Bowen Island Municipality

June 24th 2014

Organic Processing Facility Feasibility Analysis:

Final Report

Prepared for:
KKN Re-Use-It Store Society &
Bowen Island Municipality
981 Artisan Lane
Bowen Island, B.C. V0N 1G2

Submitted by:
Net Zero Waste Inc.

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www.netzerowaste.com

Bowen Island Municipality
981 Artisan Lane
Bowen Island, B.C. V0N 1G2

June 24th, 2014

Attention: Mary Ellen deGrace and the KKN Re-Use-It Store Society

Re: Final Report – Organic Processing Facility Feasibility Analysis

Please find enclosed the final report for the above mentioned project which outlines the results of our on-site investigation, as well as provides you with a brief outline of the necessary information you require to evaluate your options moving forward. Our team has compared estimated current organic costs to forecasted capital and operating costs associated with the development and operation of your own facility. Bowen Island can now make an "apples to apples" comparison of the viability of on-site processing and the supply of a locally manufactured compost for its citizens.

Information was provided and discussions were held over the one day on-site meeting. A presentation was provided so as to evaluate the different composting technologies available. Unfortunately, few commercial facilities operate at a scale less than 10,000 TPA as the costs per tonne rise quickly below this capacity. An analysis of these systems was provided in the presentation but has not been expanded upon further in this report. An estimate of the costs associated with the construction and operation of a small scale model using the Gore Cover System has been provided. Some excellent sites are available on the island, and each location provides its own advantages and disadvantages. These have been expanded upon in the following report. In one site location, very little site-work is required, and it is estimated that a facility can be constructed and operated for a small savings to the municipality even with the reduced tonnages expected. The benefit would be that funding would be invested on-island instead of being wasted on fuel and ferry costs as is currently the status quo as organics are exported off-island for composting.

While additional site work and permitting will still be required before the construction of an on island facility could be a possibility you can now move forward with an understanding of the costs and responsibilities associated with a privately owned facility. We would be pleased to have the opportunity to work with you and your team again as you progress with the next phase of your project and remain at your service should you need support moving forward.

Very truly yours,

NET ZERO WASTE INC.
Per:

Mateo Ocejo, P.Eng.
Director

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1 Executive Summary

The Bowen Island Municipality (through support from Knick Knack Nook) recently commissioned Net Zero Waste Inc. to evaluate options for the management of organic materials produced locally (on-island). Representing the largest recyclable fraction of the waste stream, diverting organics from the waste being trucked to the Transfer Station in North Vancouver, is expected to immediately lower disposal costs. Additionally, source separating organics will significantly increase the environmental sustainability of Bowen Island in terms of reducing greenhouse gas emissions and capturing valuable nutrition for agriculture and landscaping applications. It is important to recognize that while other initiatives such as backyard composting will continue to play a role for some people in the community, broad based support is likely only attainable through a curbside food waste collection program. Centralized processing will allow a higher quality end product to be manufactured than possible from the back yard and allow diversion of materials from meat and bones to commercial food waste and agricultural organics not possible with the much simpler systems designed for back yard use. On island processing of source separated organics provides a cradle to cradle solution and an integrated organics management and nutrient recovery strategy for the Island.

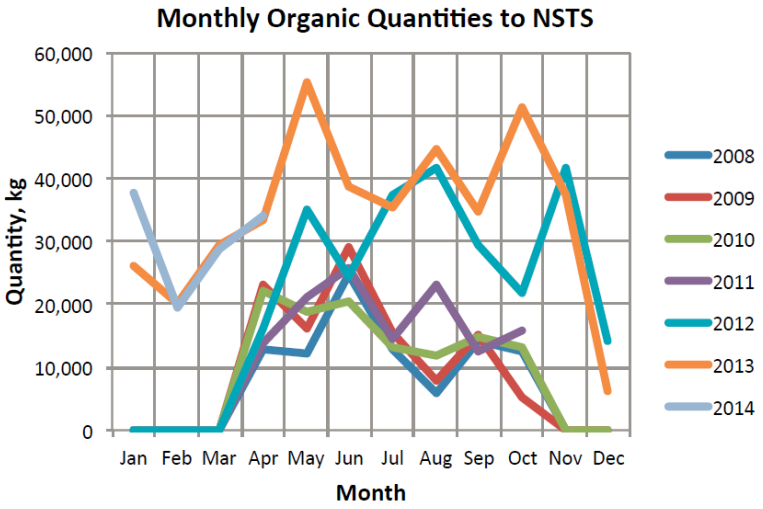
While there was not a suitable budget for a detailed cost analysis of the existing costs for disposal, an assumed cost of $160/tonne was made for organics hauled to the North Vancouver Transfer Station. An assumed processing capacity of 1,000 tonnes/year for the facility was also made, through discussion with the project team and analysis of existing organic disposal quantities. While currently volumes are still significantly below 1,000 tonnes, organics remain in the waste stream and the island continues to see population growth which is expected to continue in the years ahead.

