



**Alberni-Clayoquot Regional District
Solid Waste Plan Monitoring Advisory Committee – West Coast
Meeting Agenda**

Meeting Date & Time: Thursday, October 15th, 2015 @ 1:30 pm

Location: Ucluelet Community Centre, 500 Matterson Drive, Ucluelet, BC

1. Call to Order
2. Adoption of Minutes – June 18th, 2015 meeting
3. ICI Disposal Bans Update
 - a. Sonbird's business plan on collecting ICI cardboard
4. Organics Diversion Strategy – Technical Memorandum
5. Other
6. Adjournment



**Alberni-Clayoquot Regional District
Solid Waste Plan Monitoring Advisory Committee – West Coast
Meeting Minutes**

Meeting Date & Time: Thursday, June 18th, 2015 @ 1:30 pm

Location: Ucluelet Community Center, 500 Matterson Drive, Ucluelet, BC

In attendance:

Dianne St. Jacques, District of Ucluelet
Brad West, McGill Engineering & Associates
Carey McIver, Carey McIver & Associates
Janice Hill, ACRD

Tony Bennett, ACRD
Maura Walker, Maura Walker & Associates
Chris Bird, SonBird Refuse

1. Call to Order

Tony Bennett called the meeting to order at 1:34 p m.

2. Adoption of Minutes

The Minutes of the April 16th meeting were adopted as presented.

3. ICI Disposal Bans Update

- a. Sonbird Update – Sonbird is preparing costs and methods for implementing an ICI Cardboard disposal ban. Numbers should be available in the next 6 weeks. Once the information is received the Committee can review the options.
- b. Alberni Valley Update - The Solid Waste Disposal and Tipping Fees Bylaw No. R1027, 2015 was adopted at the June 10th, 2015 Board meeting. Which allows the ICI cardboard disposal ban implementation to start on July 1, 2015. There will be a six month phase in period to give businesses time to comply with the bans.

4. Organics Diversion Strategy

- a. Carey McIver presented a report of the Organics Diversion strategy. Results of the strategy are not favorable for the West Coast at this time. (Report is attached). Committee agreed to revisit Organics Diversion in the next 4 to 5 years.
- b. The committee agreed to move ahead with banning all stewardship materials from disposal at the landfill which includes Metal. A bylaw amendment will follow.

5. **Other**

- a. Dianne St. Jacques stated that the District of Ucluelet does not have a bylaw prohibiting backyard composting therefore residents are encouraged to backyard compost in a bear aware manner.
- b. The committee suggested that a video on Recycling and Waste Disposal be created that could be shown on “Our Town”.
- c. The committee also suggested the need for more waste reduction education by way of the following:
 - Use municipal communication tools like Facebook to educate locals.
 - Poster for vacation rentals
 - Develop education strategy.

Meeting adjourned at 3:00 pm.

Next meeting: TBD



TO: West Coast Solid Waste Plan Monitoring Committee

DATE: October 6, 2015

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

PROJECT: Organics Diversion

SUBJECT: Organics Diversion Strategy – West Coast Waste Management

1. Introduction

The Alberni-Clayoquot Regional District (ACRD) engaged Carey McIver & Associates Ltd. (CMA) to undertake an assessment of organic waste diversion opportunities on the West Coast. The assessment consisted of the following tasks:

1. Assess and confirm organic waste quantities by source (ICI and residential) and by type (food, yard and compostable 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 West Coast Solid Waste Plan Monitoring Advisory Committee (SWPMAC) at the December 11, 2014 committee meeting; provided a progress report at the February 19, 2015 committee meeting; presented the preliminary results of the assessment at the April 16, 2015 committee meeting; and, presented the results and discussed a draft organics diversion strategy at the June 18, 2015 committee meeting.

This memorandum presents the final results of the assessment as well as a draft organics diversion strategy incorporating the feedback and direction given by the SWPMAC at the June 18th meeting. The memorandum outlines: the benefits of organic waste diversion; the estimated quantities of compostable organics in the waste stream; reduction opportunities; collection options; processing considerations; market considerations; program costs and financing as well as a draft strategy for diverting organics on the West Coast.

