b>843,385</b>	<b>805,000</b>	<b>821,100</b>	<b>837,522</b>	<b>632,162</b>	<b>644,805</b>	<b>657,701</b>	<b>670,855</b>	<b>684,272</b>	<b>697,957</b>	<b>711,917</b>	<b>726,155</b>

<b>Other Policy &amp; Promotion Initiatives</b>												
Illegal Dumping Prevention Program	-	15,000	15,300	15,606	15,918	16,236	16,561	16,892	17,230	17,575	17,926	18,285
Bear-Human Conflict Mngmt - Bear Aware Program	-	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Extended Producer Responsibility												
- Promotion, Education and Advocacy		Included in general promotion and education costs (above)										
Policy re												
- Intergovernmental Cooperation		To be incorporated into PRRD corporate management budget										
- Coordination with Other PRRD Plans		To be incorporated into PRRD corporate management budget										
- PRRD Operations Model - Walk-the-Talk		To be incorporated into PRRD corporate management budget										
<b>Subtotal Other Policy &amp; Promotion Initiatives</b>		<b>17,000</b>	<b>17,300</b>	<b>17,606</b>	<b>17,918</b>	<b>18,236</b>	<b>18,561</b>	<b>18,892</b>	<b>19,230</b>	<b>19,575</b>	<b>19,926</b>	<b>20,285</b>
<b>Miscellaneous Components</b>												
Waste Composition Study	-	-	-	-	-	-	25,000	-	-	-	40,000	-
Solid Waste Management Plan Updates	-	-	-	-	-	-	100,000	-	-	-	120,000	-
<b>Subtotal Miscellaneous Components</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>125,000</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>160,000</b>	<b>-</b>
<b>Annual Totals</b>	<b>1,361,077</b>	<b>1,382,000</b>	<b>1,324,400</b>	<b>1,593,588</b>	<b>1,911,189</b>	<b>1,940,393</b>	<b>2,097,221</b>	<b>2,004,685</b>	<b>2,037,799</b>	<b>2,071,575</b>	<b>2,266,026</b>	<b>2,134,167</b>
<b>PRRD Operating &amp; Capital Debt Payments</b>	<b>1,125,805</b>	<b>1,146,000</b>	<b>1,083,680</b>	<b>1,329,054</b>	<b>1,425,744</b>	<b>1,447,439</b>	<b>1,596,607</b>	<b>1,496,260</b>	<b>1,521,405</b>	<b>1,547,053</b>	<b>1,733,214</b>	<b>1,592,898</b>
<b>City Operating &amp; Capital Debt Payments</b>	<b>235,272</b>	<b>236,000</b>	<b>240,720</b>	<b>264,534</b>	<b>485,445</b>	<b>492,954</b>	<b>500,613</b>	<b>508,425</b>	<b>516,394</b>	<b>524,522</b>	<b>532,812</b>	<b>541,268</b>

**PRRD Waste Management Budget also includes**

Texada Transfer Station	14,500
Legal, Insurance, Administration	52,770
Miscellaneous & Contingency	32,500
<b>Total</b>	<b>99,770</b>

These would continue to apply in some form

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### 10.3 Cost Recovery Mechanisms

Cost recovery mechanisms that will be utilized to fund the implementation of programs in this Plan include:

- Garbage tipping fees;
- Compost tipping fees;
- Sales (e.g., compost, recyclables);
- Sponsorships, and
- Taxation.

Reflecting the guiding principles of this Plan, user-pay mechanisms (such as tipping fees) will be applied to the provision of solid waste services wherever appropriate. Opportunities for sponsorship and grants will be explored to assist in the funding of programs.

## 11. Monitoring and Evaluation

### 11.1 Plan Monitoring Committee

The Advisory Committee that was formed to develop this updated plan will be discontinued once the Plan is approved by the Minister of Environment. However, a Plan Monitoring Committee will be formed to monitor the implementation on the Plan and report directly to the Intergovernmental Community Planning Steering Committee comprised of elected officials from the City of Powell River, Sliammon First Nation and Powell River Regional District. Monitoring Committee members will:

- review and become familiar with the Solid Waste Management Plan;
- review and become familiar with the existing solid waste management system in the PRRD;
- identify methodologies to be employed in the monitoring and evaluation of the Plan's implementation;
- monitor the implementation of the Plan and annually report to the Intergovernmental Community Planning Steering Committee on the effectiveness of the SWMP at achieving its objectives; and
- make recommendations to increase the effectiveness of the Plan or the solid waste management system.

The committee membership will strive to have a broad representation of interests including the CPR, PRRD, Sliammon, the waste management industry, environmental organizations, the business sector, the residential sector and senior governments. Additionally, members will be selected to create a committee with a balance of representation geographically, demographically, and with a variety of interests and perspectives. It is anticipated that the Chair of the Intergovernmental Community Planning Steering Committee will also sit on the Plan Monitoring Committee to provide a strong link with the Regional Board.