The Island and it's waste hauling contractor have already done well to have a successful collection program in place. As a result, only facility development costs have been assumed in this report. It was evident from the Site Evaluation, that the Municipal Site presents the best option for a small on-island processing site. As a result, the cost of land has been omitted from the operating cost model. Cost of bins or kitchen catchers, collection vehicle upgrades or other program components have been omitted as it appeared that island participation was already well underway and the collection and transfer infrastructure seemed to be working well. This report has demonstrated that the Island has the resources available to develop its own composting model. This will save the community money immediately and provide residents with a locally manufactured resource with multiple downstream benefits.

2 Operational Evaluation

The current structure of the solid waste management system is straightforward; however with the rising cost of fuel and transportation, there is no guaranteed rate stability. It is estimated that the cost of fuel will more than double in the coming decade and this will likely have a negative impact on the cost of disposal for the disposal of waste off the island due to the additional distance this material is required to travel. Ferry costs also continue to rise and so minimizing the number of trips off island will also have a positive effect on waste costs.

Pulling any remaining organics out of the waste stream will be the final goal for Island residents as the price of waste continues to rise in all markets. This has already become evident in larger markets including the Lower Mainland where tip fees have climbed from $65/T to more than $100/T over the past decade and are expected to exceed $200/T in the near future as existing landfills reach capacity and expensive WTE facilities are funded. While rates can be lowered through the implementation of multi-year contract terms with fixed rates per household minimizing escalation risk, the same discounts can be provided for organics with significantly lower transportation costs for disposal on Island. It is recommended that the Island use what it has available



Another operational consideration was evident after data was collected on the quantity of organics send to the North Shore Transfer Station. Volumes tapper substantially for 4 months (Nov – Mar), and the Gore Cover System Design is able to accommodate these feedstock fluctuations. There will be a slower processing times during the winter period which will allow on-site operations time to catch up with screening and soil blending. The busiest time of the year will be in the spring, when all of the compost made from the past year is sold to residents and utilized in gardens around the island.

3 Project Background

Net Zero Waste Inc. (NZW) was contracted by the Municipality of Bowen Island to undertake an evaluation and comparison of the financial and operational implications associated with running their own composting facility when compared to other disposal or recycling options. The overall goal is to increase both the financial and environmental accountability and sustainability of the Island through improved organics management. The scope of work included a presentation on the range and suitability of the technology available, tours of an existing operating facility and an overall evaluation of processing and disposal options based on a review of the islands best processing locations. This evaluation will provide additional tools to enable Bowen Island to invest wisely in a new organic waste management solution.

The various options were graded against one another on a cost per tonne basis, which highlights the impact the total tonnage diverted has on the comparison. For the purpose of this report a facility design capacity has been estimated at 1,000 tonnes per annum (TPA). This capacity will provide a good starting point for a blended processing of collected curbside organics co-mingled with yard and garden waste

A wide range of materials exist locally from bio-solids to commercial waste to food waste, however with a system of the small capacity required by Bowen, it will be difficult to process different materials independently. This can present a challenge for small scale facilities who desire to process bio-solids separately from food waste so as to produce two distinct end products (one tailored to landscaping applications and the other for food production). Comingling the waste streams and a less desirable end product may also be a necessary sacrifice to consider as a potential reality should the local processing option be determined as the best path forward. For the purposes of this report we have not allowed for the inclusion of bio-solids in the organic waste managed at the facility.

There will be a significant investment required in equipment and infrastructure required wherever a facility is ultimately sited. How those costs are shared between the operator and the Municipality will influence the price per tonne for processing. Should the municipality take control of those costs, due to their low cost of capital, they will minimize the price per tonne paid for processing. Finally, there is the sale or distribution of the compost end product. The municipality may wish to retain control of the compost or allocate some of this product (Example of 1 bag per residence free of charge). All of these items ranging from rent to the cost required for site development will ultimately influence the tip fee, however this brief report serves to outline the options available to the Island so that an educated and balanced approach can be utilized for implementation. It is our goal to optimize funding to areas that will provide the best value to residents and tax payers of the region.

