ENVIRONMENTAL ASSESSMENT REGISTRATION

BURIN PENINSULA REGIONAL WASTE MANAGEMENT SYSTEM AND FACILITIES

Prepared for:
Department of Environment and Conservation
Environmental Assessment Division
P.O. Box 8700
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Project No. 723445

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Title: ENVIRONMENTAL ASSESSMENT REGISTRATION,
BURIN PENINSULA REGIONAL WASTE MANAGEMENT SYSTEM AND FACILITIES

Client: Burin Peninsula Waste Management Corporation

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Rev.	Date yyyy/mm/dd	Page No.	Description	Prepared By	Reviewed By	Approved By

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APPENDICES

1 NAME OF THE UNDERTAKING

Burin Peninsula Regional Waste Management System and Facilities

2 PROPONENT

2.1 NAME OF CORPORATE BODY

Burin Peninsula Waste Management Corporation

2.2 ADDRESS

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3 THE UNDERTAKING

3.1 NATURE OF THE UNDERTAKING

The purpose of the proposed project is to aid the Burin Peninsula Waste Management Corporation (BPWMC), and the communities it represents, to move forward with its waste management plans through the construction of a modern waste management facility to service communities located on the Burin Peninsula of Newfoundland. In 2008, Edwards and Associates Ltd. submitted the Burin Peninsula Regional Waste Management Study to the BPWMC recommending that the committee operate a 2-stream co-mingled at-source separation waste management system, with the first stream being organics, and the second being comprised of garbage, recyclables and fibres (preferred option).

The preferred option was selected based upon the objectives of the 2002 Newfoundland and Labrador Waste Management Strategy and Provincial Guidance Waste Standards (2007), the convenience to the users, and the overall cost. The waste management facility will be designed to cost effectively accommodate the current and projected waste volumes from the collection area. Based on extensive research and investigation, the committee decided to adopt a 2-stream co-mingled at-source separation waste management system. In 2010, BAE-Newplan Group (BNG) had investigated the option of incorporating the fibre stream into the organic stream to cut down on the overall volume of waste transported to Robin Hood Bay (RHB).

Currently, there are numerous locations existing on the Burin Peninsula that accept waste from communities (see Appendix A, Figure 1). An assessment of the collection and transportation requirements of the new system has identified the area surrounding the existing Frenchman's Cove dumpsite as the preferred location for the proposed Burin Peninsula Waste Management Site. This location offers sufficient landmass, and balances local travel times between the western and eastern portions of the Burin Peninsula. Edwards and Associates (2008) analyzed other factors such as visibility from the main highway, construction costs, environmental impact, and collection and transportation logistics in order to recommend the preferred project site.

Table 3-1 shows the estimated annual volumes of wastes generated on the Burin Peninsula.

Table 3-1: Estimated Annual Volumes of Wastes Generated on the Burin Peninsula

Waste Management Facility	Annual Volume of Waste Generated[1]
Burin Peninsula Waste Management Facility	• 13,000 tonnes (Residential waste including recycling and composting) • 2,477 tonnes (Construction and Demolition (C&D), Household Hazardous Waste (HHW) and other waste) • 15,476 tonnes (Total Waste)

3.2 NEED FOR THE UNDERTAKING

The undertaking will provide a suitable location for solid waste disposal to service communities located in the collection areas of the Burin Peninsula, Newfoundland and Labrador. The waste management facility will provide a permanent storage location for construction and demolition (C & D) materials and will also provide a temporary collection area for waste before it is transported to the Eastern Newfoundland Host Site located in Robin Hood Bay, St. John's, Newfoundland for further recycling and waste disposal efforts. This site will also see the operations of an Organics Processing Facility.

The establishment of the proposed Regional Waste Management Facility (RWMF) is necessary for the Burin Peninsula to meet the objectives of the comprehensive waste management strategy[2] established by the Province of Newfoundland and Labrador. The strategy has a goal of 50% diversion of materials currently going to landfills by the year 2015. The strategy also includes a reduction in the number of disposal sites, the elimination of open burning, and the phase-out of unlined landfills.

This option provides the most cost effective solution for the region and will improve environmental stewardship, leading to the closure of 20 dump sites and eliminate volume reduction by burning, as well as introduce the concept of composting and at-source separation on the Burin Peninsula.

[1] Volumes of Waste Generated were taken from the *Burin Peninsula Waste Management Corporation Sources Separated Organics (SSO) Processing Facility Conceptual Evaluation* by Stearns and Wheler, June 2010.

[2] Government of Newfoundland and Labrador, Department of the Environment. *Newfoundland and Labrador Waste Management Strategy.* Revised May 2007.

In keeping with the goals of this strategy, the BPWMC has undertaken the task to manage the planning and implementation of a modern waste management system for the Burin Peninsula.

4 DESCRIPTION OF THE UNDERTAKING

4.1 GEOGRAPHIC LOCATION

The RWMF will be in the vicinity of the current Frenchman's Cove dumpsite, which is situated on Route 220, approximately 0.7 km northeast of the intersection of Route 213 and Route 220. The site boundary takes in a total area of approximately 136 ha and can be accessed by an existing road off Route 220. Currently the land for development consists of a landfill whereby the Town of Frenchman's Cove dumps domestic garbage into a trench. Open pit burning is also employed to control waste volume. The remainder of the land for development is provincial Crown Land; an application has been submitted and is under review.

4.2 PHYSICAL FEATURES OF THE UNDERTAKING

The waste management facility will consist of the following components:

1. Access Road
2. Administration Building
3. Scale and Scale House
4. Public Drop-off
5. Metals Storage
6. Transfer Station
7. Maintenance Garage
8. Household Hazardous Waste (HHW) Storage Building
9. Composting Facility (Building and Curing Pad)
10. C&D Storage

For an overall site plan, see Appendix A, Figure 2. For an aerial view of the site location see Figure 3.

The preferred site possesses topographic features, ground slope and surface features that are suitable for development of the proposed waste management facilities. These features are described in more detail below:

- The area currently being used as a waste disposal site for the community of Frenchman's Cove. The remainder of the site consists of low-lying vegetation and trees;
- The site is approximately 800 m southwest of the Frenchman's Cove – Route 210 Intersection;
- The land is approximately 136 ha and includes 1600 m of roadway footage;
- The access road is proposed to extend from the Burin Peninsula Highway (along existing landfill access road) for a distance of 1600 m;
- A small unnamed stream runs through the property on the western portion of the site;
- The proposed C & D landfill is approximately 1600 m from Route 370;
- The proposed site development will be a minimum of 100 m from the nearest body of water (Brook) with the C & D Landfill measuring approximately 212 m from the Brook; and
- See Appendix A, Figure 3.

Site Access

Access to the site would be via a two-way, asphalted, all season access road. Signs stating the hours of operation, site rules, owner/operator, and permitted material types for the facility would be posted at the entrance. The entrance area would be landscaped. A partial section of the road to the existing landfill site can be utilized and upgraded. In order to control unauthorized access, the entrance to the access road for the material delivery vehicles and employee parking would be equipped with a lockable gate.

Administration Building

An administration building will also be located near the entrance of the site. This would be a single storey building, containing the administrative offices, boardroom, classroom facilities, washrooms and kitchen facilities.

Scale

Upon entering the site, collection and transport vehicles would be directed to the scale to have sources of incoming loads identified, weighed and directed to the appropriate disposal location. Non-haulage vehicles would bypass the scale. A scale house will be located adjacent to the scale. In addition, vehicles exiting the facility after waste disposal will be again directed to the scale to determine the amount of waste deposited at the facility so they can be charged the appropriate tipping fee.

Scale House

A scale house will be constructed to be either free-standing or connected to the tipping floor (pre-engineered structure), and will be located adjacent to the scale. The scale house includes a washroom and lunchroom.

Public Drop-off

Private vehicles will first register at the inbound scale and can then dump waste directly into the waiting trailer at the public drop-off site. The public drop off area will include a grade separated off-loading area where materials can be segregated into various waste streams. The off-loading area will be covered with a steel frame roof. The drop off area will accommodate room for six steel roll-on/off bins. The bins will be designated for source separated materials.

Metals Storage

A metals storage area will be located on site. Public vehicles and commercial haulage vehicles will deposit metals at this site. Metals will be picked up from a metals recycler on a regular basis.

Transfer Station

A transfer station building will be constructed to provide space for collection vehicles to discharge their waste onto a concrete tipping floor. A front loader with a bucket will then be required to push the waste from the floor into a transfer trailer. Once the transfer trailer has been filled, it will be removed by a truck and transported to the Robin Hood Bay Regional Waste Management Facility.

Maintenance Garage

A permanent building and compound would be required for equipment maintenance and storage. The building would contain service bays, parts storage and washrooms. The building would be fully serviced with on-site potable water and septic system. The area around the building would contain the septic field, water well, fire pond, and parking areas.

Household Hazardous Waste (HHW) Storage Facility

A Household Hazardous Waste (HHW) storage building will be constructed in the area of the transfer station and used for the storage of flammable and combustible liquids in containers and portable tanks. This building will not be more than 100 m^2 in floor area and is planned to be constructed at least 10 m from adjacent buildings or property lines. It will be designed according to all standard Canadian codes and will prevent spills, leaks and the accumulation of flammable vapours, as well being resistant to impacts.

Compost Facility

The compost facility will include an interior building portion and compost curing pad. Aerated piles will process for 30 days inside the facility and then be transferred to the compost curing pad and cured in windrows for two to three months as a final processing step.

Construction and Demolition Storage Area

Vehicles carrying C&D waste upon leaving the inbound scale will proceed to the C&D storage area. This storage area will be staffed and will accept inert construction and demolition waste materials including: concrete, brick, wood waste, fibre board, wall

board, asphalt shingles, and general construction debris. A tipping fee will be charged to drop-off materials. The area will be sited on a graded flat area. The area will be covered with gravel and have a dedicated storm water collect network and detention pond. Some materials deposited here will be transferred to Robin Hood Bay and some materials will be deposited in the landfill permanently.

The environmental protection system of the C&D Landfill will consist of a low permeability soil base layer and be designed to promote gravitational drainage. Once a portion of the C&D landfill reaches its operational height, the area will be covered to reduce infiltration of precipitation and redirect the surface runoff. The final cover system will consist of a multi-layer arrangement including a compacted soil layer to minimize infiltration and a vegetative layer to prevent erosion.

Household hazardous waste would be deposited in a self-contained unit and stored until the waste could be removed by a licensed hazardous waste hauler.

Site Electricity and Telephone

Three-phase power would be required to service the site, and telephone lines will be brought in along the site access road carried to each building.

5 CONSTRUCTION ACTIVITIES

Construction of the Burin Peninsula RWMF includes an administration building / scale house, household hazardous waste building, C&D landfill, maintenance garage, metals storage area, compost facility with curing pad and public drop-off area. Construction of the site will involve the removal of vegetation, grubbing, and grading of soil material for the access road, building locations, parking area and disposal area. Realizing some impact is likely on certain areas, the proponent is committed to keeping those impacts to a minimum. During the construction and operation of the disposal site, all efforts will be made to preserve and conserve the natural environment. Vegetation will be maintained to provide natural buffer zones and any exposed slopes will be stabilized with natural vegetation where possible.

All construction activities will be conducted involving mitigation measures as per Section 5.2 of this document.

Vegetation Clearing

Potential concerns associated with vegetation clearing include loss of habitat, as well as sedimentation of watercourses. All vegetation clearing and associated activities will adhere to all applicable acts, regulations, and permits. Also, mitigation measures will be implemented to reduce the potential effects of vegetation removal. A cutting permit will be obtained prior to the start of any site clearing. Clearing and removal of trees will be restricted to the minimum areas needed for the site requirements and will not be outside the permitted limits. Limits of clearing will be shown on all drawings "Issued for Construction".

Disposal of cleared timber and slash will be in compliance with the *Forest Fire Regulations*, Environmental Code of Practice for Open Burning, and the Permit to Burn.

Grubbing and Disposal of Related Debris

The principal concerns associated with grubbing are the potential effects of erosion on marine and freshwater ecosystems, as well as water quality. All grubbing and disposal of related debris near watercourses will adhere to relevant regulatory requirements. Grubbing activities shall be minimized where possible and limits of stripping shall be placed on all drawings "Issued for Construction".

Measures will be implemented to minimize and control runoff of sediment-laden water during grubbing, and the re-spreading of the grubbed material. Erosion control measures will be implemented in areas prone to soil loss.

Grubbed materials will be stockpiled for use in other areas of the project. Areas used for stockpiling will not be adjacent to any water bodies.

Filling, Excavation, Embankments, and Grading

Excavation, embankment, and grading will only be completed upon conclusion of grubbing and stripping. Where engineering requirements do not require grubbing and stripping, filling shall occur without any disturbance to the vegetation or upper soil horizons. Excavation, embankment, and grading shall be done in a manner that ensures that erosion and sedimentation will not impact watercourses in the area.

5.1 POTENTIAL SOURCE OF POLLUTANTS DURING CONSTRUCTION

The potential sources of pollutants are generally those associated with land development and construction. Adherence to permit conditions and application of sound construction practices will protect against the release of pollutants into the surrounding environment.

Strict monitoring and sound construction practices will control activities to minimize risks associated with:

- Silt and sediment;
- Dust;
- Construction debris and sewage;
- Risk of fuel, lubricant and hydraulic fluid release;
- Airborne emissions from construction equipment; and
- Noise pollution from construction activities.

5.2 MITIGATION MEASURES DURING CONSTRUCTION

Mitigation measures to reduce the environmental concerns associated with construction activities include:

- Silt laden runoff from construction areas will not be permitted to discharge directly into any body of water or watercourse. Runoff will be diverted to settling basins to ensure silt is settled out prior to release into the water. Silt fence construction of filter fabric will be used where necessary to preclude release of construction water directly into any body of water. The measures will include natural vegetation buffer, stone rip rap, wire mesh, settling ponds, and drainage channels.
- Efforts will be made to minimize dust generation during the construction phase of the project. Dust from construction activities will be controlled using the frequent application of water. Any application of calcium chloride will be in accordance with applicable guidelines from the Department of Transportation and Works.
- Solid waste disposal practices will be in compliance with the *Environmental Protection Act* and associated regulations. Any construction debris generated during the course of the project will not be permitted to be disposed of on site, but

will be contained in steel boxes on site for disposal at a municipal solid waste disposal facility. Where possible, construction waste will be recycled. Portable toilets will be located on site to minimize any impacts from sewage generated during construction.

- All machinery will be inspected for leakage of lubricants or fuel and must be in good working order. Any accidental spills or leaks will be promptly contained, cleaned up, and reported to the 24-hour environmental emergencies report system (1-800-563-2444).
- All fuel handling and storage will be in compliance with *The Storage and Handling of Gasoline and Associated Products Regulations.* Also, to minimize the risk of fuel, lubricant or hydrocarbon release, construction equipment will not be permitted to be re-fuelled within 30 m of any water body. If fuel storage is necessary, it will be stored only in approved containers with all necessary permits in place. Basic petroleum spill clean-up equipment will be on-site and made accessible to all contractors and/or employees.
- Equipment exhaust systems will be maintained to provide emissions meeting the standards designed for the equipment by the manufacturer.
- Exhaust systems will be maintained to ensure noise levels are within the design specifications of the machinery.

6 OPERATIONS

The RWMF is estimated to begin operations in 2012 and be operational for approximately a 50-year period. The following provides a summary of the composting operations of the facility; further information is provided in the Burin Peninsula Waste Management Corporation Sources Separated Organics (SSO) Processing Facility Conceptual Evaluation by Stearns and Wheler, June 2010 (see Appendix C for further information).

The operational process of the RWMF begins as a material delivery vehicle enters the facility and proceeds to the weigh scale station. An employee registers the vehicle, weighs it, and directs it to the receiving area / tipping floor. Vehicles back into the building and deposit their loads directly onto the concrete tipping floor, or travel to the

compost facility, C&D landfill area, household hazardous waste area or metals disposal area.

Delivery vehicles carrying dry and/or wet waste would be directed by a staff member to place the material on the tipping floor in a designated area where it would be visually inspected to ensure that wet waste and dry waste are correctly separated. The load would also be inspected to identify the presence of material that may be deposited in another area. Once dumped, a loader would then move the waste into the appropriate trailer.

Staff would be properly trained to recognize hazardous materials and the method of handling. Hazardous materials would be segregated and stored for off-site disposal.

After discharging the materials, vehicles then proceed back to the weigh scales to have the empty weight registered before leaving the site.

The operation will be conducted in a fashion which protects public health and safety, minimizes fire hazard, does not create a nuisance to adjacent areas, and will not contaminate ground or surface waters off-site.

All operational activities will be conducted involving mitigation measures as per Section 6.2 of this document.

6.1 POTENTIAL SOURCE OF POLLUTANTS DURING OPERATIONS

The potential sources of pollutants during operations will consist of those associated with daily transportation and storage of waste debris. Strict monitoring and mitigation practices will control activities to minimize risks associated with:

- Silt and sediment;
- Dust;
- Sewage;
- Risk of fuel, lubricant and hydraulic fluid release;
- Airborne emissions from trucks and equipment;
- Noise pollution from daily activities; and
- Scattered debris.

6.2 MITIGATION MEASURES DURING OPERATIONS

The operation will be conducted in a fashion which protects public health and safety, minimizes fire hazard, does not create a nuisance to adjacent areas, and will not contaminate ground or surface waters off-site. All mitigation measures for vehicle use and silt/sediment controls that were implemented during the construction phases will also apply during operation of the facility. In addition, the following mitigation measures will be implemented during operation of the site to address potential impacts:

Receiving Waste – All vehicles delivering waste to the site shall be screened to make sure they are carrying acceptable materials and, if required, weighed to determine waste quantities for accounting purposes.

Site Access – Public access to the site is to be controlled so that the general public does not have direct access to the facility unless accompanied by staff members.

Hazardous Waste – Any hazardous waste received at the site shall be properly segregated, stored, and removed from the site on a regular basis by an approved licensed contractor.

Contingency Plans – Up-to-date contingency plans must be in place to effectively handle the results from fire, odour, flood, power outage, spill, delivery of hazardous waste, or any other issue, which could cause a disruption to proper facility operation. If an Environmental Protection Plan (EPP) is required, one will be prepared in accordance with the *Newfoundland and Labrador Environmental Protection Act*.

Animal, Rodent, and Vector Control Program – An active vector and rodent control program is required.

Sewage – Septic tanks will be installed to receive and treat sewage generated during operations. There will be a septic tank installed for each building that has washroom facilities (at minimum (4); the administration building, scale house, maintenance garage and transfer station). Plans for these systems will be reviewed and approved by the Department of Government Services in accordance with the *Water and Sewerage System Guidelines*. Systems will have a volume less than 4,546 litres and

will be in conformance with the Sanitation Regulations and Standard Accepted Practice for On-Site Sewage Disposal System and prepared by an approved designer.

Litter Control Program – Includes the requirement for tarping of loads and regular litter collection. Also mobile litter collection fencing will be used where appropriate.

Dust Control Program – Roads shall be properly maintained and dust control programs implemented as required.

Fire Safety Program – Develop fire safety program in consultation with the local fire department and, where required, the Department of Forest Resources and Agri-Foods.

Groundwater / Surface Water Monitoring Program – Where required, surface water control measures will be implemented to minimize the impact on the environment from the construction activities and operation of the landfill. The basic element of surface water controls is to maintain post-development flow rates at pre-development levels and not to alter the pre-development water quality. It is important to minimize the contact between sediment and surface water by:

- Constructing ditches to intercept and divert surface water from areas of sediment;
- Constructing temporary measures to separate surface water from placed waste to minimize leachate generation; and
- Installing a low permeability cover to limit infiltration.

C & D Waste – The C & D area shall be sloped for gravity drainage to a point outside of the filled areas. The base layer of the C & D area shall be designed as per the Environmental Standards for Construction and Demolition Waste Disposal Site.

Reporting Requirements – An annual report summarizing the operation of the site is required.

6.3 POTENTIAL VALUED ECOSYSTEM INTERACTIONS AND MITIGATION

6.3.1 Resource Conflicts

Fish & Fish Habitat

A small, unnamed stream is located on site; however, construction activities will be conducted in such a manner as to prevent the release of sediment or other deleterious materials into water bodies. These measures are discussed in previous sections.

Wildlife

Operations of the RWMF are not expected to cause any direct wildlife conflict. If nuisance wildlife should become an issue during operations, the first priority will be the health and safety of employees. The proponent will seek advice from the Department of Natural Resources, and if necessary, will obtain a permit to control nuisance wildlife. This will ensure that any animal species that may cause a threat to personnel or operations of the facilities are dealt with in a humane manner.

Forestry

Construction activities will be such as to minimize the clearing of the forested areas.

Adjacent Areas

During operations, maintenance equipment will be confined to the areas of the site and will not be permitted in adjacent areas in order to conserve their natural state.

Human Activities

Human activities will place extra demand on the local services available; however, these activities are expected to have a positive economic impact.

There is no expected conflict with the surrounding natural environment, as site-related activities will be conducted within the boundaries of the waste management site.

7 OCCUPATIONS

7.1 CONSTRUCTION PHASE

It is expected that approximately thirty-six (36) people will be employed during the construction phase of the RWMF. The Burin Peninsula Waste Management Corporation offers an equal employment opportunity, free of gender-specific qualifications. Construction work will be performed by contractors hired by the proponent. Table 7-1 shows the anticipated occupations during construction of the RWMF.

Table 7-1: Anticipated Occupations and Associated NOC Codes during Construction

National Occupational Classification Group Title Code	Potential Positions (# Anticipated)	Description
0711	1	Construction Managers
2152	1	Landscape Architects
2154	2	Land Surveyors
7217	8	Contractors & Supervisors, Heavy Construction Equipment Crews
7219	3	Contractors & Supervisors, Other Construction Trades, Installers, Repairs & Services
7241	2	Electricians
7244	3	Electrical Power Lines & Cable Workers
7411	2	Truck Drivers
7412	3	Heavy Equipment Operators
7611	5	Construction Trades Helpers & Laborers
2264	1	Construction Health & Safety Inspectors
7612	5	Other Trades Helpers and Laborers

7.2 OPERATIONAL PHASE

It is estimated that approximately eleven (11) people will be employed during the facility operational phase. In addition, the facility also plans to employ an education coordinator. Work during the operations phase will likely be performed by employees of Burin Peninsula Waste Management Corporation. Table 7-2 shows the anticipated occupations during operations of the RWMF.

Table 7-2: Anticipated Occupations and Associated NOC Codes during Operations

National Occupational Classification Group Title Code	Potential Positions (# Anticipated)	Description
0912	1	Manager
0912	1	Assistant Manager/Superintendant
1211	1	Administrative Assistant
9613	1	Scale house attendant
4161	1	Transfer Station Attendant
4161	1	Compost Technologist
7312	1	Mechanic
7412	1	Heavy Equipment Operator
7612	1	Labourer
6651	2	Security Guards and Related Occupations

8 APPROVAL REQUIRED FOR THE UNDERTAKING

The permits, approvals, and authorizations that may be necessary for the undertaking include:

Permit, Approval or Authorization	Issuing Agency
▪ Approval for the Undertaking	Minister of Environment and Conservation
▪ Approval under the National Building Code of Canada ▪ Approval under the National Fire Code of Canada ▪ Certificate of Approval for Septic System and Well for <4,500 L/day	Engineering Services, Department of Government Services
▪ Building Accessibility Design Registration ▪ Fuel Storage and Handling-Temporary Storage/Remote Locations	Operations Division, Department of Government Services
▪ Crown Lands Applications/Licenses ▪ Develop Land – Protected Road Zoning and Development Control Regulations – Preliminary Application to Develop Land ▪ Electrical Permit	Customer Services, Department of Government Services Department of Environment & Conservation Department of Municipal Affairs
▪ Permit to Burn	Forest Fire Protection Specialist, Department of Natural Resources
▪ Permit to Cut Crown Timber ▪ Operating Permit/Fire Season	Newfoundland Forest Service, Department of Natural Resources
▪ Permit to Destroy Problem Animals	Department of Natural Resources
▪ Development Approvals	Respective Municipalities

9 BACKGROUND INFORMATION

9.1 PUBLIC EDUCATION PROCESS

During the course of the Solid Waste Management Study, the Burin Peninsula Waste Management Corporation conducted a number of education sessions for the communities in the Burin Peninsula region. The public meetings occurred in three (3) communities (Burin, the Placentia Bay West Development Association Building near Bay L'Argent, and Grand Bank). The meetings were open to the public and were designed to provide citizens with an opportunity to discuss and provide input concerning the proposed waste management facility.

9.2 PROJECT RELATED DOCUMENTS

Please refer to the following documents for further information:

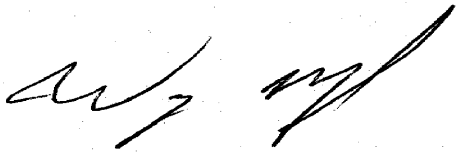
- Edwards and Associated ltd., 2008. Burin Peninsula Regional Waste Management Study (see Appendix B); and
- Stearns and Wheler, June 2010. Burin Peninsula Waste Management Corporation Sources Separated Organics (SSO) Processing Facility Conceptual Evaluation (see Appendix C).

10 SCHEDULE FOR RELEASE FROM ENVIRONMENTAL ASSESSMENT

Construction of this project is scheduled to begin in 2011, with operations anticipated to commence in late 2012/early 2013. In order to meet this proposed scheduling, the requirements of the *Environmental Assessment Act* must be completed as soon as possible.

11 FUNDING

Financing of this project is expected from the Provincial Government of Newfoundland and Labrador, Department of the Environment through *the Newfoundland and Labrador Waste Management Strategy.*



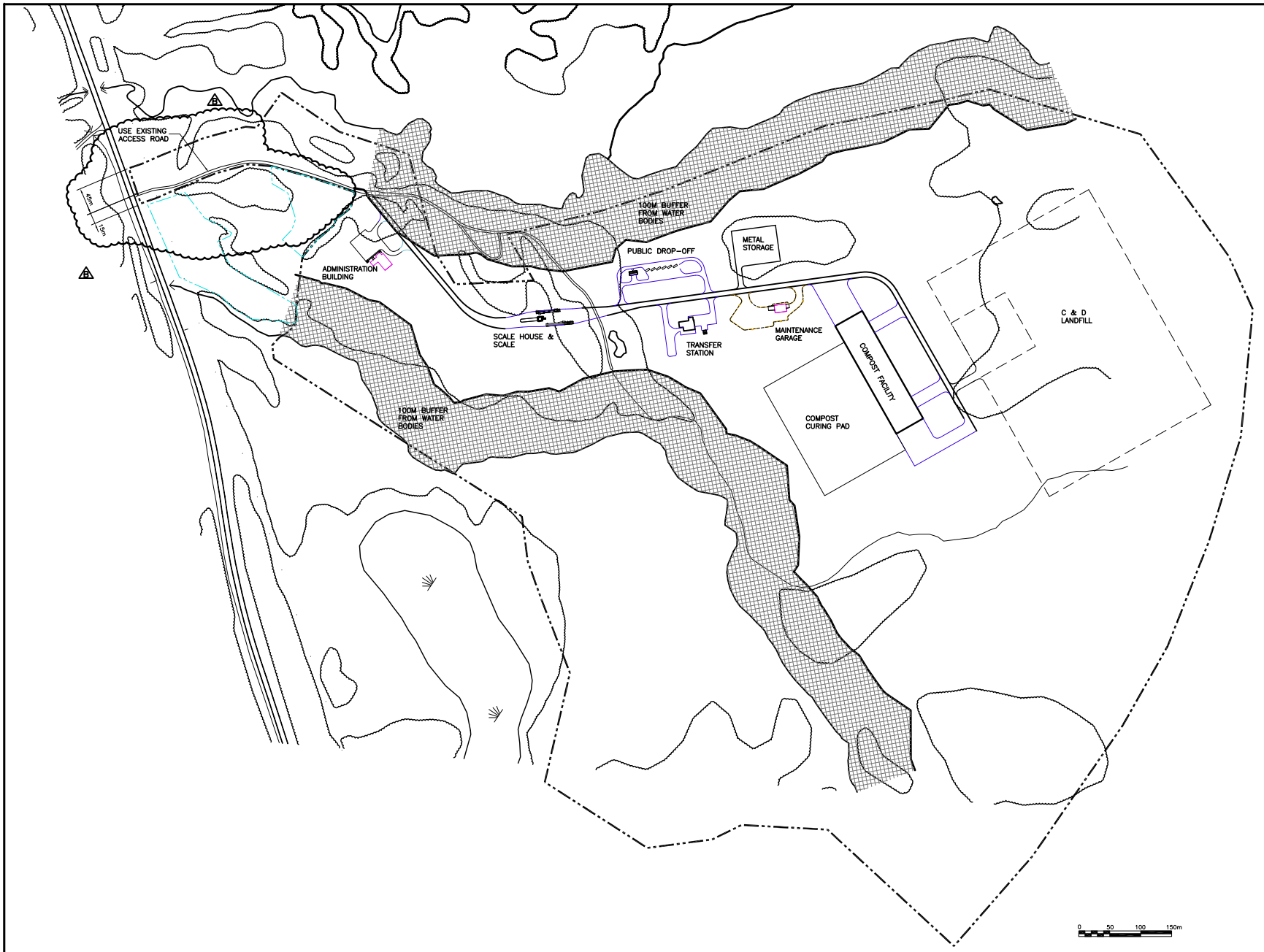
Wayne Manuel, P. Eng.
BAE-Newplan Group Limited

Date
August 25rth 2010

APPENDIX A

Figures and Aerial Photography

CLIENT: Burin Peninsula Waste Management Corporation			
PROJECT: Environmental Assessment Registration			
DRAWING TITLE: Figure 1. Study Region			
SNC·LAVALIN 1133 Topsail Road Mount Pearl, NL A1N 5G2 Tel: (709) 368-0118 Fax: (709) 368-5410			
DESIGNED: AH	DATE: 20/08/10	CHECKED: JS	DATE: 20/08/10
DRAWN: AH	DATE: 20/08/10	APPROVED: MS	DATE: 20/08/10
SCALE: AS SHOWN		PROJECT NO.: 723445	
FILENAME: 723445.Study Region.WOR			



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REV.	REVISIONS	REVISED BY	APP. BY	DATE
B	REVISED FOR CROWN LANDS APPROVALS			10/08/17
A	ISSUED FOR CROWN LANDS APPROVALS			10/08/10

NORTH

PROFESSIONAL STAMP

PERMIT HOLDER STAMP

BAE • NEWPLAN GROUP

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1133 TOPSAIL RD., MOUNT PEARL, NL, A1N 5G2
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CLIENT
BURIN PENINSULA WASTE MANAGEMENT CORPORATION

PROJECT
ENVIRONMENTAL ASSESSMENT REGISTRATION

TITLE
FIGURE 2
SITE PLAN

DESIGNED BY	W.M.	CHECKED BY	JS
DRAWN BY	T.R. & J.B.	APPROVED BY	WM
SCALE	AS SHOWN	DATE	10-08-20
BNG PROJ. No.	723445		
CLIENT PROJ. No.			

DRAWING No. PR1 – XX – CV – XX – 001 REV. B

CLIENT:
BURIN PENINSULA WASTE MANAGEMENT CORPORATION

PROJECT:
ENVIRONMENTAL ASSESSMENT REGISTRATION

DRAWING TITLE:
FIGURE 3 – AERIAL VIEW OF PROPOSED DEVELOPMENT

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REV.	REVISIONS	BY	APP.	DATE

DRAWN:	APPROVED:	DATE:
AH	WM	20/08/10

CLIENT PROJ. NO.	BNG PROJ. NO.
	723445

DRAWING NO.	REV.
PR1–XX–EN–BP–001	

APPENDIX B

Burin Peninsula Regional Waste Management Study, 2008 Final Report

Burin Peninsula Regional Waste Management Study, 2008

Final Report

Submitted To:

Burin Peninsula Waste Management Corporation

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1.0 EXECUTIVE SUMMARY

Edwards and Associates Ltd., in conjunction with CBCL Consulting Engineers, while under contract to the Burin Peninsula Waste Management Corporation conducted an investigation into various waste management strategies for the Burin Peninsula Region, with the goal of recommending a preferred model that would best meet the needs of the area and also contribute towards achieving the broader goals set out in the provincial waste management strategy. Alternatives investigated ranged from a complete independent system, with an engineered landfill, compost facilities, leachate treatment system, etc. to a transfer station system with final waste disposal taking place at either the eastern Newfoundland host site or the central Newfoundland host site.

To design a waste management strategy it is first necessary to determine the volume of waste to be dealt with, which is normally estimated as a function of population, such as waste generation rate per person per day. A review of various statistical data for the region showed a declining and aging population base; however, for the purposes of this report the population demographic was assumed to be constant at 21,233 for the 50 year design period. Without primary research (waste audits, etc.) into waste generation for the region, the project team reverted to secondary research, which indicated a total waste generation rate of 2.12 Kg of waste per person per day. This translates into 16,430 tonnes of waste per year, 57% of which (9,365 tonnes) is being generated from the residential sector.

The waste collection strategy was designed on the premise that the Burin Peninsula Waste Management Corporation would provide residential curb side collection on the same day of each week. Commercial, Industrial and Institutional establishments would be required to transport their wastes to a regional waste management site by their own means and costs; in addition they would be required to conduct at source separation. To facilitate residential waste collection the Burin Peninsula region was divided into five collection zones, balanced out at approximately 2000 dwellings per zone, which provides for an approximate collection time of 0.75 minutes per dwelling. The number and type of

collection vehicles to be used was based on the method of residential source separation being proposed. The 4 Stream system (Garbage, Organics, Fibers and Recyclables), the 2 Stream Wet Dry system and the 2 Stream Co-mingled system (Organics and other waste) were investigated during this project. It was determined that, with respect to collection, either of the 2 stream systems would be more cost effective than the 4 stream system, as a 2 stream system could be implemented with a single pass collection strategy as opposed to a 2 pass per collection cycle strategy associated with the 4 stream system.

Facility requirements, site development costs and operational costs associated with different versions of a modern waste management system were tabulated based on generally accepted industry norms, to facilitate a comparative analysis between the various options investigated as part of this project. Attention was given to site development costs, acquisition of fixed assets, acquisition of collateral assets, employment levels and annual operational costs.

The self contained system based on a 4 Stream source separation proved to be most expensive in all regards. It required extensive site development, created the largest environmental impact and required the greatest number of employees and equipment. The 4 Stream system with local composting and transfer of other waste streams to the eastern Newfoundland host site offered a mid range operational costs alternative, while at the same time providing the region with a high level of environmental stewardship. The 2 Stream Co-mingle system, with local composting, proved to be the most cost effective, while at the same time offering a significant improvement in environmental stewardship, when compared to current day activities.

Based on the analysis conducted it is recommended that the Burin Peninsula Waste Management Corporation:

1. Operate a 2-Stream Co-Mingled at-source separation waste management system, with the first stream being Organics, and the second being comprised of Garbage, Recyclables and Fibers.

2. Implement a weekly, single-pass, residential curb-side collection with dual compartment collection trucks. Waste should be set out in coloured coded disposal bags and collected on the same day each week.
3. Operate a local compost system utilizing a combination of indoor static pile / open field windrow composting methodology.
4. Transfer co-mingled waste to the eastern Newfoundland Host Site, located at Robin Hood Bay, St John's, NL.
5. Contract residential curb side collection and transfer services to private sector companies.
6. Have the ICI sector responsible for collection and disposal of their waste, with at-source separation per the 2 Stream Co-mingled separation strategy.
7. Develop a modern regional waste management site, complete with construction / demolition landfill, transfer station, composting facility, scrap metal storage, etc. The preferred location for this facility has been identified as the Frenchman's Cove Dump Site, which provides a balance, with respect to local travel time, between the populated regions of the Burin Peninsula.
8. Operate 10 roll-on/roll-off collection facilities, which shall be strategically positioned throughout the collection area to help reduce inconvenience to the private citizens involved in construction and demolition activities. Commercial entities involved in such activities would be expected to utilize the waste management site.
9. Design a Transfer Station building to enable a switch from the Co-mingled 2 Stream system to a 4 Stream system with a minimal amount of refit work.
10. Dedicate sufficient resources for public relations and educational activities.
11. Secure sufficient funds, in a timely manner, to have a consultant prepare a detailed project plan, outlining project tasks, project schedule, resource

requirements and responsibility identification to ensure the successful implementation of the waste management strategy.

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Implementation of the above recommendations would result in an annual residential operational cost of $1,811,958, which when passed onto residents of Burin Peninsula, may be expressed as follows:

Cost per person per year	$85
Cost per house per year	$187
Cost per residential tonne per year	$194

Industrial, Commercial and Institutional costs are based on a $60.00 per tonne tipping fee and expected to contribute approximately $299, 475 towards the total operational cost of the waste management system. This operational cost may be expressed as follows:

Cost per business per year	$600.00

The above costs are also based on the premise that the Provincial Government will provide:

- a one time cash injection to cover initial capital;
- an annual operational subsidy to cover transfer trucking cost, outside a 100 Km buffer of the waste management site, to the eastern Newfoundland host site.

It should be noted that operational costs include allowances for equipment replacement, professional development, building maintenance, etc., which will enable the Waste Management Corporation to sustain itself and its operations into the future.

The above recommended strategy is founded on the principle of equity among the citizens of the study area; that is, all citizens pay the same regardless of location. On many occasions regional stakeholders, through consultations, have suggested that this equity principle should be applied provincially, which would imply that all citizens in the Province of Newfoundland and Labrador pay the same unit cost for waste management,

regardless of location. This would mean that a citizen in the most remote community on the Burin Peninsula would pay the same as a citizen who lives in close proximity of the respective host sites.

Implementation of the above recommendations will require a paradigm shift, with respect to waste management practices on the Burin Peninsula. No longer will throwing everything into the back of a truck, dumping it in a pit and burning it be considered as waste management. This became evident during several consultation sessions held on the Burin Peninsula where all agreed that there was need for change; however, many expressed concerns about the cost associated with modern waste management practices. Concerns were also expressed with respect to the proposed revenue generation models, which would see municipal governments becoming responsible for collection of residential waste management fees, either through new taxes or increases in current tax regimes.

2.0 INTRODUCTION

In December, 2007, Edwards and Associates Ltd., in conjunction with CBCL Consulting Engineers, while under contract to the Burin Peninsula Waste Management Corporation commenced a study to investigate feasible waste management options for the Burin Peninsula area. The contract was to be a continuation of work completed by Edwards & Associates Ltd. in March 2003.[1] Under the terms of reference, established by the Corporation, in consultation with the Multi Materials Stewardship Board (MMSB) and the Department of Municipal Affairs, the project team was to investigate several different scenarios for waste management and recommend a preferred waste management strategy for the Burin Peninsula area. Appendix A, "Terms of Reference", presents a copy of the Terms of Reference established for the project. The Department of Municipal Affairs amended the Terms of Reference in September 2008 to have the project team also investigate a 2 Stream Co-Mingled system and to provide a high level investigation of a HotRot Composting system.

Section 3, Environmental Scan, of this report, summarizes the results of research conducted into the demographics of the region, current waste management practices, waste profiles and generation rates. This information was subsequently used in the design of collection strategies and estimation of infrastructure requirements for the various waste management options being considered.

Section 4, Waste Management Options, presents an overview of the waste management options that were to be investigated for the Burin Peninsula area. The primary waste management options investigated during this project included the following:

Option No	Title	Description
1	Independent System	Independent system is a fully self contained waste management system for the Burin Peninsula. This would consist of residential curb side collection, engineered landfill, "In-Vessel" compost facility, materials recovery facility, wood storage, construction and demolition storage, white metal storage, scales, public drop area, house hold hazardous waste collection, leachate treatment area, etc. The proposed system is developed with a 4 stream source separation

[1] Burin Peninsula Regional Waste Management Study, Edwards and Associates Ltd. March 12, 2003

		strategy, with 100% of the service being supplied by corporation staff.
2	4 Stream – Full Transfer to Eastern Host Site	This system is developed on the premise of four stream source separation. Collected waste will be transferred to the waste management site at St. John's. The waste management compound will include a transfer station, wood storage, construction and demolition storage, white metal storage, scales, public drop area, house hold hazardous waste collection. 100% of services are to be supplied by corporation staff.
3	4 Stream Transfer to Easter Host with Local Compost	This system is similar to that described above with the exception that the organic material and a small portion of the fiber material will be composted locally with an "In-Vessel" compost system. It will also include a leachate treatment system for the compost facility. 100% of services to be supplied by corporation staff.
4	2 Stream (Wet / Dry) - Full Transfer to Central Host Site	This system is developed on the premise of two stream source separation (Wet / Dry System). Collected waste will be transferred to the waste management site in central NL. The waste management compound will include a transfer station, wood storage, construction and demolition storage, white metal storage, scales, public drop area, house hold hazardous waste collection, etc. 100% of services to be supplied by corporation staff.
5	2 Stream Transfer to Central Host Site with local compost.	This system is similar to that described above with the exception that the organic material and a small portion of the fiber material will be composted locally with an "In-Vessel" compost system. It will also include a leachate treatment system and a separation system to separate wet trash from organics, destined for the compost facility. 100% of services to be supplied by corporation staff.
3A	4 Stream Transfer to Easter Host with Local Compost-Contracted collection and transportation	This system is similar to Option 3, with the exception that the organic material and a small portion of the fiber material will be composted locally with a "Static Pile/Wind Row" compost system. It will also include a leachate treatment system for the compost facility. Collection and transfer trucking to be contracted out.
4A	2 Stream (Wet / Dry) - Full Transfer to Central Host Site – Collection and Transportation Contracted Out	This system is developed on the premise of two stream source separation (Wet / Dry System), similar to Option 4; the major difference being that collection and transfer trucking will be contracted out. Collected waste will be transferred to the waste management site in central NL. The waste management compound will include a transfer station, wood storage, construction and demolition storage, white metal storage, scales, public drop area, house hold hazardous waste collection.
6	Co-mingled 2 stream system, local compost, transfer other waste to eastern site. Contracted collection and trucking.	2 Stream Co-mingled system with stream 1 being organic materials and stream 2 consisting of recyclables, fibers and garbage, which would be landfilled. The waste management compound would include a transfer station, "Static Pile/Wind Row" compost system, wood storage, construction and demolition storage, white metal storage, scales, public drop area and house hold hazardous waste collection. Residential collection and transfer transportation to be contracted out.
6A	Co-mingled 2 stream system, full transfer to eastern host,	2 Stream Co-mingled system with stream 1 being organic materials and stream 2 consisting of recyclables and garbage, which would be landfilled. The waste management compound would include a transfer station, wood storage, construction and demolition storage,

	contracted collection and trucking.	white metal storage, scales, public drop area and house hold hazardous waste collection. Residential collection and transfer trucking to be contracted out.