In general there will be 2-3 meetings per year of the committee with the provision for additional meetings, workshops or other presentations at the committee's discretion.

### 11.2 Plan Evaluation

On an annual basis, Regional District staff will compile data that reflects the status of the Plan's implementation and progress toward waste reduction targets. This data will be provided to the Plan Monitoring Committee and the regional office of the Ministry of the Environment.

A multi-season waste composition study on the residual waste management stream will be conducted in advance of the next SWMP update to assess the success of current waste diversion programs and policies and identify opportunities for additional diversion.

### 11.3 Plan Updates

A review and update of the Solid Waste Management Plan will be undertaken every five years to ensure that it reflects the current needs of the PRRD.

### 11.4 Plan Flexibility

Costs provided in this plan are estimates and may not reflect actual costs at the time of implementation. As a result, programs and infrastructure may undergo further assessment, including an assessment of costs and continued community support, by the Plan Monitoring Committee prior to implementation.

The Plan implementation schedule will be flexible enough to reflect the variability in priorities and available funding of the PRRD, CPR and Sliammon. The Plan is intended to be flexible when warranted to implement plan components, directly or through private firms and/or non-profit organizations.

Notwithstanding the above, the contents of this Plan are subject to legal requirements, and as a result, guidance and the direction from the Ministry of the Environment will be sought in regards to the appropriate level of flexibility in a specific circumstance.

## 12. Approval by the Board

This Plan was approved by the Board of Directors by the following resolution on \_\_\_\_\_:

# Appendix A

## Stage 1 Report: Current Waste Management System



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# Appendix B

## Preliminary Centralized Composting Costs

# Preliminary Centralized Composting Costs

## Capital Costs

The costs presented in Table B1 are based on a processing capacity of 4,500 tonnes per year, and on the Gore composting system. This system uses large tarps made of waterproof/breathable fabric (industrial grade Gore-Tex) to cover the compost piles. The piles are built over aeration channels or pipes, which blow air into the piles to improve decomposition. The covers prevent the escape of odours from the piles, and prevent the piles from becoming water-logged in the winter; the breathable nature of the covers together with the aeration systems means that the piles remain aerobically active. The Gore system is recognized as an in-vessel system, but is less expensive to build and operate than many other in-vessel systems.

The costs for the Gore cover system were obtained from the Gore representative for North America; costs for ancillary equipment are based on previous experience with compost facility design and construction.

**Table B1. Capital Costs for Composting Facility**

Item	Capital Cost
Gore Cover system with portable winder	\$525,000
Site clearing & grading	\$125,000
Asphalt (around compost heaps and tipping building)	\$250,000
Concrete (pads and tipping building)	\$200,000
Leachate collection system	\$40,000
Storm water pond	\$15,000
Tipping (receiving) building (simple membrane covered structure)	\$100,000
Biofilter	\$20,000
Mixer	\$125,000
Trommel screen	\$150,000
Site services (power, water)	\$60,000
Engineering services	\$150,000
Land	\$400,000
Permitting/training	\$200,000
<b>Total</b>	<b>\$2,325,000</b>
<b>Annualized Capital (15 years, 5% interest)</b>	<b>\$224,000</b>
<b>Annualized capital cost per tonne</b>	<b>\$50</b>

The capital cost estimate does **not** include

- Site Surveying
- Geotechnical Assessment
- Environmental Assessment
- Legal Fees
- Staff Training
- Public Communications
- Insurance
- Spare Parts
- Taxes & Duties

In terms of site size, a 4,500 tonne per year facility requires 72 m x 30 m for the Gore cover system. Approximately the same amount of space is needed for receiving material, mixing/grinding, screening, curing and storage. Therefore the total land requirement is approximately 0.4 ha. The price for land included in the capital cost is an allowance for 1 ha, which allows the inclusion of buffer space.

Capital costs could be financed from existing reserves, grants, and/or by borrowing.

## Operating Costs

Operating costs must also be considered. These include labour, equipment operation, equipment maintenance/replacement, and consumables. An estimate of operating costs is provided in Table B2.

**Table B2. Operating Costs for Compost Facility**

Item	Operating Cost
1 full time equivalent operator	\$80,000
Administration (5%)	\$4,000
Vacation, sick relief, training (7%)	\$6,000
Electricity (0.82 kWh/tonne @ \$0.07/kWh) + other site needs	\$1,000
Diesel (5L/hr @ 1,000 hrs/year @ \$1.50/L)	\$7,500
Loader use \$70/hr for 1,000 hrs	\$70,000
Trommel use \$20/hr for 1,000 hrs	\$20,000
Grinder service (@ \$1,000/month)	\$12,000
Equipment maintenance (1.5% of capital)	\$26,000
Consumables (15% of other operating costs)	\$34,000
Contingency (15% of other operating costs)	\$34,000
<b>Total annual operating cost</b>	<b>\$295,000</b>
<b>Operating cost per tonne</b>	<b>\$65</b>

According to these estimates, in-vessel composting for 4,500 tonnes per year using the Gore system will cost in the order of \$115/tonne total (including annualized capital, debt repayment and operating costs).

