



**TO:** Alberni Valley Solid Waste Plan Monitoring Committee  
Alberni Clayoquot Regional District

**DATE:** October 28, 2015

**FROM:** Carey McIver  
Principal, Carey McIver & Associates Ltd.

**PROJECT:** Organics Diversion

**SUBJECT:** Diversion Strategy – Alberni Valley Waste Management

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## 1. Introduction

The Alberni-Clayoquot Regional District (ACRD) engaged Carey McIver & Associates Ltd. (CMA) to undertake an assessment of organics diversion opportunities in the Alberni Valley. This assessment consisted of the following tasks:

1. Assess and confirm organic waste quantities by source (ICI and residential) and by type (food, yard and paper);
2. Review and assess local opportunities for reduction, collection, processing and markets;
3. Review and assess supporting policies;
4. Based on an assessment of local opportunities refine reduction and diversion estimates;
5. Prepare high level cost estimates and cost/benefit analysis including impact on current system costs; and,
6. Prepare a PowerPoint presentation outlining results and recommendations.

CMA presented the scope and objectives of the assessment to the Alberni Valley Solid Waste Plan Monitoring Advisory Committee (SWPMAC) at the December 17, 2014 committee meeting; provided a progress report at the February 26, 2015 committee meeting; presented the preliminary results of the assessment at the April 23<sup>rd</sup> committee meeting; presented the results and discussed potential strategies at the June 25<sup>th</sup> committee meeting; and, on August 27<sup>th</sup> presented the final results of the assessment as well as a draft organics diversion strategy.

This memorandum presents the final results of the assessment as well as the final draft organics diversion strategy incorporating the feedback and direction given by the SWPMAC on August 27<sup>th</sup>. The memorandum outlines: the current state of organic waste diversion in BC; the estimated quantities of compostable organics in the waste stream; reduction opportunities; collection options; processing considerations; market considerations; processing facility costs and financing; as well as an organics diversion strategy including tasks, costs and implementation schedule.

All quantity and cost estimates presented in this briefing memorandum are for illustration only and are intended to provide high-level information for discussion purposes. This information should not be considered as a basis for concept design and associated concept-level cost estimates.



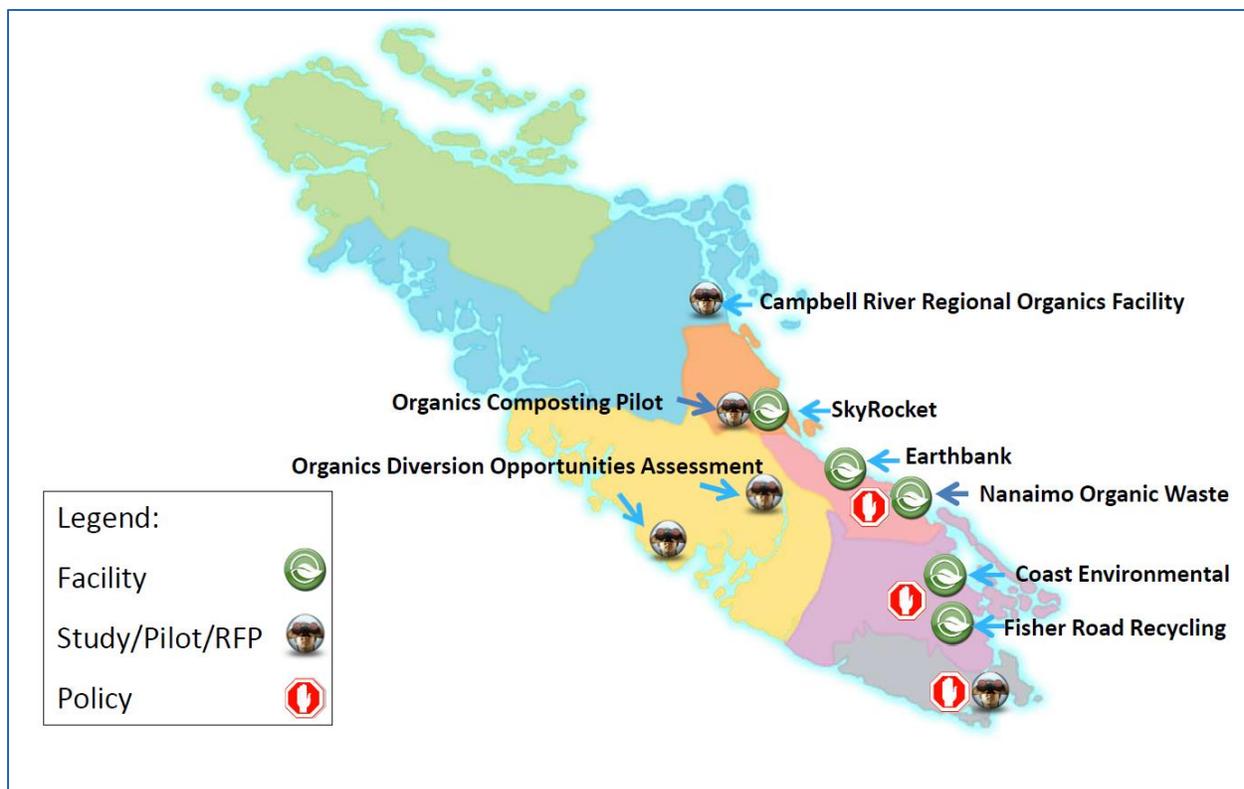
## 2. Current State of Organic Waste Diversion in BC

Diverting organic wastes (food waste, yard waste and compostable paper) from landfill and producing compost contributes to sustainability in many communities in BC and North America. In 2005 two Regional Districts on Vancouver Island (Regional District of Nanaimo and Cowichan Valley Regional District), introduced bans on the disposal of commercial organic wastes to reduce GHG emissions, preserve landfill capacity and reduce waste export disposal costs. Residential collection programs followed roughly 5-7 years later in both those regional districts.