Investigation of the various options focused on operational logistics, collection strategies, the cost of operational activities and the costs of infrastructure requirements.

Section 5, Comparative Analysis, provides a comparative analysis between the various waste management options discussed above. The comparison focused on financial considerations, direct employment levels, operational issues, implementation challenges and environmental stewardship.

Other waste management issues such as disposal of bulk items, scrap metals, automobile salvage, etc. are addressed in Section 6, Other Waste Streams, of the report. These items were elaborated on separately, because management of these other waste streams is, to a large part, independent of the residential collection strategy.

Section 7, Conceptual Plan – Waste Management Site, presents a proposed layout for the Burin Peninsula Waste Management Site, to be located near Frenchman's Cove, NL. The layout incorporates all aspects of a modern waste management site, while at the same time utilizing the natural topography of the proposed site as much as possible. Also presented are two different design concepts for the transfer station building, which when reviewed indicates that it would not be a significant refit to switch between a 2 Stream Co-mingled system to a 4 Stream system.

Section 8, Project Schedule, presents a high level list of events and schedules for the same, which must take place in an orderly fashion to have the waste management strategy successfully implemented in a timely manner. This schedule should be elaborated on or supplemented with a detailed project plan, which is outside the scope of this project.

Consultation may well be considered the corner stone to the successful implementation of any strategy that involves an attitude adjustment for the general public. Section 9, Consultation Summary, presents a summary of findings of three consultation meetings held with various municipalities throughout the study area. While many municipal leaders agreed with the concept of waste management and or better environmental stewardship, many expressed concerns with respect to the cost and the logistics of implementing such a system.

Section 10, Conclusions and Recommendations Summary, summarizes many aspects of the project and sets out a series of recommendations, that when acted upon will see the successful implementation of a modern waste management system for the Burin Peninsula.

3.0 ENVIRONMENTAL SCAN

3.1 Provincial Strategy

The Government of Newfoundland and Labrador released a "Waste Management Strategy" [2] for the province in April 2002. In summary the strategy established provincial goals to reach 50% waste diversion from landfill sites by 2010, to reduce the number of sites by 80%, to eliminate volume reduction open burning by 2005 and to phase out unlined landfills by 2010.

The province established five primary actions to accomplish its goals, which included increased waste diversion, establishing waste management regions, developing modern standards and technology, and maximizing the economic and employment opportunities and public education.[3]

Under the hypothesis of regional cooperation the provincial government delineated 15 regional waste management zones in the province, with the Burin Peninsula Area being one of these. The strategy envisioned that with a greater focus on waste diversion, not all regions in the province will require a final waste disposal site; as such, 3 host sites have been identified for this purpose, which include the Eastern Disposal Region, the Central Disposal Region and Western Disposal Region.

The Eastern and Central Regions are of interest to the Burin Peninsula Area as one or the other of these would become the host site for this region, should a transfer station option prove to be most viable. Discussions with representatives from these two regions have indicated that the Eastern Host Site will be located at Robin Hood Bay near St. John's, while the Central Host Site will be located near Norris Arm, approximately midway between Gander and Grand Falls Winsor.[4]

[2] Newfoundland and Labrador Waste Management Strategy, April 2002, Government of Newfoundland and Labrador, Department of Environment
[3] Ibid
[4] Mr. Ed Evans, Central Region; Mr. Jason Sinyard, Eastern Region.

3.2 Geographic Extent of Burin Peninsula Waste Management Area

The study area covers a major portion of the Burin Peninsula and stretches a far north as the Monkstown Road intersection with Route 210, Burin Peninsula Highway, an area of approximately 4000 square kilometers. Figure 1, Burin Peninsula Waste Management Area, graphically presents the extent of the management area, with larger municipalities and transportation networks being shown to assist with orientation.

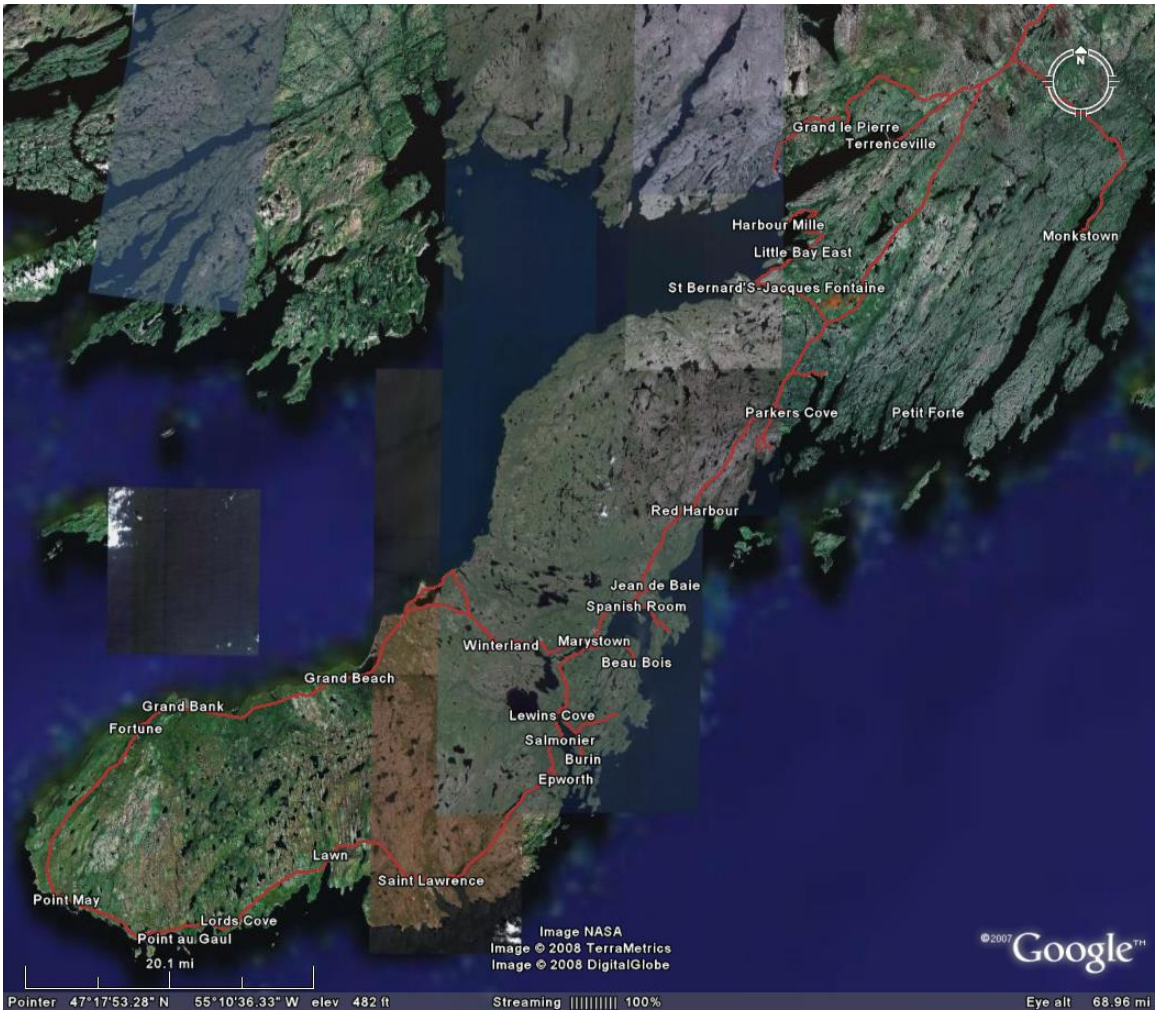


Figure 1, Burin Peninsula Waste Management Area

3.3 Regional Demographic Profile

"The demographics of the Burin Peninsula region have changed significantly over the past 20 years."[5] There has been a decline in total births while at the same time total deaths remain fairly constant, resulting in a negative natural population growth. Impacts of negative natural population change have been further enhanced by out-migration, resulting from "challenges in the fishery and manufacturing industries, and the increased number of attractive high paying jobs in other provinces, particularly Alberta."[6]

As a result of a falling natural population and out-migration the population on the Burin Peninsula has decreased over the past number of years. Population for the study area was determined to be 23,391 in 2001,[7] while an examination of the 2006 Census Canada[8] data coupled with personal interviews of various municipal representatives has determined the current population to be 21, 233. This represents a 9% decrease in population over a 5 year period, or an annual decrease of 1.8%.

On further review of the population statistics for the Burin Peninsula area it becomes apparent that the region is not only experiencing a decrease in population, it is also experiencing a change in the demographic; that is, a greater percentage of the area population falls within an age range of 50-60 years. Typically, this age group would generate less waste than a younger population and their waste generation patterns would be somewhat different than a young working couple, with one or two small children.

Applying the above negative trends in population over a fifty year period would not be practical as it would result in a zero population base for the region. This is not likely given the industrial base and the diverse economy that exist in the region. A conservative approach, in terms of waste generation, would be to assume that the population of the

[5] Regional Demographic Profiles Newfoundland and Labrador, November 2007, Economics and Statistics Branch, Dept. of Finance, Government of Newfoundland and Labrador
[6] Ibid
[7] Burin Peninsula Regional Waste Management Study, March 2003, Edwards and Associates Ltd.
[8] Statistics Canada Web Search

Burin Peninsula will, at least, remain constant for the study period (50 years). It is quite possible that there may be a shift in population from smaller municipalities to larger central municipalities; however, overall net population change for the region will be minimally impacted.

Table1, Burin Peninsula Population 2007, presents a summary of the population distribution in the region.

Table 1, Burin Peninsula Population 2007

Municipality	Population	Dwellings
Grand Bank (includes L'Anse au Loup)	2,580	1,197
Grand Beach	70	25
Fortune	1,458	779
Lord's Cove	207	94
Point May	260	115
Point au Gaul	85	41
Lawn	705	294
Taylor's Bay	5	5
St. Lawrence	1,349	589
Little St. Lawrence	132	94
Lamaline	300	145
Lewin's Cove	566	240
Big Salmonier / Epworth	250	125
Burin	2,483	1,119
Fox Cove-Mortier	331	135
Frenchman's Cove	166	146
Garnish	578	309
Winterland	337	176
Marystown (Part of Creston South)	600	200
Marystown (less part of Creston South)	4,836	2,203
Beau Bois	54	19
Rock Harbour	60	30
Spanish Room	131	53
Jean De Baie	150	50
Baine Harbour	134	73
Parker's Cove	308	123
Red Harbour	170	85
Rushoon	319	139
Boat Harbour	185	62
Brookside	63	28
Petit Forte	90	27
South East Bight	110	36
Monkstown	30	25

Little Bay East	140	66
St. Bernard's - Jacques Fontaine	525	228
Bay L'Argent	287	148
Harbour Mille / Little Harbour East	220	84
Terrenceville	526	224
English Harbour East	169	64
Grand Le Pierre	264	92
Total	**21,233**	**9687**

The figures presented in Table 1, Burin Peninsula Population 2007, will be used in the design of the waste management facilities and collection system for the Burin Peninsula.

An analysis of the demographic figures shows a population to dwelling ratio of 2.2 : 1; that is, 2.2 persons per household. Using the estimate of 4000 square kilometers for the service area, the population density may be expresses as 5.3 persons per square kilometer; alternatively, the dwelling density may be expressed as 2.4 dwellings per square kilometer. The relatively low densities of the service area present unique challenges in the design of a waste management system. It is anticipated that this will cause the cost per dwelling, or the cost per person, to be comparatively high.

3.4 Current Waste Management Practices

For the most part, waste management practices on the Burin Peninsula can be divided into two basic categories, Dump-site Operations and Collection Operations. The remainder of this section will deal with each of these separately.

3.4.1 Dump-site Operations

Many of the dump-sites located on the Burin Peninsula are in close proximity to neighboring towns or highways, and typically consist of an open pit arrangement with varying degrees of waste separation. It is not uncommon to see, or smell, smoke pluming from these sites as the waste is burned, either by the operators for volume reduction or by "scrapers" burning off scrap metal. These sites are normally serviced with uncontrolled gravel access roads, have little or no fencing to control wind swept debris and minimal

security to ensure the proper operations of the sites. Note, there are exceptions to the scenario previously presented and these exceptions normally occur where volume is sufficient to warrant a full time attendant.

There is a small degree of regionalization, however there still remains 20 individual dump-sites, or expressed another way, one dump site for every 1000 people. Table 2, Current Waste Management Sites and Capacities (2003),[9] presents a summary of the site locations, estimated remaining capacities and the list of municipalities served by each dump-site.

[9] Burin Peninsula Regional Waste Management Study, March 2003, Edwards and Associates Ltd.

Table 2, Current Waste Management Sites and Capacities (2003)									
	Position (NAD 27) UTM Z-21		Capacity	Municipalities Serviced					
DISPOSAL SITE	Northing	Easting	Years	1	2	3	4	5	6
Burin (White Metals)	5208925	638850							
English Hr. East	5283296	661935	10+	English HR. East					
Epworth	5212268	635232	5+	Epworth-Salmonier	Lewin's Cove				
Fortune Bay East	5263448	663370	10	Bay L'Argent	St. Bernards-J.F.	Harbour Mille	Little Bay East	Brookside / Boat Hr.	
Fox Cove	5214861	642483	?	Fox Cove- Mortier					
Frenchman's Cove	5226261	618656	50+	Frenchman's Cove	Grande Beach				
Garnish	5228634	624247	50	Garnish					
Grand Bank	5214430	604094	50+	Grand Bank	Fortune	Burin			
Grand Le Pierre	5286711	667752	10	Grand Le Pierre					
Lamaline	5190579	589104	20+	Lamaline					
Lawn	5198443	609992	10+	Lawn					
Marystown	5235955	644610	10	Marystown	Spanish Room	Rock HR.	Beau Bois	Red Harbour	Jean De Baie
Monkstown			?	Monkstown					
Point Au Gaul	5191982	598960	10	Point Au Gaul	Lord's Cove				
Point May	5197094	579326	10	Point May					
Rushoon	5249984	658392	10	Rushoon	Petite Forte	Baine HR.	Parker's Cove	Brookside / Boat Hr.	
Southeast Bight			?	Southeast Bight					
St Lawrence	5199282	622599	2	St. Lawrence	Little St. Lawrence				
Terrenceville	5282297	672648	20	Terrenceville					
Winterland	5222971	627901	20	Winterland					

3.4.2 Residential Collection

Many of the municipalities in the Burin Peninsula area offer curb side residential waste collection, normally on a weekly basis. Table 3, Collection System Summary (2003),[10] presents a review of the collection systems that were employed in 2003. It is not unreasonable to assume that similar practices continue today, given that there have not been any significant changes in population or service levels since that time. A review of previous waste management reports for the region[11] revealed the following synopsis of the domestic collection systems.

- On average 24 % of the collection time is spent traveling to and from the various dumpsites.
- There is a wide variety of equipment employed in the collection system (compactor trucks to pick up trucks and everything in between)
- On average each carrier makes 3 trips per week to the respective dumpsites.
- The average one way haul distance is 9.95 Km.
- The average round trip haul time is 0.8 hours.

In addition to the above each municipality typically offers one clean-up week per year (normally Spring time), a period of time when residents are encouraged to clean up around their homes and the respective municipalities offer daily curb side collection of both large and small debris.

3.4.3 Other Waste Streams

The Burin Peninsula Area, as like any other populated area, generates a variety of waste which include construction and demolition (C&D) waste, industrial commercial and institutional (ICI) waste, household hazardous waste, car wrecks, scrap metal, tires, etc. Strategies to deal with each on these waste streams were discussed in a previous report by Edwards & Associates[12] and will be dealt with again in subsequent sections of this report.

[10] Burin Peninsula Regional Waste Management Study, March 2003, Edwards and Associates Ltd.
[11] Ibid
[12] Ibid

Tablle 3 - Collections System Summary (2003)											
DISPOSAL SITE	MUNICIPALITY	COLLECTOR	TYPE OF TRUCK	HAUL DISTANCE (km)	HAUL TIME / TRIP	TOTAL COLLECTION TIME/ WEEK	WORK FORCE	FREQ. PICK UP	TRIPS PER WEEK	NO. HOUSES	% TIME COLLECTION
Rushoon	Baine HR.	Contractor	Pick-up	5	0.5	8	2	Weekly	3	60	19%
Fortune Bay East	Bay L'Argent	Contractor	Stake Body	15	1	8	2	Weekly	1	140	13%
Marystown	Beau Bois	Contractor	Pick-up	22	1	4	1	Weekly	1	18	25%
Unknown	Boat HR.- Brookside	Own	Unknown	5	0.5					90	
Grand Bank	Burin	Contractor	25 yd. Compactor	50	2	24	3	Weekly	3	1097	25%
English Hr. East	English HR. East	Contractor	Pick-up	2	0.5	8	2	Weekly	5	65	31%
Epworth	Epworth- Salmonier	Contractor	Stake Body	4	0.5	4	2	Weekly	1	90	13%
Grand Bank	Fortune	Council	Single Axle Dump	15	1.5	16	?	Weekly	?	650	
Fox Cove	Fox Cove- Mortier	Council	Pick-up	5	0.5	8	2	Weekly	5	139	31%
Frenchman's Cove	Frenchman's Cove	Contractor	Pick-up	6	0.5	8	2	Weekly	4	85	25%
Garnish	Garnish	Council	Single Axle Dump	5	0.5	8	2	Weekly	3	292	19%
Grand Bank	Grand Bank	Council	Inter. Leach Compactor	10	1	24	2	Weekly	3	1130	13%
Grand Le Pierre	Grand Le Pierre	Contractor	Pick-up	3	0.5	12	2	Weekly	?	80	
Frenchman's Cove	Grande Beach	Contractor	Pick-up	20	1	8	2	Weekly	1?	35	
Fortune Bay East	Harbour Mille	Contractor	Stake Body	30	1.5	8	2?	Weekly	1	68	19%
Marystown	Jean De Baie	Contractor	Pick-up	10	1	8	2?	Weekly	1	65	13%
Lamaline	Lamaline	Council	Pick-up	2	0.5	8	2?	Weekly	4	161	25%
Lawn Dump	Lawn	Contractor	Pick-up	3	0.5		2	Weekly	10	280	
Epworth	Lewin's Cove	Contractor	Stake Body	6	0.5	4	2	Weekly	2	200	25%
Fortune Bay East	Little Bay East	Contractor	Stake Body	18	1	4	2?	Weekly	1	60	25%
St Lawrence	Little St. Lawrence	Contractor	Pick-up	5	1	4?	1?	Weekly	2	55	
Point Au Gaul	Lord's Cove	Contractor	Pick-up	2	0.5			Weekly		90	
Marystown	Marystown	Council	25 yd. Compactor	20	1	40	3	Weekly	10	2125	25%
	Monkstown	Contractor	Pick-up	2	0.5	4	1	Weekly	2		25%
Rushoon	Parker's Cove	Contractor	Pick-up	8	1			Weekly		115	
Rushoon	Petite Forte	Contractor	Pick-up	40	1.5	8	2?	Weekly	2?	32	
Point Au Gaul	Point Au Gaul	Contractor	Pick-up	2	0.5			Weekly		35	
Point May	Point May	Council	Pick-up	1	0.5	8	2?	Weekly	4	105	25%
Marystown	Red Harbour	Contractor	Pick-up	8	1	8	2?	Weekly	3	80	38%
Marystown	Rock HR.	Contractor	Pick-up	15	1	4	1	Weekly	1	34	25%
Rushoon	Rushoon	Contractor	Pick-up	5	0.5	8	2	Weekly	3	140	19%
Southeast Bight	Southeast Bight	Contractor	Pick-up	1	0.5			Weekly			
Marystown	Spanish Room	Contractor	Pick-up	10	1	8	2	Weekly	2	135	25%
Fortune Bay East	St. Bernards-J.F.	Contractor	Stake Body	8	1	8	2	Weekly	2	200	25%
St Lawrence	St. Lawrence	Council	Single Axle Dump	2	0.5	16	3	Weekly	7	550	22%
Terrenceville	Terrenceville	Council	Pick-up	2	0.5	8	2	Weekly	7	225	44%
Winterland	Winterland	Contractor	Pick-up	1	0.5	8	2	Weekly	4	100	25%
Average Values				9.95	0.80				3	8826	24%
	NOTES:										
	Haul distance is one way from center of service area to dumpsite.										
	Haul time includes time at the dump site										

3.5 Regional Waste Profile

In order to determine the size of the various facilities required, a regional waste profile must first be developed. This profile will provide information on:

- the amount of solid waste that is expected to be generated over the next 50 years;
- the breakdown of the waste generated by the residential sector and the ICI sector; and
- the amount of waste that can be diverted from the landfill by various recycling and diversion programs.

The waste profile calculations included here are based on 2004 and 2006 statistical data from Statistics Canada.

3.5.1 Population Assumption

As was presented in a previous report for the region, Burin Peninsula Regional Waste Management Study,[13] and confirmed again from research for this report, the population of the region has been declining over the last number of years; however, for the purposes of estimating waste volume for the fifty year life expectancy of the waste management strategy, it has been assumed that the levels will remain as they are for the design life of the project. Section 3.3, Regional Demographic Profile, of this report states that the population of the region has been determined to be 21,233.

The regional waste profile calculation will be based on a stable population of 20,000 residents. Facility requirements and collection strategies etc. utilized the actual population statistic of 21,233.

3.5.2 Waste Generation Assumption

The Statistics Canada Waste Management Survey[14], provided a synopsis of information gathered on the waste management activities undertaken by companies, local

[13] Burin Peninsula Regional Waste Management Study, Final Report, Edwards and Associates Ltd., March 2003.
[14] Waste Management Industry Survey: Business and Government Sectors, 2004, Statistics Canada, February 2007.

governments and other public waste management bodies, which indicated that in the year 2004, the province of Newfoundland and Labrador disposed of 400,048 tonnes of municipal solid waste. This amount includes non-hazardous residential and ICI waste, including C&D waste. Table 4, Disposal of Municipal Solid Waste in Newfoundland and Labrador in 2004,[15] below provides a breakdown of the residential and ICI waste values for 2004 and also identifies the amount of waste generated per person per day.

Table 4 – Disposal of Municipal Solid Waste in Newfoundland and Labrador in 2004[16]

	Total Waste Disposed (Tonnes)	Percentage	Waste Disposed per Capita (kg/person/day)
Residential waste	228,004	57%	1.21
ICI waste (including C&D)	172,044	43%	0.91
Total waste	400,048	100%	2.12

The 2.12 kg/person/day generation rate agrees well with data provided by the USEPA in their most recent municipal solid waste generation data[17] for 2006. According to this report, the average municipal waste generation in the US is 2.09 kg/person/day.

The waste generation rate of 2.12kg/person/day can be further substantiated as follows:

- Town of Marystown reports that their 18m^3 compactor truck makes 8 trips per week to their waste disposal site, with residential waste. Using a conservative bulk density estimate of compacted waste of 400kg/m^3 and an approximate population of 5400 yields a residential waste generation rate of 1.5 kg/p/d, which

[15] Waste Management Industry Survey: Business and Government Sectors, 2004, Statistics Canada, February 2007.
[16] Waste Management Industry Survey: Business and Government Sectors, 2004, Statistics Canada, February 2007.
[17] Municipal Solid Waste Generation, Recycling and Disposal in the United States: Facts and Figures for 2006, EPA-530-F-07-030, United States Environmental Protection Agency, November 2007

is slightly higher than that shown in Table 4, Disposal of Municipal Solid Waste in Newfoundland and Labrador in 2004. Similar results may be derived from waste collection data for the Town of Burin.

- An analysis of figures presented in Section 1.3 of a Gartner Lee report[18] prepared for the City of St. John's, shows that on review of 2006 receipts for Robin Hood Bay one may estimate a total per capital waste generation rate of 2.15 kg/p/d, which again is only slightly higher than the figures shown in Table 4, Disposal of Municipal Solid Waste in Newfoundland and Labrador in 2004.

For the purpose of this report a waste generation rate of 2.12 kg/person/day will be used to calculate total waste volume for the region, for the 50 year life of the project.

3.5.3 Calculation of Waste Volume to be Landfilled

It has been observed over a number of years, that although Canadians have been diverting more waste from landfills, they have also been generating more waste each year. This is considered to be partly due to changing consumer preference towards disposal and convenience items. However, due to the fact that the population of this region is declining, it was decided that the increase in waste generation will be offset by the decline in population; hence, the population and waste generation rates were assumed to be constant for the fifty year life of the project.

Applying a waste generation rate of 2.12 kg/person/day to 20,000 persons for a 50 year period resulted in an estimate of 773,800 tonnes of municipal waste generated in the region, over for that period of time. To determine the amount of waste that will be landfilled, it was assumed that in year one of the program (2009), 10% of the municipal waste stream would be diverted from the landfill. This was then assumed to ramp up to a

[18] PART A : Waste Tonnage and Composition, City of St. John's, Gartner Lee et al, Supplied by Cory Grandy, Department of Municipal Affairs.

diversion rate of 50%[19] over the next 4 years. Based on this assumption, it is estimated that 402,000 tonnes of solid waste will require landfill disposal over the next 50 years. The calculation results are summarized in Table 5, Municipal Solid Waste Generation Projection for 50 Years.

Table 5 - Municipal Solid Waste Generation Projection for 50 Years

	2009	2010	2011	2012	2013	……	2058	50 Year total (tonnes)
Population Estimate	20,000	20,000	20,000	20,000	20,000	……	20,000	
Waste Generation Estimate (kg/cap/day)	2.12	2.12	2.12	2.12	2.12	……	2.12	
Waste Generation per Year (tonnes)	15,476	15,476	15,476	15,476	15,476	……	15,476	773,800
Diversion Rate from Landfill (%)	10%	20%	30%	40%	50%	……	50%	
Waste Going to Landfill (tonnes)	13,928	12,381	10,833	9,286	7,738	……	7,738	402,376

The Burin Peninsula region will generate 773,800 tonnes of waste during the next 50 years, with 402,376 tonnes (phased in 50% diversion over 5 years) requiring landfill disposal.

3.5.4 Breakdown of Residential and ICI Waste

According to the Statistics Canada Waste Management Survey, as summarized in Table 4 – Disposal of Municipal Solid Waste in Newfoundland and Labrador in 2004, the breakdown of municipal solid waste is 57% residential and 43% ICI. The composition of this waste becomes important in planning a waste diversion strategy, which will meet the 50% diversion objective set out in the provincial strategy.

[19] 50 % diversion required only if the local region develops a landfill site – % of local diversion may be less if tied into one of the host sites for eastern of central Newfoundland, personal interview Cory Grandy, November 2008.

3.5.4.1 Composition of the Residential Waste Stream

Without primary research, such as a Burin Peninsula Waste Audit, the composition of waste for the region is estimated through secondary research, which includes interpretation of external waste audit data. A number of recent waste reports were consulted to determine the typical residential waste breakdown. These reports included:

1. *Waste Generation Data for Green Bay Area and Conception Bay North from Burin Peninsula Regional Waste Management Study*, Final Report, Edwards and Associates Ltd., March 2003;
2. *Waste Management Strategy*, Department of Environment, Newfoundland and Labrador, April 2002;
3. *Human Activity and the Environment*, Annual Statistics 2005, Feature Article: Solid Waste in Canada, Statistics Canada, November 2005;
4. *Markham's Mission Green Program*, Waste Audit Results, Fall 2004, RIS International Ltd., February 2005;
5. *Municipal Solid Waste Generation, Recycling and Disposal in the United States*: Facts and Figures for 2006, EPA-530-F-07-030, United States Environmental Protection Agency, November 2007; and
6. *City of Calgary 1999 Residential Waste Composition Study*, CH2M Gore & Storrie Ltd., and ENVIROSIS.

Figure 2, Residential Waste Composition for the Burin Peninsula, presents a pie chart representation of the residential waste composition for the project area.

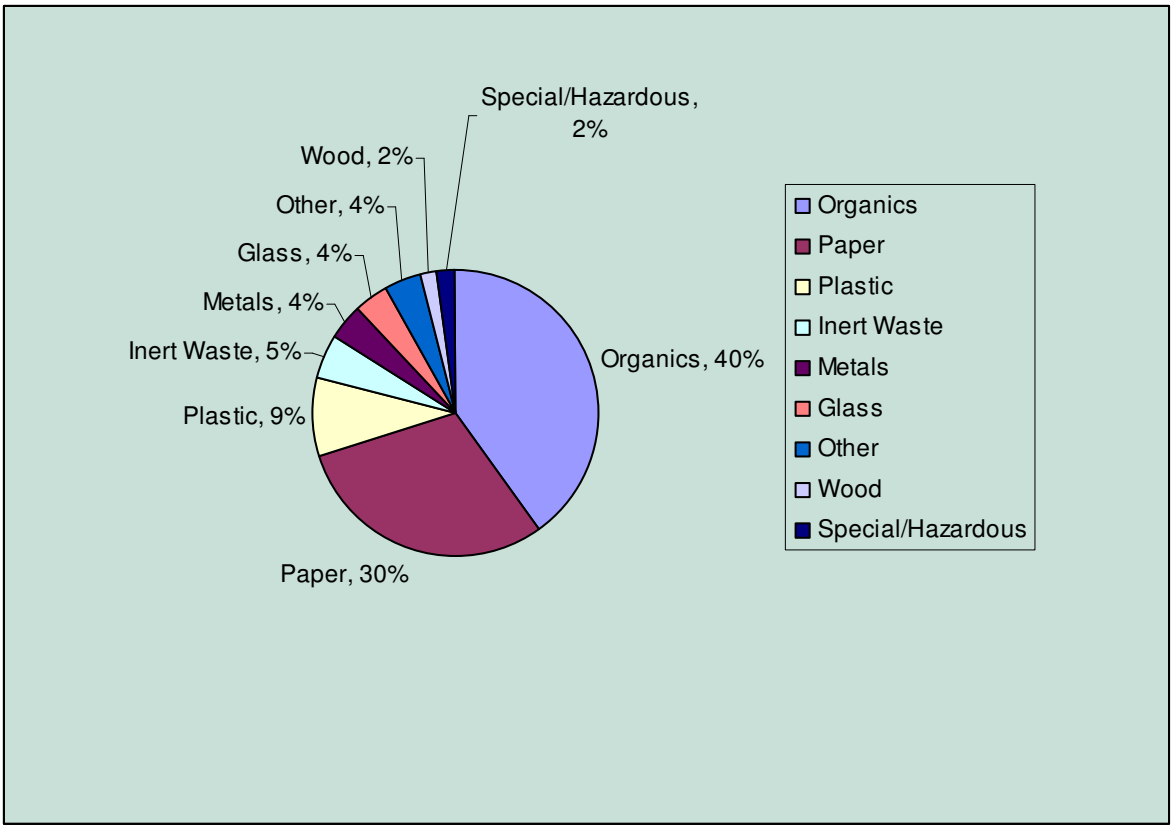


Figure 2 – Residential Waste Composition for the Burin Peninsula

3.5.4.2 Composition of the ICI Waste Stream (including C&D Waste)

To determine the waste of the institutional, commercial and industrial sectors, ICI sector breakdown data from Metropolitan Toronto's Solid Waste Environmental Project (SWEAP)[20] was used. This data was integrated with 2004 employment data from Statistics Canada for the project area and with collected summary information on the local ICI sectors to calculate weighted averages for the individual ICI sectors. Appendix B, ICI Composition – Burin Peninsula, presents a summary of the ICI composition on the Burin Peninsula as determined by primary research with each municipality in the region. Figure 3, ICI Waste Composition for the Burin Peninsula, presents a pie chart representation of the ICI waste stream for the Burin Peninsula area.

[20] SWEAP Solid Waste Environmental Assessment Plan Component 4: Solid Waste Management System Inventory, Metropolitan Toronto Department of Works (MTO), 1991.

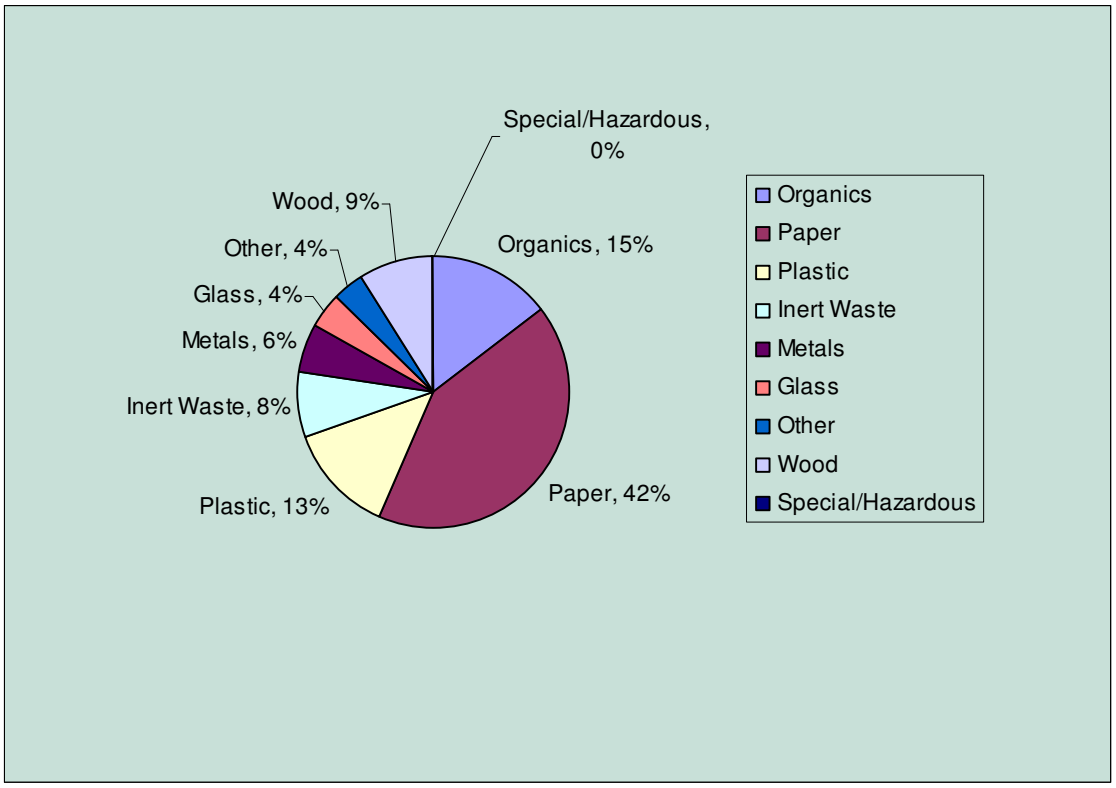


Figure 3–ICI Waste Composition for the Burin Peninsula

3.5.4.3 Composition of the Total Waste Stream for Burin Peninsula

Combining data from the residential and ICI waste estimates in the preceding sections and utilizing the residential/ICI percentages from the Statistics Canada data, the estimated waste profile was developed for the Burin Peninsula. Figure 4, Solid Waste Profile for the Burin Peninsula, presents a pie chart representation of the composition of the solid waste stream for the Burin Peninsula area.

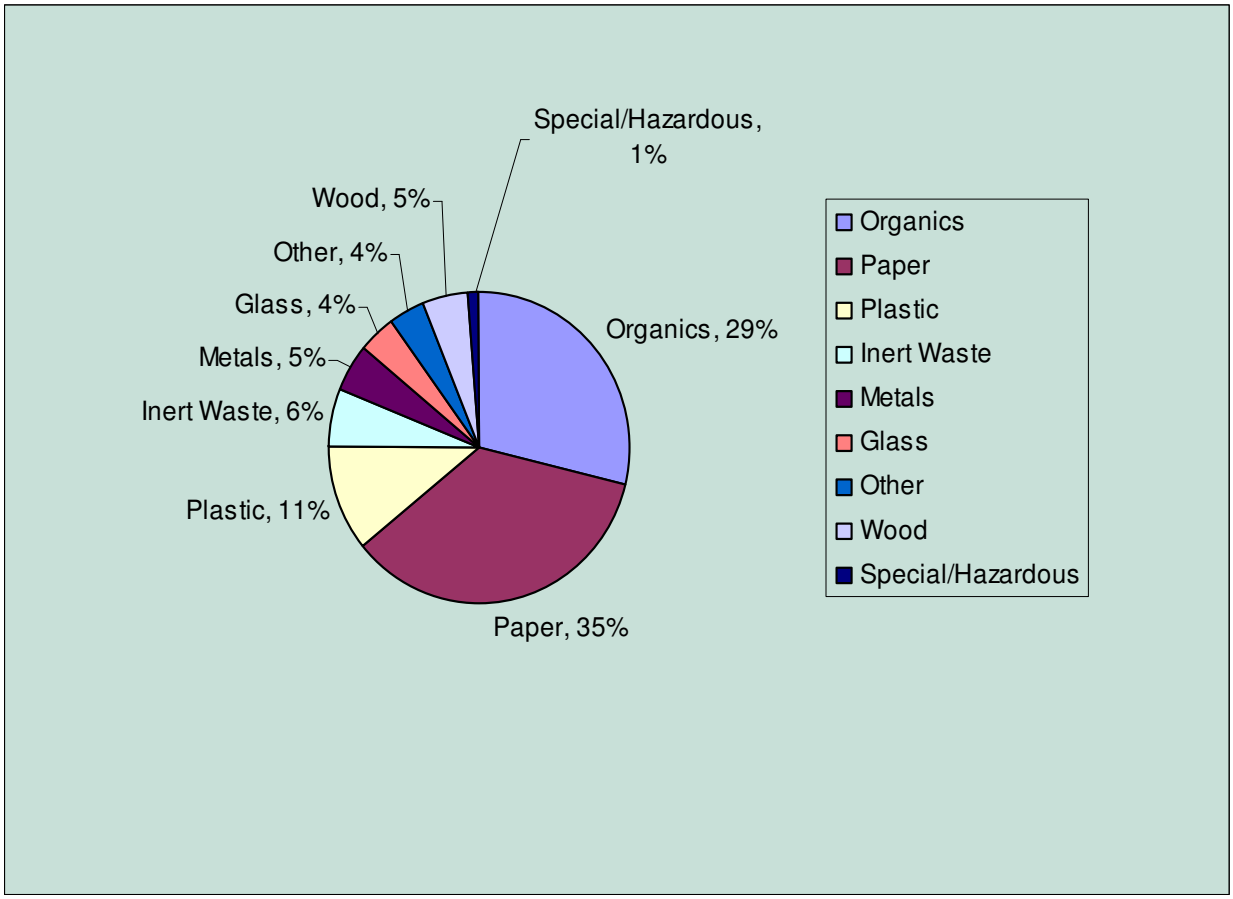


Figure 4 –Solid Waste Profile for the Burin Peninsula

Utilizing information from the waste profile presented in Figure 4, Solid Waste Profile for the Burin Peninsula, and the projected waste generation rate of 2.12 kg/person/day, calculated earlier in this report, the projected tonnage for each waste stream was determined for the next 50 years.

Table 6, Solid Waste Generation Projection for 50 Years Based on Various Waste Streams, presents a tabular summary, expressed in weight (metric tonnes), of the waste profile presented in Figure 4, Solid Waste Profile for the Burin Peninsula.

	2009	2010	2011	2012	2013	……	2058	50 Year total (tonnes)
Population estimate	20,000	20,000	20,000	20,000	20,000	……	20,000	
Recycling (tonnes)						……		
Paper	5,417	5,417	5,417	5,417	5,417	……	5,417	270,830
Plastic	1,702	1,702	1,702	1,702	1,702	……	1,702	85,118
Metals	774	774	774	774	774	……	774	38,690
Glass	619	619	619	619	619	……	619	30,952
Composting (tonnes)						……		
Organics	4,488	4,488	4,488	4,488	4,488	……	4,488	224,402
C&D Waste (tonnes)						……		
Inert Waste	929	929	929	929	929	……	929	46,428
Wood	774	774	774	774	774	……	774	38,690
HHW (tonnes)						……		
Special/Hazardous	155	155	155	155	155	……	155	7,738
Other						……		
Other	619	619	619	619	619	……	619	30,952

Table 6 – Projected Solid Waste Generation Projection for 50 Years Based on Various Waste Streams

57% 0f the total waste generated on the Burin Peninsula originates from residential properties, 40% of which is made up of organics, which for the most part could be removed from the waste stream by backyard composting.

4.0 WASTE MANAGEMENT OPTIONS

4.1 Overview of Waste Management Options

The seven waste management options, ranging from a fully independent system to a full transfer facility, that have been investigated for the Burin Peninsula area are as presented in Table 7 – Waste Management Options.

Table – 7 Waste Management Options

Option No	Title	Description
1	Independent System	Independent system is a fully self contained waste management system for the Burin Peninsula. This would consist of residential curb side collection, engineered landfill, "In-Vessel" compost facility, materials recovery facility, wood storage, construction and demolition storage, white metal storage, scales, public drop area, house hold hazardous waste collection, leachate treatment area, etc. The proposed system is developed with a 4 stream source separation strategy, with 100% of the service being supplied by corporation staff.
2	4 Stream – Full Transfer to Eastern Host Site	This system is developed on the premise of four stream source separation. Collected waste will be transferred to the waste management site at St. John's. The waste management compound will include a transfer station, wood storage, construction and demolition storage, white metal storage, scales, public drop area, house hold hazardous waste collection. 100% of services are to be supplied by corporation staff.
3	4 Stream Transfer to Easter Host with Local Compost	This system is similar to that described above with the exception that the organic material and a small portion of the fiber material will be composted locally with an "In-Vessel" compost system. It will also include a leachate treatment system for the compost facility. 100% of services to be supplied by corporation staff.
4	2 Stream (Wet / Dry) - Full Transfer to Central Host Site	This system is developed on the premise of two stream source separation (Wet / Dry System). Collected waste will be transferred to the waste management site in central NL. The waste management compound will include a transfer station, wood storage, construction and demolition storage, white metal storage, scales, public drop area, house hold hazardous waste collection, etc. 100% of services to be supplied by corporation staff.
5	2 Stream Transfer to Central Host Site with local compost.	This system is similar to that described above with the exception that the organic material and a small portion of the fiber material will be composted locally with an "In-Vessel" compost system. It will also include a leachate treatment system and a separation system to separate wet trash from organics, destined for the compost facility. 100% of services to be supplied by corporation staff.
3A	4 Stream Transfer to Easter Host with Local Compost-Contracted collection and transportation	This system is similar to Option 3, with the exception that the organic material and a small portion of the fiber material will be composted locally with a "Static Pile/Wind Row" compost system. It will also include a leachate treatment system for the compost facility. Collection and transfer trucking to be contracted out.
4A	2 Stream (Wet /	This system is developed on the premise of two stream source

	Dry) - Full Transfer to Central Host Site – Collection and Transportation Contracted Out	separation (Wet / Dry System), similar to Option 4; the major difference being that collection and transfer trucking will be contracted out. Collected waste will be transferred to the waste management site in central NL. The waste management compound will include a transfer station, wood storage, construction and demolition storage, white metal storage, scales, public drop area, house hold hazardous waste collection.
6	Co-mingled 2 stream system, local compost, transfer other waste to eastern site. Contracted collection and trucking.	2 Stream Co-mingled system with stream 1 being organic materials and stream 2 consisting of recyclables, fibers and garbage, which would be landfilled. The waste management compound would include a transfer station, "Static Pile/Wind Row" compost system, wood storage, construction and demolition storage, white metal storage, scales, public drop area and house hold hazardous waste collection. Residential collection and transfer transportation to be contracted out.
6A	Co-mingled 2 stream system, full transfer to eastern host, contracted collection and trucking.	2 Stream Co-mingled system with stream 1 being organic materials and stream 2 consisting of recyclables and garbage, which would be landfilled. The waste management compound would include a transfer station, wood storage, construction and demolition storage, white metal storage, scales, public drop area and house hold hazardous waste collection. Residential collection and transfer trucking to be contracted out.