4 Technology Selection

There is a significant difference between the use of a proven / advanced technology and a new and emerging technology. There are many new and emerging technologies which may be successful at processing organics but which have not yet been constructed commercially on a wide scale. While these systems may provide valuable solutions for source separated organics in the future, the level of risk associated with implementation of technologies of this nature is significant enough for us to only consider proven systems. A proven system is one which has been implemented in numerous locations and utilized with a variety of feed stocks successfully.

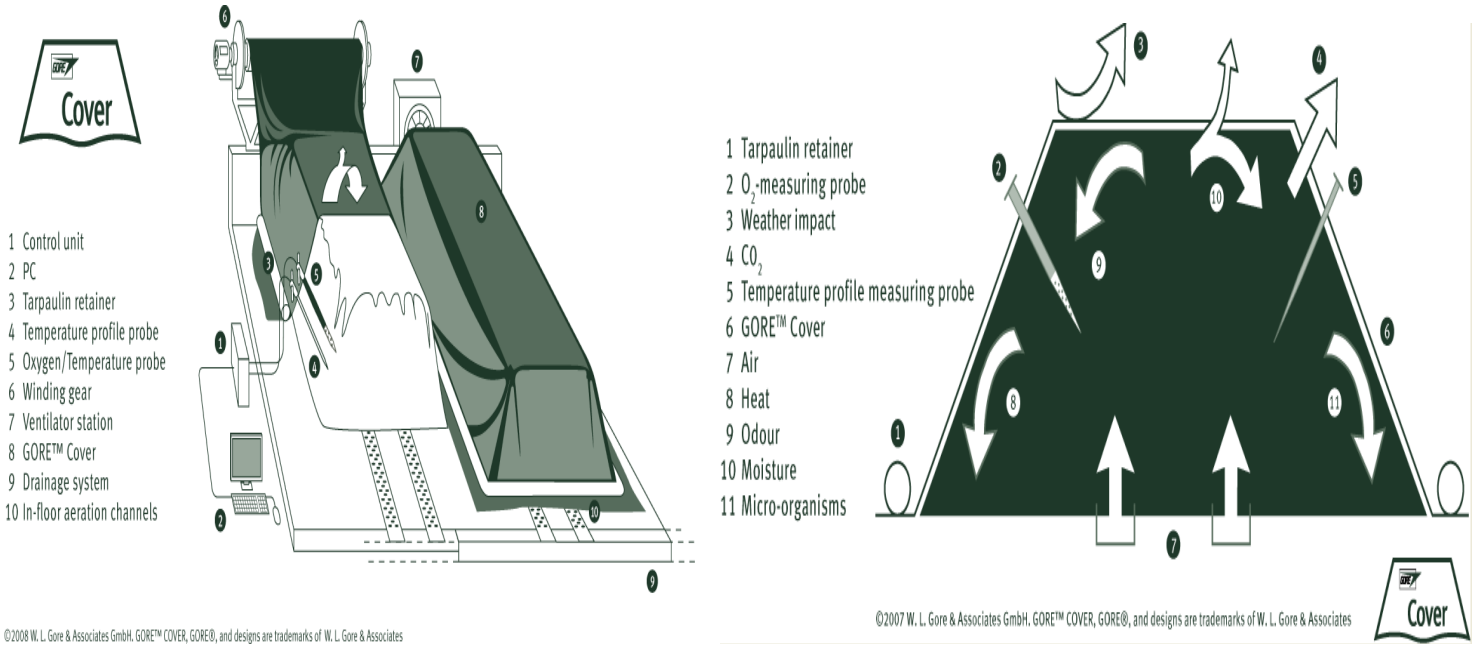
As there was neither the time nor the budget in this report to complete a full technology review, it is assumed that the technical team assigned to the project by the Municipality completed their own technology review. Multiple sites were toured and various systems which are in use locally were viewed firsthand. This review ultimately led them to a tour of the Net Zero Waste operating facility in Abbotsford which processes the regions food, yard and commercial waste streams. At this location there has never been a single odour complaint and we utilize the Gore Cover System. While various systems were discussed in the presentation provided while on-site, in this report a focus will be made on the Gore Cover System as the selected technology for this project implementation. For the implementation of the project and the tonnages expected at the facility, we are suggesting the use of HDPE piping for the aeration system rather than placement of trenches in the slab. In the future, should the project be a success with the expected financial savings realized by the community, then there may be the possibility of adding in slab aeration at a future date. Small scale systems operate for many years successfully with on-floor aeration systems.