In 2015 the Capital Regional District and Metro Vancouver implemented organics disposal bans from both the commercial and residential sector. As a result, in 2015 roughly 66% of the population of BC is covered by an organic waste disposal ban. There are also numerous municipal collection programs in regional districts that have not implemented disposal bans (eg. Grand Forks, Mission, and Courtenay).

Figure 1 illustrates the current organics diversion initiative on Vancouver Island with respect to existing facilities, policies and studies, pilot programs or planned facilities (Campbell River).

**Figure 1: Organics Diversion Activity on Vancouver Island**



As evident from the examples above, an effective organics management program can yield important benefits for a community, however successful implementation requires careful planning to integrate all the issues and opportunities that are unique to each regional district or municipality. The following sections outline the issues and opportunities as they exist for the Alberni Valley.



### 3. Estimating Organic Waste Quantities

In order to properly plan for organics diversion programs and design facilities, accurate estimates of organic waste quantities in the municipal solid waste (MSW) stream are required. Compostable organic waste typically represents 35-40% of the waste deposited in landfills. Due to the fact that a waste composition study has not been undertaken in the ACRD, estimates must be based on information from other communities.

In 2004 the Regional District of Nanaimo (RDN) completed a waste composition study that would apply to the ACRD. In that study, food waste represented 30% and compostable paper 4% of total landfilled waste. The following Table 1 applies these percentages to the 17,000 tonnes of MSW deposited in the Alberni Valley Landfill in 2014.

**Table 1: Total Estimated Organic Waste in the Alberni Valley**

Waste Material	Waste Stream Percentage	Estimated Annual Landfill Tonnes	50% Recovery Rate	70% Recovery Rate
Food Waste	30%	5,100	2,550	3,570
Compostable Paper	4%	680	340	476
<b>Total</b>	<b>34%</b>	<b>5,780</b>	<b>2,890</b>	<b>4,046</b>

Based on the RDN waste composition study, the quantity of organic wastes deposited in the Alberni Valley Landfill in 2014 is estimated at 5,780 tonnes from the residential and the industrial, commercial and institutional (ICI) sectors. This estimated quantity consists of 5,100 tonnes of food waste and 680 tonnes of compostable paper (tissues, paper toweling and food contaminated paper packaging).

Given that organic collection systems typically recover only 50% of these wastes, the estimated total organics diverted from landfill to a composting facility would be 2,890 tonnes per year. This amount would increase to 4,046 tonnes per year if an ambitious 70% recovery rate were achieved.

What is missing from this quantity estimate is yard waste. In many urban communities significant amounts of yard waste is collected at the curb from single-family households or accepted at drop-off facilities from both residential and ICI customers. These communities typically enforce bans on backyard burning and/or have lot sizes that do not lend themselves to on-site management of yard waste. This is not the case in the Alberni Valley where lot sizes are large and there are no burning bans. Indeed, very little yard waste (341 tonnes in 2014) is actually delivered to the Alberni Valley Landfill in spite of the fact that there is no tipping fee for this material.

Nevertheless, due to the importance of the carbon to nitrogen ratio for the composting process, as indicated in Table 2, additional bulking amendments such as yard waste (mainly branches and prunings) and wood waste (which has a high carbon to nitrogen ratio) must be added as feedstock to the process. This is because the composting process requires equivalent tonnes of material with a high carbon to nitrogen ratio such as yard waste and wood waste to equal tonnes of food waste with a low carbon to nitrogen ratio.



**Table 2: Total Estimated Processing Capacity for Organic Wastes**

Waste Material	Waste Stream Percentage	Estimated Annual Landfill Tonnes	50% Recovery Rate	Process Capacity	70% Recovery Rate	Process Capacity
Food Waste	30%	5,100	2,550	2,550	3,570	3,570
Compostable Paper	4%	680	340	340	476	476
Bulking Amendments				2,890		4,046
<b>Total</b>	<b>34%</b>	<b>5,780</b>	<b>2,890</b>	<b>5,780</b>	<b>4,046</b>	<b>8,092</b>

This means that a potential composting facility to process organic wastes from both the residential and ICI sectors would require an annual design capacity of roughly 5,800 tonnes at a 50% recovery rate including 2,900 tonnes of bulking amendment (i.e. yard and “woody” waste). At a 70% recovery rate, the annual design capacity would be roughly 8,000 tonnes with 4,000 tonnes of bulking amendments. Given that the Alberni Valley Landfill only received 341 tonnes of yard waste and 291 tonnes of land clearing waste in 2014, a composting facility would need to secure additional sources for this material.

With respect to estimating quantities of organic waste from the residential sector, Table 4 assumes that only those households in the City of Port Alberni that currently receive curbside collection of garbage would be included in a curbside collection program. Given that households in the Beaver Creek and the Tseshaht communities only receive curbside recycling collection services and the remaining households in the Alberni Valley do receive any collection services at all, it is unreasonable to assume that a garbage and organic waste collection system would be implemented in these areas within the next three years.

Accordingly, as indicated in Table 3, if organic wastes are initially only collected from households in the City of Port Alberni, based on data from the City of Saanich, the process capacity would be reduced to roughly 1,500 tonnes including the required yard and woody waste feedstock. In this case the required yard waste could be collected at the curb, which is common in many programs that have added food waste collection to an existing yard waste collection program. However, as stated above, it is important to note that yard waste is not currently included in residential curbside collection programs, meaning that this would entail additional collection costs.

**Table 3: Total Estimated Residential Organic Waste**

Area	Households	Food Only	Food & Yard Waste
		Tonnes @120 kg/hh	Tonnes @250 kg/hh
City of Port Alberni	6,300	756	1,575
Area E - Beaver Creek	1,330	Not Applicable	Not Applicable
First Nations	200	Not Applicable	Not Applicable
<b>Total</b>	<b>7,830</b>	<b>756</b>	<b>1,575</b>

Assuming a 50% recovery rate, a potential organics diversion program in the Alberni Valley would need to be designed to collect and process roughly 1,500 tonnes (City of Port Alberni residential curbside organics only) to 5,800 tonnes (residential + ICI) of organic materials per year.