The evaluation criteria employed to rank the above noted options included the following:

- Efficient waste management service for the Burin Peninsula area.
- Emphasis to be placed on job creation and provision of in-house services (per request of the Burin Peninsula Waste Management Corporation).
- Cost comparisons were to be broken down to an annual cost per house and annual cost per person to sustain the waste management plan.
- Development and capital costs were to be based on realistic rates, which would provide reasonable project estimates. Appendix C, Unit Price Table, presents a listing of unit prices used to generate cost estimates for the various options presented above.
- In – house labour costs were to reflect current rates paid by various municipalities in the region.
- Operational costs were to include sufficient allowances to enable the Burin Peninsula Waste Management Corporation to sustain itself and the infrastructure needed to fulfill its mandate.

- Revenue models were to include a subsidy from the Provincial government to cover the cost of transfer trucking anywhere outside a 100km buffer of the waste management site. Appendix I, Transfer Costs – Various Options, presents a summary on how this subsidy was computed for the various options. Appendix E, Revenue Models – Various Options, presents a summary of the transportation subsidy.

- Nominal values were employed for the lengths of the access road and the onsite roads, with the assumption that a full road build would be required. Appendices N and O present construction estimate for the Access Road and Onsite Roads respectively.
- Realistic building sizes were employed and held consistent for comparisons between various options. The following appendices present a summary of the building estimates:
    - Appendix P Recycling / Transfer Building
    - Appendix R Scale House and Household Hazard Waste Storage
    - Appendix S Administration Facility
    - Appendix T Maintenance Building Estimate
    - Appendix U Public Drop Area

4.2 Collection Strategies

The overall collection strategy for the Burin Peninsula Area is based on the assumption that the Burin Peninsula Waste Management Corporation will be responsible for all residential curb side collection. Industrial, Commercial and Institutional establishments will be responsible for getting their waste to the waste management facility on their own accord. To facilitate residential collection, the Burin Peninsula area was divided into 5 collection zones.

The Burin Peninsula Waste Management Corporation will be responsible for Residential Curb Side Collection. Industrial, Commercial and Institutional establishments will be responsible for getting their waste to the waste management site.

Figure 5, Collection Zones, presents a graphical representation of the five collection zones. These zones were designed with the following criteria in mind;

- Curb side collection based on source separation either along a four stream or two stream strategy;
- Collection will occur on the same day each week;
- The collection vehicles are able to service their respective areas with in a 12 hour work day (4 stream system) or eight hour a work day (2 stream system).
- Each collection vehicle can collect 500 houses per day in the four stream system and 400 houses per day in the 2 stream system. This also takes into account travel distance to the waste management site, lunch breaks, etc. On average this resulted in 0.7 minutes per house for both the 2 Stream and 4 Stream systems.
- Four stream system is based on four days of collection per week while the two stream system is based on five collection days per week.

The Burin Peninsula area will be divided into five collection zones, with each area receiving residential curbside collection on the same day each week.

Appendix D, Demographics and Collection Analysis, presents a detailed summary of the collection regions, population served per region, residential waste generated per region, houses served per region and the number of collection trucks required for the four stream, two stream wet / dry and the two stream co-mingled collection strategies.

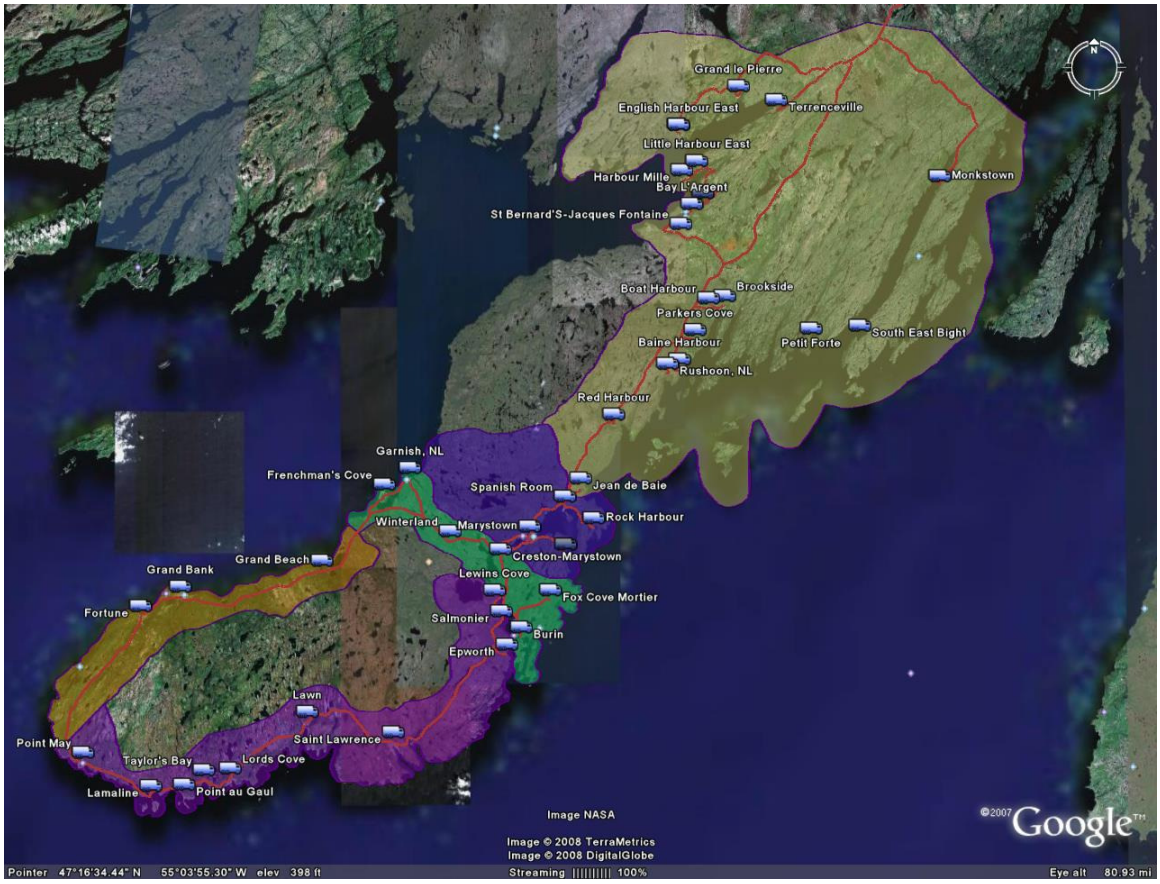


Figure 5, Collection Zones

Figure 6, Potential Waste Management Sites, presents a graphical representation of potential waste management sites to service the Burin Peninsula. The weighted centroid, computed as a function of population, was found to be just west of the Town of Marystown, in the vicinity of the Forest Access Road. A review of aerial photography and topographic maps for the Marystown area has identified 3 potential sites within a reasonable distance of the centroid, which have adjacent roadways, electrical services, proper site clearance distances, etc. These three sites are demarked on Figure 6, Potential Waste Management Sites, and may be summarized as follows:

1. Forest Access Road west of the Town of Marystown;
2. Black Brook area between the populated areas of the Town of Marystown and the Town of Burin;

3. Frenchman's Cove Dump Site

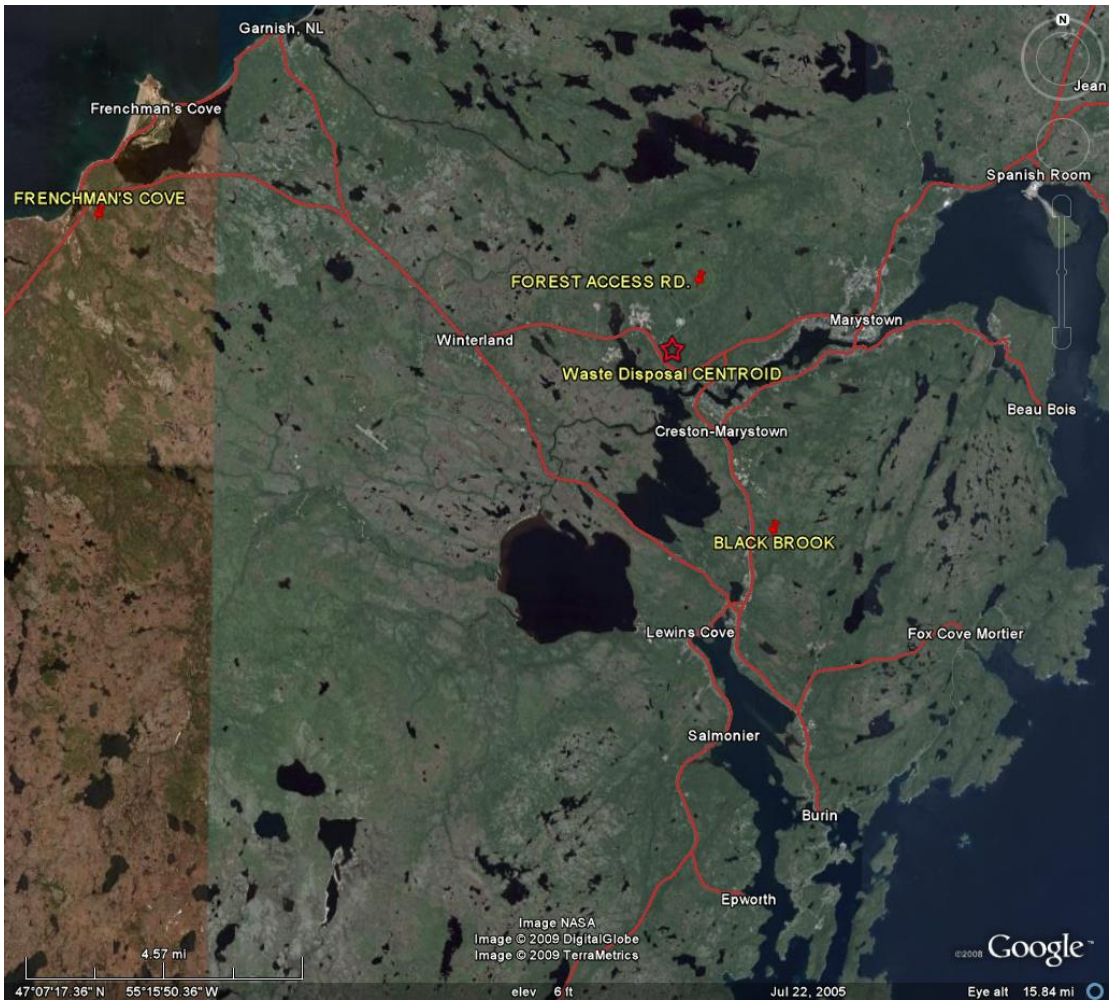


Figure 6, Potential Waste Management Sites

The above sites have been used to facilitate the analysis of travel times, etc. between various options described in Section 4.1, Overview of Waste Management Options. It is important to note that if Option 1, Independent System, is selected as the go forward strategy, then much more site selection work will be required.

Key points to be considered in making a recommendation of the most suitable location, may be summarized as follows:

- The *Black Brook* site is strategically located with respect to being closest to the most densely populated areas on the Burin Peninsula. However, this advantage can also be considered a disadvantage, in that if the Towns of Marystown or Burin were to grow, then the Black Brook waste management site could very well be situated in the middle of a populated area. This site would also require residents and businesses located on the western side of the peninsula to travel substantially longer distances than residents on the eastern side of the peninsula, which would not be an equitable situation.

- The *Forest Access Road* site, situated to the west of Marystown is in close proximity to the waste generation centroid for the Burin Peninsula, thereby providing a balance in travel time to the waste management site. This site is also very close to an existing auto salvage yard. Major concerns with this site would include the length of the access road and more significantly the type of terrain in the area; that is, the local topography is very hilly with evidence of wet lands / marsh lands between the hills.

- The *Frenchman's Cove* site is located in the proximity of the existing Frenchman's Cove dump site. The access road would be relatively short and there would be a ready supply of electricity. This location would cause a little extra travel time for transfer trucks and collection vehicles from the Marystown area, however this would be more than offset by providing residents on the western portion of the peninsula with more equitable travel time to the regional site. There appears to be sufficient land (Crown land) available to accommodate current waste management needs of the Burin Peninsula as well as provide for future expansion should the need arise. The site is located far enough away from any populated area to eliminate conflicting land uses and existing site conditions are such that the proposed site will meet environmental requirements.

The existing Frenchman's Cove dump site has been identified as the preferred location for the Burin Peninsula Waste Management Site. The location offers sufficient land mass, while at the same time balancing local travel times between the western and eastern portions of the Burin Peninsula.

4.3 Facility Requirements

Figure7, Generic Conceptual Design, presents a description of various facilities that are typically associated with modern waste management systems. Subsequent sections will identify which facilities will be required for the each of the options described in Section 4.1, Overview of Waste management Options, of this report.

Figure7, Generic Conceptual Design

Transfer Station

Transfer stations help lower transportation costs and make waste collection and disposal affordable for smaller communities, or regions.

The transfer station concept: smaller trucks bring waste to the transfer station where it is consolidated and sometimes compacted. Larger trucks then transport the consolidated waste to the disposal or recycling facility.

The Department of Environment and Conservation's Guidance document[21] on solid waste transfer stations provides details on the design features that should be included. Also consulted was the USEPA document on Waste Transfer Stations[22].

The transfer station requires a tipping and possible sorting area, as well as storage area, for various waste streams that will be handled by the transfer station. The storage area should allow for at least three days of waste collection, given that there are times when the Burin Peninsula Highway has been blocked with snow for several days.

The site for the transfer station will use visual screens or other aesthetic components to ensure a relatively pleasant experience for those working at the site and for the general public who may visit the site or pass by the site in their travels. The transfer facility will include necessary environmental controls such as ventilation and odor management, and control of surface water and storm-water runoff.

For comparison purposes the transfer station building was sized at 1000 square meters (25m x 40m), which will provide sufficient floor area for sorting and storage. Loading will be accomplished via vertical shuts, which will deposit waste into walking floor transfer trailers located on the lower level. Appendix P, Recycling / Transfer Building, provides a summary of construction estimates associated with the transfer building. These prices were held fixed for all options, however final design may see variations, depending on what the preferred option and final building size are.

[21] Guidance Document, Environmental Standards for Solid Waste Transfer Stations, Department of Environment and Conservation, Newfoundland and Labrador, GD-PPD-046, May 2007.
[22] Waste Transfer Stations: A Manual for Decision-Making, EPA530-R-02-002, United States Environmental Protection Agency, June 2002

The terms of reference for this project requested an analysis of various transportation costs associated with the transfer of waste from a Transfer Station to a regional host site. Appendix I, Transfer Cost – Various Options, presents an analysis of transportation costs, both for an in-house system and for a contracted out service. In doing the analysis, it was necessary to differentiate between waste with a high bulk density (organics, garbage, wet items) and waste with a relatively low bulk density (recyclables, fibers, dry items). Table 8, Transportation Costs Analysis, presents a summary of the analysis.

Table 8 – Average Transportation Costs Per Tonne Per Kilometer		
Waste Type	**In-House**	**Contracted Out**
Wet, organics, garbage	$0.05	$0.06
Dry, recyclables, fibers	$0.08	$0.10

Scrap Metal and White Goods Storage

Designated areas will be set aside for the collection and temporary storage of White Metals and Scrap Metals. These areas will have controlled access and will have surface water control system. When sufficient quantities exist, these materials will be shipped for recycling.

Construction and Demolition (C&D) Debris

The Newfoundland and Labrador Guidance Document on C&D Waste Disposal Sites[23] defines construction and demolition waste as:

> "Waste materials not of a hazardous nature which are normally incorporated in the construction of, and found in the materials resulting from demolition or destruction of, buildings, structures, walls and landscaping features, and includes:
>
> a) clean soil;

[23] Guidance Document, Environmental Standards for Construction and Demolition Waste Disposal Sites, Department of Environment and Conservation, Newfoundland and Labrador, GD-PPD-050, May 2007.

b) landscaping waste such as root balls and organic mat;
c) brick, mortar, concrete;
d) drywall, plaster, windows, doors, glass, ceramic items, cellulose, fiberglass fibers, gyproc, unsalvagable metals;
e) wood that has not been chemically treated (i.e. non-pressure treated and non-creosote wood);
f) asphalt shingles and other roofing materials (no cans, drums or other packages (empty or otherwise) of roofing adhesives, tar or waterproofing compounds);
g) siding, floor coverings and ceiling tile, wire, conduit, pipes, plastic films, and other building plastics and metals,
h) other inert materials approved by the Department."

To conserve space in the engineered landfills and increase their lifespan, inert construction and demolition materials are normally disposed of in a C&D landfill area.

The guidance document also provides the requirements for the base layer of the disposal area, which must be a minimum of one meter of soil with a hydraulic conductivity of $1x10^{-5}$ cm/sec or less.

Appendix K, Landfill Cost Estimates, provides a summary of the various items associated with the construction of a C&D landfill.

Engineered Landfill

An engineered landfill is the central part of an independent regional municipal solid waste management system. It accommodates wastes that cannot be diverted by other means such as reuse, recycling, and composting. A properly designed landfill includes:

- an impermeable liner;
- leachate collection system and treatment,;
- groundwater monitoring wells; and

- landfill gas collection and flaring (or combustion).

Liner System – a system of clay layers or geo-synthetic membranes (high density polyethylene) are placed on the bottom floor of the landfill to contain the liquid leachate generated during land-filling and prevent it from contaminating the groundwater.

Leachate collection and treatment system – leachate is the liquid that is formed from the chemical breakdown of the waste and from the rainwater that percolates through the waste. This liquid contains toxic compounds and cannot be discharged to the environment without treatment. A leachate collection and treatment system is therefore required to ensure that all of the leachate generated in the landfill is properly collected and treated prior to being discharged to the environment.

Gas control recovery system – the breakdown of waste generates landfill gases, which include methane, a highly flammable gas. The generation of landfill gases starts early in the waste deposition process and continues many years after the closure of the landfill. The generation of these gases can create an explosive atmosphere at the landfill and it is therefore necessary to collect and vent the gases from the landfill. Since methane is a known greenhouse gas pollutant, one that has 21 times the global warming potential of carbon dioxide, the gases should be flared (burned) to decrease the pollutant potential of the landfill. By burning the methane gas, (or utilizing it to generate energy), the global warming potential can be reduced by 95% and greenhouse gas emissions reduction credits can be obtained. Note, for the purpose of this report, it is assumed that a passive gas control system will be used; that is, the gas will be permitted to dissipate into the atmosphere.

Groundwater monitoring wells – in order to ensure that the surrounding groundwater system is not being exposed to the toxic leachate and that the landfill liner is operating properly, monitoring wells are required to periodically test the quality of

the groundwater in the area. The results of these tests can indicate if there is a leak in the liner or if the leachate treatment facility is operating properly.

Cover – A cover over the deposited waste is required to minimize the exposure of the waste to the environment and to contain the waste. A daily cover of soil is placed over the waste at the end of each day and a final cover (or cap) is placed over the completed landfill to control infiltration of water into the waste area and to eliminate gas emissions to the atmosphere. The final cover essentially seals the landfill area and allows the landfill site to be developed for alternate use following site closure.

Closure and Post closure procedure – due to the nature of landfilling, a closure procedure and post-closure plan, which includes post-closure care and maintenance of the landfill is required for any sanitary landfill design. The post-closure plans include continued monitoring of the landfill, gas collection and flaring and development of the site for future usage.

Landfill Cost

A detailed design and cost estimate of a landfill is based on many variables, including, but not limited to:

- Geology, topography and hydrogeology of the potential area;
- Distance of the site from the center of generation;
- Amount of road infrastructure required;
- Type of landfilling method utilized during site operations;
- Type of landfill liner installed;
- Type of leachate collection and treatment; and
- Type of landfill gas collection and treatment.

Since this is a report to evaluate the various options, most of the above variables have not been established in great detail; the cost estimate is based on a conceptual design of a sanitary landfill and provides only conceptual costing.

Appendix K, Landfill Cost Estimates, provides a summary of the construction costs associated with an engineered land fill. These costs are based on a 5 year cell construction / closure life cycle. Appendix J, Capital and Operational Cost Summaries, shows how the waste management corporation will set aside an allowance each year to see the construction of a new cell for each 5 year period. Appendix M, Leachate Treatment Costs, presents a summary of costs associated with a full leachate treatment system. Appendix L, Cell Closure Estimate, provides a cost summary for the closure of a 5 year cell.

Compost Facility

Composting plays an integral role in any modern waste management strategy. It is essentially recycling of readily biodegradeable materials into their basic components of water, carbon dioxide, energy and a compost matter.[24] Typical composting facilities consist of staging areas, processing areas, mixing areas, curing areas and general storage areas. Leachate from the compost will be minimized by having the initial decomposition take place inside a building. In addition, a concrete pad may be used on the floor of the compost building to prevent any infiltration of leachate into the ground water system. Leachate collected in the processing area will be treated or reintroduced back into the compost pile.

Edwards & Associates Ltd has investigated several compost systems to meet the needs of the Burin Peninsula area. During initial stages of the project interest was focused on an "In-Vessel" compost system, completely housed indoors and equipped with automatic turners, bio-filters, leachate collection, etc. This approach involved considerable capital expenditure and required ongoing maintenance of the system. The project team also reviewed the Hot-Rot compost system, which has a smaller environmental foot print, however the capital costs were still in the order of several million dollars, without site

[24] Design of Landfills and Integrated Solid Waste Management, 2004, John Wiley and Sons, Inc., Amelendu Bagchi, ISBN 0-471-25499-1

development, and involved ongoing maintenance for proper operations. Appendix Y, Hot-Rot Compost Systems, provides information on the Hot-Rot compost system. It should be noted that much of the information on the In-Vessel system was supplied in a 2003 report, entitled Burin Peninsula Waste Management Study[25].

In an attempt to keep operational costs reasonable and to lessen the Corporation's reliance on mechanical composting components, which are subject to maintenance and breakdown, the project team investigated a less sophisticated compost system made up of a combination indoor static pile / outside windrow system. Under this system, the initial decomposition of material would take place indoors, with the final curing taking place in a open windrow manner. Turning would be accomplished with an onsite multi purpose back digger. Residential organic waste would be supplemented with fibers to provide the necessary compost mixture. It should be noted that end product compost material will be suitable for landscaping, etc, but not necessarily suitable as a soil supplement for growing vegetables, etc. The combination static pile / windrow system was considered in options 3A and 6, Table 7 – Waste Management Options, as is evident in the cost estimates provided in Appendix J, Capital and Operational Cost Summaries.

4.3.1 Option 1, Independent System

4.3.1.1 Infrastructure Requirements

An independent system, or self contained waste management system, would involve the greatest amount of site development and have the greatest environmental footprint. It would involve all components of a modern waste management system described above and without doubt it would involve the greatest cost both from a construction and operational perspective.

[25] Burin Peninsula Regional Waste Management Study, Final Report, Edwards and Associates Ltd., March 2003.

Major features associated with a four stream independent system include:

- A – Scale House
- B- HHW Depot
- C – Public Drop Area
- D – Administration Building
- E – Service Garage
- F – Materials Recovery Facility
- G – Compost Building 1
- H – Compost Building 2
- I – Waste Wood Storage
- J – White Goods Storage
- K – Scrap Metal Storage
- L – Construction and Demolition Landfill
- M – Engineered Landfill
- N- Leachate Treatment
- O - Potable Water Well
- P – Sludge Reception
- P – Sludge Reception
- X – Monitoring Well

Figure 8, Independent System, presents an overview of the key components associated with this option.

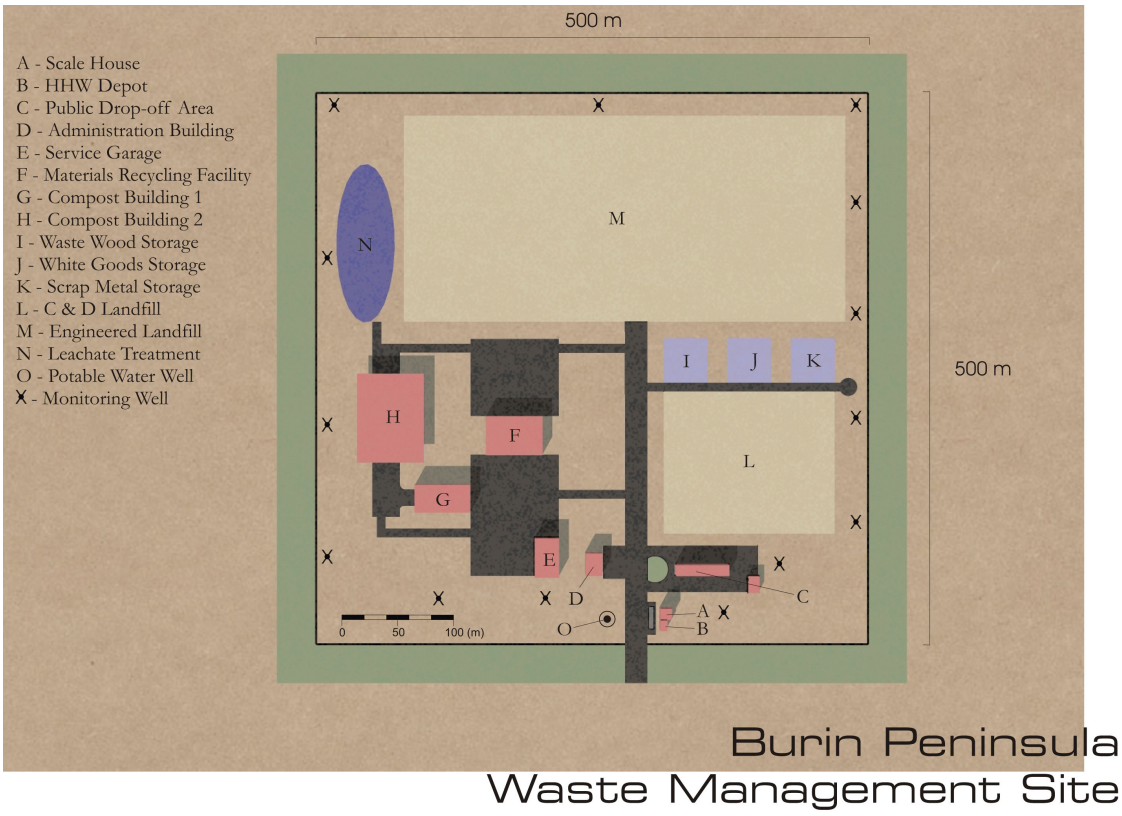


Figure 8, Independent System

4.3.1.2 Transportation Strategy – Option 1

The transportation strategy associated with a four stream independent system is made up of the following components.

Residential Curbside Collection

The Burin Peninsula has been divided into five zones. Each zone is serviced by two dual compartment compactor trucks, on a weekly basis. The first would collect organics and garbage. The second would collect fibers and other recyclables. Each zone will be serviced in a four day period, thereby leaving several days for schedule catch up should the need arise. The collection strategy is based on the analysis presented in Appendix D, Demographics and Collection Analysis.

Recyclables Transfer

Representatives from Multi Materials Stewardship Board, MMSB, have informed the Corporation that it would not be practical to assume that the local Green Depot could handle the volume of recyclables that would be generated with mandatory source separation; hence the following two options are available for consideration:

- The Corporation could pay to have the recyclables trucked and disposed of at the Materials Recovery Center situated at the eastern host site, Robin Hood Bay St. John's; or,
- The Corporation could truck and sell the recyclables to various recycling depots throughout Atlantic Canada.

Cost analysis associated with the latter of these two options is presented in Appendix E, Revenue Models Various Options.

Municipal C & D Containers

It is proposed that 10 roll-on / roll-off containers be positioned at strategic locations throughout the service area, typically in a controlled environment near a municipal building. It is not envisioned that municipalities in close proximity to the waste management site will be equipped with these containers. The Corporation will retrieve and empty these containers on an as needed basis. It is assumed that one truck capable of loading / off loading these containers will be sufficient to service the project area. The truck will also be equipped with a small crane, to assist crews with bulk item pick-up, should the need arise.

ICI Waste

Transportation of ICI waste will be the responsibility of the individual entities, similar to what they experience now; however, with the exception that they will have to sort their waste in accordance with the source separation strategy and pay a tipping fee at the facility.

4.3.1.3 Financial Analysis – Option 1, Independent System

Table 9, Independent System Financial Analysis, presents a summary of both the capital cost and annual operating costs associated with the implementation of an independent system. It should be noted that the cost estimate includes an engineered landfill and leachate treatment system with a 5 year life expectancy.

As previously stated, an independent system will require all components of a modern waste managements system, as described above, in Section 4.3, facility Requirements. This is certainly achievable from a technical perspective; however, given the relatively small population of the Burin Peninsula, one would certainly have to look at the per capita costs for the same.

ITEM	OPTION 1
SITE DEVELOPMENT	$ 5,819, 286.81
FIXED ASSETS	$ 3,171,963.35
OTHER ASSETS	$ 8,594,760.72
TOTAL ASSETS	$ 17,586,010.88
PER CAPITA COST ASSETS	$ 828.24
OPERATING EXPENSES	$ 5,207,106.58
REVENUE (ICI, MMSB, ETC.)	$ 235,145.67
OPERATING EXPENSE TO RESIDENTIAL STREAM	$ 4,971,960.91
Operating Expense per Dwelling	$ 513.26
Operating Expense Per Capita	$ 234.16
EMPLOYMENT	44.00

Table 9, Independent System Financial Analysis

Appendix J, Capital and Operational Costs, provides additional detailed information on costs associated with this option. Appendix E, Revenue Models Various Options provides supporting information on the revenue streams. Significant details that may be associated with Table 9, Independent System Financial Analysis , include:

- Site development cost includes such things as civil works, electrical, access roads, engineered landfill, leachate collection and treatment, etc.
- The engineered landfill is the largest single contributor to the site development cost and is based on a five year life expectancy. Leachate treatment and cell

closure are also significant contributors and are also based on a five year life expectancy.

- The site access road, estimated at 3 Km in length is also a significant contributor to the site development cost.
- Fixed assets relate to real property, which are items that are attached to the ground, such as building etc. For the most part prefabricated steel buildings will be installed on locally constructed foundations.
- Collateral assets include collection vehicles, heavy equipment, roll on / roll off containers, composting equipment, recycling equipment, transfer equipment, etc.
- Operating costs are based on primary and secondary research. Labour rates are approximated from a review of various municipal collective agreements. Fuel cost is based on interviews with local contractor and long haul drivers.
- The labour component associated with this option is 44 employees, details of which are presented in Appendix G, Labour Estimates. This is based on the premise that all work will be completed by in-house employees.
- Per capita and per dwelling cost have been derived from figures presented in Appendix D "Demographics and Collection Analysis".

4.3.2 Option 2, 4 Stream Separation – Transfer to Eastern Host Site

4.3.2.1 Infrastructure Requirements

A 4 stream at source waste separation with full transfer to the eastern host site, St. John's, NL involves less physical infrastructure than the independent system. The materials recovery facility, of the independent system can be replaced with a transfer station, with four loading docks. The need for an engineered landfill and extensive leachate collection and treatment are eliminated. Figure 9, Transfer Station Design, presents a graphical representation of a typical waste management site involved in this mode of operations.

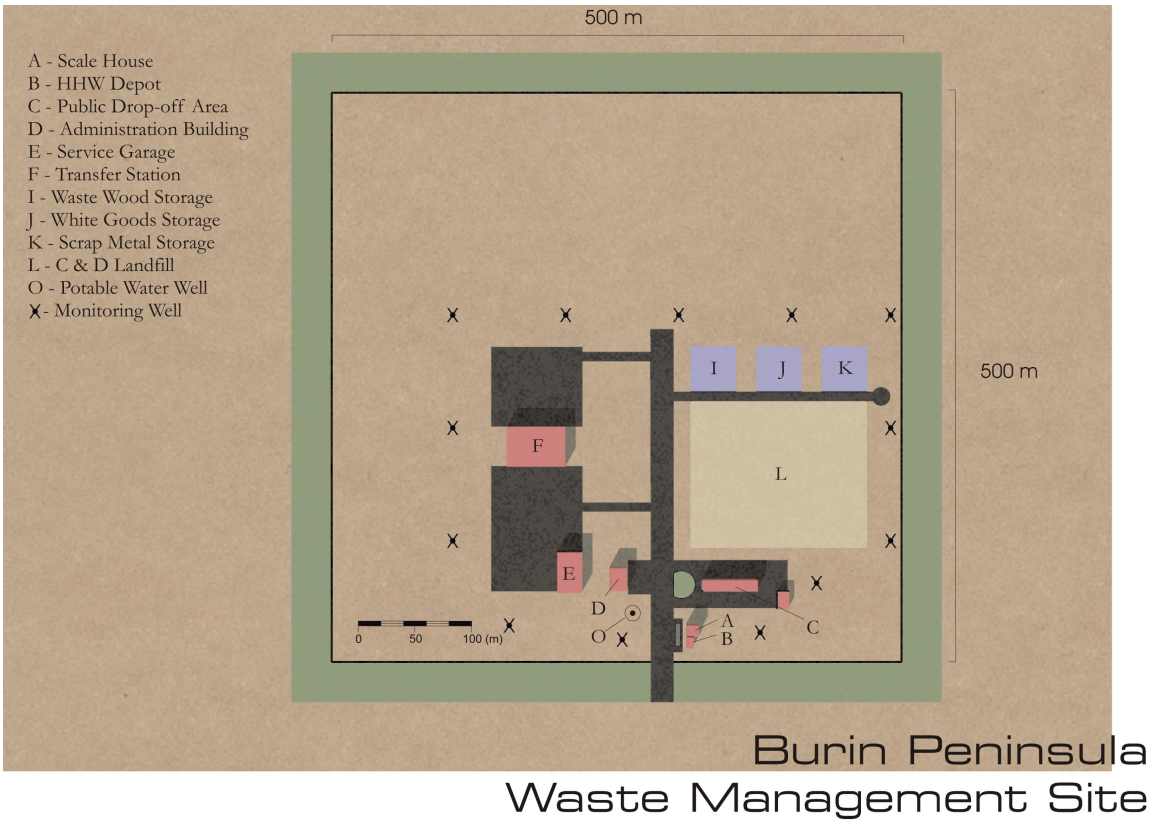


Figure 9 – Transfer Station Design

Major components of the system consists of the following:

- A – Scale House
- B- HHW Depot
- C – Public Drop Area
- D – Administration Building
- E – Service Garage
- F – Transfer Station
- I – Waste Wood Storage
- J – White Goods Storage
- K – Scrap Metal Storage
- L – Construction and Demolition Landfill
- O - Potable Water Well
- P – Sludge Reception
- X – Monitoring Well

Evident from the above is a smaller physical and environmental footprint for the facility. Components presented above were described in Section 4.3, Facility Requirements, of this report.

4.3.2.2 Transportation Strategy – Option 2

The transportation strategy associated with a four stream source separation system with full transfer to the Eastern Host Site is made up of the following components.

Residential Curbside Collection

The Burin Peninsula area was divided into five zones. Each zone is serviced by two dual compartment compactor trucks. The first would collect organics and garbage. The second would collect fibers and other recyclables. Each zone will be serviced in a four day period, thereby leaving several days for schedule catch up should the need arise.

Transfer

The Corporation will operate two day cab trucks, six walking floor trailers and will make seven trips per week to the eastern site. The transfer station building will be constructed with a tipping floor, of suitable size to accommodate three days storage.

Municipal C & D Containers

It is proposed that ten roll-on / roll-off containers be positioned at strategic locations throughout the service area, typically in a controlled environment near a municipal building. The Corporation will retrieve and empty these containers on an as needed basis. It is assumed that one truck capable of loading / off loading these containers will be sufficient to service the project area. The truck will also be equipped with a small crane, to assist crews with bulk item pick-up.

ICI Waste

Transportation of ICI waste will be the responsibility of the individual entities, similar to what they experience now; however, with the exception that they will have to sort their waste in accordance with the source separation strategy and pay a tipping fee at the facility.

4.3.2.3 Financial Analysis – Option 2, Transfer To Eastern Host Site

Table 10, Transfer System to Eastern Host Site Financial Analysis, presents an estimate of both the capital costs and annual operating costs associated with the implementation of this option. It is understood from an initial kick-off meeting dealing with this project, that MMSB will make a one time financial contribution to offset capital costs for the preferred Burin Peninsula Waste Management System.

ITEM	OPTION 2
SITE DEVELOPMENT	$ 1,775,860.61
FIXED ASSETS	$ 1,849,463.35
OTHER ASSETS	$ 4,586,160.72
TOTAL ASSETS	$ 8,211,484.68
PER CAPITA COST ASSETS	$ 386.73
OPERATING EXPENSES	$ 3,727,281.19
REVENUE (ICI, MMSB, ETC.)	$ 575,546.14
OPERATING EXPENSE TO RESIDENTIAL STREAM	$ 3,151,735.05
Operating Expense per dwelling	$ 325.36
Operating Expense Per Capita	$ 148.44
EMPLOYMENT	37

Table 10, Transfer System to Eastern Host Site Financial Analysis

Appendix J, Capital and Operational Costs, provides additional detailed information on costs associated with this option. Appendix E, Revenue Models Various Options provides supporting information on the revenue streams. Significant details that may be associated with Table 10, Transfer System to Eastern Host Site Financial Analysis, include:

- Major items contributing to the site development cost include the 1Km access road, onsite roads and the development of C&D landfill.
- Fixed assets consist of five buildings with the transfer station being the most significant contributor. Other assets are made up of vehicles, machinery and office equipment and vehicles.
- Operational costs associated with this option involves a tipping fee at the Eastern Host Site of $65.00 per tonne for items going to the engineered land fill and $20.00 per tonne for recyclables and organics.
- The labour component associated with this option is 37 employees, details of which are presented in Appendix G, Labour Estimates. This is based on the premise that all work will be completed by in-house employees.
- Per capita and per dwelling cost have been derived from figures presented in Appendix B "Demographics and Collection Analysis".

4.3.3 Option 3, 4 Stream Separation – Transfer to Eastern Host Site – Local Compost

4.3.3.1 Infrastructure Requirements

Infrastructure requirements for Option 3 are much the same as presented in the previous section for Option 2, with the exception that a composting facility has been added. This compost facility basically consists of 2 prefabricated steel building, curing areas and related equipment, such as turner, bio filters etc. There will also be a need for a small leachate treatment system, which would be utilized to treat any leachate that may be produced from the compost activity.

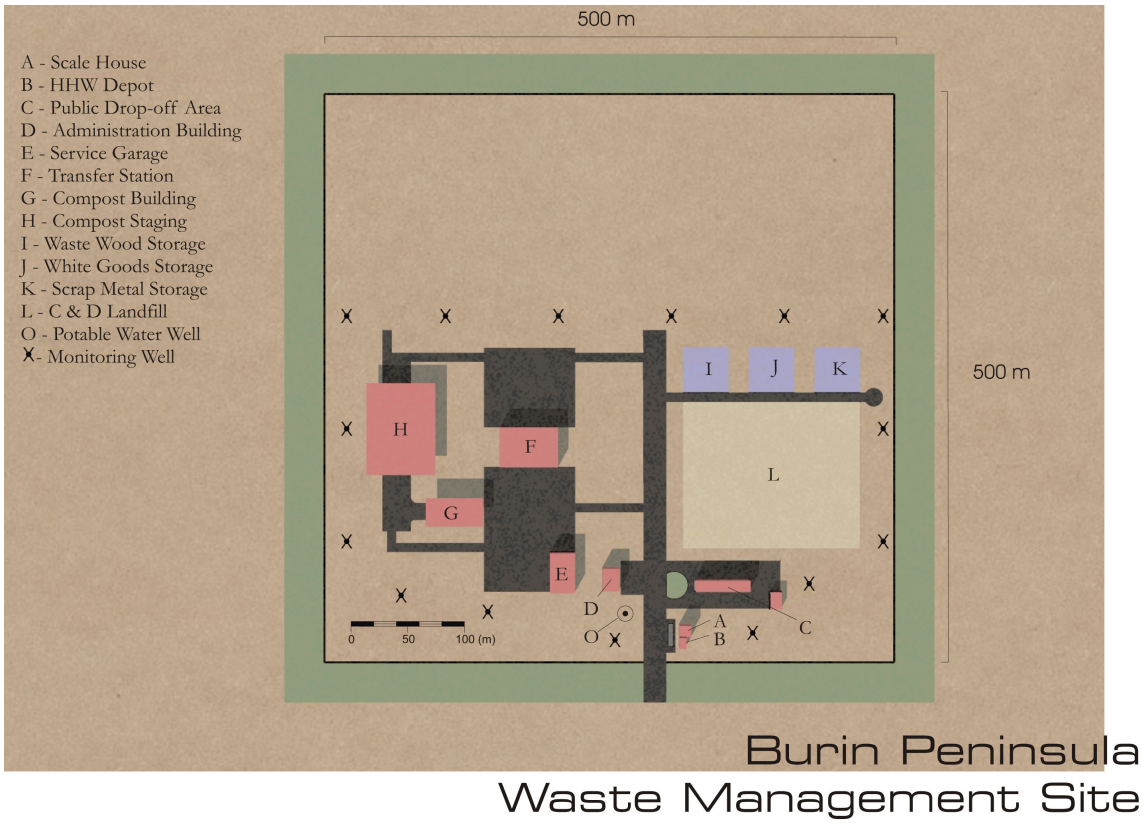


Figure 10 – Transfer Station With Composting

Major components of the system consists of the following:

- A – Scale House
- B - HHW Depot
- C – Public Drop Area
- D – Administration Building
- E – Service Garage
- F – Transfer Station
- G – Compost Building
- H – Compost Building
- I – Waste Wood Storage
- J – White Goods Storage
- K – Scrap Metal Storage
- L – Construction and Demolition Landfill
- O - Potable Water Well
- P – Sludge Reception
- X – Monitoring Well

It should be noted that a local farmer has expressed interest in managing the composting operation in return for access to the end product; alternatively, he also expressed a willingness to take whatever organic material that the Corporation can supply, and he will develop his own compost, on his farm in the Winterland area, using a windrow methodology. It is advised that this may be worth further investigation, as it would lessen the logistical load on the Corporation if he managed the compost operation, or it could lessen the amount of material being shipped to the Eastern Host Site. Caution would be advised to ensure that proper permits are in place and that having an external party managing the composting facility would not cause labour unrest.