4.1 Gore Cover System Technology

The GORE™ Cover System, manufactured by W. L. Gore & Associates, utilizes a specially designed cover to create an enclosed system that optimizes the composting process. Today, their enterprise is comprised of approximately 7,500 associates in 45 locations around the world. Annual revenues top $3 billion USD.

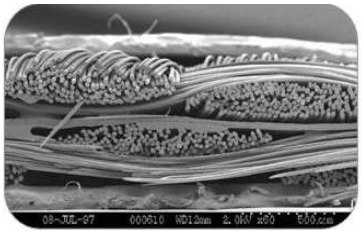
As the GORE™ Cover System composting process has no moving parts itself and is not very sensitive to contamination this system is flexible and can cope with widely differing waste streams. The GORE™ Cover System provides the environmental and odour control benefits of a typical “in-vessel” system without the cost of a permanent structure or the need for bio-filtration of process air. The typical components and equipment utilized in the GORE™ Cover System facilities is as follows.

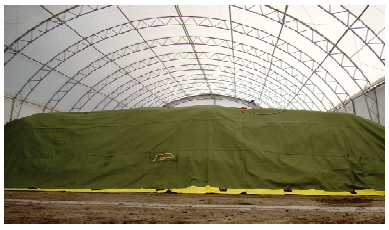
- GORE™ Covers
- Aeration System: Trench/Pipes & Aeration Blowers (1 per heap)
- Control System complete with Oxygen and Temperature Sensors
- Control Units plus Computer and Software



Positive aeration drastically reduces utility operational costs (less than 1kWh of electricity per tonne of compost). The Gore Cover 2Hp blowers are on for approximately 2 minutes every 10. In comparison, “Negative Aeration Systems” must have their blowers on 24 hours a day 7 days a week to prevent negative odour events. Compact design results in a drastically reduced facility footprint and a 400% improvement in throughput from conventional windrow systems. Installed in more than 200 plants in 26 countries worldwide, the benefits of the Gore Cover System have been realized by a growing number of facilities.

GORE
Creative Technologies Worldwide





5 Potential Local Site Availability (Site Review)

As no site has been officially selected by the Island, some potential site locations were viewed during a day trip and tour. The existing waste management infrastructure is centered around the Bowen Island Recycling Depot, where a variety of items are separated, pre-processed and trucked off island when economically efficient to do so. This site would hence be a logical location to begin our search for a suitable processing facility location, however due to space constraints, a salmon hatchery and a limitation on available land for development this site was not considered in the review.

There were two private companies that were considered in the site review (Titled as Gravel Pit and Industrial in the following review). Both of these companies / landowners felt that there were significant synergies that their sites would be able to support in concert with a compost facility operation. Both of these sites presented advantages and disadvantages which will be outlined in the following section. Finally there was a site which is Municipally owned and appears to have been used to store green waste in the past. This site is already level, graded and has a number of lock blocks and bunkers already in place.

Once an ideal site has been selected, a re-zoning process may need to be pursued which will include public hearings and an educational campaign. Following the successful approval from all parties involved in the process, a facility design would need to be finalized and a contractor selected for construction. A notice to operate would also need to be filed with the Ministry of the Environment no less than 90 days prior to commencing operations. No less than 6 months should be budgeted as a reasonable implementation of this site selection process should the Island wish to pursue the construction of a local facility.

A number of potential sites were viewed during a single visit to Bowen Island on June 5th, 2014. A focus was made on sites who had expressed a desire to participate in the organic processing facility operation. A total of 3 preferred sites have been outlined below with the advantages and disadvantages of each highlighted for consideration. While all sites presented excellent potential, it is difficult for an undeveloped private site location to compete from a cost perspective with an ideally sized and prepared (graded / utilities) “municipal site” which was previously used for organic management.

5.1 Site A – The Gravel Pit

Advantages

This site provides adequate capacity of available lands (2-3 acres), however these lands remained undeveloped. There are no residents within the vicinity of the site and the forested area surrounding the site provides a suitable wind buffer for any minor odours generated from the compost operation. The equipment utilized for the gravel pit operation could in many cases be used to operate aspects of a composting operation. The owner of the site is interested in synergistic business opportunities that will complement the existing gravel business. The site and the existing operation was well organized and clean which is what would be required for an organics facility operation to prevent/minimize vector attraction.

Disadvantages

This site location is on the top of a large hill which is not ideal for wind borne odour propagation. Access to the site was completed through a long and at times steep driveway. It is questionable if the transfer vehicles could travel on this road without the need for upgrades at a few locations. It was mentioned that the road had been closed in the past during snowfall events.