#### 4. Reduction

To avoid the costs associated with the collection and processing of organics many communities encourage reduction initiatives such as backyard composting and food waste avoidance programs. Although the ACRD currently provides backyard composters at cost, this program could be enhanced through implementation of a compost coaching program that focuses on helping residents compost in their own backyards. The North Shore Recycling Program has seen a significant increase in organics waste diversion through delivery of this type of educational service.



Based on research in Europe and North America, ACRD residents may be wasting about 25 percent of all the food and drinks that they purchase. Metro



Vancouver's Love Food Hate Waste Program aims to change this behavior through educating consumers about meal planning, and careful cooking and storage, so that consumers can enjoy eating over half of the food that they currently end up throwing away. Metro Vancouver has stated publicly that they are willing to share this program with other regional districts. The BC Ministry of Environment will also provide the US EPA developed Food Too Good to Waste toolkit to regional districts at no charge. The ACRD could implement either one of these programs at a relatively low cost.

#### 5. Collection

Typically, organics collection programs for the ICI sector are operated by private hauling companies and are limited to food waste only. Depending on the quantity of food waste, generators use plastic garbage cans to collect food waste from kitchens while private haulers utilize plastic carts and metal bins to collect food waste outside of commercial establishments.



For the residential sector, curbside collection programs can be for food waste only or for food waste combined with yard and garden waste.

Given that yard waste is not currently collected in the Alberni Valley, commencing collection of this material would represent an additional cost to each household with respect to collection and processing costs. Cost estimates to provide organics collection to single family households in the City of Alberni are provided later in the memorandum under Section 8 – Program Costs and Financing.





## 6. Processing

As discussed above, decisions regarding the collection of organics from the residential and ICI sectors will impact the design capacity of the processing facility. However, in all cases, given the design range of 1,500 to 5,000 tonnes of organics per year it is likely that an actively aerated composting system will be the most appropriate technology.

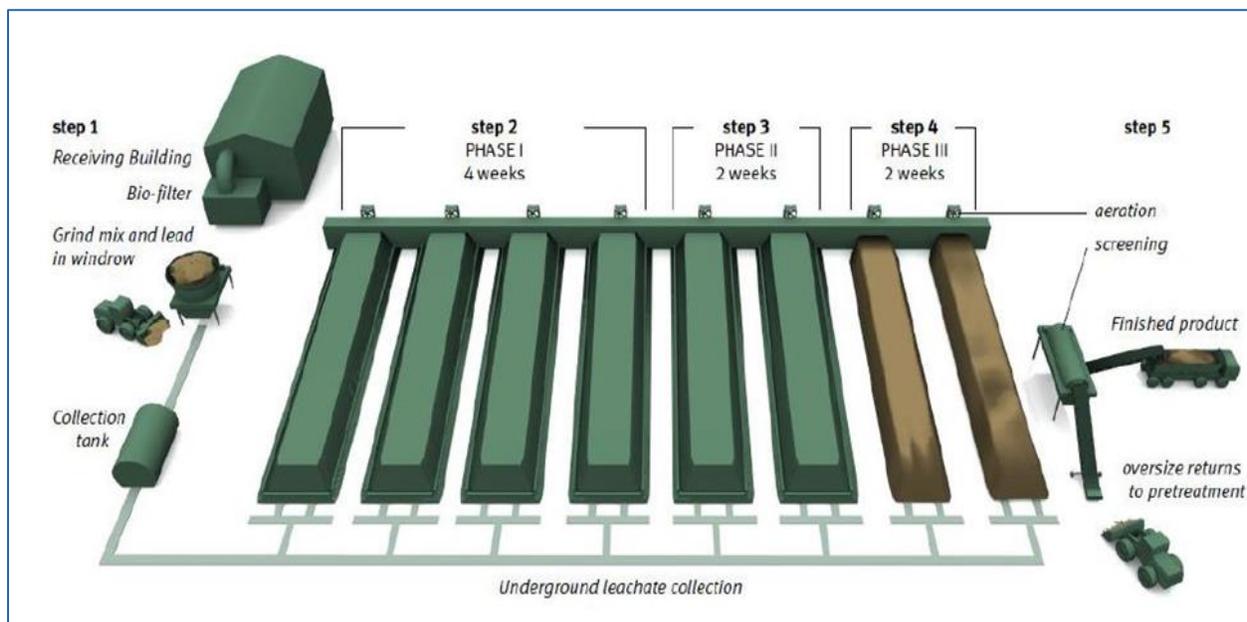
There are typically seven types of composting systems that utilize active aeration: aerated static pile, enclosed aerated static pile (tunnel), static containers, agitated containers, channel, agitated bed and rotating drum. Active aeration is a common feature in all of these technologies. There are many subtle variations in the design of composting systems, and system designers and vendors use these variations to provide a balance between processing efficiency and capital costs.

Based on expert input, CMA estimates that representative capital costs for a facility in the Alberni Valley would be in the order of \$300 to \$400 per tonne of installed capacity with annual operating costs \$70 to \$90 per tonne. This is because, even at 5,000 tonnes per year, this size of facility is still relatively small and hence the per-unit cost is higher than what larger communities are experiencing.

In order to further fine-tune these potential capital and operating cost estimates, CMA engaged Net Zero Waste Inc. (NZW), to prepare a briefing note on the capital and operating costs associated with a small scale food waste composting facility in the ACRD. Net Zero Waste has designed several successful GORE Cover System facilities in BC including Abbotsford, Pemberton, Chemainus, and Cumberland (Comox Pilot). All of these systems have demonstrated good odour control and provided a good quality product while keeping costs minimal. NZW estimate that a GORE facility in the Alberni Valley could be built for a capital cost of between \$375 and \$400 per tonne excluding land costs.