4.3.3.2 Transportation Strategy – Option 3

The transportation strategy associated with a four stream source separation system with a combination of local composting and transfer to the Eastern Host Site is made up of the following components.

Residential Curbside Collection

The Burin Peninsula area was divided into five zones. Each zone is serviced by two dual compartment compactor trucks. The first would collect organics and garbage. The second would collect fibers and other recyclables. Each zone will be serviced in a four day period, thereby leaving several days for schedule catch up should the need arise.

Transfer

The Corporation will operate one day cab truck, five walking floor trailers and will make five trips per week to the Eastern Host Site. The transfer station building will be constructed with a tipping floor, of suitable size to accommodate three days storage.

Municipal C & D Containers

It is proposed that ten roll-on / roll-off containers be positioned at strategic locations throughout the service area, typically in a controlled environment near a municipal building. The Corporation will retrieve and empty these containers on an as needed

basis. It is assumed that one truck capable of loading / off loading these containers will be sufficient to service the project area. The truck will also be equipped with a small crane, to assist crews with bulk item pick-up.

ICI Waste

Transportation of ICI waste will be the responsibility of the individual entities, similar to what they experience now; however, with the exception that they will have to sort their waste in accordance with the source separation strategy.

4.3.3.3 Financial Analysis – Option 3, Combination Transfer To Eastern Host Site and Local Composting

Table 11, Transfer System to Eastern Host Site and Local Composting Financial Analysis, presents a estimate of both the capital cost and annual operating costs associated with the implementation of this option. It is understood from an initial kick-off meeting dealing with this project, that the provincial Government will make a one time financial contribution to offset capital costs for the preferred Burin Peninsula Waste Management System.

ITEM	OPTION 3
SITE DEVELOPMENT	$ 2,297,590.73
FIXED ASSETS	$ 3,171,963.35
OTHER ASSETS	$ 6,682,260.72
TOTAL ASSETS	$ 12,151,814.80
PER CAPITA COST ASSETS	$ 572.31
OPERATING EXPENSES	$ 4,087,451.39
REVENUE (ICI, MMSB, ETC.)	$ 533,090.14
OPERATING EXPENSE TO RESIDENTIAL STREAM	$ 3,554,361.25
Operating Expense per dwelling	$ 366.92
Operating Expense Per Capita	$ 167.40
EMPLOYMENT	41

Table 11, Transfer System to Eastern Host Site and Local Composting Financial Analysis

Appendix J, Capital and Operational Costs, provides additional detailed information on costs associated with this option. Appendix E, Revenue Models Various Options provides supporting information on the revenue streams. Significant details that may be associated with Table 11, Transfer System to Eastern Host Site and Local Composting Financial Analysis, include:

- Major items contributing to the site development cost include the 1Km access road, onsite roads and the development of C&D landfill.
- Fixed assets consist of five buildings with the transfer station and compost buildings being the most significant contributor. Other assets are made up of vehicles, machinery and office equipment and vehicles.
- Operational costs associated with this option involves a tipping fee at the Eastern Host Site of $65.00 per tonne for items going to the engineered land fill and $20.00 per tonne for recyclables and organics.
- The labour component associated with this option is 41 employees, details of which are presented in Appendix G, Labour Estimates. This is based on the premise that all work will be completed by in-house employees.
- Per capita and per dwelling cost have been derived from figures presented in Appendix B "Demographics and Collection Analysis".

4.3.4 Option 4, 2 Stream Separation – Transfer to Central Host Site

4.3.4.1 Infrastructure Requirements

Infrastructure requirements associated with a 2 stream source separation strategy, is very similar to that of the four stream system, with the major differences, from a facilities perspective, being in the design of the transfer building. The building will have a larger tipping floor compartment and two loading doors. This option would also require 50% less collection trucks, which equates to a substantial capital and operational cost saving.

Figure 9, Transfer Station Design, presents graphical representation of a typical facility configuration. Major components are summarized as follows:

- A – Scale House
- B- HHW Depot
- C – Public Drop Area
- D – Administration Building
- E – Service Garage
- F – Transfer Station
- I – Waste Wood Storage
- J – White Goods Storage
- K – Scrap Metal Storage
- L – Construction and Demolition Landfill
- O - Potable Water Well
- P – Sludge Reception
- X – Monitoring Well

4.3.4.2 Transportation Strategy – Option 4

The transportation strategy associated with a two stream source separation system with full transfer to the Central Host Site is made up of the following components.

Residential Curbside Collection

The Burin Peninsula area was divided into five zones. Each zone is serviced by a dual compartment compactor truck; one compartment for wet materials and one for dry materials. Each zone will be serviced in a five day period, thereby leaving 2 days per week for schedule catch up should the need arise.

Transfer

The Corporation will operate two day cab trucks, four walking floor trailers and will make eight trips per week to the central Newfoundland site. The transfer station building will be constructed with a tipping floor, of suitable size to accommodate three days storage.

Municipal C & D Containers

It is proposed that ten roll-on / roll-off containers be positioned at strategic locations throughout the service area, typically in a control environment near a municipal building. The Corporation will retrieve and empty these containers on an as needed basis. It is assumed that one truck capable of loading / off loading these containers will be sufficient to service the project area. The truck will also be equipped with a small crane, to assist crews with bulk item pick-up.

ICI Waste

Transportation of ICI waste will be the responsibility of the individual entities, similar to what they experience now; however, with the exception that they will have to sort their waste in accordance with the source separation strategy.

4.3.4.3 Financial Analysis – Option 4, Transfer To Central Host Site

Table 12, Transfer System to Central Host Site Financial Analysis, presents an estimate of both the capital cost and annual operating costs associated with the implementation of this option. It is understood from an initial kick-off meeting dealing with this project, that MMSB will make a one time financial contribution to offset capital costs for the preferred Burin Peninsula Waste Management System.

ITEM	OPTION 4
SITE DEVELOPMENT	$ 1,775,861
FIXED ASSETS	$ 1,849,463
OTHER ASSETS	$ 2,983,500
TOTAL ASSETS	$ 6,608,824
PER CAPITA COST ASSETS	$ 311
OPERATING EXPENSES	$ 3,473424
REVENUE (ICI, MMSB, ETC.)	$ 612,540
OPERATING EXPENSE TO RESIDENTIAL STREAM	$ 2,860,885
Operating Expense per dwelling	$ 295
Operating Expense Per Capita	$ 135
EMPLOYMENT	27

Table 12, Transfer System to Central Host Site Financial Analysis

Appendix J, Capital and Operational Costs, provides additional detailed information on costs associated with this option. Appendix E, Revenue Models Various Options provides supporting information on the revenue streams. Significant details that may be associated with Table 12, Transfer System to Eastern Host Site and Local Composting Financial Analysis, include:

- Major items contributing to the site development cost include the 1Km access road, onsite roads and the development of C&D landfill.
- Fixed assets consist of five buildings with the transfer station being the most significant contributor. Other assets are made up of vehicles, machinery and office equipment.

- Operational costs associated with this option involves a tipping fee at the Central Newfoundland Host Site of $87.50 per tonne for items passing over the weight scales.
- The labour component associated with this option is 27 employees, details of which are presented in Appendix G, Labour Estimates. This is based on the premise that all work will be completed by in-house employees.
- Per capita and per dwelling cost have been derived from figures presented in Appendix B "Demographics and Collection Analysis".

4.3.5 Option 5, 2 Stream Separation – Transfer to Central Host Site With Local Composting

4.3.5.1 Infrastructure Requirements

Infrastructure requirements associated with this option are very similar to that of the previous section. However, one significant difference being the need for a processing area, in the Transfer Building, to separate waste materials for organic materials. There will also be a need for composting buildings and storage area.

Figure 10, Transfer Station Design with Composting, presents graphical representation of a typical facility configuration. Major components are summarized as follows:

- A – Scale House
- B - HHW Depot
- C – Public Drop Area
- D – Administration Building
- E – Service Garage
- F – Transfer Station
- G – Compost Building
- H – Compost Building
- I – Waste Wood Storage
- J – White Goods Storage
- K – Scrap Metal Storage
- L – Construction and Demolition Landfill
- O - Potable Water Well
- P – Sludge Reception
- X – Monitoring Well

4.3.5.2 Transportation Strategy – Option 5

The transportation strategy associated with a two stream source separation system and local composting is made up of the following components.

Residential Curbside Collection

The Burin Peninsula area was divided into five zones. Each zone is serviced by a dual compartment compactor truck; one compartment for wet materials and one for dry materials. Each zone will be serviced in a five day period, thereby leaving 2 days per week for schedule catch up should the need arise.

Transfer

The transfer station building will be constructed with a tipping floor, of suitable size to accommodate three days storage. Under this option it is estimated that the Corporation will operate 1 transfer truck, 3 walking floor trailers and make 5 trips to the central host site per week.

Municipal C & D Containers

It is proposed that ten roll-on / roll-off containers be positioned at strategic locations throughout the service area, typically in a control environment near a municipal building. The Corporation will retrieve and empty these containers on an as needed basis. It is assumed that one truck capable of loading / off loading these containers will be sufficient to service the project area. The truck will also be equipped with a small crane, to assist crews with bulk item pick-up.

ICI Waste

Transportation of ICI waste will be the responsibility of the individual entities, similar to what they experience now; however, with the exception that they will have to sort their waste in accordance with the source separation strategy and pay a tipping fee at the waste management site.

4.3.5.3 Financial Analysis – Option 5, Transfer To Central Host Site

Table 13, Transfer System to Central Host Site With Local Composting Financial Analysis, presents a estimate of both the capital cost and annual operating costs associated with the implementation of this option. It is understood from an initial kick-off meeting dealing with this project, that MMSB will make a one time financial contribution to offset capital costs for the preferred Burin Peninsula Waste Management System.

ITEM	OPTION 5
SITE DEVELOPMENT	$ 2,007,590.73
FIXED ASSETS	$ 3,171,963.35
OTHER ASSETS	$ 7,578,600.00
TOTAL ASSETS	$ 12,758,154.08
PER CAPITA COST ASSETS	$ 601.80
OPERATING EXPENSES	$ 4,192,994.22
REVENUE (ICI, MMSB, ETC.)	$ 533,111.57
OPERATING EXPENSE TO RESIDENTIAL STREAM	$ 3,659,882.65
Operating Expense per dwelling	$ 377.81
Operating Expense Per Capita	$ 172.37
EMPLOYMENT	32

Table 13, Transfer System to Central Host Site and Local Composting Financial Analysis

Appendix J, Capital and Operational Costs, provides additional detailed information on costs associated with this option. Appendix E, Revenue Models Various Options provides supporting information on the revenue streams. Significant details that may be associated with Table 13, Transfer System to Central Host Site With Local Composting Financial Analysis, include:

- Major items contributing to the site development cost include the 1Km access road, onsite roads and the development of C&D landfill.
- Fixed assets consist of seven buildings with the transfer station being the most significant contributor. Other assets are made up of vehicles, machinery and

office equipment, with vehicles, compost equipment and separators contributing significantly to the budget.

- Operational costs associated with this option involves a tipping fee at the Central Newfoundland Host Site of $87.50 per tonne for items passing over the weight scales.
- The labour component associated with this option is 32 employees, details of which are presented in Appendix G, Labour Estimates. This is based on the premise that all work will be completed by in-house employees.
- Per capita and per dwelling cost have been derived from figures presented in Appendix B “Demographics and Collection Analysis”.

4.3.6 Option 4A, 2 Stream Separation – Transfer to Central Host Site - Haulage and Collection Contracted Out

Contracted services, such as curb side collection and transfer haulage to the selected host site permits the markets to dictate the costs involved, while at the same time reducing the level of logistics that the Corporation would have to contend with. The generally accepted hypothesis being that the operating costs to the Corporation would be lower under this operating scenario as compared to the Corporation having a larger work force associated with in-house collection and haulage equipment. To test this hypothesis, an analysis was conducted on the lowest operational scenario discussed in Section 4.3.4 - 2 Streams Separation – Transfer to Central Host Site. This new option will now be referred to as Option 4A, 2 Stream Separation – Transfer to Central Host Site – Haulage and Collection Contracted Out.

Option 4A requires the same level of site development and fixed assets as that presented in Section 4.3.4, "Option 4, 2 Stream Separation – Transfer to Central Host Site"; however, in this case residential curb side collection and haulage to the central host site have been contracted out to private interest. Cost estimates for the haulage services were derived from a series of interviews with long haul trucking companies and local contractors[26], while cost estimates for collection services were based on current collection rates being charged to the Town of Burin, the Town of Harbour Grace and the Town of Conception Bay South.

Table 14, Transfer System to Central Host Site - Contracted Collection and Haulage Financial Analysis, presents a summary of the costs related to the scenario being discussed.

ITEM	OPTION 4A -Contract Collection & Haulage
SITE DEVELOPMENT	$ 1,775,860.61
FIXED ASSETS	$ 1,696,251.73

[26] Day and Ross Ltd., April 2007

OTHER ASSETS	$	1,545,300.00
TOTAL ASSETS	$	5,017,412.33
PER CAPITA COST ASSETS	$	236.30
OPERATING EXPENSES	$	3,201,032.45
REVENUE (ICI, MMSB, ETC.)	$	612,539.57
OPERATING EXPENSE TO RESIDENTIAL STREAM	$	2,588,492.88
Operating Expense Per Dwelling	$	267.21
Operating Expense Per Capita	$	121.91
EMPLOYMENT		10

Table 14, Transfer System to Central Host Site - Contracted Collection and Haulage Financial Analysis

A review Table 14 shows a significant cost reduction, nearly 1.5 million dollars in the costs of other assets (trucks) and a reduction of operating expense in the amount of approximately 0.25 million dollars, when compared to that of Option 4, i.e., Transfer to Central Host Site using Corporation personnel and equipment. Significant in the above table is the relatively low number of employees hired by the Corporation, which may be attributed to the fact that collection and haulage has been contracted to private interest. This also reduced the cost associated with maintenance personnel, the maintenance building, etc.

4.3.7 Option 3A, 4 Stream Separation – Transfer to Eastern Host Site – Contracted Transportation - Local Compost

As mentioned in Section 4.3.6, contracted services, such as curb side collection, permits the markets to dictate the costs involved in such services, while at the same time reducing the level of logistics that the Corporation would have to contend with. In addition to the reduced level of equipment, this option investigates the cost savings associated with the operation of a less sophisticated compost system based primarily on inside static pile / open windrow concept. However, in order to increase compost efficiency, management leachate, control odor and reduce wind swept debris, this option included one building to receive and house the compost material during its active period (approximately 30 days).

Investigations have revealed[27] that for the volumes of organics involved, it would be possible to manipulate the compost pile with an excavator or with a front end loader, equipment which the Corporation would already have on site as part of its normal operations.

Option 3A requires the same level of site development as that presented in Section 4.3.3, "Option 3, 4 Stream Separation – Transfer to Eastern Host Site- Local Compost"; however, in this case transportation has been contracted to third parties. Cost estimates for collection services were based on current collection rates being charged to the Town of Burin, the Town of Harbour Grace and the Town of Conception Bay South. Transfer trucking costs were based on interviews conducted with long haul trucking companies.

Table 15, Transfer System to Eastern Host Site - Contracted Transportation Static Pile / Windrow Composting Financial Analysis, presents a summary of the costs related to the scenario being discussed.

ITEM	OPTION 3A
SITE DEVELOPMENT	$ 2,113,203.64
FIXED ASSETS	$ 2,317,826.73
OTHER ASSETS	$ 1,805,400.00
TOTAL ASSETS	$ 6,236,430.36
PER CAPITA COST ASSETS	$ 293.71
OPERATING EXPENSES	$ 2,720,611.66
REVENUE (ICI, MMSB, ETC.)	$ 576,223.00
OPERATING EXPENSE TO RESIDENTIAL STREAM	$ 2,144,388.66
Operating Expense per Dwelling	$ 221.37
Operating Expense Per Capita	$ 100.99
Operational Cost per Residential Tonne	$ 229.59
EMPLOYMENT	11

Table 15, Transfer System to Eastern Host Site - Contracted Collection - Windrow Composting Financial Analysis

[27] Discussions with Waste Management Authorities in NS, April 2007. Discussions with Mike Deprez, Walker Industries, Niagara, Ontario, January 2009.

A review Table 15 shows a significant cost reduction, nearly 4 million dollars in the costs of other assets (trucks, compost equipment, etc.) and a reduction of operating expense in the amount of approximately 1 million dollars, when compared to that of Option 3, i.e., Transfer to Eastern Host Site using Corporation personnel, equipment, and more complex composting techniques.

It should be noted that under this scenario, curb side collection would be modified as follows:

- Garbage and organics would be collected once per week.
- Recyclables and fibers would be collected bi-weekly.

Implementing this approach to curb side collection, reduced operational costs by approximately $315,000.

4.3.8 Option 6, 2 Stream Co-mingled Separation – Transfer to Eastern Host Site - Local Compost

Discussions with a representative from the Department of Municipal Affairs[28] have indicated that the Provincial Waste Diversion Strategy is aimed at a provincial waste diversion factor of 50%, and it is not intended that each and every operation receive that level of diversion. That being said, the project team was requested to investigate a 2 Stream Co-mingled Strategy, which would see garbage, recyclables and fibers collected in one stream and organics collected in the other. This strategy enables more rural areas to "piggy-back" on the potential waste diversion rates of more urban areas while at the same time adhering to the regulations banning organics from landfill sites.

Costs associated with this management strategy are summarized in Table 16, Co-mingled 2 Stream System – Local Compost.

[28] Personal Interview, Mr. Cory Grandy, Department of Municipal Affairs, November 2008

ITEM	OPTION 6
SITE DEVELOPMENT	$ 2,113,203.64
FIXED ASSETS	$ 2,317,826.73
OTHER ASSETS	$ 1,330,400.00
TOTAL ASSETS	$ 5,761,430.36
PER CAPITA COST ASSETS	$ 271.34
OPERATING EXPENSES	$ 2,342,681.32
REVENUE (ICI, MMSB, ETC.)	$ 530,723.00
OPERATING EXPENSE TO RESIDENTIAL STREAM	$ 1,811,958.32
Operating Expense per Dwelling	$ 187.05
Operating Expense Per Capita	$ 85.34
Operational Cost per Residential Tonne	$ 194.00
EMPLOYMENT	10

Table 16, Co-mingled 2 Stream System – Local Compost.

Infrastructure requirements associated with the 2 Stream Co-mingled System, with local composting is very similar to that discussed in Option 3A – 4 Stream Separation with Local Composting. Cost reductions attributed to the Co-mingled strategy result from:

- single pass collection;
- more efficient use of transfer trailers;
- reduced loading areas in the transfer station;
- lower tipping fees at the eastern host site.

Appendix J, Capital and Operational Costs, provides additional detailed information on costs associated with this option. Appendix E, Revenue Models Various Options provides supporting information on the revenue streams.

4.3.9 Option 6A, 2 Stream Co-mingled Separation – Full Transfer to Eastern Host Site

Option 6A, Co-Mingled 2 Stream Separation – Full Transfer to Eastern Host Site was investigated to see if there was any cost saving in operating a co-mingled full transfer system as opposed to operating a local compost. Table 17, Co-Mingled 2 Stream System – Full Transfer to Host Site, presents a summary of the costs associated with this option.

ITEM	OPTION 6A
SITE DEVELOPMENT	$ 1,865,860.61
FIXED ASSETS	$ 1,696,251.73
OTHER ASSETS	$ 1,485,400.00
TOTAL ASSETS	$ 5,047,512.33
PER CAPITA COST ASSETS	$ 237.72
OPERATING EXPENSES	$ 2,468,265.04
REVENUE (ICI, MMSB, ETC.)	$ 594,975.00
OPERATING EXPENSE TO RESIDENTIAL STREAM	$ 1,873,290.04
Operating Expense per Dwelling	$ 193.38
Operating Expense Per Capita	$ 88.23
Operational Cost per Residential Tonne	$ 200.57
EMPLOYMENT	9

Table 17, Co-Mingled 2 Stream System – Full Transfer to Eastern Host Site.

Appendix J, Capital and Operational Costs, provides additional detailed information on costs associated with this option. Appendix E, Revenue Models Various Options provides supporting information on the revenue streams.

Evident from the above table is a reduction in capital cost; however, this is offset by a higher trucking and tipping fee cost to transfer organics to the eastern host site composting facility.

5.0 COMPARATIVE ANALYSIS

A comparative analysis, of the various options presented in Section 4.3, Facility Requirements, was designed with the following parameters in mind:

- Financial Estimates;
- Local Employment;
- Operational Logistics;
- Implementation Logistics;
- Environmental Impact.

Each of these parameters will be dealt with in more detail in subsequent sections of this project.

5.1 Comparative Cost Analysis

Table 18, Summary Costs - Waste Management Options, presents a cost comparison of the various options investigated per the terms of reference for this report.

Option 6 – Co-Mingled Two Stream System – Local Composting – Contracted Transportation provided the lowest annual operational cost to the residential sector at ($1,811,958), which translates into a cost of $85 per person per year. Estimated capital cost related to this option ($5,761,430) is approximately $50 thousand dollars lower than Option 3A, 4 Stream Separation, Transfer to Eastern Host Site, Local Compost, Contracted Collection and Haulage, which can be mostly attributed to the cost of transportation and tipping.

From a financial perspective, Option 6 - 2 Stream Co-Mingled – Local Compost – Transfer other waste to Eastern Host Landfill is most favorable.

	Complete Systems in the Region 4 Stream Separation at Source	Complete Transfer to Eastern Host - 4 Stream Separation	Local Organic Compost - Transfer of Garbage & Recyclables to Eastern Host	Complete Transfer to Central Host - Wet / Dry Separation	Local Organic Compost - Transfer of Garbage & Recyclables to Central Host	Complete Transfer to Central Host - Wet / Dry Separation Contracted Transportation	Local Organic Compost - Transfer of Garbage & Recyclables to Eastern Host Contract Collection & Haulage	Co-mingled Local Organic Compost Transfer to Eastern Host - Contracted Transportation	Co-mingled Full transfer to Eastern Site – Contracted Transportation
ITEM	**OPTION 1**	**OPTION 2**	**OPTION 3**	**OPTION 4**	**OPTION 5**	**OPTION 4A**	**OPTION 3A**	**Option 6**	**Option 6 A**
SITE DEVELOPMENT	5819287	1775861	2297591	1775861	2007591	1775861	2113204	2113204	1865861
FIXED ASSETS	3171963	1849463	3171963	1849463	3171963	1696252	2317827	2317827	1696252
OTHER ASSETS	8594761	4586161	6682261	2983500	7578600	1545300	1805400	1330400	1485400
TOTAL COST	**17586011**	**8211485**	**12151815**	**6608824**	**12758154**	**5017412**	**6236430**	**5761430**	**5047512**
PER CAPITA COST ASSETS	828	387	572	311	601	236	294	271	238
OPERATING EXPENSES	5207107	3727281	4087451	3473424	4081602	3201032	2720612	2342681	2468265
REVENUE (ICI, MMSB, ETC.)	235146	575546	533090	612540	533112	612540	576223	530723	594975
OPERATING EXPENSE TO RESIDENTIAL STREAM	4971961	3151735	3554361	2860885	3548490	2588493	2144389	1811958	1873290
Operating Expense per dwelling	513	325	367	295	366	267	221	187	193
Operating Expense Per Capita	234	148	167	135	167	122	101	85	88
Operational Cost per Residential Tonne	532	337	381	306	380	277	230	194	201
EMPLOYMENT	44	37	41	27	32	10	11	10	9

Table 18, Summary Costs - Waste Management Options

Option 1 4 Stream Independent System Landfill, Compost, MRF, etc. operated in the region
Option 2 4 Stream Transfer System to Eastern Host Site
Option 3 4 Stream Transfer System to Eastern Host Site with Local Compost Facility
Option 4 2 Stream Transfer System to Central Host Site
Option 5 2 Stream Transfer System to Central Host Site with Local Compost Facility
Option 4A 2 Stream Transfer System to Central Host Site – Contracted Collection and Haulage
Option 3A 4 Stream Transfer System to Eastern Host Site – Contracted Collection – Windrow Compost
Option 6 2 Stream Co-Mingled – Local Compost – Transfer to Eastern Host
Option 6A 2 Stream Co-Mingled – Transfer to Eastern Host

Appendix J, Capital and Operational Costs, provides additional information on costs associated with the various options. Appendix E, Revenue Models Various Options provides supporting information on the revenue streams. It is important to note that the revenue model, presented above, includes a Provincial Government subsidy for transportation, which is based on the premise that the Provincial Government will pay for all transfer cost outside a 100 Km buffer of the waste management site. The amount of subsidy then becomes a function of the waste management option chosen or in other words, the number of trips a transfer trailer would make to the host site and of course the distance traveled. For Option 6 this translates into an annual subsidy of $182,000 (Appendix E). Without this subsidy the most cost effective scenario for waste management on the Burin Peninsula would be as follows:

- Annual Operating Expense per dwelling $206
- Annual Operating Expense per capita per $94

5.2 Comparative Analysis - Employment

One of the actions documented in the Provincial Waste Management Strategy stated that the province would "Maximize Economic and Employment Opportunities associated with waste management."[29] Table 18, Summary Costs - Waste Management Options presents a summary of the anticipated employment levels associated with each waste management alternative investigated in this report.

Option 6, which offered the preferred option from a financial perspective, will create 10 fulltime permanent jobs with the Corporation. In addition to this it is estimated that an additional ten jobs (2 per collection truck) will be created through residential collection contracts and another 2 positions from transfer trucking. It would not be unrealistic to assume that another twenty indirect jobs would be maintained as a result of this initiative, which when summed up the employment impact on the peninsula would be approximately fifty jobs.

[29] Newfoundland and Labrador Waste Management Strategy, Government of Newfoundland and Labrador, Department of Environment, April 2002.

Options one to five were investigated with in-house employment, with numbers ranging from forty-four employees for a fully independent system to twenty-seven employees for the 2-Stream System with Transfer to the Central Host Site. Discussions with several waste management authorities in the Nova Scotia area, showed these numbers to be within the norm for similar size operations, utilizing similar management strategies.

From an employment perspective, Option 1- 4 Stream Independent System, operated by the Corporation, would create the greatest number of direct jobs (44). There was no significant difference, +/-2 positions, for the options which utilized contracted services for curb side collection and transfer trucking.

5.3 Comparative Analysis – Operational

From a logistics perspective, waste management options dealing with contracted residential collection and transfer trucking appear to be most favorable when consideration is given to the following:

- Low number of employees to manage;
- Smaller fleet of vehicles to maintain and insure;
- Low number of buildings to maintain;
- Less complex compost process;
- Small environmental impacts as compared to an engineered landfill system.

It should be noted that Option 6, the preferred option from a financial perspective, is based on the assumption that curb side residential collection will be contracted to third party interest. Concerns have been expressed by municipal leaders[30] that contracted curb side collection will lessen the Corporation's ability to exercise day-to-day control of the service being offered. In the same meeting concern was also expressed that having the Corporation responsible for waste management would lessen Councils' ability to keep

[30] Public Waste Management Consultation, Grand Bank Region, 2008 - Edwards and Associates Ltd.

their respective Towns clean.[31] Towns which currently utilize contracted collection services advise that with properly worded contract documents the Corporation will still maintain control of the waste management services.[32]

From an operational perspective Option 4A or 6A would be the easiest to operate. Both options offer a 2 stream weekly single pass curb side collection with full transfer to a host site.

5.4 Comparative Analysis - Implementation

For the most part, residents of the Burin Peninsula area are accustomed to a single green bag collection system with weekly curb side collection occurring on the same day in each week.

Either of the 2 stream options, the Wet Dry System or Co-Mingles System, would provide less of an adjustment for residents; however, the Wet Dry Option would make the possibility of local composting impractical. The wet system would contain a mixture of wet waste and organics, which would require rather complex separation prior to any material going to the compost facility. From a technical perspective, this is achievable, but from a financial perspective, given the rather low volumes of waste involved, the cost per tonne would be rather high.

Implementation of either of the 4 stream source separation systems would prove to be the greatest challenge form an implementation perspective. Residents who now, for the most part, maintain a single green bag for garbage disposal would have to learn to separate their waste into four containers. Under option 3A, this would be further complicated with the corporation offering weekly collection for garbage and organics, and biweekly collection for recyclables and fibers.

[31] Ibid
[32] Personal Interviews, Town of Burin, Town of Harbour Grace, Town of Conception bay South

It is also anticipated that implementation of the proposed residential construction and demolition roll-on / roll-off collection system will prove to be a significant challenge for the Corporation. For the most part, residents are accustomed to having relatively unrestricted access to local dump sites; whereas, under the new management regime, residents will be permitted to dispose of construction and demolition materials at dumpsters (roll-on/roll-off container) situated throughout the region, and enclosed in fenced areas.

Commercial establishments will be required to sort and dispose of their waste at the regional waste management site. This will prove to be an inconvenience for local contractors and businesses; however, it will create a demand for additional services, which will be filled by local waste collection firms. In addition to the inconvenience, it is anticipated that regional businesses will be charge a per tonne disposal fee, similar to any other jurisdiction that has been researched.

From an implementation perspective either of the 2 stream source separation systems would be most favorable.

5.5 Comparative Analysis - Environmental

All nine options investigated under this project would have a positive environmental impact, in that all will see the closure of approximately twenty local dump sites, all will see the end to volume reduction by burning and all will see a degree of waste diversion (organics) from landfill sites.

The four stream system and the 2 stream wet dry system both offer major advances in environmental stewardship for the region. Coupling at source separation with local composting, Option 3A, offers the most environmentally friendly scenario, in that residents need not concern themselves with emissions associated with trucking organic waste over long distances. Options 6 and 6A, Co-mingled 2 stream systems, which are

the most favorable from a financial perspective, would see recyclables and fibers being transferred to the eastern Newfoundland landfill site and hence both options would be considered least favorable from an environmental perspective.

Option 3A, which couples 4 stream at source separation with local composting offers the most environmental friendly approach to waste management for the Burin Peninsula Area.

5.6 Comparative Analysis - Summary

Table 19, Comparative Analysis Summary, presents a comparison matrix which summarizes the most favorable solutions from the various perspectives discussed in Sections 5.1 to 5.5 of this report. In some situations, several options ranked equally, hence they were both checked in the comparative summary.

Evident from this analysis is the fact that Option 6 – Co-mingled 2 stream separation, local composting and transfer of other waste streams to eastern host site offers the most cost effective waste management solution for the Burin Peninsula. This option would also rank high in terms of ease of implementation and operational logistics. However this solution ranked poorly in terms of environmental stewardship, given that recyclables and fibers would be sent to a landfill.

Option 3A, 4 Stream Transfer System to Eastern Host Site – Contracted Collection – Windrow Compost, ranked highest in environmental stewardship while maintaining a reasonable cost alternative. However, implementation of Option 3A will require a significant attitude adjustment for residents and businesses in the region. This alternative will require a switch from single bag collection to a four stream at source separation.

Option	Description	Financial	Employment	Operational	Implementation	Environmental
1	4 Stream Independent System Landfill, Compost, MRF, etc. operated in the region		√			
2	4 Stream Transfer System to Eastern Host Site					
3	4 Stream Transfer System to Eastern Host Site with Local Compost Facility					
4	2 Stream Transfer System to Central Host Site			√	√	
5	2 Stream Transfer System to Central Host Site with Local Compost Facility				√	
4A	2 Stream Transfer System to Central Host Site – Contracted Collection and Haulage				√	
3A	4 Stream Transfer System to Eastern Host Site – Contracted Collection – Windrow Compost					√
6	2 Stream Co-Mingled – Local Compost – Transfer to Eastern Host	√		√	√	
6A	2 Stream Co-Mingled – Transfer to Eastern Host				√	

Table 19, Comparative Analysis Summary

√ . . . . . Favorable

6.0 OTHER WASTE STREAMS

To this point, much of the attention of this report has focused on residential waste. The Burin Peninsula region, like any other populated area, generates many other types of waste, each of which require attention in the Regional Waste Management Strategy. The remainder of this section of the report deals with these streams and offers a waste management strategy for each.

6.1 Industrial, Commercial and Institutional Waste

Source separation will be the responsibility of the waste generator. Business, commercial establishments, etc. will be responsible to supply sorting containers, for use by employees and the general public, at each business location. These clients will be responsible for the transport of their respective wastes to the waste management site. Each vehicle will be weighed as it enters the site and reweighed as it departs. The difference in weight will be applied to a tipping fee, which is estimated at $60.00 per tonne, as presented in Appendix E, Revenue Models – Various Options (Non Residential).

Private collection companies, which offer collection services to commercial establishments, will be required to pay the tipping fee for the waste they deposit at the waste management site. It is anticipated that these charges would be passed along to their respective clients. It is also important to note that these collectors will also be responsible to ensure that the waste they are bringing to the site is separated along the source separation strategy being implemented at the site.

Any business that does not comply with the source separation policy will be charged a penalty of 2.5 times the tipping fee as determined by weight. This penalty fee will be used to compensate the waste management corporation for their time in separating the waste.

Businesses will be encouraged to have their recyclables dropped off at the Green Depots.

6.2 Scrap Metal Waste

The regional waste management site will accept scrap metal at a yet to be determined price per tonne. This revenue source has not been included in the revenue models, as experience has shown that charging a tipping fee for these items often leads to illegal disposal along back roads or inquarry pits.

Residents, industrial users, commercial establishments, etc. will be responsible for the transport of these materials to the regional site. The existing practice of community based collection, by private businesses such as Dominion Metals, etc., will be encouraged as an alternative to bringing the scrap materials to the regional waste management site.

6.3 White Metals

White metals (stoves, fridges, washers, dryers) will be accepted at the waste management site at no charge. These items will be discharged in an orderly fashion in a designated area of the site. When an ample supply is available, a contractor will be hired to drain and dispose of any hazardous fluids that may found in these items. The generating party will be responsible for the transport of these products to the regional waste management site.

Domestic fuel tanks, propane tanks, etc. will also be collected and stored at a designated area inside the site. When an ample supply is available, a transporter will be hired to haul these items to approved recycling stations.

6.4 Automobile Wrecks

Disposal of car wrecks, under the proposed waste management strategy, will only be permitted at approved auto salvage yards. The waste management site, operated by the Burin Peninsula Waste Management Corporation, will not accept any automobile wrecks, however, it may be advantageous for the Corporation to negotiate a price per wreck with the various salvage yards; then when a client calls to have a wreck disposed of, the

Corporation would collect a prescribed fee and issue a pick up request to the respective salvage yard. The salvage yard would be paid by the Corporation.
Alternatively, the Corporation may wish to not be involved in any aspect of automobile salvage, a scenario where competitive markets would dictate the collection fees, etc. In this situation, the Corporation should maintain a list of approved yards through out their jurisdiction, and make the same available to residents of the area, who will undoubtedly be calling requesting this information.

6.5 Bulk Items

It is proposed that bulk items be broken down along source separation strategy being implemented at the waste management site. Weight and size restriction, yet to be determined by the corporation, will be introduced to govern if questionable items can be collected with the normal waste collection system. Items falling outside the set parameters will have to be transported to the regional site at the owners expense.

6.6 Used Tires

The regional waste management strategy must be in compliance with provincial regulations introduced by the Department of Environment and Conservation concerning used tires. The majority of used tires will be collected by the respective service stations / garages, and disposed of through a pre-established collection process set in place by the Multi Materials Stewardship Board.

There may be situations where private residents of the area may want to dispose of used tires at the regional waste management facility. It is recommended that the Corporation accept these items, at a cost neutral basis (charge a drop fee equal to what the corporation would be charged to dispose of the tires), however in all situations the respective persons will be encouraged to dispose of their used tires at the various garages, etc.

The waste management corporation should set aside a temporary storage area for used tires, which will be picked up, at regular intervals, by an approved collection firm and disposed of in accordance with provincial regulations.

6.7 Special Clean Up Periods

Special clean up periods in the respective Towns will be the responsibility of the said Towns. It is proposed that the waste management corporation relax any tipping fees for municipalities who are engaged in such activities, which are aimed at good environmental stewardship. Towns engaged in these practices will be expected to honor the waste separation strategy, implemented for the region, and thus not add additional work load to site personnel. The logistics of how each Town will offer "clean-up periods" will be left to the respective Towns to resolve.

6.8 Christmas Trees

Collection of Christmas trees presents an additional challenge to the waste management corporation. Dry Christmas trees are very flammable, hence storage and sequent pick up by the corporation, carries with it a risk of fire. It may be possible that the used trees could be disposed of at the various Roll-On / Roll-Off yards, situated around the peninsula. This however would see these facilities quickly fill up, and the risk of fire would still be present.

To address the problem of this once a year collection issue, it is recommended that the Corporation implement the following policy:

- Curb side collection of trees will be permitted as long as the trees have been broken down and tied into a manageable bundle, to permit waste collection personnel to handle the same.
- Municipalities wishing to offer Christmas tree pick up, similar to a special clean period, discussed in Section 6.7, Special Clean Up Period, will not be charged any tipping fees at the waste management site.

6.9 Household Hazardous Waste (HHW)

Every effort will be made to remove these substances from the waste stream. The following two strategies are being proposed to accomplish this goal:

- The waste management corporation will coordinate an annual mobile collection service, on a cost neutral basis, with any municipality wishing to be involved in providing HHW collection services to residents of the respective Towns. This may also involve coordination with the Multi Materials Stewardship Board, who already offer a similar service.
- The waste management corporation will set aside a HHW storage area within the waste management site. This area will be supervised by a trained site attendant, and when ample waste is accumulated, the corporation will make arrangements for the disposal of the said waste in an approved manner.

6.10 Biomedical Waste and Sharps

It is recommended that biomedical waste and sharps not be accepted by the Waste Management Corporation. This will not be an issue for the Burin Peninsula Heath Care Corporation, who currently operate a well managed plan for the collection and disposal of biomedical waste and sharps within their facilities. However there is no formal mechanism in place to collect and dispose of similar items being generated at doctors' offices, dental offices, veterinary clinics, morgues, school laboratories, etc.

It is propose that the Waste Management Corporation enter into discussion with the Heath Care Board to investigate the possibility of using their services on a cost recovery basis. That is, doctors, dentists or other contributors will be charged on a fee for service basis for the disposal of these substances. The magnitude of the fees will be based on expenses to the Health Care Board, and the system will operate on a revenue neutral basis[33].

[33] Personal Interview – Doctor's Office, Burin Marystown Area, Jan 2009.

In addition to the above, consideration must be given to the significant numbers of residents who use and dispose of sharps and out dated medical supplies in the study area. The requirement to return certain classifications of medicines to the point of purchase (local drug stores) should be expanded to include any prescription drugs and application devices. The Waste Management Corporation could then implement a plan, similar to that being proposed for doctors' offices, etc. to have these substances collected and disposed of in an approved manner. To maximize participation in this process it is proposed that there be no fees attached to this service.

6.11 Contaminated Soil and Sewerage Sludge

The provincial Department of Environment has implemented policies and regulations to govern the disposal of petroleum contaminated soil. The study area falls within an "exemption area" as defined in Figure 11, Provincial Exemption Areas, for the transportation of petroleum contaminate soils to an approved treatment site.

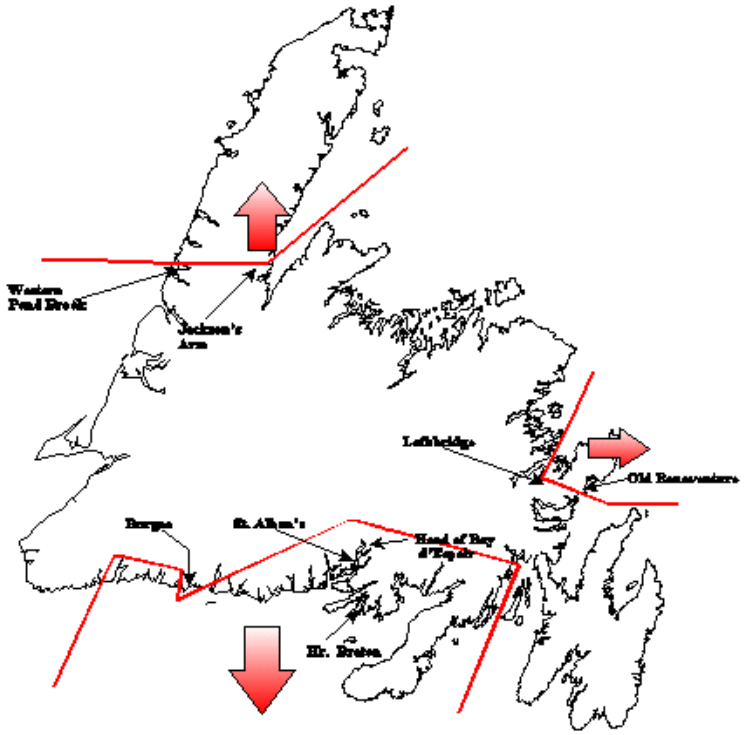


Figure 11, Provincial Exemption Areas

Disposal of contaminated soils in an exempted area can occur at a local site only if the site has an appropriate management plan and it is approved by the Department of Environment and Conservation. In situations where soils have a contamination level of less than 1000ppm, the Waste Management Corporation **may** accept these materials and use such soils for internal waste management operations.