Unfortunately, the most significant disadvantage of this site location is that it is a “greenfield” site where no infrastructure currently exists. While there is power at the gravel pit, it would need to be “distributed” to the proposed greenfield development area. Existing grade is uneven and has large rock outcroppings which would need to be removed. Access roads to the proposed site would also need to be constructed from the lower grade, active pit area.

5.2 Site B – Old Municipal Works Site

Advantages

This site provides ideal access directly off the paved island roadway which would easily accommodate a transfer truck and bin. The site itself appeared to be of more than adequate size to house a composting facility of the capacity required. As outlined in the financial evaluation section of the proposal it was determined that approximately 2 acres would be required for processing and storage of finished compost for the stated capacity, however much of the site will need to be left open to provide roadway access for large vehicles to enter, turn around and leave. This space would be utilized by operations or for special annual activities such as screening when not being used to receive the weekly load from the recycling center.

The site already contains lock blocks which would be used to create the phased bunker system (more blocks would still be required). The site also has a bobcat skid steer loader which be the primary piece of equipment used for a small composting operation. The site also could be used to supply compost and soil back to the community as it is easily accessed and controlled by the Island. With the lowest development cost this site has been used for purposes of the financial evaluation as it presents the best case scenario for the Island.

Disadvantages

While the site does present a centralized location with some natural buffers and vegetation, as with any site location there is always the potential that if not managed properly a compost facility can generate odour. It is for this reason that the added cost of the Gore Cover System has been included in the capital cost estimate. It is felt that the return on investment will be realized by both odour and vector management, but by encouraging the site to be utilized for the sale of compost and for potential community gardens or other downstream benefits which could be provided back to island residents.

5.3 Site C - Industrial Site Location

Advantages

This site is centrally located and of suitable size (2 acres or more) for a facility of the required capacity. It already has a variety of synergies with other operations including green waste / land clearing / stump grinding. There was some limited soil screening observed while on site, however this may be completed on a larger scale from time to time. An office and other site infrastructure and existing utilities would allow a part time operation to be shared with other site work. Material moving equipment (while largely oversized for the needs of the scale required for the islands compost processing) exists and provides operational synergies.

Disadvantages

The largest and most significant disadvantage of the site is the fact that significant site work would be required before the development area would be ready for grading and the placement of an impermeable surface. The site also is quite spread out with many different work areas and material stock piles. These multiple areas will present havens for vectors or rodents that would desire to live at the composting facility. It was also evident that a number of residents live on the immediate boundary of the property who may be opposed to a compost facility development so close to their property.

6 Evaluation of Construction and Operation of an Island Owned Compost Facility

6.1 Overview of Conceptual Design

This section of the report outlines the proposed conceptual design for the facility which has been recommended to the Municipality of Bowen Island. The scope of this report does not allow for detailed design and costing; however the attached conceptual design for a facility of this scale will allow for an opinion of probable costs associated with the capital and operating expenses expected for an operation of this nature. The conceptual design selected incorporates the use of an encapsulated aerated static pile composting system with leachate control and positive aeration so as to minimize capital cost while providing flexibility with the operation so as to allow for the seasonal volumes seen on Bowen Island.

This simple and cost-effective composting approach meets the needs of the Island, while providing the necessary and appropriate environmental controls. The design description as outlined in this report also serves to identify facility requirements, the process flow for the system, as well as various recommendations for equipment and infrastructure. The recommended process will use forced aeration under automated temperature and oxygen control to minimize operator requirements and to ensure that hourly data is collected, documenting the history of the pile and demonstrating that the required vector and pathogen reduction limits have been met. This process control strategy will maintain an aerobic process and minimize the formation of fugitive gases. Leachate will be managed through a collection system and reused during the primary composting phase of the process. The receipt of incoming materials can be done inside of a tube frame building (budget permitting) if improved leachate and odour vector control is desired, however this is not required in most operations of this size and is not utilized in many of our other small scale facilities including the operation for the Comox Valley Regional District where materials are received on an impermeable surface and covered with compost overs before being mixed and processed under the Gore Cover.

For the purposes of the preliminary cost estimate and given that the waste stream to be processed will be a relatively low-concentration material (predominantly green waste with some food waste) we felt it was acceptable to proceed with the assumptions listed. Further modifications can be made in the future to provide additional odour and process control at the facility if necessary.