A schematic of how a GORE systems works is shown in Figure 2.

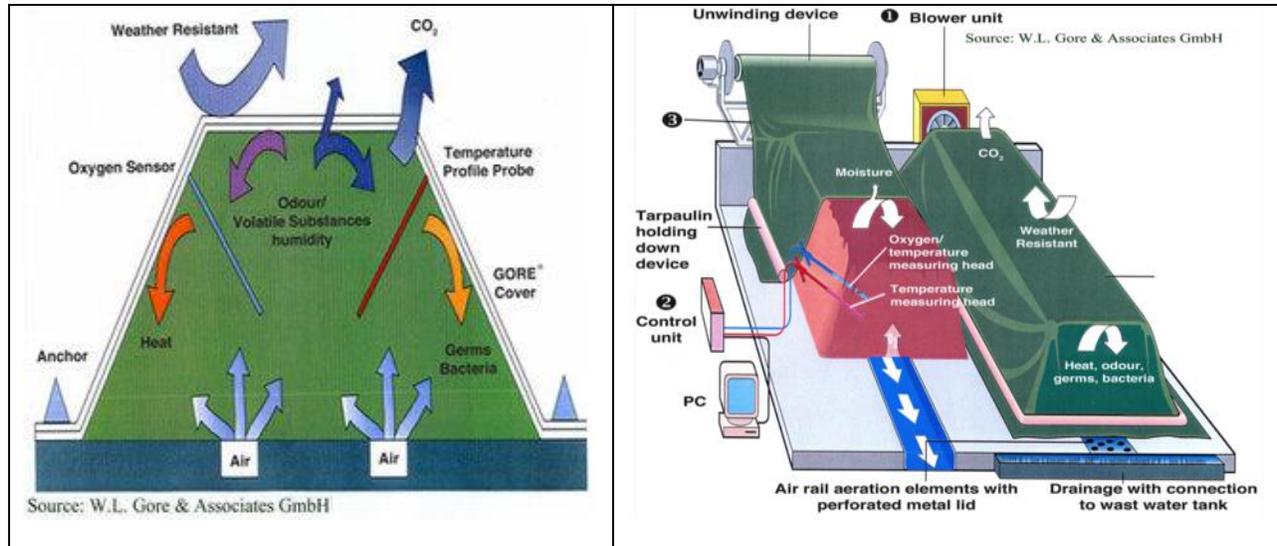
**Figure 2: Schematic of GORE System**





In the Gore System organic wastes are mixed with amendment (usually ground up yard waste) and placed under cover for 4 weeks (Phase 1). Air is provided with blowers on an as-needed basis. During this time the volume is substantially reduced and after 4 weeks the compost is shifted and re-mixed into Phase II piles, where it is aerated for an additional 2 weeks. In Phase III, it is aerated without covers since it is no longer odorous. After 8 weeks it is essentially a finished product that can be safely stored or sold. The principle of the GORE Cover Systems is shown in Figure 3 below.

**Figure 3: How the GORE Cover System Works** (provided by GORE)



For the Alberni Valley, the GORE Cover System would utilize aerated encapsulated static pile/turned windrow system to compost organic material. This is similar to the Comox Valley pilot system as shown in Figure 4. In this system mixing is not required since it only processes co-mingled food and yard waste from the residential sector.

**Figure 4: Comox Valley Waste Management Centre Pilot System**





GORE Systems are gaining popularity in BC. Morrison Hershfield engineering consultants have recently prepared a 75% design cost estimate to construct a GORE Cover System to process 4,500 tonnes of organics for the Regional District of Kitimat-Stikine. This estimate ranges from \$1.3 to \$1.7 million (\$300 to \$400 per tonne) depending on whether the client assumes some of the geotechnical risk associated with a cold climate. The City of Campbell River is also utilizing the GORE system for a proposed 12,875 tonne per year facility at a capital cost of \$5.8 million, or \$450 per tonne.

Based on the expert input discussed above, at \$400 per tonne, estimated capital costs would be \$600,000 for a 1,500 tonne per year facility and \$2 million for a 5,000 tonne per year facility. Operating costs at \$90 per tonne would equate to \$150,000 and \$450,000 annually under the same facility size assumptions. Land costs are not included at this time due to uncertainties regarding facility siting.

## 7. Markets

To market compost products successfully, it is necessary to understand the unique characteristics of the compost being produced and how it will be used. It is also important to identify the market segments expected to purchase the compost and any products competing for a share of those markets. There are several viable markets for compost: agriculture, erosion and sediment control, landscaping, reclamation, resellers (garden centres), topsoil manufacturing, turf application and wholesale nurseries.

Although CMA has not undertaken a detailed market assessment, we have confirmed that there would be a market for the compost in the Alberni Valley. The key will be the quality and maturity of the compost.

Net Zero Waste forecasts that a GORE Cover System processing 5,000 tonnes of organic materials will produce 4,000 cubic yards of compost in the first year of operations and that more than 4,900 cubic yards annually will be produced in following years. Currently NZW projects that the value of this type of compost is \$30 to \$40 per yard (retail) on Vancouver Island. Consequently there is an opportunity to sell some of the compost produced by the facility to provide additional revenue to offset the cost of operations.

However, although GORE Cover Systems profess to be able to produce a mature product in 2 to 4 months, there are some concerns that this product may not meet market quality requirements in this timeframe and therefore will not produce any significant revenue to off-set facility costs.

Based on expert input obtained from Bio-Logic Environmental Systems (Bio-Logic), a firm with significant experience in Nova Scotia (where composting is mandated by the province), many commercial operations underestimate the time required to produce finished compost, thus reducing capital costs.

Although it is always presumed that proposed facilities are capable of producing a mature product, it is not always the case. Revenue from the sale of finished compost can only occur if the product is mature. If the product is not mature, it needs further curing which requires more management and the investment in more capital.