Note, that to date there has not been any contaminated soil receiving sites established in the study area; instead proponents involved in clean up activities have elected to transport contaminated soils to the Sunny Side treatment site, located off the Trans Canada Highway, just east of the municipality of Sunny Side. It should also be noted, that for the most part municipalities have been reluctant to accept any contaminated soil, regardless of the level of contamination.

The proposed waste management site will have a domestic sewerage sludge receiving area, which can be accessed by licensed operators. The corporation will charge a disposal fee based on the weight of sludge being disposed of.

7.0 CONCEPTUAL PLAN – WASTE MANAGEMENT SITE

Section 4.2, Collection Strategies, identified three possible regional waste management sites for the Burin Peninsula, of these the existing Frenchman's Cove Dump site was designated as the preferred site, given that it offered an equitable balance of inconvenience to residents and business located in the various collection zones of the project area. It also met all sighting criteria for the establishment of a regional waste management site.

Appendix W, Conceptual Site Plan, presents a possible layout for the proposed Burin Peninsula Waste Management Site. Major components of the proposed waste management site include:

- A- Scale House and Scales
- B- Household Hazardous Waste
- C- Public Drop area
- D- Administration Building
- E- Maintenance Building
- F- Transfer Building
- G- Compost Building
- H- Compost Staging Area
- I- White Goods Storage
- J- Scrap Metal Storage
- K- Waste Wood Storage
- L- C&D Landfill
- M – Sludge Disposal
- N- Sludge Disposal Treatment
- O- Water Well
- P- Access Gate
- Q- Highway Improvement Area
- R- Septic Disposal Field
- S- Typical Monitoring Well
- T- Fire Fighting Pump/Reservoir

It is being proposed that the Transfer Building, designated as area F, Conceptual Site Plan, be designed to accommodate the following two source separation strategies:

- Option 6 – 2 Stream Co-Mingled – Local Compost – Transfer Other Waste to Eastern Host.
- Option 3A - 4 Stream Transfer System to Eastern Host Site – Contracted Collection – Combination Static Pile / Open Windrow Compost.

It is anticipated that with proper attention to design it may be possible for the Waste Management Corporation to switch from the most cost effective option, Option 6, to the more a more environmentally friendly option, Option 3A. Figure 12, Transfer Building Layout- Option 6 and Figure 13, Transfer Building Layout – Option 3A, present typical layouts for the transfer station

building. A comparison of the two options shows that the overall building dimensions are relatively similar. It also shows that the lower levels could be manipulated to minimize the impact of switching between Option 6 and Option 3A, should the Waste Management Corporation desire to do so.

Enhancements to the highway area are mostly related to providing merge and turn-in lanes, so that regular traffic flow on Route 210 is not interrupted.

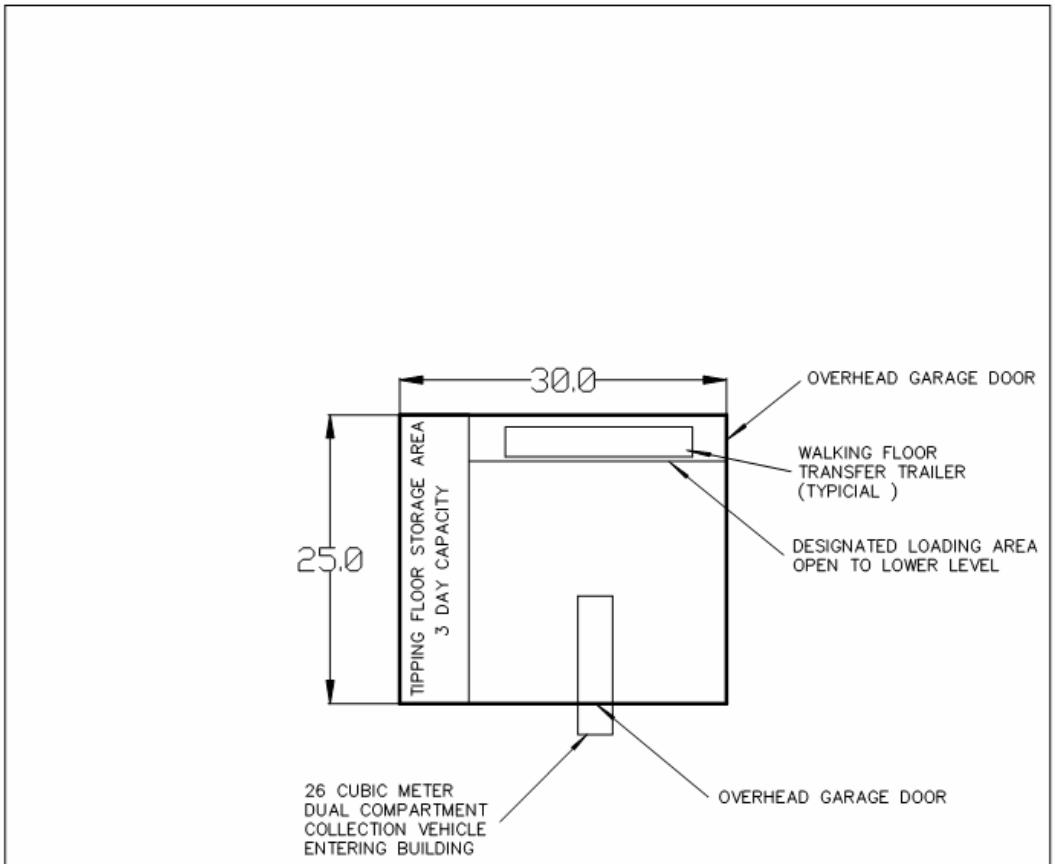


Figure 12, Transfer Building Layout- Option 6

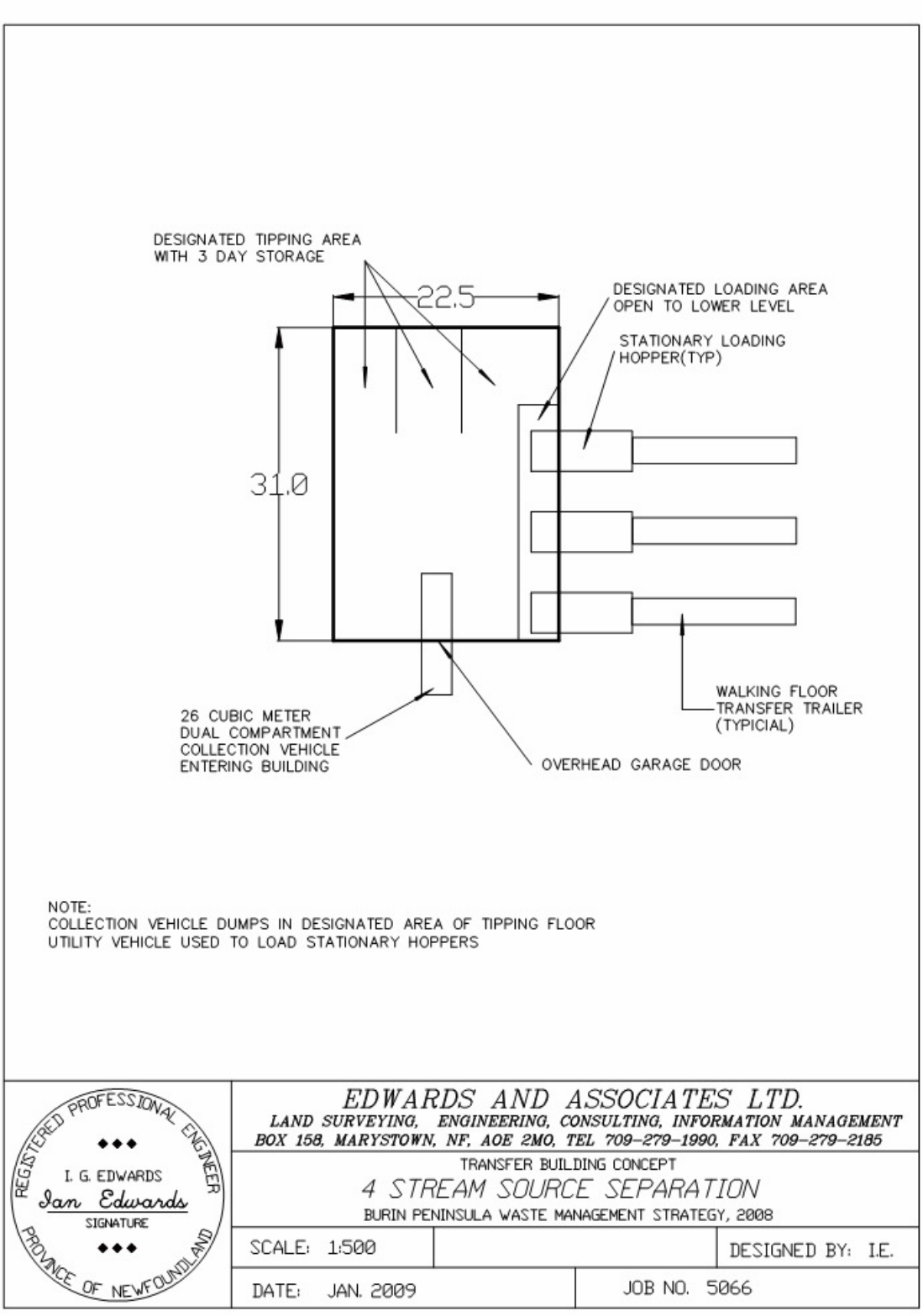


Figure 13, Transfer Building Layout – Option 3A

8.0 PROJECT SCHEDULE

Implementation of the Burin Peninsula Waste Management Strategy will require the coordinated efforts of many stakeholders. There are many tasks to be completed, some of which are on a critical path, while others are peripheral, however still a necessity. It is recommended that the Burin Peninsula Waste Management Corporation secure funding to develop a detailed project plan, which would out line tasks to be performed, assign responsibilities for the tasks, estimate resource levels, and project realistic time lines to see the successful implementation of the Burin Peninsula Waste Management Strategy.

It is recommended that the Burin Peninsula Waste Management Corporation secure funds to hire a consultant to develop a detailed project plan.

Table 20, Project Schedule, presents a very high level schedule to have the Burin Peninsula Waste Management Site opened in a reasonable time frame. It assumes timely review and approval processes by Government Agencies.

ADMINISTRATION	Start Date	End Date
Corporation Approval Conceptual Design	January 16, 2009	January 16, 2009
Prov. Gov. Technical Committee Conceptual Design Approval	January 25, 2009	February 6, 2009
Crown Lands Freeze Proposed Site	January 19, 2009	January 30, 2009
Secure Funding Pre-design Engineering Work	February 6, 2009	February 27, 2009
Secure Title to Land	May 1, 2009	June 1, 2009
Secure Project Funding	May 1, 2009	September 1, 2009
Public Relations	January 1, 2010	November 1, 2010
Labour Relations	June 1, 2010	November 1, 2010
Client Relations	October 1, 2009	November 1, 2010
Contract Preparation	April 1, 2010	September 1, 2010
Operational Issues	May 1, 2010	November 1, 2010
Organizational Issues	June 1, 2010	November 1, 2010
ENGINEERING / TECHNICAL		
Pre-Design Engineering Services	March 1, 2009	June 1, 2009
Preparation of Regulatory Approval Applications	June 1, 2009	August 1, 2009
Main Site	June 1, 2009	September 1, 2010
Municipal C&D Sites	May 1, 2010	September 1, 2010
Equipment Procurement	October 1, 2009	July 1, 2010

Table 20, Project Schedule

Each of the items identified in Table 20, Project Schedule, have many sub tasks associated with it.

9.0 PUBLIC CONSULTATIONS

There were three consultation sessions held during the development of the Burin Peninsula Waste Management Strategy, the first being at Burin, the second being at the Placentia Bay West Development Association Building, near Bay L'Argent, and the third being at Grand Bank. Each session ran for approximately two and a half hours with the chair of the Waste Management Corporation, Cyril Dodge providing opening remarks, followed by a technical presentation by Ian Edwards, Edwards and Associates Ltd., and finally a question and answer session.

Appendix X, Consultation Feed Back, presents a series of letters received from various municipal councils on the Burin Peninsula, all of which endorse the need for improved waste management; however, all have raised several common concerns which may be summarized as follows:

- Municipalities believe that the cost of waste management should be the same through out the entire province. That is, residents of this region should not have to pay any more than a person living in close proximity to one of the host sites.
- Municipalities do not agree that they should be billed for residential curb side collection. Many felt that the provincial government should pay for the service through some form of taxation, or alternatively the Waste Management Corporation should invoice each home independently of the respective municipal council.
- Municipalities felt that having to raise municipal taxes to pay for waste management will lead to many delinquent tax payers, which may lead to cut off of municipal services, a situation that can be very volatile in small communities, where the person you are turning the water off on may very well be a family member or friend. Because of this many council representatives felt that it would be hard to get people in their communities run for council in future municipal elections.

Without a doubt, as this process unfolds and there are more public consultations, there will be other concerns expressed by municipalities, businesses and the general public. For example, in some towns, small businesses have curb side collection offered by the town, similar to residential properties; however, under the proposed collection strategy these small business will have to arrange for collection services, independent of the town. This they will argue will be an unbearable expense, but with time this expense will be passed onto their respective costumers and become a revenue neutral expense for the business involved.

It is recommended that the Waste Management Corporation adopt a policy that would see them engage the public in all aspects of the waste management strategy, when ever and where ever possible.

10 CONCLUSION

The proceeding report summarized a series of investigations to evaluate a preferred waste management strategy for the Burin Peninsula Area. Options investigated ranged from a fully self contained system, complete with engineered landfill, compost, etc., to a transfer station system with residential curb side collection and transfer to a host site being contracted out to third parties. The report focused on site development, acquisition of assets and operational costs in determining a preferred strategy. Other issues, such as handling house hold hazardous waste, or dealing with car wrecks, etc. are also discussed and are for the most part independent of the residential collection strategy. Recommendations to assist with the implementation of the waste management strategy are presented throughout the report.

To conduct the investigation Edwards & Associates Ltd. utilized the following parameters:

- Population base for the study area 21233;
- Population will remain stable for design period of 50 years;
- Total waste generation rate for the region of 2.12 Kg/person/day;
- Residential waste generation at 57% of total waste;
- 75 % capture rate for source separation;
- Collection bulk density of 400 Kg/m^3 and 175 Kg/m^3 for wet waste and dry waste respectively.

Based on the analysis conducted it is recommended that the Burin Peninsula Waste Management Corporation:

1. Operate a 2-Stream Co-Mingled at-source separation waste management system, with the first stream being Organics, and the second being comprised of Garbage, Recyclables and Fibers.
2. Implement a weekly, single-pass, residential curb-side collection with dual compartment collection trucks. Waste should be set out in coloured coded disposal bags and collected on the same day each week.

3. Operate a local compost system utilizing a combination of indoor static pile / open field windrow composting methodology.
4. Transfer co-mingled waste to the eastern Newfoundland Host Site, located at Robin Hood Bay, St John's, NL.
5. Contract residential curb side collection and transfer services to private sector companies.
6. Have the ICI sector responsible for collection and disposal of their waste, with at-source separation per the 2 Stream Co-mingled separation strategy.
7. Develop a modern regional waste management site, complete with construction / demolition landfill, transfer station, composting facility, scrap metal storage, etc. The preferred location for this facility has been identified as the Frenchman's Cove Dump Site, which provides a balance, with respect to local travel time, between the populated regions of the Burin Peninsula.
8. Operate 10 roll-on/roll-off collection facilities, which shall be strategically positioned throughout the collection area to help reduce inconvenience to the private citizens involved in construction and demolition activities. Commercial entities involved in such activities would be expected to utilize the waste management site.
9. Design a Transfer Station building to enable a switch from the Co-mingled 2 Stream system to a 4 Stream system with a minimal amount of refit work.
10. Dedicate sufficient resources for public relations and educational activities.
11. Secure sufficient funds, in a timely manner, to have a consultant prepare a detailed project plan, outlining project tasks, project schedule, resource requirements and responsibility identification to ensure the successful implementation of the waste management strategy.

The project team and the Waste Management Corporation realize that the 2 Stream Co-mingled system, does not meet the 50% diversion criteria, per Appendix A, Terms of Reference, however, this option offers the most cost effective solution, while at the same time improving environmental stewardship. It will lead to the closure of approximately 20 dump sites on the Burin Peninsula, it will eliminate volume reduction by burning, and it will introduce the concept of composting and at source separation. As time progresses and financial resources permit, it may be feasible for the Burin Peninsula Waste Management Corporation to phase in a 4-stream waste management strategy.

A review of Table 18, Summary Costs - Waste Management Options, indicates that residents of the Burin Peninsula would be expected to incur a large portion ($1, 811, 958) of the total operational costs ($2, 342, 681) associated with the proposed waste management strategy; i.e. 77%. In summary these operational costs may be expressed as follows:

Cost per person per year	$85
Cost per house per year	$187
Cost per residential tonne per year	$194

Commercial revenue is based on a $60.00 per tonne tipping fee and expected to contribute approximately $299, 475 towards the total operational cost. This operational cost may be expressed as follows:

Cost per business per year[34]	$600.00

The Cost per business is presented for illustrative purposes only; it is not likely that these operational costs would be equally distributed among the various businesses, as some of the businesses produce larger amounts of waste than others. In addition to this consideration must be given to the fact that commercial establishments will have to incur costs associates with getting their wastes to the regional waste management site.

[34] Based on 499 businesses, Appendix B, ICI Composition – Burin Peninsula

Terms of Reference (at October 18, 2007)

1. Purpose

The purpose of this study is to identify which type of waste facility - or facilities - will best suit the Burin Peninsula, and where it/they should be located in accordance with the requirements of the Provincial Waste Management Strategy.

2. Background

In 2001, the Schooner Regional Development Corporation - the Regional Economic Development Board for Provincial Zone 16 - formed a waste management committee for the purpose of engaging a consultant to conduct a regional waste management strategy for the Burin Peninsula. The resulting Burin Peninsula Waste Management Study was completed in March 2003 by Edwards and Associates, Ltd. of Marystown. In December 2006, the Burin Peninsula Waste Management Corporation was incorporated to move forward with the concepts discussed in the Burin Peninsula Waste Management Study.

3. Consultant Selection

In 2001, a request for proposals was issued by the Schooner Regional Development Corporation's Waste Management Committee to have a Burin Peninsula Waste Management Study completed. Edwards and Associates Ltd. of Marystown was selected to complete the project through a competitive process at that time. In March 2003, their initial study was submitted. The objectives involved in this project are an extension upon that work, and consequently, it is the feeling of the Burin Peninsula Waste Management Corporation that it is best to maintain consistency and have this second phase completed by the same firm.

4. Project Objective

To provide a recommendation as to the best waste management methods and facility site(s) for the Burin Peninsula in accordance with the requirements of the Provincial Waste Management Strategy.

5. Study Requirements

1) The Boundaries of the Study area will be consistent with those of the Burin Peninsula Waste Management Region as laid out in the Provincial Waste Management Strategy.

6. Development of a Waste Management Plan

A) The research brought forth in the Burin Peninsula Waste Management Study's Phase I will have to be updated to suit current provincial government regulations.
B) All recommendations to be brought forth outlining the best waste diversion option for the Burin Peninsula must meet the 50% diversion requirement and all other requirements of the Provincial Waste Management Strategy.

C) In recommending a transfer station with two-stream diversion, the following considerations (a-d) must be included:

i) Analyze costs associated with two-stream system under Central Waste Management (Grand Falls-Windsor area)
- Tipping fees
- Transportation costs per KM from region to super site

ii) Economic feasibility of two-stream separation
- Specific volume and content of residential and commercial waste on the Burin Peninsula
- Number of businesses in region and the composition of their waste
- Number of households in the region, the composition of the waste and their demographic profiles (disposable income, age, etc.)
- Cost of separation of wet and dry waste at regional level
- Cost of not separating wet and dry waste at regional level
- Recommendation as to which waste streams should be separated

iii) Regional collection method
- Recommend method to be used to collect various waste streams i.e. weekly, monthly for special pick up, separator truck verses separate days for "dry" verses "wet" waste.
- Cost analysis of authority-operated collection verses contracted collection

iv) Cost analysis of proposed regional waste system
- Cost of collection and transportation within region
- Costs of collection and transportation from region to super site
- Identification of centroid and design for transfer facility
- Estimated capital costs of system
- Estimated operational costs of system
- Estimated cost per household

D) In recommending a transfer station with four-stream diversion, the following considerations (e-h) must be included:

i) Analyze costs associated with four-stream system under Avalon Waste Management (P[illegible]n Hood Bay)
- Tipping fees
- Transportation costs per KM from region to super site

ii) Economic feasibility of regional waste stream separation
- Specific volume and content of residential and commercial waste on the Burin Peninsula
- Number of businesses in region and the composition of their waste
- Number of households in the region, the composition of the waste and their demographic profiles (disposable income, age, etc.)
- Cost of separation of each of the four waste streams
- Cost of not separating various waste streams at regional level (other than organic)
- Region-specific waste profile outlining: the content of regional waste; the number of businesses in the region and their types/industries; the number of households in the region and demographics pertaining thereto (i.e. age, disposable income, etc.)
- Recommendation as to which waste streams should be separated

iii) Regional collection method
- Recommend method to be used to collect various waste streams i.e. weekly, monthly for special pick up, separator truck verses separate days for various streams

- Cost analysis of authority-operated collection verses contracted collection

iv) Cost analysis of proposed regional waste system
- Cost of collection and transportation within region
- Costs of collection and transportation from region to super site
- Identification of centroid and design for transfer facility
- Estimated capital costs of system
- Estimated operational costs of system
- Estimated cost per household

E) In recommending a Materials Recovery Facility/landfill site, the following considerations must be included (i-k):

i) Cost analysis of proposed regional waste system
- Cost of collection and transportation within region
- Identification of location and design for facility
- Estimated capital costs of system
- Estimated operational and maintenance costs for facility
- Estimated cost per household

ii) Economic feasibility of regional waste stream separation
- Specific volume and content of residential and commercial on the Burin Peninsula
- Number of businesses in region and the composition of their waste
- Number of households in the region, the composition of the waste and their demographic profiles (disposable income, age, etc.)
- Cost of separation of various waste streams
- Region-specific waste profile outlining: the content of regional waste; the number of businesses in the region and their types/industries; the number of households in the region and demographics pertaining thereto (i.e. age, disposable income, etc.)
- Recommendation as to how many waste streams the facility should accommodate (two or more)
- Recommendation of tipping fees

iii) Collection method
- Recommend method to be used to collect various waste streams i.e. weekly, monthly for special pick up, separator truck verses separate days for "dry" verses "wet" waste.
- Cost analysis of authority-operated collection verses contracted collection

F) In recommending local processing of organics while shipping remaining waste, the following considerations must be included (l-n):

i) Cost analysis of proposed composting system
- Cost of collection and transportation within region
- Identification of location and design for facility
- Estimated capital costs of facility
- Estimated operational and maintenance costs for facility
- Estimated cost per household
- Resale opportunities and markets

ii) Economic feasibility of regional waste stream separation
- Specific volume and content of residential and commercial waste on the Burin Peninsula

- Number of businesses in region and the composition of their waste
- Number of households in the region, the composition of the waste and their demographic profiles (disposable income, age, etc.)
- Cost of separation of various waste streams
- Region-specific waste profile outlining: the content of regional waste; the number of businesses in the region and their types/industries; the number of households in the region and demographics pertaining thereto (i.e. age, disposable income, etc.)
- Recommendation as to how many waste streams the facility should accommodate (two or more)
- Recommendation of tipping fees

iii) Collection method

- Recommend method to be used to collect various waste streams i.e. weekly, monthly for special pick up, separator truck verses separate days for "dry" verses "wet" waste.
- Cost analysis of authority-operated collection verses contracted collection

G) A conceptual design of the recommended facility is to be developed.

H) A facility cost analysis is to be provided with a budget and timeline.

I) A financial analysis of capital and operational costs is to be provided.

7. **Contract Control**

Edwards and Associates Ltd. will enter into a contractual agreement with the Burin Peninsula Waste Management Corporation for the completion of the study as per the above outlined Terms of Reference.

All reports developed for the purpose of this study shall be the sole property of the Burin Peninsula Waste Management Corporation, and Edwards and Associates Ltd. shall not publish, release, or in any way use this information, in whole or in part.

8. **Payment**

Payment shall be granted as follows:

30 per cent at start of project; 20 per cent at 50 per cent completion; 25 per cent at 75 per cent completion; and 25 per cent at 100 per cent completion.

9. **Amendments to the Terms of Reference**

Amendments to the Terms of Reference must be made in consultation between the consultant, the Burin Peninsula Waste Management Corporation, the MMSB, the Department of Environment and the Department of Municipal Affairs.

10. **Cost Control**

The consultant shall submit a cost estimate and work schedule for the study. The cost estimate is

to be itemized in detail for each component of the work, and a schedule of professional feeds is to be provided, complete with labour hours for each assignment. The consultant will be expected to complete the project within the cost estimate.

11. **Liaison**

The consultant must report regularly to the Burin Peninsula Waste Management Corporation. Progress meetings with the Corporation will be required, in which work completed will be presented. The consultant will also inform the committee of tasks to be completed in finishing the study.

Consultation is also to be continuously sought with MMSB, the Greater Avalon Waste Management Authority and all relevant government agencies and departments.

12. **Completion**

Projected completion date of the consultant's report will be approximately three months from the date of the award.

13. **Reports and Inquiries**

All reports and inquiries relating to the preparation of the work proposal from these terms of reference should be directed to :

Jeff Pittman
Regional Waste Management Coordinator
Burin Peninsula Waste Management Corporation
P.O. Box 510
Burin Bay Arm, Newfoundland and Labrador
A0E 1E0
Tel. (709) 891-1717

BURIN PENINSULA ICI STATISTICS 2007

	Community	Population 2006	# of Dwellings	Occupied by usual residents	Total No. of Businesses	Automotive (Repairs/Garages)	Bar/Lounge	Bar/Restaurant	Restaurant/ Fastfood /Takeout	Hotel/Restaurant	Commnity Centre(Legion/Club	Convenience/ General Store	Drug Store	Grocery/Hardware	Gas Station	Hair/Beauty Salon	Retail (clothing, furniture, Computers, auto parts, etc.	Church	Fish Plant, Seafood Processing	Industrial (Construction, Manufacturing)	Health Care (Dental, Medical)	Liquor Store	Senior's Home	Parks	Painting, Carpentry, Woodworks	Post Office	Professional Service	Schools	Town Hall	Transprotation	Other	Category Breakdown
Burin Peninsula	**Statistics Canada**	**22,298**	**11,677**	**8,712**																											
Placentia Bay West Centre	**Baine Harbour**	134	73	55	3						1	1																1			
	Parker's Cove	308	123	110	9						1	1						1			1	1							1		3	**Other** (2 Fish Buyers, 1 Wood-working Shop)
	Red Harbour	170	85	79	6						1	1						1								1			1		1	**Other** (1 fish buyer)
	Rushoon	319	139	125	3						1							1											1			
	Boat Harbour	185	62	48	4			1				1			1												1					
	Brookside	63	28	26	0																										
	Petit Forte	90	27	20	2							1														1					
	South East Bight	110	36	25	0																										
	Monkstown	30	25	22	3							1						1								1					
Bay L'Argent Area	**Little Bay East**	140	66	53	2						1															1					
	St. Bernard's - Jacques Fontaine	525	228	197	10						2	1	1		2			2									1	1			**Profess Serv.**(Fortune Bay East Empl. Services)
	Bay L'Argent	287	148	124	6						1	1		1				1				1							1			
	Harbour Mille / Little Harbour East	220	84	74	4						1			1				1								1					
Terrenceville Area	**Terrenceville**	526	224	224	21	1	1		1		1	2		2				1		3	1						5	1	1	1		**Industrial** (3 Contractors)
	English Harbour East	169	64	58	3							1															1		1			
	Grand Le Pierre	264	92	91	3							1			1														1			
Mortier Bay	**Marystown**	5,436	2,403	2,061	165	12	2	3	11	2	6	5	2	4	4	6	31	5	1	12	9	1	1		9	1	20	4	1	7	6	**Industrial** (10 Contractor/Constr, 1 Ship Yard, 1 Scrap Yard) **Prof.Serv**. (2 Law Firm, 3 Sur/Eng, 5 Ins., 3 Banking, 7 Financial ser., 2 Real Estate, 2 Consulting, 2 Assocociations, Travel Agent) **Other** (3 Daycare, 1 Gym, 1 Recycling Depot, 1 Funeral Home)
	Winterland	337	176	124	4						1							1											1		1	**Other** (Farmer's Depot (3 or 4 farmers share Agriculture building to store & process vegetables)
	Beau Bois	54	19	19	0																										
	Jean De Baie	150	50	48	2						1					1															
	Rock Harbour	60	30	24	1						1																				
	Spanish Room	131	53	52	3																									3	**Other** (B & B, Gift/Craft Shop, Kayaking Shop)
Burin Area	**Burin**	2,483	1,119	972	69	6	4		4		3	3	1	2	2	4	1		2	3	3				2		5	4	1	4	15	**Health Care** includes 1 Hospital & 1 Medical Clinic (4 Doctors), 1 Chiropractor **Prof Serv.** (1 Bank, 4 Associations **Industrial** (3 Contractors) **Other** (1 Cinima, 2 B & B, 2 Funeral Homes, 10 other)
	Fox Cove-Mortier	331	135	127	4							1					1													2	**Other** (1 Dick's Taxi/ Yvonne's Bakery)
	Lewin's Cove	566	240	230	3						1													1					1		
	Big Salmonier / Epworth	250	125	115	2													1								1					
St. Lawrence Area	**St. Lawrence**	1,349	589	488	27		3		1	1	2		1	2	1				1		1		1			1		1	1		10	**Other** (Curling rink, hair salon, 2 take-outs, Museum, ABM Bldg.)
	Little St. Lawrence	132	94	48	3						1	1			1																
Lamaline Area	**Lamaline**	300	145	135	13	1		1	1			1			1		1	2				1				1		1	1		1	**Other (**Dev. Association includes Brighter Futures, Keyin Training Centre)
	Lord's Cove	207	94	82	3						1	1			1																
	Point May	260	115	95	0																										
	Point au Gaul	85	41	34	0																										
	Lawn	705	294	267	8		1		1		1	1			1			1		1								1			
	Taylor's Bay	5	5	4	0																										
Fortune-Grand Bank Area	**Fortune**	1,458	779	614	30		2		3			2		1		1	10		1	3							1	1	1		4	**Other** (1 Off loading fishing/longliners, 3 B & B)
	Frenchman's Cove	166	146	70	9							1						3							1				1		3	**Other** (Cabins for rent, Golf Course)
	Garnish	578	309	235	9				1		1	1			1			3								1			1			
	Grand Bank (includes L'Anse au Loup)	2,580	1,197	1,089	65	5	1		3	1	3	3	1		1	4	6		1	4	2	1			8		7		1	3	10	**Industrial** (3 Construction, 1 Metal shop) **Prof.Serv.** (1 Bank, 1 Accting, 1 Advertising, 4 Insurance) **Other** (3 B&B, 1 sewing, 1 wood crafts, 2 Gift shop/flower shop, radio repair, 1 funeral home, 1 laudromat, 1 Airplanes)
	Grand Beach	70	25	20	0																										
	Total	**21,233**	**9,687**	**8284**	**499**	**25**	**14**	**5**	**26**	**4**	**32**	**32**	**6**	**13**	**17**	**16**	**50**	**25**	**6**	**26**	**17**	**5**	**2**	**2**	**19**	**10**	**41**	**15**	**17**	**15**	**59**	

UNIT PRICE TABLE
BURIN PENINSULA WASTE MANAGEMENT STRATEGY - 2008

Site Development		Units	Cost	Fuel / Day
Clearing / Grubbing		ha	$ 7,000.00	
Site grading per cubic meter		m^3	$ 5.00	
mass excavation		m^3	$ 12.00	
Mass Import Material		m^3	$ 10.00	
Mass Import Material		m^3	$ 25.00	
Ditching		m	$ 12.00	
Class A per cubic meter		m^3	$ 32.00	
Asphalt (Surface Course)		t	$ 150.00	
Road Culverts (600mm CSP)		m	$ 150.00	
Sub base material		m^3	$ 30.00	
Monitoring Wells		Each	$ 2,500.00	
Fencing		m	$ 50.00	
washed Stone		m^3	$ 35.00	
HDPE liner Install / m sq		m^2	$ 20.00	
Filter fabric / m sq		m^2	$ 2.00	
100mm cell drainage pipes		m	$ 45.00	
Transit leachate pipes (300mm Dia SDR35) include trench excav		m	$ 150.00	
Pipe Fittings (average) installed		Each	$ 200.00	
Topsoil per m sq		m^2	$ 3.00	
Hydro seed / Sod		m^2	$ 3.00	
Prefab Steel Building per m^2		m^2	$ 200.00	
Foundation per m^3		m^3	$ 500.00	
Concrete Floor cw WWM per m^3		m^3	$ 500.00	
Commercial Overhead Garage Doors with Openers		Each	$ 20,000.00	
Loading Hopper for xfer station		Each	$ 50,000.00	
Loading pads		Each	$ 5,000.00	
Internal Building Improvements m2		m^2	$ 100.00	
Covered Structure open sides		m^2	$ 75.00	
Compost Building		m^2	$ 85.00	
Equipment				
Dual Compartment Trucks		Each	$ 210,000.00	120
Dual Compartment Trucks		Each	$ 190,000.00	120
Walking Floor Trailers		Each	$ 125,000.00	
Day Cab Truck		Each	$ 120,000.00	400
Stake Body Truck small crane and roll on/roll off		Each	$ 125,000.00	120
Excavator		Each	$ 250,000.00	150
Rubber Tire Back Digger		Each	$ 100,000.00	75
Turner and Cradle		Each	$ 75,000.00	
Bag Ripper		Each	$ 30,000.00	
Propane Fork Lift		Each	$ 60,000.00	50
Compost - Mixers, Turners, Aerator, Biofilters,Screener, etc.		Each	$ 2,000,000.00	15000
MRF Ripper Complete with transport belts etc.		Each	$ 500,000.00	
Roll on roll off complete with fences etc		Each	$ 20,000.00	
Roll On - Roll Off Containers		Each	$ 12,000.00	
Service Truck		Each	$ 60,000.00	50
Front End Loader		Each	$ 150,000.00	100
Loading Hoppers		Each	$ 50,000.00	
Heavy Equipment Ramps		Each	$ 30,000.00	
Weight Scales Installed		Each	$ 85,000.00	
Recycling equipment, bag ripper, magnets, belts, etc		Each	$ 2,500,000.00	
Carts 60Liter		Each	$ 28.00	

UNIT PRICE TABLE
BURIN PENINSULA WASTE MANAGEMENT STRATEGY - 2008

Operations		Units	Cost	
Transfer Truck fuel cost per kilometer		km	$ 0.50	
Round trip km to eastern site		km	700.0	
Round trip km to central site		km	800.0	
Round trip hr to eastern site		hr	12.0	
Round trip hr to central site		hr	13.0	
Meal Cost per transfer trip		Trip	$ 25.00	
Labour				
Overhead Factor			1.30	
CEO		hr	$ 25.00	
Site Operations Manager		hr	$ 25.00	
Administrative Assistant		hr	$ 20.00	
Heavy Equipment Operator		hr	$ 20.00	
Truck Drivers (Collection)		hr	$ 20.00	
Truck Attendants		hr	$ 18.00	
Site Attendants		hr	$ 18.00	
Compost Technician		hr	$ 20.00	
Recycling Foreman		hr	$ 20.00	
Secretary		hr	$ 15.00	
Mechanic		hr	$ 20.00	
Mechanic Assistant		hr	$ 15.00	
Design Parameters				
Number of Houses		Each	9,687	
Number of People		Each	21,233	

Curb Side Collection Analysis
Burin Peninsula Waste Management Strategy

Collection Zone	Municipality	Population	Dwellings	Total Dwellings per Zone	Dwellings Per Day - 4 Day Cycle	Travel Times (minutes) per day	Collection time per house (minutes)	Residential Waste Generated kg/p/wk	4 Stream Separation: Organics / week (kg) 75% capture rate	Garbage / week (kg)	Recyclable Containers / week (kg) 75% capture rate	Recyclable Fibers / week (kg) 75% capture rate	Volume Organics / Collection Day 450kg/m³	Volume Garbage / Collection Day 350 kg/m³	Volume Recyclable Containers / Collection Day 150kg/m³	Volume Recyclable Fibers / Collection Day 200kg/m³	Houses / day - 5 day collection cycle	2 Stream Wet Dry Separation: Wet / Week (kg)	Dry / Week (Kg)	Volume Wet / Collection Day 400kg/m³	Volume Dry/ Collection Day 175kg/m³	Travel Times (minutes)	Collection time per house (minutes)	Houses / day - 5 day collection cycle	2- Stream Co-Mingled: Organics / week (kg) 75% capture rate	Co-Mingled Stream (Kg)	Volume Org/ Collection Day 450kg/m³	Volume co-mingled / Collection Day 256kg/m³	Travel Times (minutes per day)	Collection time per house (minutes)
parameters								8.46	30%	25%	10%	23%	450	350	150	200		55.0%	34.0%	400	175				30%	57%	450	256		
Zone 1	**Grand Bank** (includes L'Anse au Loup)	2,580	1,197					21,824	6,547.11	5,401.37	2,127.81	4,910.33						12003	7420						6,547.11	12,439.51				
	Grand Beach	70	25					592	177.63	146.55	57.73	133.23						326	201						177.63	337.51				
	Fortune	1,458	779					12,333	3,699.88	3,052.40	1,202.46	2,774.91						6783	4193						3,699.88	7,029.77				
		4,108		2,001	500	150	0.9	34,757	10,427.16	8,602.41	3,388.83	7,820.37	5.79	6.14	5.65	9.78	400	19116	11817	9.56	13.51	150	0.7	400	10,427.16	19,811.61	4.63	15.48	150	0.7
													Truck 1		Truck 2					Truck 1							Truck 1			
Zone 2	**Lord's Cove**	207	94					1,751	525.29	433.37	170.72	393.97						963	595						525.29	998.05				
	Point May	260	115					2,199	659.79	544.32	214.43	494.84						1210	748						659.79	1,253.59				
	Point au Gaul	85	41					719	215.70	177.95	70.10	161.77						395	244						215.70	409.83				
	Lawn	705	294					5,963	1,789.04	1,475.95	581.44	1,341.78						3280	2028						1,789.04	3,399.17				
	Taylor's Bay	5	5					42	12.69	10.47	4.12	9.52						23	14						12.69	24.11				
	St. Lawrence	1,349	589					11,411	3,423.28	2,824.20	1,112.56	2,567.46						6276	3880						3,423.28	6,504.23				
	Little St. Lawrence	132	94					1,117	334.97	276.35	108.86	251.23						614	380						334.97	636.44				
	Lamaline	300	145					2,538	761.29	628.07	247.42	570.97						1396	863						761.29	1,446.45				
	Lewin's Cove	566	240					4,788	1,436.30	1,184.95	466.80	1,077.23						2633	1628						1,436.30	2,728.98				
	Big Salmonier / Epworth	250	125					2,115	634.41	523.39	206.18	475.81						1163	719						634.41	1,205.38				
		3,859		1,742	436	150	1.0	32,643	9,792.75	8,079.02	3,182.64	7,344.56	5.44	5.77	5.30	9.18	348	17953	11098	8.98	12.68	150	0.8	348	9,792.75	18,606.23	4.35	14.54	150	0.9
													Truck 3		Truck 4					Truck 2							Truck 2			
Zone 3	**Burin**	2,483	1,119					21,003	6,300.96	5,198.29	2,047.81	4,725.72						11552	7141						6,300.96	11,971.82				
	Fox Cove-Mortier	331	135					2,800	839.96	692.97	272.99	629.97						1540	952						839.96	1,595.92				
	Frenchman's Cove	166	146					1,404	421.25	347.53	136.91	315.94						772	477						421.25	800.37				
	Garnish	578	309					4,889	1,466.76	1,210.07	476.70	1,100.07						2689	1662						1,466.76	2,786.84				
	Winterland	337	176					2,851	855.18	705.53	277.94	641.39						1568	969						855.18	1,624.85				
	Marystown (Part of Creston South)	900	300					7,613	2,283.88	1,884.20	742.26	1,712.91						4187	2588						2,283.88	4,339.36				
		4,795		2,185	546	150	0.8	40,560	12,167.98	10,038.59	3,954.59	9,125.99	6.76	7.17	6.59	11.41	437	22308	13790	11.15	15.76	100	0.7	437	12,167.98	23,119.17	5.41	18.06	100	0.8
													Truck 5		Truck 6					Truck 3							Truck 3			
Zone 4	**Marystown (less part of Creston South)**	4,536	2,103					38,369	11,510.74	9,496.36	3,740.99	8,633.05						21103	13045						11,510.74	21,870.40				
	Beau Bois	54	19					457	137.03	113.05	44.54	102.77						251	155						137.03	260.36				
	Rock Harbour	60	30					508	152.26	125.61	49.48	114.19						279	173						152.26	289.29				
	Spanish Room	131	53					1,108	332.43	274.26	108.04	249.32						609	377						332.43	631.62				
		4,781		2,205	551	60	1.0	40,442	12,132.46	10,009.28	3,943.05	9,099.34	6.74	7.15	6.57	11.37	441	22243	13750	11.12	15.71	60	0.8	441	12,132.46	23,051.67	5.39	18.01	60	0.9
													Truck 7		Truck 8					Truck 4							Truck 4			
Zone 5	**Jean De Baie**	150	50					1,269	380.65	314.03	123.71	285.48						698	431						380.65	723.23				
	Baine Harbour	134	73					1,133	340.04	280.54	110.51	255.03						623	385						340.04	646.08				
	Parker's Cove	308	123					2,605	781.59	644.81	254.02	586.19						1433	886						781.59	1,485.03				
	Red Harbour	170	85					1,438	431.40	355.90	140.20	323.55						791	489						431.40	819.66				
	Rushoon	319	139					2,698	809.51	667.84	263.09	607.13						1484	917						809.51	1,538.06				
	Boat Harbour	185	62					1,565	469.46	387.31	152.58	352.10						861	532						469.46	891.98				
	Brookside	63	28					533	159.87	131.89	51.96	119.90						293	181						159.87	303.76				
	Petit Forte	90	27					761	228.39	188.42	74.23	171.29						419	259						228.39	433.94				
	South East Bight	110	36					930	279.14	230.29	90.72	209.36						512	316						279.14	530.37				
	Monkstown	30	25					254	76.13	62.81	24.74	57.10						140	86						76.13	144.65				
	Little Bay East	140	66					1,184	355.27	293.10	115.46	266.45						651	403						355.27	675.01				
	St. Bernard's - Jacques Fontaine	525	228					4,441	1,332.26	1,099.12	432.98	999.20						2442	1510						1,332.26	2,531.30				
	Bay L'Argent	287	148					2,428	728.30	600.85	236.70	546.23						1335	825						728.30	1,383.78				
	Harbour Mille / Little Harbour East	220	84					1,861	558.28	460.58	181.44	418.71						1024	633						558.28	1,060.73				
	Terrenceville	526	224					4,449	1,334.80	1,101.21	433.81	1,001.10						2447	1513						1,334.80	2,536.12				
	English Harbour East	169	64					1,430	428.86	353.81	139.38	321.65						786	486						428.86	814.84				
	Grand Le Pierre	264	92					2,233	669.94	552.70	217.73	502.45						1228	759						669.94	1,272.88				
		3,690		1,554	389	180	1.1	31,213	9,363.89	7,725.21	3,043.26	7,022.92	5.20	5.52	5.07	8.78	311	17167	10612	8.58	12.13	180	0.8	311	9,363.89	17,791.39	4.16	13.90	180	0.9
													Truck 9		Truck 10					Truck 5							Truck 5			
	Total	21,233	9687	9687				179,614	53,884																					
								9,339.94	2,801.98																					

Notes																														
												Haulage Analysis Full Transfer								Haulage Analysis Full Transfer								Haulage Analysis Full Transfer		
											I collect day	m^3	29.94	31.75	29.19	50.52				49	70					I collect day	m^3	24	80		
Volume of Transfer trailer		104	m3								1 collect day	kg	13,471	11,114	4,378	10,103				19758	12214					1 collect day	kg	10777	20476		
Max load of semitrailer		28,800	kg								2 collect days	kg	26942	22227	8756	20207					24428					2 collect days	kg	21554	40952		
											3 collect days	kg	40413	33341	13134	30310										3 collect days	kg	32331	61428		
											4 collect days	kg			17512	40413														
											collection days per Xfer Truck trip		2.1	2.6	3.6	2.1				1.5	1.5					collection days per Xfer Truck trip		2.7	1.4		
											Computed Trips per week		1.9	1.5	1.1	1.9				3.4	3.3					Computed Trips per week		1.9	3.6		
											Trips per week		2	2	1	2				4.0	4.0					Trips per week		2	4		
											Kg per Trip		28800	28800	15660	20880				24697	18270					Kg per Trip		26942	25595		
												Haulage Analysis Compost Here (assume 20% of fibers to compost)						Haulage Analysis Compost Here (assume 20% of fibers to compost)												
											1 day	m^3		31.8	29.2	40.4			WET		Dry										
											1 collect day	kg		11,114	4,378	8,083			comp (50%)	transfer (50%)	Comp (10%)	Trans (90%)									
											2 collect days	kg		22227	8756	16165		1 day	9879	9879	1221	10992									
											3 collect days	kg		33341	13134	24248		2 days	19758	19758	2443	21985									
																		3 days	29636	29636	3664	32977									
											per transfer trip			2.6	3.6	2.6		1 day m^3		24.7		62.8									
											Computed Trips per week f(4 day week)			1.5	1.1	1.5		Collection days per transfer trip		2.9		1.7									
											Trips per week			2	1	2															
											Kg per trip			28800	15660	20880		Computed Trips per week f(5 day week)		1.7		3.0									
																		Trips per week		2		3									
																		Tonnes per trip		28800		18270									

Sheet E2 - Recyclable Revenue

Total annual waste stream			15477										
Fuel Cost per Km			0.5										
type	tonnes	tonnes per trip	Revenue/tonne	Total rev per trip	Fuel cost per Trip		Labour Cost	Meal Cost	Ferry Charge	Total cost	Profit/trip	No Trips/yr	profit / yr
paper	5417	21	100	2100	3000	$ 1,500.00	$ 624.00	100	300	$ 2,524.00	$ (424.00)	258	$ (109,371.81)
plastic	1702	16	200	3200	3000	$ 1,500.00	$ 624.00	100	300	$ 2,524.00	$ 676.00	106	$ 71,909.50
metal can /	63	16	1500	24000	3000	$ 1,500.00	$ 624.00	100	300	$ 2,524.00	$ 21,476.00	4	$ 84,561.75
Glass	619	16	0	0	3000	$ 1,500.00	$ 624.00	100	300	$ 2,524.00	$ (2,524.00)	39	$ (97,647.25)
hhw	155	21	0	0	3000	$ 1,500.00	$ 624.00	100	300	$ 2,524.00	$ (2,524.00)	7	$ (18,629.52)
													$ (69,177.33)
									vehicle maintenance and replacement fund				-44400
											net		$ (113,577.33)
		Note: very little cross contamination permitted. Could truck it all the way and have the load rejected.											