6.2 Conceptual Design of Compost Facility

6.2.1 Proposed Feedstock

The feedstock for the proposed facility would be organics from residential sources, composed of yard and food waste, some commercial organics and some clean green waste used to supplement the other feedstocks and fill the capacity constructed. It is important to achieve a greater economy of scale, by accepting as many commercial sources of organics available however this waste stream can add complexity to the operation and challenges when handling slurry or highly liquid wastes.

Many communities feel that Organics must be looked at as part of a comprehensive system that connects the associated nutrients generated by a region to sustainable food production and improved food security. If the soil products manufactured from the food/yard waste are to be used in certified organic food production, they must meet all the compost guidelines set forth in the Organic Production Systems (OPS) - Permitted Substances List (CA.CGSB 32.311-2009). Please note that this will require that the compost products produced have not been mixed with or co-mingled with bio-solids or sewer sludge. Compost which includes these feedstocks will not qualify for use in “Certified Organic” food production in Canada.

Other possible (and permitted) commercial feedstocks which could be seen at a local facility in limited quantities include; Animal bedding, Brewery waste/ Winery waste, Hatchery waste, Manure, Milk processing waste (Solids), Poultry carcasses, Red meat carcasses (Excluding all SRM as outlined in Federal Regulations) and Whey.

6.3 Preferred Composting Technology and Design

Following a review of the facility sizing and design capacity it was determined that the most suitable technology for a development of this nature would be the Gore Cover System. This type of facility would utilize an aerated encapsulated static pile / turned windrow system (bunkers) to compost the organic material. As the Gore Cover System turned windrows are readily scalable, and are able to operate at a very small / pilot scale; the design capacity of approximately 1,000 tonnes/year can be managed through the use of 2 small covers of the dimension of 6m wide by 15m long. These small covers provide the added benefit of being light enough that they can be positioned over the organic materials by one person and sealed with the placement of weights around the perimeter of the cover. (See photo on the following page)

For the purposes of the report, we have allowed for the installation of a small shelter, which will ensure complete separation of leachate from the stormwater in the main processing area. The initial equipment purchased will be limited to the composting equipment to minimize necessary capital costs with items such as screens and grinders left to be rented as required. We have not gone with an in-floor aeration design, however due to conservative numbers in some areas, depending on how the project budget is tightened up in the months ahead; in floor aeration may be a good choice for a single heap inside of the building

We recommend a flexible layout, with a minimal infrastructure investment to provide the lowest overall cost of capital which will ultimately be reflected in the tip fee/tonne paid by the residents. The facility however, will still be designed to process food waste or other difficult to handle waste and will provide the necessary environmental and process controls to produce a top quality end product. It is also always possible to complete additional design improvements if so required in the future to further enhance operations. We have placed a priority on a preliminary design which is straightforward and cost-effective to operate, with a minimum amount of complex infrastructure. These priorities are a must if a facility of this size is to operate sustainably. This will include the use of above ground piping which can be purchased at a low cost and welded or repaired easily if damaged.

The design proposed will provide the necessary controls as dictated by the Organic Matter Recycling Regulation of BC (OMRR). At the tonnage proposed, on-site labour will be optimized at approximately 2 - 4 hours per work day or 10 – 20 hours per week depending on the time of year. An operation of this size would likely only be open on

certain days of the week (part time operation). While you would need one key staff member as the primary point of contact, the operator will also require a couple of assistants who can provide holiday relief and part time operational support as required. Food waste will likely be delivered once weekly due to the storage capacity of commercial generators (restaurants) and the optimization of collection vehicles (bin filling at recycling depot).

Weekly delivery of materials to the site will support a controlled operation with only weekly operation on that day. Materials will not be left to stockpile on site and instead will be immediately pre-processed and buried under the Gore Cover as it is rolled out. This system also allows the operators to receive waste and operate part-time with a batch type feedstock system. This will allow larger volumes of waste to be processed at the same time allowing site-work to be completed more efficiently for the capacity required on Bowen.

6.4 Facility Infrastructure

The use of a simple encapsulated aerated static pile (Gore Cover System or equivalent) was felt as the lowest risk alternative to ensure improved process control and throughput while maintaining a relatively simple and non-complex facility design. Aeration will be controlled through software provided by the technology supplier. This forced aeration will also ensure that the material does not become anaerobic which can be an Occupational Health and Safety concern when operating in enclosed areas. While it is understood that many facilities use large loaders for outdoor operations, the movement of material for a smaller facility can be completed using a small skid steer loader as is already owned by the Municipality. This also saves considerable costs on the thickness of the slab design, as a large machine will never be required for the Islands design capacity.