According to Bio-Logic, mature, high quality compost needs to be cured for nine not four months. However this mature product could be sold for up to \$40 per cubic yard. It is important to note that existing Vancouver Island food waste composting facilities receive little or no revenue from the sale of compost due to immaturity. Consequently, while there is a market for compost in the Alberni Valley, it is for a high quality product which will have an impact on capital and operating costs going forward.



## 8. Processing Facility Costs & Financing

There are many issues that must be resolved prior to developing meaningful cost estimates and financing options for an organics diversion program in the Alberni Valley. These are as follows:

- Will organic materials will be collected from the all sectors (ICI and residential) or residential only?
- Where will the processing facility be located? Will it involve land acquisition? What kind of site preparation will be required?
- Will the processing facility be owned and operated by the ACRD or will the facility be owned and operated by the private sector or a combination of both?

### 8.1. Processing Facility Cost Estimates

Due to the high capital and operating costs associated with a small scale facility (less than 10,000 tonnes per year), many local governments attempt to reduce capital costs by entering into partnerships with a private sector facility operator. These partnerships typically involve the local government providing land as well as assuming some or all of the capital costs, with or without grant funding. For the purposes of this high level exercise, CMA assumed that the processing facility will be located on land owned by the ACRD or City of Port Alberni. This assumption was supported by the Alberni Valley SWPMAC at their June 25, 2015 meeting.

Accordingly, Table 4 provides processing facility cost estimates and associated capital and operating costs for a 5,000 tonne per year facility (ICI and residential) under the following three scenarios:

1. Private ownership and operation including private sector borrowing costs at 8% interest;
2. Public-private partnership including public sector borrowing at 4% with and without grant funding at 50%; and,
3. Full public ownership and operation (no profit) with and without grant funding at 50%.

As indicated in Table 4, a privately owned and operated facility would have a total annual processing cost of \$650,746 (exclusive of land costs). For comparison purposes, at 5,000 tonnes of food waste and bulking amendments per year, this equates to total processing cost per tonne of \$130 with no profit. Depending on the profit required this cost could increase to upwards of \$150 per tonne.

Under a public-private partnership scenario, total annual processing costs would be reduced from \$650,746 to \$595,435 with no grant; and to \$521,718 if a 50% grant was available. Once again, for comparison purposes, this equates to \$119 per tonne without a grant and \$104 per tonne with a grant. This cost will increase depending on profit requirements.

Under a fully public ownership scenario, total processing costs would be identical to the public-private partnership scenario except that there would be no profit requirement. Consequently total annual processing costs would be reduced from \$650,746 to \$595,435 with no grant and to \$521,718 if a 50% grant was available.



**Table 4: Processing Facility Cost Estimate Scenarios (Annual Capacity = 5,000 tonnes)**

	Private	Partnership		Public	
		No Grant	50% Grant	No Grant	50% Grant
<b>Assumptions</b>					
Rate	8%	4%	4%	4%	4%
Amortization (Years)	20	20	20	20	20
Capital Cost	\$ 2,000,000	\$ 2,000,000	\$ 1,000,000	\$ 2,000,000	\$ 1,000,000
<b>Capital Costs</b>					
Annual Capital Costs	\$ 200,746	\$ 145,435	\$ 71,718	\$ 145,435	\$ 71,718
Tonnes	5,000	5,000	5,000	5,000	5,000
Annual Cost Per Tonne	\$ 40	\$ 29	\$ 15	\$ 29	\$ 15
<b>Operating Costs</b>					
Annual Operating Costs	\$ 450,000	\$ 450,000	\$ 450,000	\$ 450,000	\$ 450,000
Tonnes	5,000	5,000	5,000	5,000	5,000
Annual Cost Per Tonne	\$ 90	\$ 90	\$ 90	\$ 90	\$ 90
<b>Total Annual Costs</b>					
Capital & Operating	\$ 650,746	\$ 595,435	\$ 521,718	\$ 595,435	\$ 521,718
Tonnes	5,000	5,000	5,000	5,000	5,000
Total Cost Per Tonne	\$ 130	\$ 119	\$ 104	\$ 119	\$ 104

It is important to note that the total annual processing cost per tonne is not the same as cost recovery or tipping fees. The total processing cost per tonne refers to the cost to process the estimated 2,500 tonnes of food waste and compostable paper going to the Alberni Valley Landfill (Table 1) plus 2,500 tonnes of bulking amendment (Table 2). Processing costs per tonne in Table 4 and the following Table 5 are provided to allow for a cost comparison between private, public-private and public facility ownership scenarios. Cost recovery options are discussed in Section 8.2.

Table 5 provides processing facility cost estimates and associated capital and operating costs for a 1,500 tonne per year facility designed to process food and yard waste from single-family households in the City of Port Alberni under the same three scenarios. The only difference is that operating costs are increased from \$90 to \$100 per tonne given the small size of the facility.



**Table 5: Processing Facility Cost Estimate Scenarios (Annual Capacity =1,500 tonnes)**

	Private	Partnership		Public	
		No Grant	50% Grant	No Grant	50% Grant
<b>Assumptions</b>					
Rate	8%	4%	4%	4%	4%
Amortization (years)	20	20	20	20	20
Capital Cost	\$ 600,000	\$ 600,000	\$ 300,000	\$ 600,000	\$ 300,000
<b>Capital Costs</b>					
Annual Capital Costs	\$ 60,224	\$ 43,631	\$ 21,815	\$ 43,631	\$ 21,815
Tonnes	1,500	1,500	1,500	1,500	1,500
Annual Cost Per Tonne	\$ 40	\$ 29	\$ 15	\$ 29	\$ 15
<b>Operating Costs</b>					
Annual Operating Costs	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
Tonnes	1,500	1,500	1,500	1,500	1,500
Annual Cost Per Tonne	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100
<b>Total Annual Cost</b>					
Capital & Operating	\$ 210,224	\$ 193,631	\$ 171,815	\$ 193,631	\$ 171,815
Tonnes	1,500	1,500	1,500	1,500	1,500
Total Cost Per Tonne	\$ 140	\$ 129	\$ 115	\$ 129	\$ 115

As indicated in Table 5, a privately owned and operated facility would have a total annual processing cost of \$210,224 (exclusive of land costs). For comparison purposes, at 1,500 tonnes of food waste and bulking amendments per year, this equates to total processing cost per tonne of \$140 with no profit. Depending on the profit required this cost could increase to upwards of \$160 per tonne.