Appendix E - Revenue Models Various Options (Non Residential)

Source	Unit	No. Units	Revenue Per Unit	Revenue Independent System Option 1	4 Stream No Compost Option 2		4 Stream With Compost Revenue Option 3		2 Stream No Compost Revenue Option 4		2 Stream No Compost Revenue Contracted collection and transfer Option 4A		2 Stream with Compost Revenue Option 5		4 Stream With Compost Revenue Contracted Collection and Transfer Option 3		C0-Mingled 2 Stream with Compost Revenue Option 6		C0-Mingled 2 Stream Full Transfer Option 6 A	
Residential					No. Units	Revenue														
Collection Per House	Household	9,687			9,687		9,687		9,687		9,687		9,687		9,687		9,687		9,687	
Gov Subsidy																				
Haulage Revenue from Gov				$ -		$ 253,571.14		$ 184,367.14		$ 290,564.57		$ 436,800.00		$ 184,388.57		$ 227,500.00		$ 182,000.00		$ 273,000.00
Haulage from Gov extra																				
Commercial																				
Business (ICI) including C&D	Per Tonne	4,991	$ 60.00	$ 299,475.00	4,991	$ 299,475.00	4,991	$ 299,475.00	4,991	$ 299,475.00	4,991	$ 299,475.00	4,991	$ 299,475.00	4991	$ 299,475.00	4,991	$ 299,475.00	4,991	$ 299,475.00
Recycling																				
Sale of Recyclables				$ (113,577.33)																
Compost	m3	4,458	$ 6.00	$ 26,748.00			4,458	$ 26,748.00					4,458	$ 26,748.00	4458	$ 26,748.00	4,458	$ 26,748.00	0	
Scrap Metal	Kg	50,000	$ 0.45	$ 22,500.00	50,000	$ 22,500.00	50,000	$ 22,500.00	50,000	$ 22,500.00	50,000	$ 22,500.00	50,000	$ 22,500.00	50000	$ 22,500.00	50,000	$ 22,500.00	50,000	$ 22,500.00
Total				$ 235,145.67		$ 575,546.14		$ 533,090.14		$ 612,539.57		$ 758,775.00		$ 533,111.57		$ 576,223.00		$ 530,723.00		$ 594,975.00
Notes:																				
See Sheet E2 for particulars on sale of recyclables																				

Appendix F - Equipment Summary Various Options

Item	Pay Unit	OPTION 1 (SELF CONTAINED SYSTEM) Quantity	Unit Price	Cost	FUEL PER VEHICLE / YR.	TOTAL FUEL	OPTION 2 (4 STREAM FULL TRANSFER) Quantity	Cost	FUEL PER VEHICLE / YR.	TOTAL FUEL	OPTION 3 (4 STREAM COMPOST HERE) Quantity	Cost	FUEL PER VEHICLE / YR.	TOTAL FUEL	OPTION 4 (2 STREAM FULL TRANSFER) Quantity	Cost	FUEL PER VEHICLE / YR.	TOTAL FUEL
Collection Equipment																		
Dual Compartment Collection Trucks (18m^3)	Each	5	$ 190,000.00	$ 950,000.00	$ 24,960.00	$ 124,800.00	5	$ 950,000.00	$ 24,960.00	$ 124,800.00	5	$ 950,000.00	$ 24,960.00	$ 124,800.00	0	$ -	$ 24,960.00	$ -
Dual Compartment Collection Trucks (26m^3)	Each	5	$ 210,000.00	$ 1,050,000.00	$ 24,960.00	$ 124,800.00	5	$ 1,050,000.00	$ 24,960.00	$ 124,800.00	5	$ 1,050,000.00	$ 24,960.00		5	$ 1,050,000.00	$ 24,960.00	$ 124,800.00
Stake Body Truck roll on / roll off with crane	Each	1	$ 125,000.00	$ 125,000.00	$ 31,200.00	$ 31,200.00	1	$ 125,000.00	$ 31,200.00	$ 31,200.00	1	$ 125,000.00	$ 31,200.00	$ 31,200.00	1	$ 125,000.00	$ 31,200.00	$ 31,200.00
Municipal Roll on / Roll off Units with fences etc	Each	10	$ 20,000.00	$ 200,000.00			10	$ 200,000.00			10	$ 200,000.00			10	$ 200,000.00		
60 liter Carts	each	9,687	$ 28.00	$ 271,236.00			9,687	$ 271,236.00			9,687	$ 271,236.00						
Subtotal				**$ 2,596,236.00**				**$ 2,596,236.00**				**$ 2,596,236.00**				**$ 1,375,000.00**		
Mobile Site Equipment																		
Excavator	Each	1	$ 250,000.00	$ 250,000.00	$ 39,000.00	$ 39,000.00	1	$ 250,000.00	$ 39,000.00	$ 39,000.00	1	$ 250,000.00	$ 39,000.00	$ 39,000.00	1	$ 250,000.00	$ 39,000.00	$ 39,000.00
Front End Loader	Each	1	$ 150,000.00	$ 150,000.00	$ 26,000.00	$ 26,000.00	0		$ 26,000.00	$ -	1	$ 150,000.00	$ 26,000.00	$ 26,000.00	0	$ -	$ 26,000.00	$ -
Rubber Tire Back Digger	Each	1	$ 100,000.00	$ 100,000.00	$ 27,900.00	$ 27,900.00	1	$ 100,000.00	$ 27,900.00	$ 27,900.00	1	$ 100,000.00	$ 27,900.00	$ 27,900.00	1	$ 100,000.00	$ 27,900.00	$ 27,900.00
SubTotal				**$ 500,000.00**				**$ 350,000.00**				**$ 500,000.00**				**$ 350,000.00**		
Compost Equipment																		
Mixers, Turners, Aerator, Biofilters,Screener, etc.	Each	1	$ 2,000,000.00	$ 2,000,000.00	$ 20,000.00	$ 20,000.00	0	$ -	$ -	$ -	1	$ 2,000,000.00	$ 15,000.00	$ 15,000.00	0	$ -	$ -	$ -
SubTotal				**$ 2,000,000.00**				**$ -**	$ -			**$ 2,000,000.00**	$ -			**$ -**	$ -	
Recyclable Equipment									$ -				$ -				$ -	
Propane Fork Lift	Each	1	$ 60,000.00	$ 60,000.00	$ 15,600.00	$ 15,600.00	1	$ 60,000.00	$ 15,600.00	$ 15,600.00	1	$ 60,000.00	$ 15,600.00	$ 15,600.00	1	$ 60,000.00	$ 15,600.00	$ 15,600.00
Loading Hoppers	Each	2	$ 50,000.00	$ 100,000.00			4	$ 200,000.00	$ -		3	$ 150,000.00	$ -		2	$ 100,000.00	$ -	
Bag rippers, magnets, belts etc	LS	1	$ 2,500,000.00	$ 2,500,000.00	$ 15,000.00	$ 15,000.00						$ 200,000.00						
Subtotal				**$ 2,660,000.00**				**$ 260,000.00**	$ -			**$ 410,000.00**	$ -			**$ 160,000.00**	$ -	
Transfer Equipment									$ -				$ -				$ -	
Day Cab Trucks	Each	1	$ 120,000.00	$ 120,000.00	$ 70,200.00	$ 70,200.00	2	$ 240,000.00		$ 163,800.00	1	$ 120,000.00		$ 117,000.00	2	$ 240,000.00		$ 208,000.00
Transfer Trailers	Each	2	$ 125,000.00	$ 250,000.00			6	$ 750,000.00	$ -		5	$ 625,000.00	$ -		4	$ 500,000.00	$ -	
SubTotal				**$ 370,000.00**				**$ 990,000.00**	$ -			**$ 745,000.00**	$ -			**$ 740,000.00**	$ -	
Public Drop Area									$ -				$ -				$ -	
Roll on Roll Off Containers	Each	10	$ 12,000.00	$ 120,000.00			10	$ 120,000.00	$ -		10	$ 120,000.00	$ -		10	$ 120,000.00	$ -	
Subtotal				**$ 120,000.00**				**$ 120,000.00**	$ -			**$ 120,000.00**	$ -			**$ 120,000.00**	$ -	
Maintenance Building Equipment									$ -				$ -				$ -	
Ramps	Each	2	$ 30,000.00	$ 60,000.00			2	$ 60,000.00	$ -		2	$ 60,000.00	$ -		2	$ 60,000.00	$ -	
Miscellaneous	LS	1	$ 20,000.00	$ 20,000.00			1	$ 20,000.00	$ -		1	$ 20,000.00	$ -		1	$ 20,000.00	$ -	
SubTotal				**$ 80,000.00**				**$ 80,000.00**	$ -			**$ 80,000.00**	$ -			**$ 80,000.00**	$ -	
Administration Building Equipment									$ -				$ -				$ -	
Office Furniture	LS	1	$ 20,000.00	$ 20,000.00			1	$ 20,000.00	$ -		1	$ 20,000.00	$ -		1	$ 20,000.00	$ -	
Computers / Projectors / Displays	LS	1	$ 20,000.00	$ 20,000.00			1	$ 20,000.00	$ -		1	$ 20,000.00	$ -		1	$ 20,000.00	$ -	
SubTotal				**$ 40,000.00**				**$ 40,000.00**	$ -			**$ 40,000.00**	$ -			**$ 40,000.00**	$ -	
General Service Vehicle									$ -				$ -				$ -	
Gang Truck	each	1	$ 60,000.00	$ 60,000.00	$ 13,000.00	$ 13,000.00	1	$ 60,000.00	$ 13,000.00	$ 13,000.00	1	$ 60,000.00	$ 13,000.00	$ 13,000.00	1	$ 60,000.00	$ 13,000.00	$ 13,000.00
Subtotal				**$ 60,000.00**				**$ 60,000.00**				**$ 60,000.00**				**$ 60,000.00**		
Totals				***$ 8,426,236.00***		**$ 507,500.00**		***$ 4,496,236.00***		**$ 540,100.00**		***$ 6,551,236.00***		**$ 409,500.00**		***$ 2,925,000.00***		**$ 459,500.00**

Appendix F - Equipment Summary Various Options

Item	Pay Unit	OPTION 4A (2 STREAM contract collection) Quantity	Cost	FUEL PER VEHICLE / YR.	TOTAL FUEL	OPTION 3A (4 STREAM contract collection) Quantity	Cost	FUEL PER VEHICLE / YR.	TOTAL FUEL	OPTION 6 (2 stream co-mingled - Local Compost) Quantity	Cost	FUEL PER VEHICLE / YR.	TOTAL FUEL	OPTION 6 (2 stream co-mingled Full Transfer) Quantity	Cost	FUEL PER VEHICLE / YR.	TOTAL FUEL
Collection Equipment																	
Dual Compartment Collection Trucks (18m^3)	Each	0	$ -			0	$ -	0	0	0	$ -	0	0	0	$ -	0	0
Dual Compartment Collection Trucks (26m^3)	Each	0	$ -	0	0	0	$ -			0	$ -			0	$ -		
Stake Body Truck roll on / roll off with crane	Each	1	$ 125,000.00	$ 31,200.00	$ 31,200.00	1	$ 125,000.00	$ 31,200.00	$ 31,200.00	1	$ 125,000.00	$ 31,200.00	$ 31,200.00	1	$ 125,000.00	$ 31,200.00	$ 31,200.00
Municipal Roll on / Roll off Units with fences etc	Each	10	$ 200,000.00			10	$ 200,000.00			10	$ 200,000.00			10	$ 100.00		
60 liter Carts	each	0	$ -			0	$ -			0	$ -			0	$ -		
Subtotal			**$ 325,000.00**				**$ 325,000.00**				**$ 325,000.00**				**$ 125,100.00**		
Mobile Site Equipment																	
Excavator	Each	1	$ 250,000.00	$ 39,000.00	$ 39,000.00	1	$ 250,000.00	$ 39,000.00	$ 39,000.00	1	$ 250,000.00	$ 39,000.00	$ 39,000.00	1	$ 250,000.00	$ 39,000.00	$ 39,000.00
Front End Loader	Each	0	$ -			0	$ -			0	$ -			0	$ -		
Rubber Tire Back Digger	Each	1	$ 100,000.00	$ 27,900.00	$ 27,900.00	1	$ 100,000.00	$ 27,900.00	$ 27,900.00	1	$ 100,000.00	$ 27,900.00	$ 27,900.00	1	$ 100,000.00	$ 27,900.00	$ 27,900.00
SubTotal			**$ 350,000.00**				**$ 350,000.00**				**$ 350,000.00**				**$ 350,000.00**		
Compost Equipment																	
Mixers, Turners, Aerator, Biofilters,Screener, etc.	Each	0	$ -			1	**$ 20,000.00**			0				0			
SubTotal							$ 20,000.00				$ 20,000.00						
Recyclable Equipment																	
Propane Fork Lift	Each	0	$ -			1	$ 60,000.00	15600	15600	1	$ 60,000.00	15600	15600	1	$ 60,000.00	15600	15600
Loading Hoppers	Each	2	$ 100,000.00			3	$ 150,000.00			1	$ 50,000.00			2	$ 100,000.00		
Bag rippers, magnets, belts etc	LS	0	$ -			0	$ -			0	$ -			0	$ -		
Subtotal			**$ 100,000.00**				**$ 210,000.00**				**$ 110,000.00**				**$ 160,000.00**		
Transfer Equipment																	
Day Cab Trucks	Each	0	$ -			0	$ -			0	$ -			0	$ -		
Transfer Trailers	Each	4	$ 500,000.00			5	$ 625,000.00			2	$ 250,000.00			3	$ 375,000.00		
SubTotal			**$ 500,000.00**				**$ 625,000.00**				**$ 250,000.00**				**$ 375,000.00**		
Public Drop Area																	
Roll on Roll Off Containers	Each	10	$ 120,000.00			10	$ 120,000.00			10	$ 120,000.00			10	$ 120,000.00		
Subtotal			**$ 120,000.00**				**$ 120,000.00**				**$ 120,000.00**				**$ 120,000.00**		
Maintenance Building Equipment																	
Ramps	Each	0	$ -			0	$ -			0	$ -			0	$ -		
Miscellaneous	LS	1	$ 20,000.00			1	$ 20,000.00			1	$ 20,000.00			1	$ 20,000.00		
SubTotal			**$ 20,000.00**				**$ 20,000.00**				**$ 20,000.00**				**$ 20,000.00**		
Administration Building Equipment																	
Office Furniture	LS	1	$ 20,000.00			1	$ 20,000.00			1	$ 20,000.00			1	$ 20,000.00		
Computers / Projectors / Displays	LS	1	$ 20,000.00			1	$ 20,000.00			1	$ 20,000.00			1	$ 20,000.00		
SubTotal			$ 40,000.00				$ 40,000.00				$ 40,000.00				$ 40,000.00		
General Service Vehicle																	
Gang Truck	each	1	$ 60,000.00	$ 13,000.00	$ 13,000.00	1	$ 60,000.00	$ 13,000.00	$ 13,000.00	1	$ 60,000.00	$ 13,000.00	$ 13,000.00	1	$ 60,000.00	$ 13,000.00	$ 13,000.00
Subtotal			$ 60,000.00				$ 60,000.00				$ 60,000.00				$ 60,000.00		
Totals			***$ 1,515,000.00***		**$ 111,100.00**		***$ 1,770,000.00***		**$ 126,700.00**		***$ 1,295,000.00***		**$ 126,700.00**		***$ 1,250,100.00***		**$ 126,700.00**

Appendix G - Labour Estimates Various Options

	OPTION 1 Indepentent System				Option 2 - 4 stream full transfer		Option 3 - 4 stream compost here		Option 4 - 2 stream full transfer		Option 5 - 2 stream compost here		Option 4 Contracted Collection & Transfer		Option 3 - 4 stream compost here		Option 6 Co-Mingled 2 stream Local Compost		Option 6 Co-Mingled 2 stream Local Compost	
Position	# Positions	Cost Per Hour Including 1.3% Overhead	Hours Per Year/Position	Cost per Year	# Positions	Cost Per Year	# Positions	Cost Per Year	# Positions	Cost Per Year	# Positions	Cost Per Year	# Positions		# Positions	Cost Per Year	# Positions	Cost Per Year	# Positions	Cost Per Year
Manager	1	$ 32.50	2,080	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00
Site Foreman	1	$ 32.50	2,080	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	1	$ 67,600.00	0	$ -	0	$ -	0	$ -	0	$ -
Administrative Assistant	1	$ 26.00	2,080	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00
Secretary	0	$ 19.50	2,080	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Heavy Equipment Operators	2	$ 26.00	2,080	$ 108,160.00	2	$ 108,160.00	2	$ 108,160.00	2	$ 108,160.00	2	$ 108,160.00	2	$ 108,160.00	2	$ 108,160.00	1	$ 54,080.00	1	$ 54,080.00
Truck Drivers (Collection)	11	$ 26.00	2,080	$ 594,880.00	11	$ 594,880.00	11	$ 594,880.00	6	$ 324,480.00	6	$ 324,480.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00
Truck Attendants	11	$ 23.40	2,080	$ 535,392.00	11	$ 535,392.00	11	$ 535,392.00	6	$ 292,032.00	6	$ 292,032.00	1	$ 48,672.00	1	$ 48,672.00	1	$ 48,672.00	1	$ 48,672.00
Truck Drivers (transfer vehicles)	1	$ 26.00	2,080	$ 54,080.00	2	$ 108,160.00	1	$ 54,080.00	2	$ 108,160.00	1	$ 54,080.00	0	$ -	0	$ -	0	$ -	0	$ -
Site Attendants	12	$ 23.40	2,080	$ 584,064.00	6	$ 292,032.00	10	$ 486,720.00	6	$ 292,032.00	10	$ 486,720.00	4	$ 194,688.00	4	$ 194,688.00	4	$ 194,688.00	4	$ 194,688.00
Compost Technician	1	$ 26.00	2,080	$ 54,080.00	0	$ -	1	$ 54,080.00	0	$ -	1	$ 54,080.00	0	$ -	1	$ 54,080.00	1	$ 27,040.00	0	$ -
Recycling Technician	1	$ 23.40	2,080	$ 48,672.00	0	$ -	0	$ -	0	$ -	1	$ 48,672.00	0	$ -	0	$ -	0	$ -	0	$ -
Mechanic	1	$ 26.00	2,080	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	1	$ 54,080.00	0	$ -	0	$ -	0	$ -	0	$ -
Mechanic Assistant	1	$ 19.50	2,080	$ 40,560.00	1	$ 40,560.00	1	$ 40,560.00	1	$ 40,560.00	1	$ 40,560.00	0	$ -	0	$ -	0	$ -	0	$ -
Total	**44**			**$ 2,263,248.00**	**37**	**$ 1,922,544.00**	**41**	**$ 2,117,232.00**	**27**	**$ 1,408,784.00**	**32**	**$ 1,652,144.00**	**10**	**$ 527,280.00**	**11**	**$ 581,360.00**	**10**	**$ 500,240.00**	**9**	**$ 473,200.00**

Appendix H - Utiliy Cost Various Options						
Description	Option 1 Cost/Yr	Option 2 Cost/Yr	Option 3 Cost/Yr	Option 4 Cost/Yr	Option 5 Cost/Yr	Option 3A Cost/Yr
Site Lighting (10 Lights)	$ 2,400.00	$ 2,400.00	$ 2,400.00	$ 2,400.00	$ 2,400.00	2400
Scales and HHW Storage	$ 2,400.00	$ 2,400.00	$ 2,400.00	$ 2,400.00	$ 2,400.00	2400
Administrative Building	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00	6000
Transfer Station Building/Recycling	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	20000
Compost Buildings	$ 20,000.00		$ 20,000.00		$ 20,000.00	12000
Public Drop Area	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00	$ 1,000.00	1000
Maintenance Building	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	12000
Total	$ 63,800.00	$ 43,800.00	$ 63,800.00	$ 43,800.00	$ 63,800.00	55800

Appendix I - Transfer Cost - Various Options

Waste Management Options	4 Stream No Composting				4 Stream with Composting			2 Stream No Composting		2 Stream With Composting		Independent System 4 Stream		Contracted Transfer 2 stream no composting	Contracted Transfer 4 Stream with Composting	Co-Mingled 2 Stream With Composting (Option 6)		Co-Mingled 2 Stream Full Transfer (Option 6A)	
Day Cab Trucks	2				1			2		1		1		2	1	0		0	
Trailers	6				5			4		3		2		4	5	2		3	
Trips per week	7				5			8		5		3		8	5	4		6	
Value of day cab trucks		240000				120000			240000		120000		120000				0		0
Value of trailer		750000				625000			500000		375000		250000				250000		375000
Maintenance of trucks trailer (2%)		19800				14900			14800		9900		7400				5000		7500
Replacement of fund (10%)		99000				74500			74000		49500		37000				25000		37500
	O	G	R	F	G	R	F	W	D	W	D	R	F			Garbage	Organics	Garbage	Organics
Trips by Stream/wk	2	2	1	2	2	1	2	4.0	4.0	2.0	3.0	1	2			4.0	0.0	4.0	2.0
Weight (tonnes per trip)	29	29	16	21	29	16	21	28.8	18.3	28.8	18.3	16	21			25.6	0.0	25.6	26.9
Transportation Cost per tonne by stream (in-house)	35	35	63	48	35	65	48	33.5	52.7	34.0	53.6	61	46			31.7		31.7	30.1
Transportation Cost per tonne by stream contracted)					42	76	58	48.6	76.0							48.0		47.9	45.5
Transportation Cost per tonne per km (in-house)	0.05	0.05	0.09	0.07	0.05	0.09	0.07	0.04	0.07	0.04	0.07	0.09	0.07			0.05		0.05	0.04
Transportation Cost per tonne per km (contracted)					0.06	0.11	0.08	0.06	0.10							0.07		0.07	0.06
Tipping Fee Cost / Tonne	20	65	20	20	65	20	20	87.5	87.5	87.5	87.5	20	20			65.0	0.0	65.0	20.0
Tipping Fee Cost /Year BY STREAM	56040	150256	18213	42030	150256	18213	33624	524160	332514	262080	249386	18213	42030			346045	0	346045	56040
Total tipping fee per year by stream	$ 266,538.43				$ 202,092.87			$ 856,674.00		$ 511,465.50		$ 60,242.59		$ 856,674.00	202,092.87	$ 346,044.64		$ 402,084.26	
Total Tonnes Per Year	8126				4903			9790.6		5845.3		3,012		9,791	4,903.47	5323.8		8125.7	
																In House	Contracted	Contracted	
Round trip Distance (km) Transfer Stat to Host Site	700				700			800.0		800.0		700		800	700.00	700.0		700.0	
Corporation																			
Corporation pay distance 100Km from centroid	200				200			200.0		200.0		200		$ 350.00	$ 350.00	200.0	350.00	350.0	
Fuel Cost per Km	0.50				0.50			0.50		0.50		0.50				0.50	0.00	0.00	
Corporation Round Trip Fuel Cost	100.00				100.00			100.00		100.00		100.00				100.00	0	0.00	
Corporation Labour (Drivers Hours)	4.00				4.00			4.00		4.00		4.00				4.00	0	0.00	
Labour Cost Per Hour	26.00				26.00			26.00		26.00		26.00				26.00	0	0.00	
Corporation Labour Costs	104.00				104.00			104.00		104.00		104.00				104.00	0	0.00	
Maintenance and Replace	93.25				98.24			60.99		65.27		81.32				41.21	0	0.00	
Sub Total Corporation	297.25				302.24			264.99		269.27		285.32		$ 350.00	$ 350.00	245.21	350.00	350.00	
Gov Subsidy																			
Fuel Cost per round trip	250				250			300		300		250		$ 1,050.00	$ 875.00	250	875.00	875	
Labour Cost Per Round Trip	189				189			221		221		189				189		0	
Meal Cost for Each Trip	25.00				25.00			25.00		25.00		25.00				25.00		0.00	
Maintenance and Replacement	233.12				245.60			152.47		163.19		203.30				103.02		0.00	
Sub Total Gov Subsidy	696.62				709.10			698.47		709.19		666.80		$ 1,050.00	$ 875.00	566.52	875.00	875.00	
Total Trip Cost	993.87				1011.35			963.46		978.46		952.12		$ 1,400.00	$ 1,225.00	811.73	1225.00	1225.00	
Annual Direct Costs for Haulage	$ 361,770.00				$ 262,950.00			$ 400,800.00		$ 254,400.00		$ 148,530.00		$ 582,400.00	$ 318,500.00	$ 168,840.00	$ 254,800.00	$ 382,200.00	
Total Transfer Trucking Cost including fuel	628308				465043			1257474		765866		208773		$ 1,439,074.00	$ 520,592.87	514885	600844.6	784284	
Fuel cost	163800				117000			208000		130000		70200				93600		382200	
Avg Cost per tonne	44.5				53.6			40.9		43.5		49.3		59.5	65.0	31.7	47.8	47.0	
Cost per kilometer	1.42				1.44			1.20		1.22		1.36		1.75	1.75	1.16	1.75	1.75	

Note:	In-House	Contracted
Average cost per tonne per kilometer (garbage, organics,wet streams)	$ 0.05	$ 0.06
Average cost per tonne per kilometer (dry, recyclables fibers)	$ 0.08	$ 0.10

Appendix J - Capital and Operational Costs

Operational Scenarios Cost Estimates										
Item	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 5**	**Option 4A**	**Option 3 A**	**Option 6**	**Option 6A**	
	Complete Systems in the Region 4 Stream Separation at Source (50 years)	**Complete Transfer to Eastern Host - 4 Stream Separation**	**Local Organic Compost - Transfer of Garbage & Recyclables to Eastern Host**	**Complete Transfer to Central Host - Wet / Dry Separation**	**Local Organic Compost - Transfer of Garbage & Recyclables to Central Host**	**Complete Transfer to Central Host - Wet / Dry Separation Contracted Transportation**	**Local Organic Compost - Transfer of Garbage & Recyclables to Eastern Host Contract Collection & Haulage**	**Co-Mingled 2 Stream System Local Compost Garbage and Recyclables to Eastern Landfill Contract Collection & Haulage**	**Co-Mingled 2 Stream System Organics, Garbage and Recyclables to Eastern Host Site Contract Collection & Haulage**	**Comments**
Capital Costs										
Site Development										
Electrical	$ 50,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	Per discussions with NF Power
Civil Utilities (Water / Sewer)	$ 300,000.00	$ 250,000.00	$ 250,000.00	$ 250,000.00	$ 250,000.00	$ 250,000.00	$ 250,000.00	$ 250,000.00	$ 250,000.00	LS estimate for firefighting, wash down. Well septic field for domestic use
Eng Landfill Cell Construction (5 yrs)	$ 1,753,211.80								0	Only required for Option 1. See Appendix K for more detail.
Inert Materials Landfill	$ 368,845.25	$ 368,845.25	$ 368,845.25	$ 368,845.25	$ 368,845.25	$ 368,845.25	$ 368,845.25	$ 368,845.25	$ 368,845.25	Required for all options. See Appendix K for more detail.
Leachate Treatment (landfill - 5yrs)	$ 409,115.38									Weed field treatment for landfill, compost and sludge truck - see Appendix M
Leachate Treatment (Compost)			$ 235,272.75		$ 235,272.75		$ 100,000.00	$ 100,000.00	0	Weed field treatment for compost - see Appendix M
Sludge Receiving and Treatment (100 trucks/yr)		$ -	$ 90,000.00	$ -	$ 90,000.00		$ 90,000.00	$ 90,000.00	$ 90,000.00	Weed field treatment for sludge truck dumping - see Appendix M
Cell Closure (Eng Landfill 5yrs)	$ 738,484.00								0	Required for Option 1 - See Appendix L
Access Roads	$ 1,186,679.25	$ 395,559.75	$ 395,559.75	$ 395,559.75	$ 395,559.75	$ 395,559.75	$ 395,559.75	$ 395,559.75	$ 395,559.75	Option1 - 3 Km Asphalt surface, other Options 1 Km. See Appendix N
OnSite Roads	$ 380,152.63	$ 285,114.47	$ 285,114.47	$ 285,114.47	$ 285,114.47	$ 285,114.47	$ 285,114.47	$ 285,114.47	$ 285,114.47	See Appendix O for details
Recycling Transfer Facility	$ 67,579.75	$ 67,579.75	$ 67,579.75	$ 67,579.75	$ 67,579.75	$ 67,579.75	$ 67,579.75	$ 67,579.75	$ 67,579.75	See Appendix P for details
Storage Areas	$ 171,491.22	$ 171,491.22	$ 171,491.22	$ 171,491.22	$ 171,491.22	$ 171,491.22	$ 171,491.22	$ 171,491.22	$ 171,491.22	See Appendix Q for details
Scales and HHW Storage	$ 34,630.99	$ 34,630.99	$ 34,630.99	$ 34,630.99	$ 34,630.99	$ 34,630.99	$ 34,630.99	$ 34,630.99	$ 34,630.99	See Appendix R for details
Maintenance Building	$ 39,979.18	$ 39,979.18	$ 39,979.18	$ 39,979.18	$ 39,979.18	$ 39,979.18	$ 39,979.18	$ 39,979.18	$ 39,979.18	See Appendix T for details
Administrative Building	$ 25,853.01	$ 25,853.01	$ 25,853.01	$ 25,853.01	$ 25,853.01	$ 25,853.01	$ 25,853.01	$ 25,853.01	$ 25,853.01	See Appendix S for details
Public Drop Area	$ 96,807.00	$ 96,807.00	$ 96,807.00	$ 96,807.00	$ 96,807.00	$ 96,807.00	$ 96,807.00	$ 96,807.00	$ 96,807.00	See Appendix U for details
Compost Facility	$ 196,457.38		$ 196,457.38		$ 196,457.38		$ 147,343.03	$ 147,343.03		See Appendix V for details
Subtotal	$ 5,819,286.81	$ 1,775,860.61	$ 2,297,590.73	$ 1,775,860.61	$ 2,007,590.73	$ 1,775,860.61	$ 2,113,203.64	$ 2,113,203.64	$ 1,865,860.61	
Fixed Assets										
Scales and HHW Storage	$ 177,479.50	$ 177,479.50	$ 177,479.50	$ 177,479.50	$ 177,479.50	$ 177,479.50	$ 177,479.50	$ 177,479.50	$ 177,479.50	See Appendix R for details
Administrative Building	$ 218,159.60	$ 218,159.60	$ 218,159.60	$ 218,159.60	$ 218,159.60	$ 218,159.60	$ 218,159.60	$ 218,159.60	$ 218,159.60	See Appendix S for details
Compost Buildings	$ 1,322,500.00		$ 1,322,500.00		$ 1,322,500.00		$ 621,575.00	$ 621,575.00		See Appendix V for details
Public Drop Area	$ 89,268.75	$ 89,268.75	$ 89,268.75	$ 89,268.75	$ 89,268.75	$ 89,268.75	$ 89,268.75	$ 89,268.75	$ 89,268.75	See Appendix U for details
Recycle / Transfer Building	$ 751,709.00	$ 751,709.00	$ 751,709.00	$ 751,709.00	$ 751,709.00	$ 751,709.00	$ 751,709.00	$ 751,709.00	$ 751,709.00	See Appendix P for details
Maintenance Building	$ 612,846.50	$ 612,846.50	$ 612,846.50	$ 612,846.50	$ 612,846.50	$ 459,634.88	$ 459,634.88	$ 459,634.88	$ 459,634.88	See Appendix T for details
Subtotal	$ 3,171,963.35	$ 1,849,463.35	$ 3,171,963.35	$ 1,849,463.35	$ 3,171,963.35	$ 1,696,251.73	$ 2,317,826.73	$ 2,317,826.73	$ 1,696,251.73	
Other Assets										
Collection Equipment	$ 2,596,236.00	$ 2,596,236.00	$ 2,596,236.00	$ 1,375,000.00	$ 1,375,000.00	$ 325,000.00	$ 325,000.00	$ 325,000.00	$ 325,000.00	See Appendix F for details
Mobile Site equipment	$ 500,000.00	$ 350,000.00	$ 500,000.00	$ 350,000.00	$ 600,000.00	$ 350,000.00	$ 350,000.00	$ 350,000.00	$ 350,000.00	See Appendix F for details
Compost Equipment	$ 2,000,000.00	$ -	$ 2,000,000.00	$ -	$ 2,000,000.00	$ -	$ 20,000.00	$ 20,000.00	0	See Appendix F for details
Recycling / Transfer Bldg Equipment	$ 2,660,000.00	$ 260,000.00	$ 410,000.00	$ 160,000.00	$ 2,660,000.00	$ 100,000.00	$ 210,000.00	$ 110,000.00	$ 160,000.00	See Appendix F for details
Transfer Equipment	$ 370,000.00	$ 990,000.00	$ 745,000.00	$ 740,000.00	$ 495,000.00	$ 500,000.00	$ 625,000.00	$ 250,000.00	$ 375,000.00	See Appendix F for details
Public Drop Area	$ 120,000.00	$ 120,000.00	$ 120,000.00	$ 120,000.00	$ 120,000.00	$ 120,000.00	$ 120,000.00	$ 120,000.00	$ 120,000.00	See Appendix F for details
Maintenance Building Equipment	$ 80,000.00	$ 80,000.00	$ 80,000.00	$ 80,000.00	$ 80,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	See Appendix F for details
Administration Building Equipment / Furniture	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	$ 40,000.00	See Appendix F for details
General Service Equipment	$ 60,000.00	$ 60,000.00	$ 60,000.00	$ 60,000.00	$ 60,000.00	$ 60,000.00	$ 60,000.00	$ 60,000.00	$ 60,000.00	See Appendix F for details
Miscellaneous Equipment (2%)	$ 168,524.72	$ 89,924.72	$ 131,024.72	$ 58,500.00	$ 148,600.00	$ 30,300.00	$ 35,400.00	$ 35,400.00	$ 35,400.00	See Appendix F for details
Subtotal	$ 8,594,760.72	$ 4,586,160.72	$ 6,682,260.72	$ 2,983,500.00	$ 7,578,600.00	$ 1,545,300.00	$ 1,805,400.00	$ 1,330,400.00	$ 1,485,400.00	
Total Capital Cost	$ 17,586,010.88	$ 8,211,484.68	$ 12,151,814.80	$ 6,608,823.96	$ 12,758,154.08	$ 5,017,412.33	$ 6,236,430.36	$ 5,761,430.36	$ 5,047,512.33	

Appendix J - Capital and Operational Costs

Operational Expenses (yearly)										
Item	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 5**	**Option 4A**	**Option 3 A**	**Option 6**	**Option 6A**	
	Complete Systems in the Region 4 Stream Separation at Source (50 years)	**Complete Transfer to Eastern Host - 4 Stream Separation**	**Local Organic Compost - Transfer of Garbage & Recyclables to Eastern Host**	**Complete Transfer to Central Host - Wet / Dry Separation**	**Local Organic Compost - Transfer of Garbage & Recyclables to Central Host**	**Complete Transfer to Central Host - Wet / Dry Separation Contracted Transportation**	**Local Organic Compost - Transfer of Garbage & Recyclables to Eastern Host Contract Collection & Haulage**	**Co-Mingled 2 Stream System Local Compost Garbage and Recyclables to Eastern Landfill Contract Collection & Haulage**	**Co-Mingled 2 Stream System Organics, Garbage and Recyclables to Eastern Host Site Contract Collection & Haulage**	**Comments**
Landfill Cell Development Allowance	$ 385,706.60							0	0	Based on 5 year life of each cell plus 10% inflation
Landfill Cell Closure Allowance	$ 162,466.48							0	0	Based on 5 year life of each cell plus 10% inflation
Leachate Treatment Allowance	$ 90,005.38							0	0	Based on 5 year life of each cell plus 10% inflation
Labour	$ 2,263,248.00	$ 1,922,544.00	$ 2,117,232.00	$ 1,408,784.00	$ 1,652,144.00	$ 527,280.00	$ 581,360.00	$ 500,240.00	$ 473,200.00	Based on Current Union rates See Appendix G for details
Utilities (Electricity)	$ 63,800.00	$ 43,800.00	$ 63,800.00	$ 43,800.00	$ 63,800.00	$ 43,800.00	$ 55,800.00	$ 55,800.00	$ 43,800.00	Estimate based on personal interviews with contractors
Fuel	$ 507,500.00	$ 540,100.00	$ 409,500.00	$ 459,500.00	$ 439,400.00	$ 111,100.00	$ 126,700.00	$ 126,700.00	$ 111,100.00	Estimate based on personal interviews with contractors - See Appendix F
Insurance (2% Assets)	$ 235,334.48	$ 128,712.48	$ 197,084.48	$ 96,659.27	$ 215,011.27	$ 64,831.03	$ 82,464.53	$ 72,964.53	$ 63,633.03	Estimate based on personal interviews with contractors
Equipment maintenance (2% of purchase Value)	$ 168,524.72	$ 89,924.72	$ 131,024.72	$ 58,500.00	$ 148,600.00	$ 30,906.00	$ 35,400.00	$ 26,608.00	$ 29,708.00	Estimate Only
Facility Infrastructure Maintenance (2% fixed assets)	$ 63,439.27	$ 55,483.90	$ 63,439.27	$ 36,989.27	$ 63,439.27	$ 33,925.03	$ 46,356.53	$ 46,356.53	$ 33,925.03	Estimate Only
Office Supplies	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	Estimate Only
Communications	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	Estimate Only
Environmental Monitoring	$ 20,000.00	$ 12,000.00	$ 10,000.00	$ 12,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	Estimate Only
Clean Up Weeks (3 per year)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	0	
External WMS Tipping Fees	$ 148,530.00	$ 266,538.43	$ 202,092.87	$ 856,674.00	$ 511,465.50	$ 856,674.00	$ 202,092.87	$ 346,044.64	$ 402,084.26	Discussions with eastern and central authorities- See Appendix I
Equipment Replacement Fund (10 year cycle)	$ 859,476.07	$ 458,616.07	$ 668,226.07	$ 298,350.00	$ 757,860.00	$ 154,530.00	$ 177,000.00	$ 133,040.00	$ 148,540.00	Based on 10 year replacement cycle
Bank Charges	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	$ 2,000.00	Estimate Only
External Consultants (IT, Engineering)	$ 20,000.00	$ 15,000.00	$ 20,000.00	$ 15,000.00	$ 15,000.00	$ 15,000.00	$ 15,000.00	$ 15,000.00	$ 15,000.00	Estimate Only
Promotional Activities	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	Estimate Only
Board Meetings	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	Estimate Only
Board Travel	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	Estimate Only
Employee Travel	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	$ 4,000.00	Estimate Only
Professional Services	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	$ 20,000.00	Estimate Only
Professional Development	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	Estimate Only
Contracted Collection	$ -	$ -	$ -	$ -	$ -	$ 629,655.00	$ 944,482.50	$ 629,655.00	$ 629,655.00	Based on current contracts with various municipalities
Contracted Transfer						$ 582,400.00	318,500.00	$ 254,800.00	$ 382,200.00	Based on discussions with local trucking companies
Contingencies (3%)	$ 133,075.58	$ 108,561.59	$ 119,051.98	$ 101,167.70	$ 118,881.60	$ 57,931.38	$ 42,455.22	$ 42,472.61	$ 42,419.71	
Sub total	$ 5,207,106.58	$ 3,727,281.19	$ 4,087,451.39	$ 3,473,424.23	$ 4,081,601.64	$ 3,201,032.45	$ 2,720,611.66	$ 2,342,681.32	$ 2,468,265.04	