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. Organics Diversion Activity on Vancouver Island

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



Figure 1: Organics Diversion Activity on Vancouver Island



Although, as evident from the examples above, an effective organics management program can yield important benefits for a community, 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 West Coast.

3. Estimating Organic Waste Quantities

In order to properly design organics diversion programs and 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. Table 2 applies these percentages to the 4,800 tonnes of MSW deposited in the West Coast Landfill in 2014.

Table 2: Total Estimated Residential & ICI Organic Waste

Waste Material	Waste Stream Percentage	Estimated Annual Landfill Tonnes	50% Recovery Rate	70% Recovery Rate
Food Waste	30%	1,440	720	1,008
Compostable Paper	4%	192	96	134
Total	34%	1,632	816	1,142



Based on the RDN waste composition study, the quantity of organic wastes deposited in the West Coast Landfill in 2014 is estimated at 1,632 tonnes from the residential and the industrial, commercial and institutional (ICI) sectors. This estimated quantity consists of 1,440 tonnes of food waste and 192 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 816 tonnes per year. This amount would increase to 1,142 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-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 West Coast where lot sizes are large and there are no burning bans. Indeed, very little yard waste (78 tonnes in 2014) is actually delivered to the West Coast 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 3, 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 3: Total Estimated Processing Capacity Residential and ICI Organic Wastes

Waste Material	Waste Stream Percentage	Estimated Annual Landfill Tonnes	50% Recovery Rate	Process Capacity	70% Recovery Rate	Process Capacity
Food Waste	30%	1,440	720	720	1,008	1,008
Compostable Paper	4%	192	96	96	134	134
Bulking Amendments				816		1,142
Total	34%	1,632	816	1,632	1,142	2,285

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 1,600 tonnes at a 50% recovery rate, including 816 tonnes of bulking amendment (i.e. yard and “woody” waste). At a 70% recovery rate, the annual design capacity would be roughly 2,300 tonnes with 1,142 tonnes of bulking amendments. Given that the West Coast Landfill only received 78 tonnes of yard waste and 5 tonnes of land clearing waste in 2014, a composting facility would need to identify and secure additional sources for this material.

There has been considerable discussion at the West Coast SWPMAC regarding the use of cardboard as a bulking amendment. While this material is indeed a carbon source, based on experience elsewhere cardboard does not provide sufficient bulk for the entire composting process. Due to the density of food waste, chipped wood waste is also required to ensure that there are air “voids” in the compost



piles; which ensures that the composting process remains aerobic and minimizes the potential for odours to be developed.

Another important factor to consider when estimating the amount of processing capacity required is whether food waste would be collected from the residential sector. Based on the results of consultation to date, the biggest support for food waste composting comes from the commercial sector, particularly the resorts. Consequently, given that the residential sector may not be ready to pay the additional costs associated with separate collection of food and yard waste, Table 4 provides estimated processing capacity for the ICI sector only.

Table 4: Total Estimated Processing Capacity ICI Organic Waste Only

Waste Material	Waste Stream Percentage	Estimated Annual Landfill Tonnes	50% Recovery Rate	Process Capacity	70% Recovery Rate	Process Capacity
Food Waste	30%	1,080	540	540	756	756
Compostable Paper	4%	144	72	72	101	101
Bulking Amendments				612		857
Total	34%	1,224	612	1,224	857	1,714

Assuming a 50% recovery rate, a potential organics diversion program on the West Coast would need to be designed to collect and process roughly 1,200 to 1,600 tonnes of organic materials per year depending whether the program includes residential and ICI organics or ICI only.

4. Reduction

To avoid the costs associated with the collection and processing of residential organics, many communities encourage reduction initiatives such as backyard composting and food waste avoidance programs. Although the ACRD currently provides subsidized backyard composters, 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. Consequently, 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 on the West Coast, initiating collection of yard waste would represent an additional cost to each household with respect to collection and processing costs. Consequently CMA does not consider organics collection from the residential sector to be feasible at this time.



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 1,200 to 1,600 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, process control and capital costs.