Under a public-private partnership scenario, total annual processing costs would be reduced from \$210,224 to \$193,631 with no grant; and to \$171,815 if a 50% grant was available. Once again, for comparison purposes, this equates to \$129 per tonne without a grant and \$115 per tonne with a grant. This cost will increase depending on profit requirements.

Under a fully public ownership scenario, total processing costs would be identical to the public-private partnership scenario except that there would be no profit requirement. Consequently total annual processing costs would be reduced from \$210,224 to \$193,631 with no grant; and to \$171,815 if a 50% grant was available.



## 8.2. Cost Recovery Options

In Section 8.1, cost estimates were prepared for two processing facilities: one at 5,000 tonnes per year to process organic waste from the ICI and residential sectors and the other at 1,500 tonnes per year to process organic waste from single-family households in the City of Port Alberni. These two cost estimates were also evaluated according to three ownership scenarios: private, public-private and public.

As discussed in Section 8.1, Tables 4 and 5, the least cost scenario for both facilities would be one where the ACRD owns and operates a facility located on an ACRD owned property such as the Alberni Valley Landfill. It is also assumed that the ACRD would be able to obtain a grant to cover 50% of capital costs. Consequently, for a 5,000 tonne per year facility this would mean that the ACRD would need to recover roughly \$520,000 in annual capital and operating costs. For a 1,500 tonne per year facility the ACRD would need to recover \$172,500 in annual capital and operating costs under a best case scenario.

Given that the ACRD currently recovers all costs associated with Alberni Landfill through tipping fees and not taxation, it is assumed that the costs associated with an organics processing facility would need to be recovered through tipping fees as well. Table 6 provides an estimate of potential tipping fee schedules under three options.

Option 1 assumes that the ACRD can charge the same tipping fee for organic feedstock (food waste and compostable paper) as for bulking amendments (yard and wood waste). As indicated in Table 6, a tipping fee of \$104 per tonne will generate sufficient revenue to operate a processing facility for ICI and residential organics (\$520,000), while a tipping fee of \$115 per tonne would generate sufficient revenue to operate a processing facility for residential only (\$172,500).

However, this option assumes that there will be 2,500 tonnes of yard waste and/or wood waste delivered to the facility annually. Given that the Alberni Valley Landfill only received 341 tonnes of yard waste and 290 tonnes of wood waste in 2014, at no charge, it is clear that the ACRD will need to secure additional sources of this material. Consequently, it is unlikely in the short term that generators of these materials would be willing to pay a tipping fee of \$104 per tonne at a processing facility.

Option 2 assumes that the ACRD will not be able to charge customers \$104 per tonne for bulking amendments. Instead the fee for yard and wood waste is set at \$50 per tonne which increases the tipping fee for food waste to \$158 and \$180. This option is similar to fees charged at other facilities on Vancouver Island where significant amounts of yard waste is collected at the curb from single-family households or accepted at drop-off facilities from both residential and ICI customers. In these cases customers are already paying a fee to process this material. As discussed above, this is not the case in the ACRD.

Option 3, assumes that the ACRD will be able to secure additional sources of bulking amendments (hopefully at no cost) but will not be able to charge a tipping fee. This is the most realistic option at this time. In this option the tipping fee for food waste would need to be set at \$208 per tonne.



**Table 6: Processing Facility Tipping Fee Estimates**

Material	ICI & Residential 5,000 tonnes per year			Port Alberni Residential 1,500 tonnes per year		
	Tonnes	Fee	Revenue	Tonnes	Fee	Revenue
<b>Option 1 -</b>						
Food Waste & Compostable Paper	2,500	\$ 104	\$ 260,000	750	\$ 115	\$ 86,250
Amendments (yard/wood waste)	2,500	\$ 104	\$ 260,000	750	\$ 115	\$ 86,250
			\$ 520,000			\$ 172,500
<b>Option 2</b>						
Food Waste & Compostable Paper	2,500	\$ 158	\$ 395,000	750	\$ 180	\$ 135,000
Amendments (yard/wood waste)	2,500	\$ 50	\$ 125,000	750	\$ 50	\$ 37,500
			\$ 520,000			\$ 172,500
<b>Option 3</b>						
Food Waste & Compostable Paper	2,500	\$ 208	\$ 520,000	750	\$ 230	\$ 172,500
Amendments (yard / wood waste)	2,500	\$ -	\$ -	750	\$ -	\$ -
			\$ 520,000			\$ 172,500

Given that the current tipping fee charged for garbage at the Alberni Valley Landfill is \$95 per tonne, it is unlikely that businesses and residents will be willing to pay \$208 per tonne to process organics. Revenue from compost sales of up to \$40,000 per year would help reduce the tipping fee, however it would likely still be in the order of \$200 per tonne. Such a high tipping fee for composting may not be supportable by the commercial and residential sector.

The only sustainable option at this time would be a facility designed to process food and yard waste from single-family households in the City of Port Alberni. In this scenario, if the City collects food and yard waste at the curb, at a fee of \$115 per tonne, sufficient revenue would be generated to recover annual capital and operating costs.

### 8.3. City of Port Alberni Collection Program Cost Estimates

Curbside collection of organics in the City of Port Alberni (the City) has been identified as a significant diversion opportunity and important to the development of processing capacity in the Alberni Valley. The City currently provides weekly garbage collection using an automated system. Under this program residents must register with the City for a specially designed wheeled cart. The cart is the property of the City.