Appendix K - Landfill Cost Estimate							
Item	**Measure**	**Measure**	**Measure**	**Pay Unit**	**Quantity**	**Unit Price**	**Cost**
Cell Construction Engineered landfill (5yrs)							
Mobilization - Demobilization				LS	1	$ 10,000.00	$ 10,000.00
Clearing / Grubbing	70	170		Ha.	1.19	$ 7,000.00	$ 8,330.00
Mass Excavation / Blasting	70	170	3	m^3	35,700	$ 12.00	$ 428,400.00
Import / Place Composite Impervious Clay	70	170	0.5	m^3	5,950	$ 25.00	$ 148,750.00
Leak Detection Layer (washed stone)	70	170	0.3	m^3	3,570	$ 35.00	$ 124,950.00
Leachate Collection Layer (washed stone)	70	170	0.3	m^3	3,570	$ 35.00	$ 124,950.00
Filter Layer (common material - permeable)	70	170	0.5	m^3	5,950	$ 10.00	$ 59,500.00
Double HDPE Liner Installed (60mil)	70	170		m^2	11900	$ 15.00	$ 178,500.00
Geotextile Filter Fabric (Installed)	70	170		m^2	11900	$ 2.00	$ 23,800.00
Collection Pipes (100mm Dia SDR35)	1500			m	1500	$ 45.00	$ 67,500.00
Transit leachate pipes (300mm Dia SDR35)	500			m	500	$ 150.00	$ 75,000.00
Pipe Fittings	100			each	200	$ 200.00	$ 40,000.00
Monitoring wells	12			each	12	$ 2,500.00	$ 30,000.00
Ditching	500			m	500	$ 12.00	$ 6,000.00
Contigencies							$ 198,852.00
Subtotal							$ 1,524,532.00
Engineering							$ 228,679.80
Total							**$ 1,753,211.80**
							$ 1,753,211.80
Cell Construction (inert materials)							
Mobilization - Demobilization				LS	1	$ 10,000.00	$ 10,000.00
Clearing / Grubbing	100	70		Ha.	0.7	$ 7,000.00	$ 4,900.00
Mass Excavation	100	70	3	m^3	21,000	$ 12.00	$ 252,000.00
Ditching / Surface water control	1000			m	1000	$ 12.00	$ 12,000.00
Contigencies							$ 41,835.00
Subtotal							$ 320,735.00
Engineering							$ 48,110.25
Total							**$ 368,845.25**

Appendix L - Cell Closure							
Item	**Measure**	**Measure**	**Measure**	**Pay Unit**	**Quantity**	**Unit Price**	**Cost**
Cell Closure							
Mobilization - Demobilization				LS	1	$5,000.00	$ 5,000.00
Compacted Clay Cap	70	170	0.4	m^3	4760	$ 25.00	$ 119,000.00
HDPE Liner 40 mil	70	170		m^2	11900	$ 20.00	$ 238,000.00
Backfill Cover Material	70	170	1	m^3	11900	$ 10.00	$ 119,000.00
Topsoil	70	170		m^2	11900	$ 3.00	$ 35,700.00
Hydroseed etc	70	170		m^2	11900	$ 3.00	$ 35,700.00
Ditching (Surface water management)	500			m	500	$ 12.00	$ 6,000.00
Contigencies							$ 83,760.00
Sub Total							$ 642,160.00
Engineering							$ 96,324.00
Total per 5 year cell							**$ 738,484.00**

Appendix M - Leachete Treatment Costs

Item	Measure	Measure	Measure	Pay Unit	Quantity	Unit Price	Cost
Leachate Treatment (Engineered landfill)							
Clearing Grubbing(very little trees etc.)	100	100		Ha.	1	$ 7,000.00	$ 7,000.00
Sampling Wells				Each	4	$ 2,500.00	$ 10,000.00
Fence	250			m	250	$ 55.00	$ 13,750.00
Ditching	300			m	300	$ 12.00	$ 3,600.00
Leachate Treatment Per Cells				Each	1	$ 275,000.00	$ 275,000.00
Contigencies							$ 46,402.50
Sub Total							$ 355,752.50
Engineering							$ 53,362.88
Cost per 5 yr cell							**$ 409,115.38**
Item	**Measure**	**Measure**	**Measure**	**Pay Unit**	**Quantity**	**Unit Price**	**Cost**
Leachate Treatment (Compost Facility)							
Clearing Grubbing(very little trees etc.)	50	50		Ha.	0.25	$ 7,000.00	$ 1,750.00
Sampling Wells				Each	4	$ 2,500.00	$ 10,000.00
Fence	200			m	250	$ 55.00	$ 13,750.00
Ditching	200			m	200	$ 12.00	$ 2,400.00
Leachate Treatment				Each	1	$ 150,000.00	$ 150,000.00
Contigencies							$ 26,685.00
Sub Total							$ 204,585.00
Engineering							$ 30,687.75
Total							**$ 235,272.75**
Leachate Treatment Sludge Truck	(100 trucks per year)						$ 90,000.00
Estimates supplied by Abydoz							

Appendix N - Access Road							
Item	**Measure**	**Measure**	**Measure**	**Pay Unit**	**Quantity**	**Unit Price**	**Cost**
Access Road Option1							
Clearing / grubbing (very little trees etc.)	3000	15		Ha.	4.5	$ 7,000.00	$ 31,500.00
Mass Excavation	600	8	1	m^3	4,800	$ 12.00	$ 57,600.00
Ditching	3000			m	3000	$ 12.00	$ 36,000.00
Subbase	3000	7	0.5	m^3	10,500	$ 30.00	$ 315,000.00
Class A	3000	7	0.1	m^3	2,100	$ 32.00	$ 67,200.00
Asphalt	2000	5	0.1	tonne	2,500	$ 150.00	$ 375,000.00
Culverts	100			m	100	$ 150.00	$ 15,000.00
Contigencies							$ 134,595.00
Subtotal							$ 1,031,895.00
Engineering							$ 154,784.25
Total							**$ 1,186,679.25**
Access road for Transfer Station at 1000m (1/3 of landfill)							$ 395,559.75

Appendix O - Onsite Roads

On Site Roads									
Clearing Grubbing(very little trees e	1000	15		Ha.	1.5	$	7,000.00	$	10,500.00
Mass Excavation	300	8	1	m^3	2,400	$	12.00	$	28,800.00
Ditching	1000			m	1000	$	12.00	$	12,000.00
Subbase	1000	7	0.5	m^3	3,500	$	30.00	$	105,000.00
Class A	1000	7	0.1	m^3	700	$	32.00	$	22,400.00
Asphalt	500	5	0.1	tonne	625	$	150.00	$	93,750.00
Culverts	100			m	100	$	150.00	$	15,000.00
Contigencies								$	43,117.50
Subtotal								$	330,567.50
Engineering								$	49,585.13
Total								**$**	**380,152.63**

Onsite roads without landfill .75 of the full system	$	285,114.47

Appendix P - Recycling / Transfer Building Estimates

Recycling Facility

Item	Measure	Measure	Measure	Pay Unit	Quantity	Unit Price	Cost
Site Work Including Curing Area							
Clearing / Grubbing	100	70		Ha.	1	$ 7,000.00	$ 4,900.00
Mass Excavation / Site Grading	100	70	0.3	m^3	2100	$ 12.00	$ 25,200.00
Topsoil	50	50		m^2	2500	$ 3.00	$ 7,500.00
Seeding	50	50		m^2	2500	$ 3.00	$ 7,500.00
Ditching	500			m	500	$ 12.00	$ 6,000.00
Contingency							$ 7,665.00
Subtotal							$ 58,765.00
Engineering							$ 8,814.75
SubTotal							**$ 67,579.75**
Buildings							
Prefab Steel Building (25 by 40)	25	40		m^2	1000	$ 200.00	$ 200,000.00
Foundation	130	1.2	0.3	m^3	47	$ 500.00	$ 23,400.00
Floor	25	40	0.1	m^3	100	$ 500.00	$ 50,000.00
Electrical, Plumbing and Mechanical				LS	1	$ 30,000.00	$ 30,000.00
Overhead Doors				LS	3	$ 50,000.00	$ 150,000.00
Loading Hoppers				Each	2	$ 50,000.00	$ 100,000.00
Loading Bumper Pads				Pair	3	$ 5,000.00	$ 15,000.00
Contingency							$ 85,260.00
Subtotal							$ 653,660.00
Engineering							$ 98,049.00
SubTotal							**$ 751,709.00**
Equipment							
Portable Fork Lift				Each	1	$ 60,000.00	$ 60,000.00

Appendix Q - Storage Areas

Storage Areas (I,J,K,L) Includes rd

Item	Measure	Measure	Measure	Pay Unit	Quantity	Unit Price	Cost
Clearing /Grubing (very little trees etc.)	150	150		Ha.	2.25	$ 7,000.00	$ 15,750.00
Site Grading	150	150	0.3	m^3	6,750	$ 5.00	$ 33,750.00
Mass Import	150	150	0.3	m^3	6,750	$ 10.00	$ 67,500.00
Ditching	800			m	800	$ 12.00	$ 9,600.00
Class A	160	6	0.1	m^3	96	$ 32.00	$ 3,072.00
Contigencies (15%)							$ 19,450.80
SubTotal							$ 149,122.80
Engineering (15%)							$ 22,368.42
Total							**$ 171,491.22**

Appendix R - Scale and HHW Estimates

Scale and HHW

Item	Measure	Measure	Measure	Pay Unit	Quantity	Unit Price	Cost
Sitework							
Clearing (very little trees etc.)	45	60		Ha.	0.27	$ 7,000.00	$ 1,890.00
Mass Excavation (scales)	13	6	1	m^3	78	$ 12.00	$ 936.00
Mass Excavation and grading (building)	30	15	0.4	m^3	180	$ 12.00	$ 2,160.00
Topsoil	45	60		m^2	2,700	$ 3.00	$ 8,100.00
Seeding	45	60		m^2	2,700	$ 3.00	$ 8,100.00
Trees Srubs				LS	1	$ 5,000.00	$ 5,000.00
Contigencies							$ 3,927.90
Sub Total							$ 30,113.90
Engineering							$ 4,517.09
Total							**$ 34,630.99**
Fixed assets							
Scale House	12	8		m2	96	$ 200.00	$ 19,200.00
HHW Storage	10	15		m2	150	$ 200.00	$ 30,000.00
Weight Scales				LS	1	$ 85,000.00	$ 85,000.00
Contigencies							$ 20,130.00
Sub							$ 154,330.00
Eng							$ 23,149.50
Total							**$ 177,479.50**

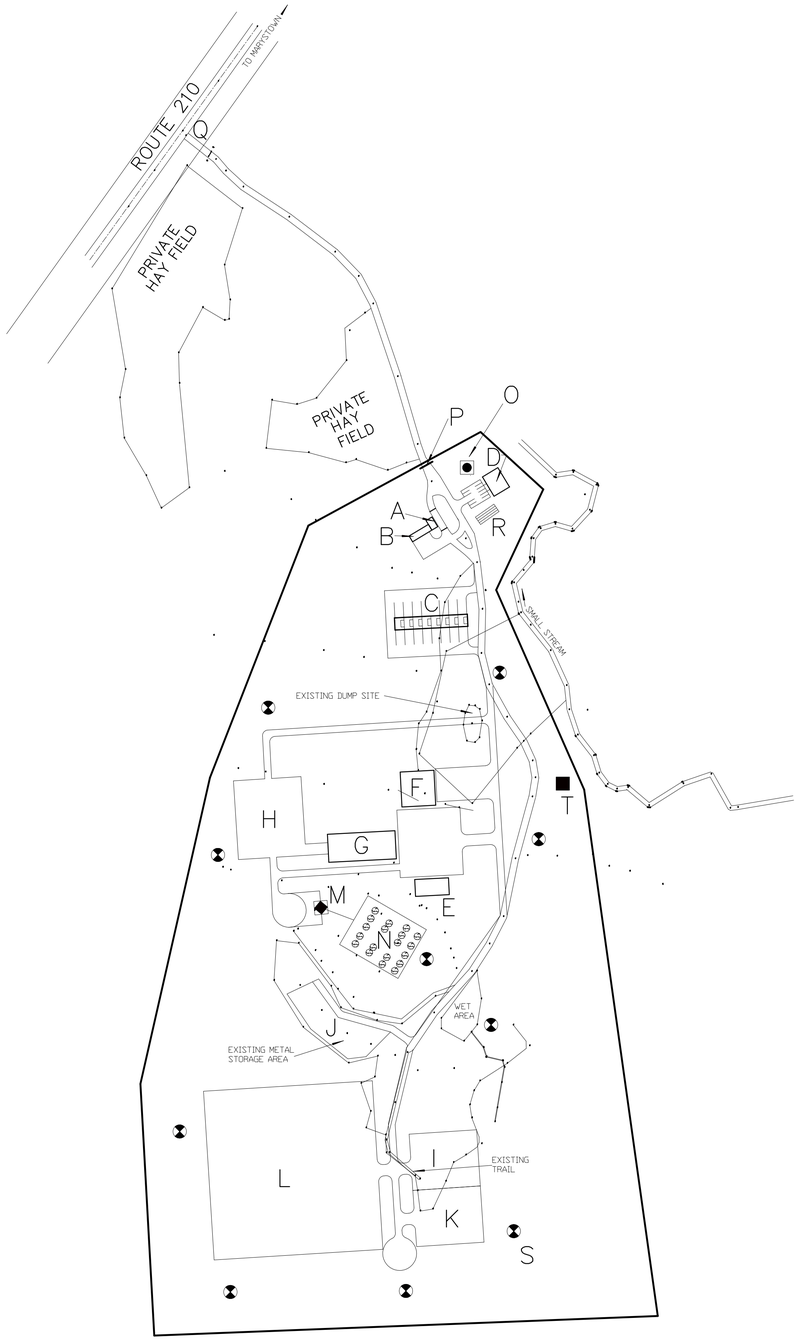
Appendix S - Administration Facility

Item	Measure	Measure	Measure	Pay Unit	Quantity	Unit Price	Cost
Site Work							
Clearing / Grubbing	45	35		Ha.	0.2	$ 7,000.00	$ 1,102.50
Mass Excavation / Site Grading	45	35	0.3	m^3	472.5	$ 12.00	$ 5,670.00
Topsoil	25	25		m^2	625.0	$ 3.00	$ 1,875.00
Seeding	25	25		m^2	625.0	$ 3.00	$ 1,875.00
Ditching	100			m	100.0	$ 12.00	$ 1,200.00
Asphalt Parking	20	30	0.1	m^3	60.0	$ 150.00	$ 9,000.00
Contingency							$ 1,758.38
Subtotal							$ 22,480.88
Engineering							$ 3,372.13
SubTotal							**$ 25,853.01**
Building							
Prefab Steel Building (25 by 30)	16	20		m^2	320.0	$ 200.00	$ 64,000.00
Foundation	72	1.2	0.3	m^3	25.9	$ 500.00	$ 12,960.00
Floor	16	20	0.1	m^3	32.0	$ 500.00	$ 16,000.00
Internal Structures	16	20		m^2	320.0	$ 100.00	$ 32,000.00
Electrical, Plumbing and Mechanical				LS	1.0	$ 40,000.00	$ 40,000.00
Contingency							$ 24,744.00
Subtotal							$ 189,704.00
Engineering							$ 28,455.60
SubTotal							**$ 218,159.60**

Appendix T - Maintenance Building							
Item	**Measure**	**Measure**	**Measure**	**Pay Unit**	**Quantity**	**Unit Price**	**Cost**
Site Work							
Clearing / Grubbing	80	70		Ha.	1	$ 7,000.00	$ 3,920.00
Mass Excavation / Site Grading	80	70	0.3	m^3	1680	$ 12.00	$ 20,160.00
Topsoil	25	25		m^2	625	$ 3.00	$ 1,875.00
Seeding	25	25		m^2	625	$ 3.00	$ 1,875.00
Ditching	200			m	200	$ 12.00	$ 2,400.00
Contingency							$ 4,534.50
Subtotal							$ 34,764.50
Engineering							$ 5,214.68
SubTotal							**$ 39,979.18**
Buildings							
Prefab Steel Building (25 by 30)	25	40		m^2	1000	$ 200.00	$ 200,000.00
Foundation	130	1.2	0.3	m^3	47	$ 500.00	$ 23,400.00
Floor	25	40	0.1	m^3	100	$ 500.00	$ 50,000.00
Electrical, Plumbing and Mechanical				LS	1	$ 30,000.00	$ 30,000.00
Overhead Doors				Each	3	$ 20,000.00	$ 60,000.00
Pits / Lifts / Garage Equipment				LS	1	$ 100,000.00	$ 100,000.00
Contingency							$ 69,510.00
Subtotal							$ 532,910.00
Engineering							$ 79,936.50
SubTotal							**$ 612,846.50**

Appendix U - Public Drop Area							
Item	**Measure**	**Measure**	**Measure**	**Pay Unit**	**Quantity**	**Unit Price**	**Cost**
Site Work							
Clearing Grubbing	60	70		Ha.	0.4	$ 7,000.00	$ 2,940.00
Mass Excavation	60	70	0.3	m^3	1260.0	$ 12.00	$ 15,120.00
Topsoil	120	10		m^2	1200.0	$ 3.00	$ 3,600.00
Seeding	120	10		m^2	1200.0	$ 3.00	$ 3,600.00
Asphalt	70	60	0.05	tonne	210.0	$ 150.00	$ 31,500.00
Class A	60	70	0.1	m^3	420.0	$ 32.00	$ 13,440.00
Ditching	250			m	250.0	$ 12.00	$ 3,000.00
Contigencies							$ 10,980.00
Subtotal							$ 84,180.00
Engineering							$ 12,627.00
SubTotal Site Work							**$ 96,807.00**
Buildings							
Covered Structure	45	20		m^2	900.0	$ 75.00	$ 67,500.00
Contigencies							$ 10,125.00
Subtotal							$ 77,625.00
Engineering							$ 11,643.75
SubTotal							**$ 89,268.75**
Equipment							
Roll on Roll Off containers				Each	8.0	$ 12,000.00	$96,000
Total Fixed Assets							$ 89,268.75

Appendix V - Compost Facility							
Item	**Measure**	**Measure**	**Measure**	**Pay Unit**	**Quantity**	**Unit Price**	**Cost**
Site Work Including Curing Area							
Clearing Grubbing	100	150		Ha.	1.5	$ 7,000.00	$ 10,500.00
Mass Excavation	100	100	0.3	m^3	3000.0	$ 12.00	$ 36,000.00
Transit leachate pipes (300mm Dia SDR35)	300			m	300.0	$ 150.00	$ 45,000.00
Pipe Fittings	25			each	25.0	$ 200.00	$ 5,000.00
Topsoil	50	100		m^2	5000.0	$ 3.00	$ 15,000.00
Seeding	50	100		m^2	5000.0	$ 3.00	$ 15,000.00
Asphalt		1500	0.05	tonne	75.0	$ 150.00	$ 11,250.00
Class A		1500	0.1	m^3	150.0	$ 32.00	$ 4,800.00
Ditching	500			m	500.0	$ 12.00	$ 6,000.00
Contingencies							$ 22,282.50
Subtotal							$ 170,832.50
Engineering							$ 25,624.88
SubTotal Site Work							**$ 196,457.38**
Buildings							
Buildings	60	25		m^2	1500.0	$ 200.00	$ 300,000.00
Building (Staging Area)	60	25		m^2	1500.0	$ 200.00	$ 300,000.00
Footings (2 buildings)	340			m	340.0	$ 500.00	$ 170,000.00
Floor (2 buildings)	3000	1	0.1	m^3	300.0	$ 500.00	$ 150,000.00
Overhead Doors				Each	4.0	$ 20,000.00	$ 80,000.00
Contingencies							$ 150,000.00
Subtotal							$ 1,150,000.00
Engineering							$ 172,500.00
SubTotal							**$ 1,322,500.00**
Static Pile / Windrow Composting							
Building	60	25		m^2	1500.0	$ 200.00	$ 300,000.00
Footings	170			m	170.0	$ 250.00	$ 42,500.00
Floor	60	25		m^2	1500.0	$ 75.00	$ 112,500.00
Overhead Doors				Each	2.0	$ 20,000.00	$ 40,000.00
Contingencies (10%)							$ 45,500.00
Engineering							$ 81,075.00
Subtotal							**$ 621,575.00**
Site work for Static Pile wind row estimated at 75% of above							$ 147,343.03



AREA REQUIRED = 26.1 HECTARES

ENVIRONMENTAL MONITORING WELL

LEGEND

A	SCALE HOUSE AND SCALES
B	HOUSEHOLD HAZARDOUS WASTE
C	PUBLIC DROP AREA
D	ADMINISTRATION BUILDING
E	MAINTENANCE BUILDING
F	TRANSFER BUILDING
G	COMPOST BUILDING
H	COMPOST STAGING AREA
I	WHITE GOODS STORAGE
J	SCRAP METAL STORAGE
K	WASTE WOOD STORAGE
L	C & D LANDFILL AREA
M	SLUDGE DISPOSAL
N	SLUDGE DISPOSAL TREATMENT
O	PROPOSED POTABLE WATER WELL
P	ACCESS GATE
Q	HIGHWAY IMPROVEMENT AREA
R	DISPOSAL FIELD (DOMESTIC)
S	MONITORING WELL (TYP)
T	FIRE PUMP / RESERVOIR

No.	DESCRIPTION	DATE
	REVISIONS	

EDWARDS AND ASSOCIATES LTD.
P.O. BOX 158, MARYSTOWN, NL, A0E 2M0
TEL 279-1990, FAX 279-2185

REGISTERED PROFESSIONAL ENGINEER
I. G. EDWARDS
SIGNATURE
PROVINCE OF NEWFOUNDLAND

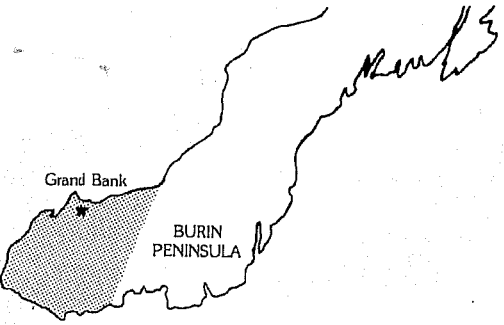
PROVINCE OF NEWFOUNDLAND & LABRADOR PERMIT HOLDER
CLASS A
THIS PERMIT ALLOWS EDWARDS AND ASSOCIATES LTD. TO PRACTICE PROFESSIONAL ENGINEERING IN THIS PROVINCE
Y0306 PERMIT NO.
2008 YEAR

OWNER: BURIN PENINSULA WASTE MANAGEMENT CORPORATION

PROJECT: 2008 REGIONAL WASTE MANAGEMENT STRATEGY

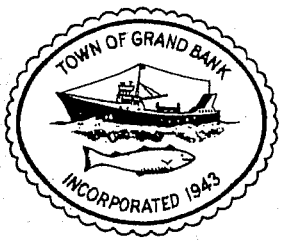
TITLE: CONCEPTUAL DESIGN

SCALE: HOR 1:2500	DATE: JAN 2009	DRAWN BY: I.E.
DESIGNED BY: I.E.		APPROVED BY: I.E.
PROJECT No. 5066		DWG No.



Town of Grand Bank
P.O. Box 640, 56 Main Street
Grand Bank, NL
A0E 1W0

☎ (709) 832-1600
Fax: (709) 832-1636
Email: townofgrandbank@townofgrandbank.net
Website: www.townofgrandbank.com



Commercial Center for the Western Side of the Burin Peninsula

A Rich History and Prosperous Future

June 04, 2008

COPY

Hon. Dave Denine, Minister
Department of Municipal & Provincial Affairs
Office of the Minister
Confederation Building
P.O. Box 8700
St. John's, NL
A1B 4J6

Dear Hon. Minister Denine:

On behalf of the Town of Grand Bank, I would like to express our concerns regarding the Burin Peninsula Waste Management Strategy.

First of all, all teepee incinerators are to be closed by December 31, 2008 even though there is no infrastructure in place for the New Waste Management Collection Program. This being so, without the burning of garbage, we will see our area being a large dump with garbage being blown all over the place, and garbage dumped everywhere.

Government should have all the required infrastructure in place before we move in a new direction. This will ease the transition for all communities and alleviate the possibilities of garbage being indiscriminately dumped in non approved areas.

Secondly, the cost of collection for each household will be a major challenge to many of our taxpayers, many of whom are on fixed incomes. The cost to defer this program needs to be reviewed, since it will cause financial hardship to many of our people. Further, who will administer the program and collect the fees, etc., needs to be addressed. If municipalities are to collect taxes, there will have to be some administrative charge from the towns to cover the cost of collecting this fee. Also, fees for this service could only be sent to this Authority once they have been collected. They could not be paid up front.

Another area of concern is the problem with garbage blowing around, etc, who is going to provide policies and enforcement?

.....2

Everyone in Newfoundland and Labrador was of the understanding that the cost per household was going to be the same for everyone. If it was $70 for someone living near Robin Hood Bay in St. John's, it was going to be $70 for someone living in Grand Bank. We now know this won't be the case with most of the financial burden being borne by residents living in rural Newfoundland. Communities should continue to have the right to collect their own garbage and work in co-operation with the province to meet waste management objectives.

You may be aware of the garbage issue in Italy with their system shut down through a labour dispute. What is happening to the garbage from Italy? It is being shipped to Germany by the hundreds of tonnes for incineration. Germany is one of the most environmentally friendly countries in the world. What kind of incineration are they using?

The Town is recommending no changes in garbage collection until all the infrastructure and operational issues are addressed with respect to Waste Management.

Sincerely yours,

TOWN OF GRAND BANK

Wayne Bolt

Wayne Bolt
Town Manager

WB/mp

cc Hon. Charlene Johnson, Minister
Hon. Clyde Jackman, Minister
MHA Darin King
Cyril Dodge, Chairperson, BP Waste Management Corp.
John Scott, Chair, MMSB

Town of Frenchman's Cove

PO Box 20
Frenchman's Cove, NL
A0E 1R0
Telephone/Fax: (709) 826-2190
Email: townoffrenchmanscove@persona.ca

May 29, 2008

Mr. Jeff Pittman, Regional Coordinator
Burin Peninsula Waste Management Corporation
PO Box 510
Burin Bay Arm, NL
A0E 1E0

Dear Mr. Pittman,

The Frenchman's Cove Town Council supports the Burin Peninsula Waste Management Corporation in its efforts to try and improve the issue of waste collection on the Burin Peninsula, however, we do not support the fact that residents on the Burin Peninsula will have to pay higher fees as opposed to the fees that residents on the Avalon Peninsula will have to pay. In the earlier stages of these meetings, we were informed that everyone no matter where the location would pay equal fees. As well, we too have the same concerns as other councils on the Burin Peninsula as listed in the four key points outlined in your letter dated May 22, 2008.

Sincerely,

Frenchman's Cove Town Council

kw

TOWN OF POINT MAY
Box 19 Site 5
Point May, NL
A0E 2C0
TEL/FAX (709) 857-2640/2113

May 21, 2008

Mr. Jeff Pittman
P.O. Box 510
Burin Bay Arm
A0E 1G0

Mr Pittman:

At a meeting held on May 20, 2008 a motion was made by Carmelita Hillier and second by Peter Parsons with all in favor to forward to you this letter of concern in regards to the future closing of the Waste Disposal Site.

Council would like to express their concern with the cost that will be associated with garbage being collected and transported away to another area. The Town struggles as it is financially. How would such a small Town afford it? There is no way that an added cost like this would be tolerable. Not only would it be financially draining, how much garbage would end up on the beach or in the water? There would be no way of controlling it. Residents would start to abuse it. Lets remind you that we have a volunteer Council here in Point May. With all of these new rules and regulations that would be put in place and the Town not being able to deal with it, what will happen to our Volunteer Council? There would be none. There would be no way that anyone would be able to handle it, you would not get anyone on Council. There would be no Council.

The Town Council would like to thank you for your time and hopes that a reasonable solution is found in the new future.

Thank You,

Janice Halcy
Town Manager
Town of Point May

Town of Winterland
P.O. Box 10
Winterland, Newfoundland
A0E 2Y0

May 20, 2008

Burin Peninsula Waste Management Corporation
P.O. Box 510
Burin Bay Arm, NL
A0E 1E0

ATTENTION: Chairperson Cyril Dodge

Dear Mr. Dodge,

Members of our council attended the presentation by Ian Edwards of Edwards and Associates Ltd. held at your Corporation office on May 13, 2008 and was very impressed by the presentation by Mr. Edwards on the Burin Peninsula Regional Waste Management Study, 2008 Interim Report.

Our major concern with the report is the cost relating to the recommendation that the Burin Peninsula Waste Management Corporation would implement a 4-Stream Waste Management System (Option 3A) as outlined in the report. We understand this is the cheapest option and it would translate to the lowest cost per household of approximately $217 per year. This would equate to an increase in cost of approximately $140 per household in Winterland compared to the $77 per household presently incurred by our residents ($8,500/year ÷ 110 households). This increase in our annual expenditure of $15,400 is near impossible to implement and certainly very difficult to collect when the average household in the town presently pays annually between $800 - $1,100 in taxes.

Furthermore, we understand the cost of $217 per household may increase if the Corporation cannot get the MMSB and/or the Department of Municipal Affairs to agree with funding 100% of the transportation cost to the host site.

Our understanding, as it is indicated in the report, is that all citizens in the Province of Newfoundland and Labrador would pay the same unit cost for waste management regardless of location. It appears this has changed since the conception of the Provincial Waste Management Strategy. We strongly suggest the Burin Peninsula Waste Management Corporation impress upon the Provincial Government that the annual cost of $217 per household for the residents of the Burin Peninsula is unfair and unjust. We would also expect our three Burin Peninsula MHA's to be seating at the table by your side representing their constituents on this very important issue.

Thank you and your fellow board members for all your efforts in dealing with this very serious and contentious issue we all are facing.

Yours truly,

Ches Kenway

Ches Kenway
Mayor

Cc Darin King, MHA, Grand Bank District
Clyde Jackman, MHA, Burin-Placentia West District
Calvin Peach, MHA, Bellevue District

The Town of Fortune

P. O. BOX 159
Temple Street
Fortune, NL
A0E 1P0

TELEPHONE: (709) 832-2810
FAX: (709) 832-2210
EMAIL: fortune@nf.sympatico.ca

May 21, 2008

Mr. Jeff Pittman
Regional Coordinator
Burin Peninsula Waste Management Corp.
Room 228-Father Berney Memorial Bldg. Salt Pond
P. O. Box 510
Burin Bay Arm, Newfoundland
A0E 1G0

Dear Sir:

In reply to your request for comments and thoughts on the Burin Peninsula Waste Management Study and the Provincial Solid Waste management Strategy, I feel that the study and presentation were very professional and a good one that fully explained the situation, as ridiculous and unnecessary as it is or will be if and when the plan is actioned.

Due to the labour situation, both Town and Provincial, the extra expenditures and pressure on those in low income and fixed income are a major concern. Also, the pressure and responsibility on Towns to collect the extra taxation in very desperate times are also a grave concern.

To plan the transportation of waste materials such a distance, in my opinion, shows a serious lack of planning by those making the decision that will adversely affect those in the Rural areas that are situated some distance from the proposed dumping sites.

I personally think the plan is irresponsible and unnecessary and needs to be reviewed in a realistic manner, with consideration being given to the above concerns.

Thank you,

Alec Noseworthy
Mayor

Burin Waste Management
c/o Jeff Pittman
Box 510
Burin Bay Arm
A0E 1G0

Mr. Pittman:

You are asking for a reaction to the cost of the proposed waste management system for the Burin Peninsula. While we all can agree that a overhaul of the present system is long over due, the cost ($216.00 per household) seems a bit excessive. Our community (Rock Harbour) is a small in size , with a population of 60 to 70 people. Of these people, over 50% are either senior citizens or approaching senior status. To place this expense on top of the cost of garbage collection, would be a very real hardship for a household with a fixed income.

Sincerely

James Withers

James Withers

Representing the Rock Harbour Local Service District

James Withers
Box M1-C4 RR#1
Marystown, NL.
A0E 2M0

ph# 279- 3246
email jwithers@persona.ca

That means these stores will have to dispose of waste illegally or close their doors. As our communities are comprised of 60% senior citizens this will cause our populations to decline even faster as it is mainly the seniors that shop in the community. They won't remain in communities where they can't buy groceries.

4. The present proposal calls for 10 roll on bins to be placed strategically through the area. That isn't anywhere near enough. Red Harbour is 40 kilometers round trip from the nearest community, Monkstown is even farther. Nobody from Red Harbour will travel that distance to dispose of a piece of drywall with gas at close to $1.50 a litre. It isn't going to happen and everyone knows that. Bins will need to be located in every community. The cost of that will be prohibitive and we know that isn't going to happen.

5. At the present time it is all but impossible to recruit people interested in serving as councilors. If this plan is implemented and additional pressure is placed on existing councilors many small towns will find it impossible to form a town council.

6. Finally and we consider this the most important point of all. At the present time there is no contract in place and no customer has expressed an interest in the recyclables beyond the pop cans and pop bottles that are presently being recycled. This defies the basic rule of marketing. No company would dream of collecting a product for which it is uncertain of a market. This should have been step one and if no market for the recyclables could be secured then this should never have gone to step two. It is referred to as putting the cart before the horse. That is precisely what government has done. We all remember the tire recycling fiasco. It looks like nothing was learned from that. We are poised to repeat that very same mistake.

The Town of Red Harbour respectfully rejects this plan as it is seriously flawed and will cause more problems that it solves. Garbage will be disposed of in the woods, over the wharfs, and in the gravel pits as people are forced to cope.

Council will be forced to shut off services for non payment for taxpayers that have traditionally paid on a timely basis as they withhold taxes in protest or because they are overwhelmed.

Councilors will resign out of frustration as will town clerks and town managers who will have to defend this proposal.

Thank you for the opportunity to present our concerns.

Sincerely,

for

Fred Kenway, Mayor

cc: MHA Clyde Jackman

Town of Lord's Cove
Site 11, Box 21
Lord's Cove, NL
A0E 2C0
Telephone/Fax: (709) 857-2316

To:
Burin Peninsula
Waste Management Corporation
Att: Jeff Pittman
Regional Coordinator

On may 15, 2008 a consultant's report was released to all mayor's and Councillors of communities from Little St. Lawrence to Grand Bank. At this time it was disclosed to everyone that the cost of removing waste from the Burin Peninsula would cost each household the sum of $216.00. This is unacceptable. At a time when rural nf. struggles to survive, this added burden would cause municipalties to cease to exist. Residents on fixed incomes are already trying to decide between eating or staying warm an extra $216.00 is just not in their budget. The only way a program of this nature could work is if every resident of nf. paid the same for waste disposal. The Town Council of Lord's Cove could not even try to explain why someone in St. John's has to pay $50.00 or $60.00 when they would have to

Town of Lord's Cove
Site 11, Box 21
Lord's Cove, NL
A0E 2C0
Telephone/Fax: (709) 857-2316

to inform you that the Lord's Cove town council members moved be stepping down from current positions.

Thanking you in Advance
Lord's Cove town Council.

John R. Hennebury Mayor

TOWN OF GARNISH
P. O. Box 70 / Garnish, NL A0E 1T0 / Phone: 709 826-2330 / Fax: 709 826-2173

May 26, 2008

Burin Peninsula Waste Management Corporation
P.O. Box 510
Burin Bay Arm, NL
A0E 1G0

Dear Members:

Upon consultations about the Burin Peninsula Waste Management Study and the Provincial Solid Waste Management Strategy, the Garnish Town Council has some grave concerns for our town's future.

A major concern is the high rate that the people of the Burin Peninsula are expected to pay. Initially, it was understood that every household in Newfoundland and Labrador would pay the same fee for waste management but alas, it is becoming a much different story with rural Newfoundland looking at an extremely higher rate than urban Newfoundland.

Also, placing the burden on the Municipalities to collect the waste management fees will be detrimental to the town financially as most of the year, Garnish operates in overdraft, another huge financial responsibility will probably bring the end closer for our council as the collection of these fees rest on our shoulders and we are all aware of the burden on municipalities to collect taxes as it is.

Consideration needs to be taken for municipalities as they are given more and more financial responsibilities but are limited in revenues.

Regards,

Reuben Noseworthy

cc. Darin King, MHA

Town of St. Lawrence

P.O. Box 128
St. Lawrence, Newfoundland A0E 2V0
Telephone (709) 873-2222 Facsimile (709) 873-3352
Email: townofstlawrence@nf.aibn.com

May 28, 2008

Burin Peninsula Waste Management Corporation
Room 228, Fr. Berney Memorial Building
P. O. Box 510
Burin Bay Arm, NL A0E 1G0

Dear Board Members;

Firstly, on behalf of Council we thank you for your presentations on the waste management study you just completed.

We all agree that there is a need for a provincial strategy to reduce waste and as a region, we are cognizant of the need, however it has to be a system that is affordable and does not result in a download on the municipalities in the region.

1. We strongly feel there has to be a uniform per household rate for all residents of the Province regardless of where you live.
2. This household fee should be collected by the Province through its tax regime, i.e. income tax, so as not to burden the local municipalities who have over stretched their resources, we feel if the collection becomes the responsibility of the municipality, the result will be no volunteers to serve on Council.
3. In respect to the per household fee and in light that it will be a lot higher than presently being paid, the result could be indiscriminant dumping and the province should fund staff to adequately control the region.
4. The Provincial strategy calls for the closure of all land fill sites in our region and we understand the cost of dump closure will be by grants through the MMSB. We feel this will have to be assured to avoid the improper closing of sites.

We strongly urge your Corporation to register these concerns to the appropriate government officials/departments.

Yours truly,

Gregory Quirke, CMC
Clerk/Manager

GQ/en

c.c. Hon. Clyde Jackman
Hon. Darin King

TOWN OF POINT MAY
Box 19 Site 5
Point May, NL
A0E 2C0
TEL/FAX (709) 857-2640/2113

May 21, 2008

Mr. Jeff Pittman
P.O. Box 510
Burin Bay Arm
A0E 1G0

Mr Pittman:

At a meeting held on May 20, 2008 a motion was made by Carmelita Hillier and second by Peter Parsons with all in favor to forward to you this letter of concern in regards to the future closing of the Waste Disposal Site.

Council would like to express their concern with the cost that will be associated with garbage being collected and transported away to another area. The Town struggles as it is financially. How would such a small Town afford it? There is no way that an added cost like this would be tolerable. Not only would it be financially draining, how much garbage would end up on the beach or in the water? There would be no way of controlling it. Residents would start to abuse it. Lets remind you that we have a volunteer Council here in Point May. With all of these new rules and regulations that would be put in place and the Town not being able to deal with it, what will happen to our Volunteer Council? There would be none. There would be no way that anyone would be able to handle it, you would not get anyone on Council. There would be no Council.

The Town Council would like to thank you for your time and hopes that a reasonable solution is found in the new future.

Thank You,

Janice Haley
Town Manager
Town of Point May

Town of Baine Harbour
General Delivery, Baine Harbour, NL AOE 1AO
Tel. 709-443-2355 Fax. 709-443-2355

May 27, 2008

Mr. Jeff Pittman, Regional Coordinator
Burin Peninsula Waste Management Corporation
Father Berney Memorial Building
P.O. Box 510
Salt Pond, NL AOE 1GO

Dear Jeff:

Re: Waste Management - Burin Peninsula

As a follow-up to my recent conversation with you, I want to express concerns the Town of Baine Harbour has with the results of the recent Waste Management Study which was presented by Edwards & Associates, Marystown just a few days ago.

The cost - $216.00 per household cited by Mr. Edwards is substantially higher than was originally anticipated, which causes us great concerns. We are recommending government subsidize the cost on a provincial level to even the cost across the Province.

Also, from what we can understand, the study recommends the collection of these fees be done through the Town Councils. Our town currently experiences problems with tax collection and we see this extra responsibility as adding to the frustrations of councillors; thus, making it even more difficult to attract volunteers to serve on municipal councils.

We trust you will carefully consider these concerns and have them addressed before a final decision is made to proceed with a new waste management program. While we believe the time is right for a new approach to waste management, we feel it's necessary to implement a plan that in the best interest of all concerned.

Sincerely yours,

Léo Gaulton
Mayor

Town of Burin

May 26, 2008

Mr. Jeff Pittman, Regional Coordinator
Burin Peninsula Waste Management Corp.
P.O. Box 510
Burin Bay Arm, NL A0E 1G0

Dear Mr. Pittman:

The Town of Burin fully supports the concept of a greener environment and is pleased to do its part to attain such at a reasonable cost. The government has stated that it anticipates a $100 - $120 per household cost for the regions throughout the province.

At a recent meeting in Burin, the Burin Peninsula Waste Management study was released projecting a $216 per household cost, substantially higher than anticipated. We feel that this figure may be on the low side given the ever increasing costs of fuel and labour today.