The leachate collection sump should be placed at one side of the impermeable surface so that leachate and rainwater can be captured and recycled by the system and domestic water needs are minimized. A small submersible pump can then be dropped into the leachate chamber when new feedstocks are prepared to ensure the appropriate moisture content. Leachate serves as an inoculant, able to kick-start the composting process with a batch of active bacteria.

6.5 Financial Evaluation

The capital cost estimate for the composting facility is estimated below. It is important to note that this estimate does not include any allowance for the cost of land. On the basis of the below preliminary conceptual design, and the review of sites and equipment available, it is estimated that the facility could be constructed for as little as $325,000, and would be capable of managing up to 1,000 tonnes of organics per year. Due to the size of the facility, we have deferred the capital costs associated with equipment such as the screen and the grinder as these items can be rented annually as shown in the budgetary operating costs for the facility. The capital cost, when annualized and paid down over the assumed 20-year life span of the facility, equates to annual debt payments assumed at $30,000. This is based on an interest rate of 6% which when used to retire capital debt load over 20 years equates to 8.72% per year. A rate this low would only be achievable for the Municipality due to the low risk assumed by the bank for this loan. A start-up business would not be able to get a rate this low and would require somewhere between 25% - 40% of the total project costs contributed as equity towards the project. If “angel” investors are required to help assure the required “debt to equity” ratio dictated by the banks, the interest rate charged can often be 3 to 4 times higher than that provided by the banks for senior debt which has been assumed for the purposes of this report. The result is a much higher cost of capital which is ultimately reflected in the tip fee. Allowances have been left in the estimates at this time for both operating and capital expenses. The Gore Covers are expected to last around 8-10 years so an allowance for depreciation / replacement costs could be included now or re-evaluated in 10 years as much less capital will be required.

Table 6-1: Capital Cost Estimate for small scale Gore Cover Facility (1,000 TPA)

- **Engineering & Construction Management** **$10,000**
- **Site Office / Signage / Fencing / Gate** **$20,000**
- **Drill Well / Process Water Distribution** **$15,000**
- **Concrete Lock Blocks (50 Assumed)** **$7,500 (delivered)**
- **Permitting Costs (Leachate / Odour Plan)** **$7,500**
- **Power / Communications (Elec. Allowance)** **$20,000**
- **Gore Cover System (1,000 TPA)** **$75,000**
- **Concrete Surface Allowance ($400/$m^3$)** **$60,000**
- **Site Work, Leachate Controls (Budget)** **$40,000**

- **Office Supplies & Small Tools Allowance** **$5,000**
- **Pre-Eng. Building (3 sides only)** **$25,000**
- **Contingency** **$40,000**
- **TOTAL** **$325,000**

The above does not include:

- **Skid Steer Allowance (Used)** **$40,000 (In Place / Not Required)**

The operating costs for the facility have been estimated, at $120,000 per year and this cost breakdown is outlined below in detail.

Table 6-2: Operating Cost Estimate - Small Scale Gore Cover Facility (1,000 TPA)

Design Capacity	1,000 TPA
Labour	$70,000
Land Lease (Assume Provided)	$0
Asphalt / Concrete & Building Maintenance	$2,000
Fuel, Utilities and Consumables	$8,000
Compost Testing	$1,000
Screening Rental	$3,000
Grinder Rental	$5,000
Marketing	$2,000
Management Costs	$5,000
Insurance (business & life)	$4,000
Contractor Overhead (10%) and Profit (10%)	$26,000
Operating Contingency (10%)	$14,000
Annual Operating Expenses	$140,000
o $325,000 Debt (6% - 7% with 20yrs amortization)	$30,000
COSTS INCL DEBT SERVICE	$170,000

6.5.1 Potential Compost Sales Revenue

The opportunity to sell some of the compost produced by the Bowen Island facility could provide additional revenue to offset the cost of operation of the facility. Currently, the average value of this type of compost is projected at around $40/yard retail on island. It is expected that between 800 - 1,000 yards of compost will be produced from 1000 Tonnes of processed materials (starting in the second year – due to the need to recycle the first year's overs). Projected revenue from bulk sales could be assumed to be $22,500/year which would assume that only half of the compost (500 yards) would be sold in bulk, allowing the remaining product produced to be provided to community projects or to be bagged and provided back to residents as a benefit of the program.

There are many different end products which can further enhance the sales from an operation of this kind. These different products have been outlined in Table 6-3, assuming total production and sales of 800 cubic yards of compost annually. While 1,000 tonnes processed will not necessarily produce 800 yards of compost, once additional amendments have been added this can be considered a reasonable estimate of the expected compost to be produced at the facility.