To promote greater waste reduction, the automated collection program offers residents the flexibility to choose the size of garbage cart that will meet their needs. The fees charged to residents are as follows: \$83 per year for an 80 litre container; \$98 per year for a 120 litre container; and \$200 per yard for a 240 litre container. Based on financial data provided by the City, the average cost per household was \$106 in 2014.

There are three components to the City's weekly automated curbside collection program: collection (staff and trucks); carts, and garbage tipping fees. Based on discussions with staff from the City, CMA prepared cost estimates for an organics collection program under three scenarios: (1) food waste



weekly, (2) food and yard waste weekly, and (3) food and yard waste bi-weekly. Under each scenario CMA assumed a garbage tipping fee of \$100 per tonne and an organics tipping fee of \$130 per tonne for food waste only and \$115 per tonne for co-collected food and yard waste.

Under Scenario 1, with weekly food collection and bi-weekly garbage collection, the average cost per household would increase from \$108 to \$151 per year, representing an increase of \$43 or 40%. Under Scenario 2, with weekly food and yard waste collection and bi-weekly garbage collection, the average cost per household would increase from \$108 to \$160 per year, representing an increase of \$52 or 48%. Under Scenario 3, with bi-weekly food and yard waste collection and bi-weekly garbage collection, the average cost per household would increase from \$108 to \$131 per year, representing an increase of \$23 or 21%. Note that these are average annual costs and do not reflect the cost impact on curbside customers based on the size of their garbage cart. Table 7 provides these cost estimates in detail.

**Table 7: Estimated Curbside Organics Collection Costs for City of Port Alberni**

Scenario	Frequency	Costs				Increase \$
		Collection	Carts	Tip Fees	Total	
<b>Status Quo</b>						
Garbage	weekly	\$ 58	\$ 8	\$ 42	\$ 108	
Recycling	bi-weekly	\$ -	\$ -	\$ -	\$ -	
<b>Total</b>		<b>\$ 58</b>	<b>\$ 8</b>	<b>\$ 42</b>	<b>\$ 108</b>	
<b>Scenario 1</b>						
Garbage	bi-weekly	\$ 29	\$ 8	\$ 27	\$ 64	
Recycling	bi-weekly	\$ -	\$ -	\$ -	\$ -	
Food	weekly	\$ 58	\$ 9	\$ 20	\$ 87	
<b>Total</b>		<b>\$ 87</b>	<b>\$ 17</b>	<b>\$ 47</b>	<b>\$ 151</b>	<b>\$ 43</b>
<b>Scenario 2</b>						
Garbage	bi-weekly	\$ 29	\$ 8	\$ 27	\$ 64	
Recycling	bi-weekly	\$ -	\$ -	\$ -	\$ -	
Food + Yard	weekly	\$ 58	\$ 9	\$ 29	\$ 96	
<b>Total</b>		<b>\$ 87</b>	<b>\$ 17</b>	<b>\$ 56</b>	<b>\$ 160</b>	<b>\$ 52</b>
<b>Scenario 3</b>						
Garbage	bi-weekly	\$ 29	\$ 8	\$ 27	\$ 64	
Recycling	bi-weekly	\$ -	\$ -	\$ -	\$ -	
Food & Yard	bi-weekly	\$ 29	\$ 9	\$ 29	\$ 67	
<b>Total</b>		<b>\$ 58</b>	<b>\$ 17</b>	<b>\$ 56</b>	<b>\$ 131</b>	<b>\$ 23</b>



## 9. Organics Diversion Opportunities Assessment Summary

The fundamental objective of the organics diversion opportunity assessment was to ascertain whether an organics diversion program would be sustainable in the Alberni Valley. To be sustainable, a new diversion program for organics would need to balance environmental, social, and economic costs and benefits.

With respect to environmental and economic benefits, diversion of food waste from the Alberni Valley Landfill would reduce greenhouse gas emissions as well as the costs associated with the construction and operation of a landfill gas (LFG) collection facility. To meet the requirements of the BC MOE LFG Regulation, the ACRD may have to construct and operate a landfill gas facility at the Alberni Valley Landfill. McGill Engineering have prepared very rough cost estimates indicating initial capital costs of \$5.5 million with operating and maintenance costs of \$5.6 million over the 70 year operating life of the landfill. Diversion of food waste could delay or even eliminate the need to invest in a costly collection system, thereby providing a significant environmental and economic benefit.

However, this benefit only relates to the diversion of food waste given that yard waste is not currently deposited in the Alberni Valley Landfill. To maximize the environmental and economic benefits, food waste would need to be collected from both the ICI and residential sectors.

As discussed above, this means that a potential processing facility for the Alberni Valley would need an annual design capacity of over 5,000 tonnes to manage 2,500 tonnes of food waste plus an additional 2,500 tonnes of suitable bulking amendment to support an effective composting process. As stated earlier in this document, recovering the cost of the composting facility would be fully borne by the food waste delivered to the facility; resulting in an anticipated tipping fee over \$200/tonne.

Although diversion of food waste from the landfill may provide significant environmental and economic benefits related to reduced landfill management costs, the costs to collect this material from residents and businesses must also be factored into the equation.

As discussed above, there will be a significant increase in collection costs to households in the City of Port Alberni regardless of whether the City collects food waste only or food and yard waste. Given that there is currently excess food waste processing capacity in central Vancouver Island (Nanaimo), a realistic cost estimate could be prepared for collection and transfer of food waste only to an out-of-region facility. However, given the uncertainties regarding the cost of processing food and yard waste at a new facility located within the Alberni Valley, as well as the current lack of capacity on Vancouver Island for combined yard and food waste, it is difficult to determine the costs and benefits associated with a combined food and yard waste program.