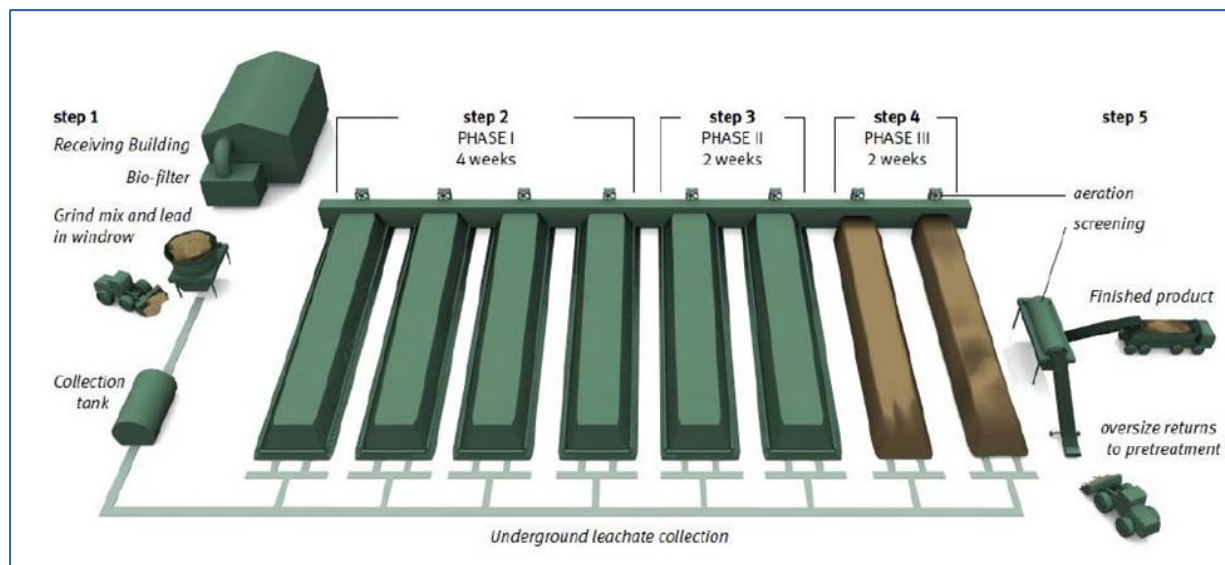
Based on expert input, CMA estimates that representative capital costs for a facility on the West Coast would be in the order of \$300 to \$400 per tonne of installed capacity with annual operating costs \$80 to \$100 per tonne. This is because at 1,600 tonnes per year, this size of facility is relatively 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 on the West Coast. 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 estimates that a GORE facility on the West Coast could be built for a capital cost of between \$375 and \$400 per tonne excluding land costs



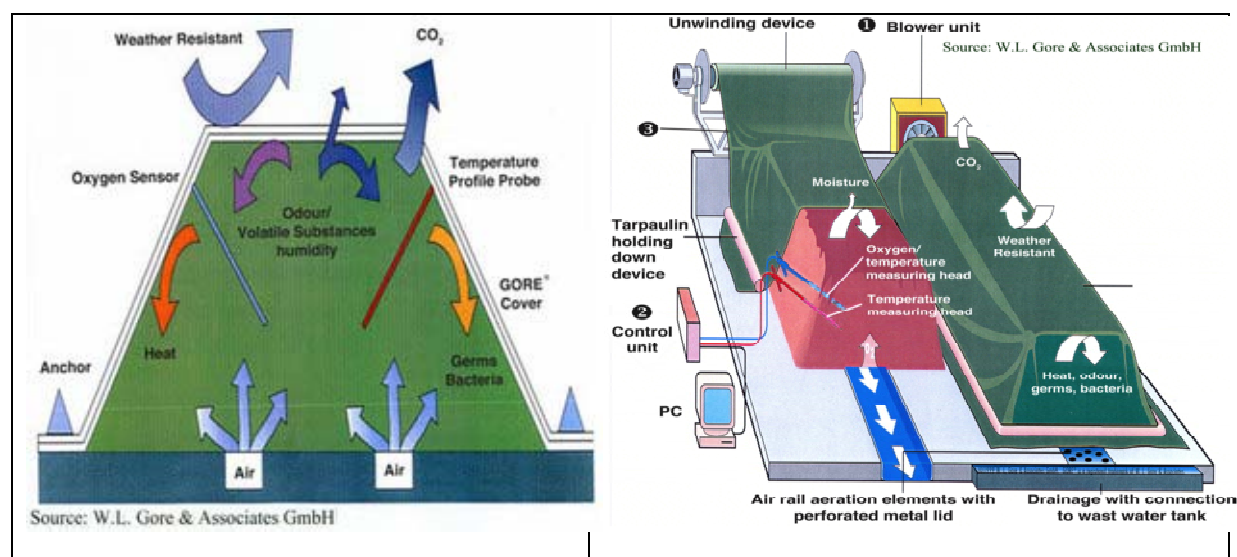
A schematic of how a GORE systems works is shown in Figure 2.