Operation of a compost facility would likely require on-going use of the transfer station to consolidate loads of organics to be taken to the composting facility (depending on the composting facility location). It is therefore prudent to assume that a cost in the order of \$30/tonne be added to the estimated cost of composting, bringing the total to roughly \$145/tonne. This cost includes debt financing, but does not include any revenue from the sale of the finished compost, or revenue from tipping fees. If funding from sources other than borrowing is used (e.g., grants or reserves) costs will be lower, since there will less interest paid.

Currently, MSW disposal costs \$160/tonne. This cost includes Metro Vancouver's tipping fee of \$67/tonne, \$66/tonne for transportation of waste from PRRD to the lower mainland, plus \$27/tonne for transfer station operations. These costs are fully funded through tipping fees charged at the transfer station.

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## Feedstock Collection

In order to operate the composting facility, clean food and yard waste is needed as feedstock. This material is best obtained through a collection system that maintains source-separation of the organics (i.e., waste destined for the composting facility should be kept separate from waste destined for a landfill). Keeping the organics separate will reduce contamination of the feedstock and result in a much higher quality product that can be sold more easily.

Residents of the electoral areas and Sliammon First Nation do not currently receive waste collection services from the PRRD. The PRRD and Sliammon may choose to become involved with organics collection through contractors or by directly providing the collection service. Alternately, the PRRD and Sliammon may choose to leave organics collection as an optional service provided by the private sector to residents on a subscription basis; this will likely reduce the quantity of organics recovered for composting. Under either scenario, the transfer station should allow residents to self-haul organics, much as garbage is currently self-hauled.

Commercial food waste generators, such as grocery stores and restaurants will be serviced by the private sector. Small businesses in the CPR that can use the same collection system as residents may be serviced by the same service provider as residents; businesses generating larger volumes of organics will require different service using front-end load bins or compactors.

Currently, residents of the CPR receive curbside collection of waste. A regular organics collection service will be required for City residents in order to maximize participation in the composting program. Collection of organics should be as simple and convenient as the collection of garbage, or participation may be reduced. The organics collection service could be operated directly by the City using its own employees and vehicles, or by a private sector collector who may operate under contract to the City.

It is usually preferable for food and yard waste to be kept separate from each other so that the optimum blending of these two feedstocks can be achieved at the composting facility. Yard waste can continue to be self-hauled to the transfer station. An estimate of the cost of providing separate collection of organics has been developed for the City, based on the current cost of garbage collection (Table B3). These costs are based on the provision of a weekly collection service, and on the assumption that additional truck capacity will be required. Additional truck capacity would not be required if organics and garbage were collected on alternating weeks.

**Table B3. Food Waste Collection Costs**

Item	Unit Cost	Total Cost (based on 5685 households)
New truck (if additional capacity needed)	\$175,000	\$125,000
Container (kitchen catcher plus green bin)	\$50/household	\$284,250
Container delivery and program roll out	\$10/household	\$56,850
Promotion/education (first year)	\$4/household/year	\$22,740
<b>Start-up costs</b>		<b>\$488,840</b>
Promotion/education (subsequent years)	\$2/household/year	\$11,370
Collection cost (based on current residential garbage collection costs, less truck and tipping fee charges)	\$20/household/year	\$113,700
<b>Ongoing costs</b>		<b>\$125,070</b>

Based on these figures, the total capital cost of the collection service is approximately \$86/household. It should be noted that the CPR is currently budgeting to replace its two garbage and recycling trucks in 2013, which is around the time that organic collection is likely to begin. Prior to the purchase of any new vehicles, the CPR should examine options for integrating the collection of garbage, recyclables and organics. It may be feasible to collect all three streams with two trucks, meaning that there would be little or no additional capital truck cost associated with organics collection. Under one scenario, garbage and organics could be picked up on alternating weeks by one truck, and recyclables could continue to be collected bi-weekly by the other truck. Under another scenario, the CPR could purchase split-compartment trucks, to enable the collection of two waste streams in one truck. This type of system is in place in the Town of Ladysmith, where organics are collected weekly in one compartment, with garbage and recycling collected in the other compartment on alternating weeks. If an integrated collection system can be established (providing garbage, recycling and organics collection), the capital costs associated with the truck may less than estimated above. The ongoing costs are \$22/household/year, based on current garbage collection costs and ongoing promotion and education.

The operating cost for collection in the rural areas would like be higher than \$22/household/year, since the households are not as densely located. The cost for collection in Sliammon may be slightly higher than in the City, but less than in the rural areas, since the population density is higher than in the rural areas.

Food waste collection programs are underway elsewhere in BC (such as the Regional District of Nanaimo and the Capital Regional District). Based on data from these programs, a weekly or bi-weekly organics collection program can expect to collect 100-150kg/household/year. The CPR could therefore expect to collect 570-850 tonnes per year. The rural areas could contribute 310-465 tonnes per year.