Nonetheless, given the environmental and economic benefits related to greenhouse gas reductions from the Alberni Valley Landfill, residents and businesses in the Alberni Valley may be supportive of an organics diversion program if increased collection and processing costs are outweighed by savings in landfill gas collection costs. Indeed, in communities where organics diversion programs are cost effective, residents and businesses understand that their participation in these programs is one of the most immediate and effective actions that they can take to reduce the impacts of climate change.



Consequently, the Organics Diversion Opportunities Assessment does not indicate a clear and immediate path towards implementing an organics diversion program in the Alberni Valley. Instead the assessment identifies issues that require further attention as well as actions that can be taken immediately to reduce organic wastes and thereby reduce associated greenhouse gas emissions.

## **10. Draft Organics Diversion Strategy**

Based on the results of the organics diversion opportunities assessment, as well as feedback from the Alberni Valley Solid Waste Plan Monitoring Advisory Committee, CMA recommends the following plan of action to divert organics from the Alberni Valley Landfill. The estimated costs and implementation schedule is provided in Table 8.

### *Reduction Program*

1. Using communication tools developed by Metro Vancouver and the BC Ministry of Environment (MOE), implement a Food Waste Reduction Campaign.
2. Expand the current subsidized backyard composter program to include enhanced education activities such as a compost coaching and Bear Smart program to reduce the amount of food waste requiring collection and disposal.

### *Process Amendments*

3. Undertake a study of wood waste generation and diversion options in the Alberni Valley to determine the availability, quantity (more than 290 tonnes per year) and cost of this material as bulking amendment for use at local organics processing facility. As recommended in the Solid Waste Management Plan, if diversion opportunities are available, this material will be banned from disposal.
4. Assess current yard waste generation and disposal practices in the residential and commercial sectors to confirm whether there would be more than 341 tonnes available as bulking amendment for use at a local processing facility.

### *LFG Collection or Compost System Cost-Benefit Analysis*

5. Finalize conceptual cost estimates to construct and operate an LFG collection system at the Alberni Valley Landfill.
6. Undertake a cost-benefit analysis of organics composting versus LFG collection to reduce greenhouse gas emissions.

### *Pilot Projects*

7. Following implementation of a reduction program, two small pilot projects should be completed: one that collects food waste on a weekly basis with garbage collected biweekly; and, one that collects food and yard waste weekly with garbage biweekly. These pilot projects will help to confirm the potential quantities of household food or food and yard waste that would be collected for processing as well as customer response and acceptance of a program.



For the first pilot, food waste could be transferred to the existing processing facility in Nanaimo. For the second pilot, due to the small quantities expected, the existing Earth Land and Sea compost operation in Port Alberni may be able to accept this material. An alternative location may be the composting facility located at the Comox Valley Landfill in Cumberland.

#### *Processing Facility – Local Collaboration*

8. Meet with the City of Port Alberni to identify potential government owned properties that could be suitable for an organics processing facility.

#### *Processing Facility – Vancouver Island Capacity*

9. Identify potential opportunities and costs to transfer organics to existing or new Vancouver Island processing facilities, including both publicly and privately owned facilities.

#### *ICI Disposal Ban – Vancouver Island Capacity*

10. Consider implementing a ban on organics from the ICI sector if cost-effective opportunities exist to transfer organics to existing or new Vancouver Island processing facilities.

#### *Communication Strategy*

11. Develop a comprehensive communications program to provide information on the organics diversion strategy to local politicians, the public, and the business community.

#### *Staffing Requirements*

12. Table 8 provides high-level cost estimates as well as an implementation schedule to complete the actions identified above. With respect to reduction programs, these costs do not include the additional staff time required to design, implement and manage these initiatives on an on-going basis. Consequently CMA recommend that the ACRD consider hiring one additional staff position to deliver reduction programs and coordinate the organics diversion strategy.

Following completion of the above actions by the end of 2016, the ACRD will be able to determine the costs and benefits of an organics diversion program, the level of public support for curbside organics collection and the preferred collection model. This strategy has not been designed to make a final decision but rather to provide the ACRD with the information required to make an informed decision regarding full implementation. In particular, upon completion of the above tasks the ACRD will be in a position to determine whether a local processing facility will be required and, if so, which would be the most attractive partnership options prior to issuing a request for proposals.



**Table 8: Organics Diversion Strategy Costs and Implementation Schedule**

	<b>Action</b>	<b>Cost Estimate</b>	<b>Schedule</b>
1.	Using communication tools developed by Metro Vancouver and the BC Ministry of Environment (MOE), implement a Food Waste Reduction Campaign.	\$10,000	2016
2.	Expand the current subsidized backyard composter program to include enhanced education activities such as a compost coaching and Bear Smart program.	\$10,000	2016
3.	Undertake a study of wood waste generation and diversion options in the Alberni Valley.	\$5,000	2016
4.	Assess current yard waste generation and disposal practices in the residential and commercial sectors	Included above	2016
5.	Finalize conceptual cost estimates to construct and operate an LFG collection system at the Alberni Valley Landfill	McGill Engineering	2015
6.	Undertake a cost-benefit analysis of organics composting versus LFG collection to reduce greenhouse gas emissions	\$10,000	2016
7.	Following implementation of a reduction program, design and prepare cost estimates to undertake two small pilot projects.	\$3,000	2016
8.	Meet with the City of Port Alberni to identify potential government owned properties that could be suitable for an organics processing facility	ACRD Staff	2016
9.	Identify potential opportunities and costs to transfer organics to existing or new Vancouver Island processing facilities including conceptual design of a transfer facility at the Alberni Valley Landfill.	\$10,000	2016
10.	Consider implementing a ban on organics from the ICI sector if cost-effective opportunities exist to transfer organics to existing or new Vancouver Island processing facilities.	\$10,000	2016
11.	Develop and implement comprehensive communications program to provide information on the organics diversion strategy to local politicians, the public, and the business community.	\$5,000	2015
12.	Hire one additional staff position to coordinate the organics diversions strategy and subsequent diversion programs.	\$70,000	2016