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 West Coast, the GORE Cover System designed by NZW 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



Table 5 provides the NZW cost estimate for a small scale facility on the West Coast. This estimate does not include any allowance for the cost of land or for site preparation as this is not possible at this time without a review of the site and the provision of geotechnical report on subgrade conditions. The facility concept design is similar to the Comox pilot except that the receipt of incoming materials would be done inside of a tube frame building for improved leachate, vector and odour control.

The initial equipment purchased is limited to composting equipment to minimize capital costs, with items such as screens and grinders to be rented as needed. This probable cost estimate also does not include an in-floor aeration system; instead it uses portable blowers similar to the Comox pilot. The pricing estimate below is a lowest cost estimate and would be likely increase once more specific site and process requirements were confirmed.

Table 5: Start Up Capital Cost Estimate

Item	Cost
Engineering & Construction Management	\$10,000
Site Office/Signage/Fencing/Fusion Weld	\$20,000
Drill Well/Process Waste Distribution	\$15,000
Concrete Lock Blocks (50 delivered)	\$7,500
Permitting Costs (Leachate/Odour Plan)	\$7,500
Power/Communications (Electricity Allowance)	\$20,000
GORE Cover System	\$150,000
Concrete Surface Allowance (\$400/m³)	\$60,000
Site Work, Leachate Controls	\$40,000
Office Supplies, Small Tools, Shipping	\$5,000



Pre-Engineered Building (2 or 3 sides only)	\$45,000
Small Loader Allowance (used)	\$30,000
Contingency	\$40,000
TOTAL	\$450,000

As stated above, this capital cost estimate could increase depending on site-specific conditions. 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. Consequently, it may be more prudent to assume that the capital costs associated with a facility on the West Coast would be in the \$400 per tonne range or \$560,000 for a 1,400 tonne per year facility.

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, land reclamation and rehabilitation, resellers (garden centres), topsoil manufacturing, turf application and wholesale nurseries.

Although CMA has not undertaken a detailed market assessment, we have confirmed that the local resorts purchase large amounts of compost for landscaping applications on a yearly basis. The Districts of Tofino and Ucluelet would also provide a market for this material. The key will be the quality and maturity of the compost.

Net Zero Waste expects that 1,000 cubic yards of compost will be produced in the first year of operations and that more than 1,200 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 that time frame 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 capital investment.



According to Bio-Logic, a mature, high quality compost similar to that already purchased by West Coast resorts needs to be cured for nine months (not four). 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 on the West Coast, it is for a high quality product which will have an impact on capital and operating costs going forward.

8. Costs & Financing

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

- Will organic materials will be collected from the all sectors (ICI and residential) or ICI 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?

For the purposes of this high level exercise, CMA assumed that the processing facility will be located at the West Coast Landfill since the ACRD already owns this property and there is sufficient space to locate a facility there. This location was supported by the WCPMAC at its June 2015 meeting. Consequently there are no land acquisition or site preparation costs included in these estimates.

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.

Accordingly, Table 6 provides processing facility cost estimates and associated capital and operating costs per tonne required for 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%;
3. Full public ownership and operation (no profit) with and without grant funding at 50%.