Table 9-4: Current Recommended Market Pricing for Finished Compost and Soil Products

Product	Mix	Price ($/yd3)	Total Yards	Revenues ($)
Soil Amender	100% compost	$ 35	200	$ 7,000
Lawn and Turf	40% compost, 60% sand	$ 45	100	$ 4,500
Garden	70% compost, 30% sand	$ 45	100	$ 4,500
Potting	70% compost, sand, peat, fertilizers	$ 65	100	$ 6,500
Total			500	$ 22,500

7 Regulatory Compliance

The facility has been designed to produce a high-quality Class A compost product which is suitable for food production and for use in Certified Organic Farms. Finished compost will meet the regulatory requirements as outlined in Schedule's 2, 3, 5 and 6 of the BC Ministry of Environment's (MOE) Organic Materials Recycling Regulations (for Class A Compost) as well as the CCME (Canadian Council Ministers of Environment) regulation. The required measures and analysis at the facility will include: vector reduction (temperature, times, C/N), pathogen reduction, compost quality (metals) and record-keeping. As stated in the Regulation "Compost that is not solely produced from yard waste or from untreated and unprocessed wood residuals and that meets the requirements of all of the following is Class A compost:"

Schedule (2) (a) to (c) Vector Reduction Limits:

Volatile solids must be reduced by greater than 38%; the process must remain aerobic for greater than or equal to 14 days at temperatures above 40 ^{o}C with an average of 45 ^{o}C. The carbon to nitrogen ratio (C/N) must be great than or equal to 15:1 and less than or equal to 35:1. The curing process must be at least 21 days.

Schedule 3, Pathogen Reduction Limits:

Finished compost must have fecal coliforms less than 1000 MPN/g dry weight and 7 samples must be analyzed every 1000 Tonnes.

Schedule 5, Sampling and Analyses:

The standard method of analysis must be employed and the analysis must take place every 1000 Tonnes of soil produced.

Schedule 6, Record-keeping:

Temperature profile records and analysis of finished compost must be maintained for 36 months and made available to a director upon request.

CCME (Canadian Council Ministers of Environment) Regulation:

Temperature must exceed 55 ^{o}C for three consecutive days in order to ensure pathogen reduction. Metal limits outlined within the CCME regulation may not exceed Schedule 4 for the respective residential, urban, commercial, industrial, or agricultural use intended.

8 Conclusion

The Municipality of Bowen Island has already demonstrated leadership by implementing a source separated organics collection program, years prior to many larger municipalities in the lower mainland. It can now take another leadership step and be the first of the BC coastal islands to complete its own on-island processing of post-consumer food and commercial waste streams.

While the development of an on-island composting solution is possible, it will require the investment of significant funds into a municipally owned site so as to minimize the tip fee. This has been estimated at around $325,000 with the majority of the capital going towards long term infrastructure which should last up to 20 years. Only the Gore Covers will require replacement every 8 years. Should these funds not be available for this use, then the Island would need to rely on the Private Sector to construct and develop a local facility and would need to provide a contract of suitable duration so as to allow the contractor to re-couperate this investment. A facility of this size would likely require a set monthly payment for the operation so as to allow for the variability in seasonal fluctuations. This will place the liability for maximizing diverted organic tonnage with the Municipality as up to 1,000 TPA of available capacity will be installed and maximization of this diversion capacity will allow for the highest level of savings for island residents. With a negotiated contract operation, tonnage will be tracked (estimated – as no scale has been allowed for) with tonnage to landfill measured as an indicator of improved diversion.

An on island operation is estimated to cost $170,000/year, however more than two thirds of this amount is re-invested with on-island labour, debt service and contingency. There will also be the benefit of the supply of a locally manufactured high end Class A Compost, for island residents and businesses. Costs for the composting operation will go down over time while it is expected that exportation of organics to the mainland will continue to rise. Composting will limit island waste management risk, as well as significantly lower the Islands carbon footprint.

While this report represents an important first step and provides a necessary tool for staff and members of the Compost Advisory Committee so as to best understand the task at hand, additional and significant efforts are still required before a facility can be constructed. This process is one which takes a considerable time to implement (particularly in smaller communities) and efforts and progress made thus far for on island processing should be continued. Savings can be realized immediately through the implementation of an on island solution and the benefit of a high quality locally manufactured soil amendment will be a downstream benefit that all island residents will be thankful for. A competitive Request for Proposal is likely the best option to ensure all available disposal options are considered and the lowest priced operating contract is obtained for the Municipality. We remain at your service should you require additional assistance as you move on-island organic recycling forward.