Table 6: Processing Facility Cost Estimate Scenarios

	Private	Partnership		Public	
		No Grant	50% Grant	No Grant	50% Grant
Assumptions					
Rate	8%	4%	4%	4%	4%
Amortization (years)	20	20	20	20	20
Capital Costs	\$560,000	560,000	\$280,000	\$560,000	\$280,000
Capital Costs					
Annual Capital Costs	\$56,209	\$40,722	\$20,361	\$40,722	\$20,361
Tonnes	1,400	1,400	1,400	1,400	1,400
Annual Cost per Tonne	\$40	\$29	\$15	\$29	\$15
Operating Cost/Tonne	\$100	\$100	\$100	\$100	\$100
Profit Assumptions					
Profit (\$20/tonne)	\$20	\$20	\$20		
Total Cost per Tonne	\$160	\$149	\$134		
Profit (\$10/tonne)	\$10	\$10	\$10		
Total Cost per Tonne	\$150	\$139	\$124		
Profit (\$5/tonne)	\$5	\$5	\$5		
Total Cost per Tonne	\$145	134	\$119		
No Profit	\$0	\$0	\$0		
<i>Total Cost per Tonne</i>	<i>\$140</i>	<i>\$129</i>	<i>\$115</i>	<i>\$129</i>	<i>\$115</i>

As indicated in Table 6, a privately owned and operated facility would have a total processing cost per tonne of \$145 to \$160 while a publicly owned and operated facility would have a total processing cost of \$115 to \$129 per tonne.

Comparison to Current Solid Waste Management Costs

The current tipping fee charged for garbage on at the West Coast Landfill is \$95 per tonne. Under the least cost processing scenario, where the ACRD owns and operates a facility located at the West Coast Landfill, the per tonne cost is estimated to be \$115 to \$129 per tonne depending on financing options. This per tonne cost is based on total tonnes of food waste, yard waste and wood waste received at the facility. However, it does not represent the tipping fee that would need to be charged to offset capital and operating costs.



Given that the ACRD currently doesn't currently charge for yard and wood waste material, and may even have to purchase bulking amendments, it is reasonable to assume that the tipping fee would need to be charged on food waste only. This would increase the tipping fee to between \$230 and \$258 per tonne.

Revenue from compost sales of up to \$40,000 per year would help reduce the tipping fee, however it would still be in the order of \$200 per tonne. Such a high tipping fee for composting may not be supportable by the commercial sector.

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 on the West Coast. To be sustainable, a new diversion program for organics would need to balance environmental, social, and economic costs and benefits. Although there are significant environmental benefits to an organics composting facility on the West Coast, the social and economic costs and benefits do not balance at this time.

Economic sustainability is lacking given the significant cost differential between landfill disposal at \$95/tonne and composting at \$200-258/tonne.

Because the viability of composting is directly correlated to the cost of landfilling, it is possible that in future, the cost of waste disposal on the west coast will increase to the extent that composting becomes financially attractive on its own. Factors that may increase the cost of disposal are:

- The release of new BC landfill criteria, and
- Establishing adequate post-closure reserves to address long-term liability requirements.

As these factors become more defined, the cost competitiveness of composting on the West Coast can be reviewed. Consequently given the high cost of establishing a food waste composting facility on the West Coast, CMA does not consider that a major food waste diversion program would be sustainable at this time.

10. Draft Organics Diversion Strategy

Based on the results of the organics diversion opportunities assessment, as well as feedback from the West Coast Solid Waste Plan Monitoring Advisory Committee in June, CMA recommends the following plan of action to divert organics from the West Coast Landfill. CMA anticipates that the actions identified in this strategy could be completed over a two to three year timeframe. The schedule will be determined following feedback from the West Coast SWPMAC on October 15th.

Reduction Program

1. Collaborate with Metro Vancouver and the BC Ministry of Environment (MOE) to implement a *Love Food Hate Waste* type program in the ACRD (West Coast and Alberni Valley) using communication graphics and messaging developed by Metro Vancouver and the BC MOE.



2. Expand the current subsidized backyard composter program to include enhanced education activities such as a compost coaching and Bear Aware programs to divert food waste from disposal.
3. Engage in linking up social service organizations (e.g. Mustard Seed) with ICI locations with “waste” food.

Collection and Processing

4. Review the viability of establishing a food waste composting facility at the West Coast landfill when there is a need for local biosolids management upon completion of the District of Tofino Liquid Waste Management Plan (estimated to be in four or five years). Consider the potential to include fish waste to improve the economies of scale of a composting facility.
5. Assess the cost-benefit of transferring food waste to a composting facility in the Alberni Valley when and if a facility is established there.