The Town of Burin has paid the highest cost for its waste management on the Burin Peninsula for many years at $150 per household. This new structure will add approximately another $100,000 to our budget annually which will adversely affect the operations of the town.

Since this policy to cut greenhouse gases is a federal commitment, passed down to the provinces, who in turn have passed it down to Town Councils and Local Service Districts, we feel that there should be a standard fee per household no matter where one lives in this province.

In closing, we need to bear in mind that the province will need to post staff within the regions to enforce this new policy in order to avoid negligent dumping and other such offences. This responsibility cannot be limited to the administrative staff of local Councils or the regional waste management corporations.

Sincerely,

BURIN TOWN COUNCIL

Kevin Lundrigan
Mayor

Support letter

Wednesday, May 21, 2008 6:57 PM

From:
"Viola Pardy" <townofbaylargent@nf.aibn.com>
To:
info@burinpenwaste.com

Dear Mr. Pittman:

Bay L'Argent Town Council offer their support of the Waste Management Strategy. However, we do have a problem with the cost amounts that were discussed. Our Town, like many others, is experiencing dwindling population due to out migration and an aging population; therefore, we cannot support the costs that our Town would incur.

Trusting this explains our position regarding this matter.

Sincerely,
Bay L'Argent Town Council

Town of Rushoon
Rushoon, Placentia Bay
Newfoundland
A0E 2S0
townofrushoon@nf.aibn.com

May 29, 2008

Burin Peninsula Waste Management Corporation
P. O. Box 510
Burin Bay Arm, NL.
A0E 1E0

Dear Members:

The Council consultations regarding the Burin Peninsula Waste Management study was very informative. We can see the need to reduce the number of dump sites for the province. However, we feel that the cost to the residents of the Burin Peninsula is very high.

Rushoon is a small town with an ageing population. About 75% of the residents in Rushoon are seniors. Most of our seniors live alone. We feel that the amount required to be paid for garbage collection under this new system will have a negative impact on our seniors. At the present time most of our seniors pay $300.00 for Property Taxes and $240.00 per year for water. If the $216.00 estimated price for garbage collection is added they will have to cut corners in order to find the money required to pay for garbage collection. We feel that this will force some of our seniors to cut out some of the necessaries they require, heat, lights, food and drugs.

In March of 2005 the Town of Rushoon entered into a Debt Management Program with the Department of Municipal Affairs. At the time of the Agreement Council agreed to increase our taxes and Municipal Affairs would write off our debt. Over the past number of years the Town of Rushoon and our residents have lived up to our agreement. To turn around now and ask our residents to add a new tax for garbage collection would be a difficult item to sell to our residents. We feel that if Government is going to proceed with regional dump sites they should be the ones'

to collect this tax from all the residents not the Municipalities. We feel that if this tax is passed on to the Municipalities to collect there will be no candidates in the 2009 Municipal Election.

At the present time Municipalities do have a difficult time trying to recruit volunteers for different groups or events taking place within our Towns. It appears that it is the same handful of people who volunteer for groups or events.

This past month the Town of Rushoon had to disconnect several homes in the Town from our water supply for non payment of taxes. If Municipalities are forced to collect the tax for the garbage collection, we will have more residents failing to pay their taxes. We feel that this is unfair to the volunteers who are now running the Municipalities.

We feel that it would be a benefit to all towns on the Burin Peninsula if there was a facility where we could compost and recycle. There would be less garbage going into the dump sites. We found that people were recycling when the truck from the Green Depot came to our community to collect the recyclables. This is one option that should be revisited.

Would it be to our advantage to have some holding facility on the Burin Peninsula where we could take our garbage and delivery it to the main dump once a week? If people were educated about recycling and composting there would be less garbage at all dump sites. This is an issue that will need some input from all stakeholders.

We feel that rural Newfoundland will suffer as a result of people resorting to the practice of random dumping. We will have dump sites in every pit in rural Newfoundland. We ask that you revisit this issue and come up with some other suggestions as to how we can work together to provide a better solution to this problem. We feel that if there is going to be a regional dump site the cost should be the same for all residents in the province.

Sincerely yours,

for Jacqueline Coulter (Clerk)
Town of Rushoon

The Town of Fortune

P. O. BOX 159
Temple Street
Fortune, NL
A0E 1P0

TELEPHONE: (709) 832-2810
FAX: (709) 832-2210
EMAIL: fortune@nf.sympatico.ca

May 21, 2008

Mr. Jeff Pittman
Regional Coordinator
Burin Peninsula Waste Management Corp.
Room 228-Father Berney Memorial Bldg. Salt Pond
P. O. Box 510
Burin Bay Arm, Newfoundland
A0E 1G0

Dear Sir:

In reply to your request for comments and thoughts on the Burin Peninsula Waste Management Study and the Provincial Solid Waste management Strategy, I feel that the study and presentation were very professional and a good one that fully explained the situation, as ridiculous and unnecessary as it is or will be if and when the plan is actioned.

Due to the labour situation, both Town and Provincial, the extra expenditures and pressure on those in low income and fixed income are a major concern. Also, the pressure and responsibility on Towns to collect the extra taxation in very desperate times are also a grave concern.

To plan the transportation of waste materials such a distance, in my opinion, shows a serious lack of planning by those making the decision that will adversely affect those in the Rural areas that are situated some distance from the proposed dumping sites.

I personally think the plan is irresponsible and unnecessary and needs to be reviewed in a realistic manner, with consideration being given to the above concerns.

Thank you,

Alec Noseworthy
Mayor

Town of St. Bernard's-Jacques Fontaine
P.O. Box 70
St. Bernard's-Jacques Fontaine
Nl., A0E 2T0
Tel. #: (709) 461 2257
Fax #: (709) 461 2179

May 22, 2008

Dept. of Municipal & Provincial Affairs
P.O. Box 8700
St. John's, Nl., A1B 4J6

RE: Waste Management

At a recent meeting of the Burin Peninsula Waste Management Corporation, the board accepted the option whereby each dwelling in the area would have to pay $217.00 per year. While the Town Council agrees with the overall idea of Waste Management, it does not agree with the amount that each household will have to pay. With a Town as small as ours, it would be very difficult to expect it's residents to pay such an amount. Most of the Towns residents consist of Senior Citizens which will be expected to carry the load. Our Town feels that this will mean the destruction of Rural Newfoundland.

Another issue deals with the Town Council having to collect this fee for Waste Management. The Town feels that if the Government is implementing this, than they should have to collect the fee for the service. The Town Council has enough difficulty with collecting it's town Taxes, adding another fee for collecting will only discourage residents from being part of the Town Council in the future. You will find that many residents will refuse to pay this amount for Waste Management.

The Town also feels that there should be a set rate for all residents, regardless of where you live in the Province. Why should some residents pay $100.00 per year and others pay more than $200.00 per year for the same service.

The Town Council is requesting that you re-evaluate the amount that each resident has to pay based on the above noted issues.

Sincerely;

Marie McCarthy
Town Clerk

c.c. Calvin Peach, M.H.A.

Town of Terrenceville
P. O. Box 100
Terrenceville, NL
A0E 2X0

Tel.# (709) 662-2204 Fax# (709) 662-2071
Email: terrencevilletownoffice@nf.aibn.com

June 05, 2008

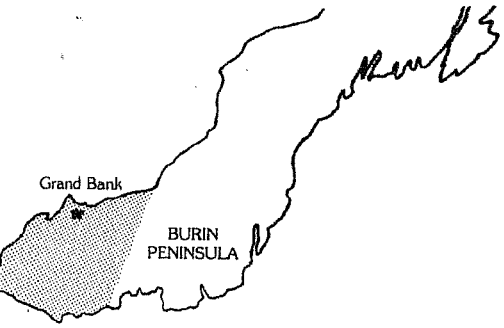
Mr. Jeff Pittman
Regional Coordinator
Burin Peninsula Waste Mgmt. Corp.

Dear Mr. Pittman;

In response to the presentation and study regarding the Waste Mgmt. for this area. With the greatest impact being presented through higher cost per household. Small municipalities like ourselves would find it quite difficult to collect, as incentives have to be offered currently to residents for collecting taxes. The pressure put on towns to collect the extra taxes at such hard times would be difficult.

We think the plan has to be reviewed and analyzed to keep in mind the low income problem of the rural areas and avoid an increase in taxes in our community.

Thank you,
Debbie Rideout
Acting Town Clerk
For Town of Terrenceville



Town of Grand Bank
P.O. Box 640, 56 Main Street
Grand Bank, NL
A0E 1W0

☎ (709) 832-1600
Fax: (709) 832-1636
Email: townofgrandbank@townofgrandbank.net
Website: www.townofgrandbank.com

Commercial Center for the Western Side of the Burin Peninsula

A Rich History and Prosperous Future

June 04, 2008

COPY

Hon. Dave Denine, Minister
Department of Municipal & Provincial Affairs
Office of the Minister
Confederation Building
P.O. Box 8700
St. John's, NL
A1B 4J6

Dear Hon. Minister Denine:

On behalf of the Town of Grand Bank, I would like to express our concerns regarding the Burin Peninsula Waste Management Strategy.

First of all, all teepee incinerators are to be closed by December 31, 2008 even though there is no infrastructure in place for the New Waste Management Collection Program. This being so, without the burning of garbage, we will see our area being a large dump with garbage being blown all over the place, and garbage dumped everywhere.

Government should have all the required infrastructure in place before we move in a new direction. This will ease the transition for all communities and alleviate the possibilities of garbage being indiscriminately dumped in non approved areas.

Secondly, the cost of collection for each household will be a major challenge to many of our taxpayers, many of whom are on fixed incomes. The cost to defer this program needs to be reviewed, since it will cause financial hardship to many of our people. Further, who will administer the program and collect the fees, etc., needs to be addressed. If municipalities are to collect taxes, there will have to be some administrative charge from the towns to cover the cost of collecting this fee. Also, fees for this service could only be sent to this Authority once they have been collected. They could not be paid up front.

Another area of concern is the problem with garbage blowing around, etc, who is going to provide policies and enforcement?

.....2

Everyone in Newfoundland and Labrador was of the understanding that the cost per household was going to be the same for everyone. If it was $70 for someone living near Robin Hood Bay in St. John's, it was going to be $70 for someone living in Grand Bank. We now know this won't be the case with most of the financial burden being borne by residents living in rural Newfoundland. Communities should continue to have the right to collect their own garbage and work in co-operation with the province to meet waste management objectives.

You may be aware of the garbage issue in Italy with their system shut down through a labour dispute. What is happening to the garbage from Italy? It is being shipped to Germany by the hundreds of tonnes for incineration. Germany is one of the most environmentally friendly countries in the world. What kind of incineration are they using?

The Town is recommending no changes in garbage collection until all the infrastructure and operational issues are addressed with respect to Waste Management.

Sincerely yours,

TOWN OF GRAND BANK

Wayne Bolt

Wayne Bolt
Town Manager

WB/mp

cc Hon. Charlene Johnson, Minister
Hon. Clyde Jackman, Minister
MHA Darin King
Cyril Dodge, Chairperson, BP Waste Management Corp.
John Scott, Chair, MMSB

Town of Frenchman's Cove
PO Box 20
Frenchman's Cove, NL
A0E 1R0
Telephone/Fax: (709) 826-2190
Email: townoffrenchmanscove@persona.ca

May 29, 2008

Mr. Jeff Pittman, Regional Coordinator
Burin Peninsula Waste Management Corporation
PO Box 510
Burin Bay Arm, NL
A0E 1E0

Dear Mr. Pittman,

The Frenchman's Cove Town Council supports the Burin Peninsula Waste Management Corporation in its efforts to try and improve the issue of waste collection on the Burin Peninsula, however, we do not support the fact that residents on the Burin Peninsula will have to pay higher fees as opposed to the fees that residents on the Avalon Peninsula will have to pay. In the earlier stages of these meetings, we were informed that everyone no matter where the location would pay equal fees. As well, we too have the same concerns as other councils on the Burin Peninsula as listed in the four key points outlined in your letter dated May 22, 2008.

Sincerely,

Frenchman's Cove Town Council

kw

HATCH™

61 Evergreen Place,
Goodwood, Nova Scotia
B3T 1P2
Tel: (902) 442-2020
Fax: (902) 442-2038

October 7, 2008

To: Mr Ian Edwards P.Eng.
Edwards & Associates
Marystown, Newfoundland

Subject: Budget Pricing To Process 2,800 To 3,000 TPY Organic Waste

The attached documents will provide you with information requested to process the expected organic waste stream in the Burin Peninsula area.

As discussed, the HotRot System is a very efficient composting unit which does not generate leachate and has low operating costs.

There is condensate generated from the hot, moist exhaust air at a rate of approximately 17 litres per tonne. This condensate has little to no odour and a BOD which meets sewar disposal levels and has an appearance which is very close to tap water.

It will require one person, on average, about three hours per day to run the facility once the operator is familiar with the unit(s).

Maintenance costs are very low and can be expected to run less than $4,000 per year (extreme case). Regular greasing, gearbox oil changes etc. are about the limits of regular maintenance.

Electrical costs are also very low since, with the exception of the exhaust fan, the motors only run for short periods of time. In the case of the four 1811 units, kW hour usage will only run between 250 and 300 kW per day while in the case of the 3518, kW usage will average between 270 and 320 kW per day.

I will be pleased to discuss this document with you and any of your colleagues at your convenience.

Yours very truly

Gerald Tibbo

HotRot® COMPOSTING SYSTEMS

OdourFree™ GUARANTEE

Technical Specifications
HotRot Equipment
For Newfoundland, Canada

Prepared by

HotRot Exports Ltd

HotRot Exports Ltd
PO Box 4442
Christchurch 8140
NEW ZEALAND

Ph +64 3 377 8822
Fax +64 3 379 9111
Email: info@hotrotsystems.com
Website: www.hotrotsystems.com

Table of Contents

HotRot® COMPOSTING SYSTEMS

OdourFree™ GUARANTEE

Introduction

This document provides a brief technical specification for the HotRot composting and ancillary equipment specified in HotRot Exports Ltd quotation supplied to Hatch for the supply of composting equipment for Newfoundland, Canada, October 2008.

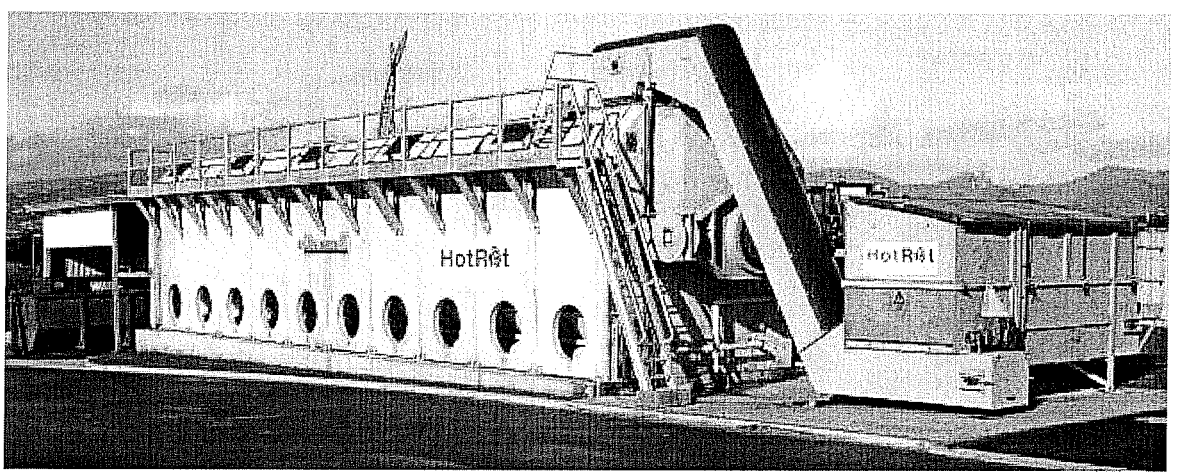
Specifications are for guidance only and are correct at time of writing but are subject to change without notification.

HotRot 3518

The HotRot composting unit is a U-shaped vessel with a central tine-bearing shaft passing longitudinally through the main vessel. The shaft is rotated periodically to provide mixing and aid aeration. Primary aeration is provided by air injection nozzles positioned along the length of the hull. Excess air is continually drawn from the composting vessel and treated through a biofilter.

The hull of the HotRot 3518 is manufactured using ten precast concrete modules and two concrete end-plates; lids are also pre-cast concrete. These concrete hull modules are transported to site, positioned and then post-tensioned together to form an integrated hull module. Once the hull module is assembled then mechanical components such as shaft, bearings, motor and gearbox, and temperature probes and air injection system are all installed.

Overall dimensions:	22.0m (l) x 4.92m (w) x 4.25m (h)
Approximate weight empty:	150,000kg
Approximate weight fully loaded:	300,000kg
Main drive:	Brevini SL50005 FAR gearbox, 800,000Nm max. Torque; driven by 3-phase 6-pole electric motor
Air injection:	Four HB729 side channel blowers connected to 4 injection ports each, 3-phase, 4-pole electric motors
Inlet slide gate:	Stainless steel with SEW gearbox, worm drive
Processing capacity:	8.0 – 12.0 tonne per day (typical 9.5-10.5tpd)



HotRot 3518 complete with 20m^3 feed hopper; similar to that proposed.

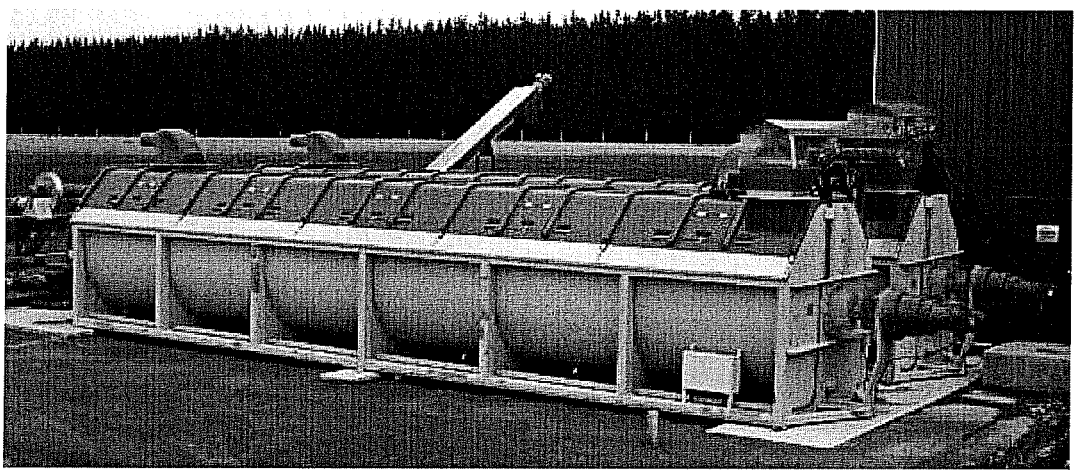
HotRot 1811

The HotRot 1811 is a continuous flow-through agitated in-vessel composting unit. The unit consists of a steel/stainless steel insulated hull capped with fibreglass insulated lids. A central tine-bearing shaft runs longitudinally through the u-shaped trough. This shaft is rotated periodically and provides mixing and aids aeration. Aeration is further enhanced by periodic air injection using a low-pressure system mounted external to the hull.

Temperature probes along the length of the vessel record temperatures of the material being composted and provide the operator with information sufficient to "tune" the process. Air is continually drawn from the HotRot vessel using a centrifugal fan; this air is subsequently treated through a biofilter for odour control:

Overall dimensions:	12.8m (l) x 2.15m (w) x 2.33m (h)
Approximate weight (empty):	11,500kg
Main drive:	Brevini SL6005FS gearbox, 3196:1, 115,790Nm max. Torque; driven by 3-phase, 4-pole electric motor
Air injection:	Two HB429 side channel blowers connected to 3 injection ports each, 3-phase, 4-pole electric
Inlet slide gate:	Stainless steel with SEW gearbox, worm drive
Processing capacity:	1.8 – 2.5 tonne per day (typical 2.0-2.3tpd)

All external mild steel is sand-blasted, zinc-arc sprayed for corrosion protection and finished with an epoxy top coat.



Two HotRot 1811s installed in parallel in New Zealand

HotRot Exhaust Fans and Ducting

High efficiency Vortex FX or FS series stainless steel centrifugal exhaust fans are supplied with each HotRot composting unit. The fan is mounted directly adjacent to the biofilter and is coupled to a variable speed drive (VSD) to regulate air-draw from the composting vessel.

Flow-rate HotRot 3518:	2500-4000m^3/h
Flow-rate HotRot 1811:	400-900m^3/h
Working pressure:	1000-1500Pa
Static efficiency:	50-60%

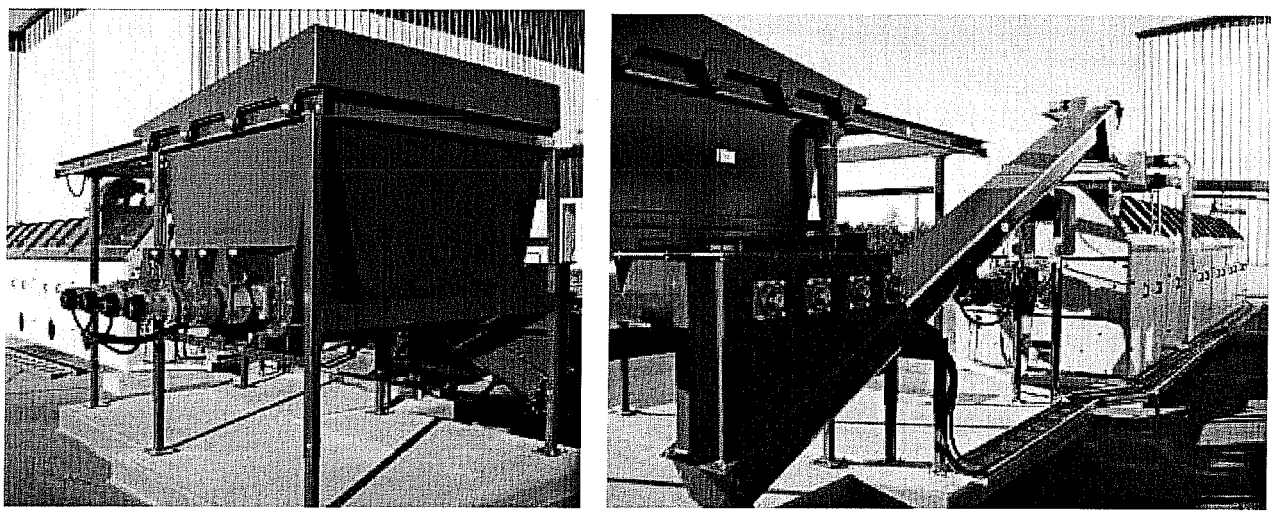
Estimated fan noise:	60-80dBA
Motor:	3-phase, 2-pole, 2800rpm
Ducting:	300mm n.b PVC, solvent joints

Feed Hopper/Auger

The feed hopper / feed auger combination is supplied to enable maximum throughput, provide storage of waste for a period of 1-2 days[1] and minimise operator involvement. The hopper consists of a multi-auger "live-bottom" bin with a nominal capacity of $20m^3$ or $40m^3$ (for 1811 and 3518 installations, respectively) coupled to an inclined feed auger.

Hopper discharge rate:	8000-10000kg/h nominal at $500kg/m^3$; hopper would normally operate for 3-4mins per hour
Hopper capacity:	$20m^3$ or $40m^3$
Hopper dimensions:	$20m^3$ - 4.0m (l) x 2.2m (w) x 2.3m (h, above screws) $40m^3$ - 5.5m (l) x 3.2m (w) x 2.3m (h, above screws)
Hopper construction:	5mm mild steel
Floor augers:	$20m^3$ - 5m long x 500mm dia variable pitch x 12mm mild steel 100mm NB, Schedule 80 shaft – 4 of $40m^3$ – 6.5m long x 500mm dia variable pitch x 12mm mild steel 100mm NB, Schedule 80 shaft – 6 of
Drives:	Four or six Brevini torque-arm mounted reduction gearboxes

Exterior surfaces are sand-blasted, zinc-primes and finished with one coat of high-build epoxy.



Smaller $4.5m^3$ Feed Hopper and elevating feed auger

Incline feed auger length:	3518 - 12,000-12,800mm 1811 – 6,000-6,500mm
Trough:	u-shaped fabricated from 5mm mild steel, lined with 12mm UHMW abrasive resistant liner, with ship-lap joints
Auger specifications:	$20m^3$ - 350mm dia x 300mm pitch x 20mm thick, carbon steel, shaftless

[1] A larger hopper providing greater storage capacity can be supplied upon request.

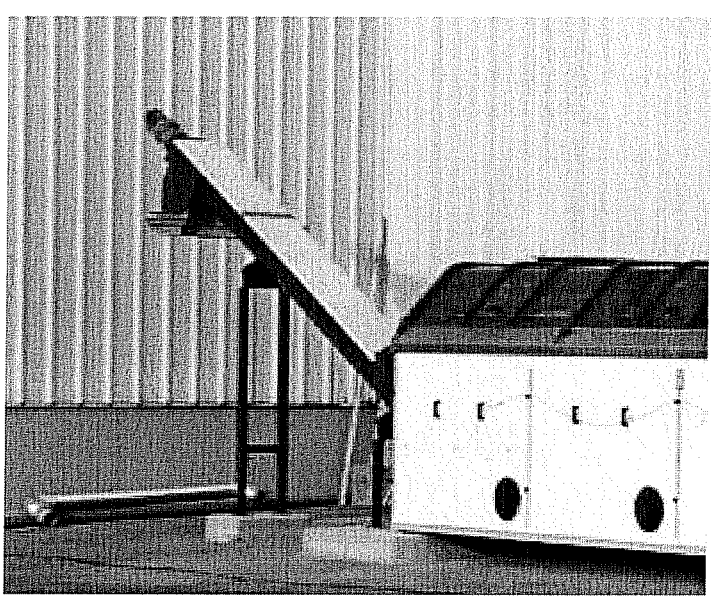
	40m^3 - 450mm dia x 300mm pitch x 20mm thick, carbon steel, shaftless
Drive:	Brevini shaft mounted 12-15rpm 3-phase 4-pole motor
Lids:	2mm 304 stainless steel

HotRot Discharge Auger

A shaftless incline screw conveyor is used to elevate the compost from the back of the HotRot unit to a drop height of approximately 2.0m (HotRot 1811) or 2.9m (HotRot 3518); this allows a trailer, bin or skip to be placed under the discharge to collect the end product. Alternatively, the material can be discharge directly into a concrete bunker for periodic clearing by small loader. It is recommended that any bunker, trailer, bin or skip be surrounded by a structure to protect the discharge from wind, which can cause material to be blown around the site.

Length:	4500-5100mm
Trough:	u-shaped fabricated from 5mm mild steel, lined with 12mm UHMW abrasive resistant liner, with ship-lap joints
Auger specifications:	HotRot 1811 - 300mm dia x 300mm pitch x 20mm thick, carbon steel, shaftless HotRot 3518 - 400mm dia x 300mm pitch x 20mm thick, carbon steel, shaftless
Drive:	Brevini shaft mounted 12-15rpm, 3-phase 4-pole motor
Lids:	2mm 304 stainless steel

Exterior surfaces are sand-blasted, zinc-primes and finished with one coat of high-build epoxy.



Discharge auger installed on HotRot 1811 composting unit

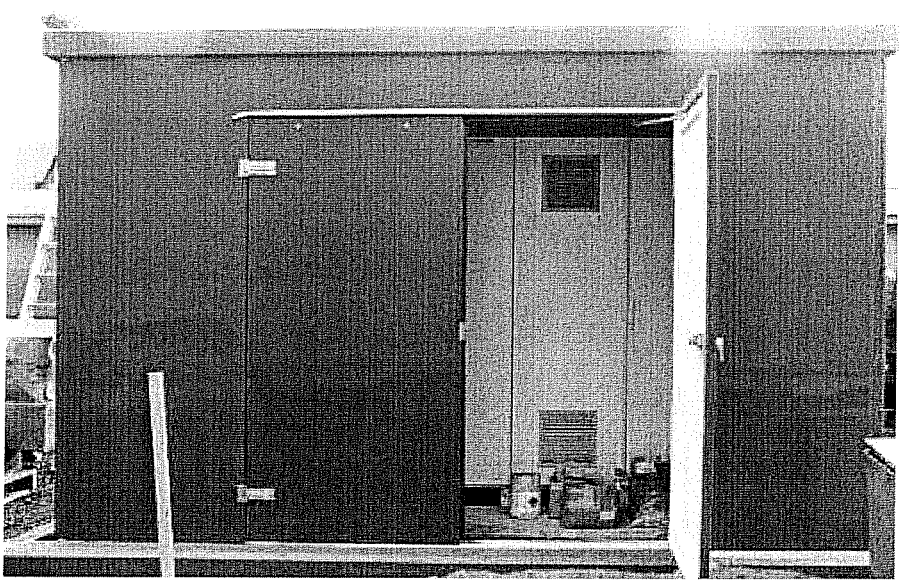
Electrical and Control System

An integrated electrical and control system is fitted with a Beijer T70 HMI[2], or similar, through which the operator can adjust key processing conditions, monitor process temperatures and conditions, and identify and rectify faults. The Beijer HMI is also capable of being viewed directly via a LAN connection; allowing monitoring from remote on-site computers.

The MCC will be supplied as a floor or wall-mount unit for location in a nearby office or control room.

Enclosure:	Rittal IP54 powder coated
PLC:	MicroLogix or Compactlogix Ethernet processor
Drives:	One reversing SoftStart for the HotRot main drive, One VSD for the exhaust fan, One reversing DOL starter for each slide-gate DOL starters for each injection fan DOL starter for discharge auger
Main switch:	200A
Controls:	24Vdc via step-down transformer
Power supply:	580-600Vac, 60-Hz, 3-phase neutral plus earth, power supply must be compatible with VSD drives (i.e. type-B RCD or ELD if present)

A separate small control cabinet containing motor starters and control specific to the feed hopper will be mounted directly on this unit.



MCC located in small "porta-cabin" building

[2] Human machine interface

HotRot EXPORTS

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Fax +64 3 379 9111

www.hotrotsystems.com

info@hotrotsystems.com

Gerald Tibbo
Hatch
Canada

6 October 2008

Re: Request for equipment supply for Hatch client in Newfoundland, Canada (our ref. Newfoundland Oct 08)

HotRot Exports Ltd (Vendor) is pleased to offer the following quotation for the supply of a HotRot composting to Hatch (Purchaser) for supply to your client located in Newfoundland, Canada

The specification of equipment and pricing is based on your email received by us on 3 October 2008 (subject: Opportunity). Equipment supply is based on treating the following materials:

- 2800-3000 tonnes per annum of source separated organics (SSO). This material is described as food waste but may also include crab and fish waste. Indicated moisture is expected to be in the region of 75%.

Based on the above information a blend assessment was carried out. The table below indicates that, in addition to the SSO an additional 1,150 tonne of chipped wood waste with a maximum moisture content of 15% is required as an amendment or bulker.

Blend calculator - HotRot composting system

Waste Material	Volume of material (m3)	Bulk density (t/m3)	Mass of material (t/d)	Moisture content (%)	Tonnes per annum
SSO (food waste)	10.50	0.75	7.9	75	2850
Chipped wood	8.00	0.40	3.2	10	1150
Water		1.00	0.0	100	
BLEND	**17.1**	**0.65**	**11.2**	**56.2**	**4000**
Ideal range		**0.5-0.75**		**45-55**	
Acceptable range				**40-60**	

The blend assessment indicates that a total of 11.1 tonnes of material is required to be processed daily. This quantity requires either one HotRot 3518 composting unit or four HotRot 1811 composting units operating in parallel.

Basic Scope of Supply – Single HotRot 3518
A single HotRot 3518 installation would be the simplest operationally and slightly cheaper than the alternative set up of four 1811s. However, delivery times will be longer depending on other projects being undertaken at time of order and the installation is likely to be significantly more complex; requiring greater on-site engineering.

The basic scope of supply for a composting facility for a single HotRot 3518 would include the following equipment (see Concept layout – *Single 3518 SSO Oct 08.pdf*):

- One live-bottom 40m^3 feed hopper, complete with incline-feed auger and manual sliding lid.
- Mechanical components for one HotRot 3518 in-vessel composting unit. ***Concrete hull sections to be supplied and installed by Hatch.***
- One electrically operated inlet slide-gate to automatically close off feed chute when feed-hopper inactive
- Exhaust fan, biofilter ducting and condensate trap to biofilter where biofilter is position within 5m of HotRot unit as indicated in the attached drawing.
- One discharge auger with a discharge height of 2900mm
- Electrical and control system suitable for connection to 3-phase 580-600V 60Hz supply
- Flashcard data storage and 20 hours remote (email, phone or fax) technical assistance for one year.
- 120 days labour (4 staff for 30 days) for installation
- 30 days labour for staff training and plant commissioning
- Airfares, accommodation and expenses for installation and commissioning staff
- Installation, operation and maintenance manuals
- Delivery DDU to the client's site in Newfoundland, Canada
- Concept designs for associated facilities including:
    - Biofilter
    - Foundations and footings (layout only)

Contract Price: See Appendix 1

Basic Scope of Supply – Four HotRot 1811s
The installation of four HotRot 1811 composting units requires significantly less on-site activity and delivery times are expected to be slightly shorter than for a single 3518.

The basic scope of supply for a composting facility of four HotRot 1811s would include the following (see concept layout drawing: *Four 1811s SSO Oct 08.pdf*):

- Two live-bottom 20m^3 feed hoppers, complete with incline-feed auger and manual sliding lid. Each feed hopper to be connected to two HotRot 1811 using a cross-feed auger mounted on weigh cells. Weigh cells are used to monitor throughput and ensure even distribution of feed to the composting units.
- Four HotRot 1811 in-vessel composting units supplied from NZ and shipped to site virtually fully assembled.
- Four electrically operated inlet slide-gates to automatically close off the individual HotRot unit's feed chute when feed system is inactive
- Exhaust fans, biofilter ducting and condensate traps to biofilters, where biofilters are position as indicated on the enclosed concept site layout.
- Four discharge augers with a discharge height of 2000mm

- Electrical and control system suitable for connection to 3-phase 580-600V 60Hz supply
- Flashcard data storage and 20 hours remote (email, phone or fax) technical assistance for one year.
- 40 days labour (2 staff for 20 days) for installation
- 30 days labour for staff training and plant commissioning
- Airfares, accommodation and expenses for installation and commissioning staff
- Installation, operation and maintenance manuals
- Delivery DDU to the client's site in Newfoundland, Canada
- Concept designs for associated facilities including:
    - Biofilter
    - Foundations and footings (layout only)

Contract Price: See Appendix 1

A summary of the technical specifications of the above equipment is detailed in the attached document – *Technical Specification HotRot Equipment Newfoundland.pdf*

Remote Monitoring
Flashcard data storage and transfer is provided as part of the above Basic Scope of Supply. This system permits processing data including temperatures and motor currents, etc to be stored on a flashcard incorporated in to the Motor Control Cabinet (MCC). If a fault occurs or the operator is concerned with performance, the flashcard can be downloaded and the file contents emailed to HotRot Exports Ltd who can supply remote assistance. This system does not rely on an Internet connection to the HotRot Composting unit. However, it is strongly recommended that for a plant of this size that internet connectivity is provided so that remote monitoring and data transfer can be provided.

With Internet connection it is possible for the operator to remotely view the HMI display on any computer.

This cost of this basic system allows for 20 hours remote phone or email assistance to be provided by HotRot Exports Ltd.

Additional annual on-going technical support can be purchased at a cost of approximately CAD $2,000 per annum (NZD $2400.00 per annum).

Installation, Training and Commissioning
Installation, training and commissioning shall normally be scheduled to commence when equipment is received at the client's site. In order to efficiently carry out these activities all goods and services (see below) necessary for installation, commissioning and operation of the plant must be in place and staff must be available for training and waste available for processing.

Failure of the client to arrange for any of the above that results in delays to installation requiring staff to spend additional time on site (over and above that allowed for in the basic scope of supply) will be charged at the rate of $595.00 (NZD) per day plus expenses.

Failure to provide waste or staff for training that delays plant commissioning or staff training and results in these activities being rescheduled or extended with be charged at the rate of $850.00 (NZD) per day plus expenses.

Equipment Specifications
See *Technical Specification HotRot Equipment Newfoundland.pdf*

Shipping Port and Terms
Supply of equipment is based on Incoterms terms DDU to the client's site in Newfoundland, Canada.

Terms and Conditions of Sale
The supply of this equipment is subject to the Terms and Conditions of Sale that accompany this letter (*Exports Terms and conditions of sale May 08 v4.pdf*) and all also subject to the Generic Specifications for Use document (*Generic Specifications for Use v3.1.pdf*) attached.

Warranty
The sale of this equipment is subject to the warranty provisions detailed in *Exports Terms and conditions of sale May 08 v4.pdf* attached.

Specifications for Use
Equipment must be used in accordance with Manuals supplied and the attached specifications for use (see *Generic Specifications for Use v3.1.pdf*). Amendments and bulkers should comply with the recommendations outlined in the attached document; *Amendments and Bulkers v1 Nov 07.pdf.*

Goods and Services to be supplied by Purchaser/Owner
The following goods and services are specifically excluded from the Vendors scope of supply and shall be supplied by the Purchaser/Owner

- Import duties, taxes or other charges associated with the importation and establishment of the composting equipment in Canada
- Cranes and equipment for unloading machinery and placing on site. Any demurrage charges caused by delays to unloading outside the Vendor's control.
- Site preparations, including the formation of footings and foundations.
- Any buildings required for housing equipment.
- Any equipment needed for preparing the waste for composting including but not limited to sorting tables/conveyors, shredders or mixers.
- The supply and installation of concrete hull components for the HotRot 3518 composting unit if this is the option selected.
- Supply and connection of 3-phase, 580-600V power[1] to MCC located adjacent to the composting units. If power is supplied via a residual-current or earth-leakage device this must be compatible with the operation of variable frequency drives.
- A biofilter enclosure of a nominal area as indicated in the concept site drawings; the enclosure can be rectangular and manufactured using concrete blocks or suitably treated timber with walls 1400mm high.
- Media to fill the biofilter consisting of 800-1000mm deep of woodchip/compost[2]
- Staff for daily operation of the composting unit and performance of routine maintenance; these personnel must be available during training and commissioning.
- Waste for composting, including appropriate bulking material such that the feedstock meets the requirements as detailed in the *Specifications for Use v3.1* supplied by the Vendor; this material must be available during the period of training and commissioning.
- Any mobile plant and equipment required for transporting or handling waste or product.
- Site security, access and landscaping.

Validity of Price
Prices outlined in this letter are valid for a period of 60 days from the 10 October 2008.

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[1] Alternative supply voltage can be catered for; please advise requirements so we can supply any price variation.
[2] It is possible to use compost generated by the process mixed with woodchip for this purpose and the biofilter can initially be commissioned with half a volume of wood chip only.

Delivery Time
Expected delivery times to the client's site are currently 16-24 weeks for the HotRot 1811s and 24-32 weeks for the HotRot 3518. However, the Vendor will endeavour to improve on these if required and delivery times shall be confirmed on receipt of order.

Payment Terms
As detailed in *Exports Terms and conditions of sale May 08 v4.pdf*

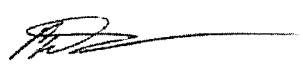
Shipping and Packing
Equipment shall generally be transported to site in standard ISO shipping containers. Concrete components for the HotRot 3518 would normally be transported on low-loader or similar. It is the client's responsibility to ensure that access to the site is possible for all vehicles and that access-ways are able to handle the expected loads imparted by the delivery vehicles and cranes.

Confirming your Order:
Should your client wish to proceed with this project HotRot Exports would require a site visit and meeting to confirm details. Once details are confirmed a draft Sale and Purchase agreement will be prepared. This document will collate this quote with any other correspondence and the supporting documents referred to below into a single contract for signing and execution by the client and the Vendor.

Supporting documentation:
This quote is based on and shall for completeness be deemed to include the following documents:

- *Generic Specifications for Use v3.1.pdf*
- *Exports Terms and conditions of sale May 08 v4.pdf*
- *Technical specifications HotRot equipment Newfoundland.pdf*
- *Amendments and Bulkers v1 Nov 07.pdf*
- *Single 3518 SSO Oct 08.pdf (concept layout – HotRot 3518)*
- *Four 1811s SSO Oct 08.pdf (concept layout – four 1811s)*

Yours sincerely



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HotRot®
COMPOSTING SYSTEMS

AMENDMENTS AND BULKERS

From a composting perspective:

- An **amendment** may be any material used to modify moisture, structure (porosity), pH or the C:N ratio of incoming feed material. Amendments can thus include sawdust, woodchip, bark, paper, cardboard or even lime and urea.
- A **bulker** is a material that is added specifically to improve the structure or porosity of the waste. A bulker is therefore normally woodchip, bark, shredded wood or woody green-waste (or indeed plastic or inorganic media).
- It is important to differentiate between a bulker (such as woodchip) and amendment used for moisture adjustment (such as cardboard, paper or sawdust) as the latter do little to improve structure. Some materials, however, can fulfil a combined roll.

Bulker materials for moisture and structure:

In order to provide structure and have the ability to adsorb moisture a bulker must consist of a range of sized particles. Ideally 50% of particles should be between 20-50mm along the longest axis and 50% less than 20mm.

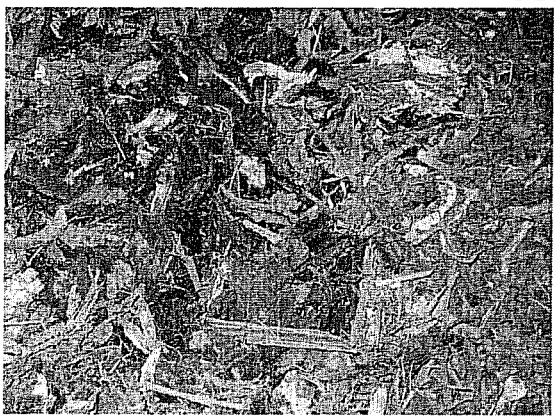
Ground waste timber – key approx 7cm long

Chipped wood waste – similar to previous image

Both the materials above have a good range of particle sizes.

Bark is another excellent material but as it is softer it will tend to breakdown more during the composting process. Hardy woody materials, as above, may be more resistant to breakdown and thus may be more easily screened from the compost and recycled through the process.

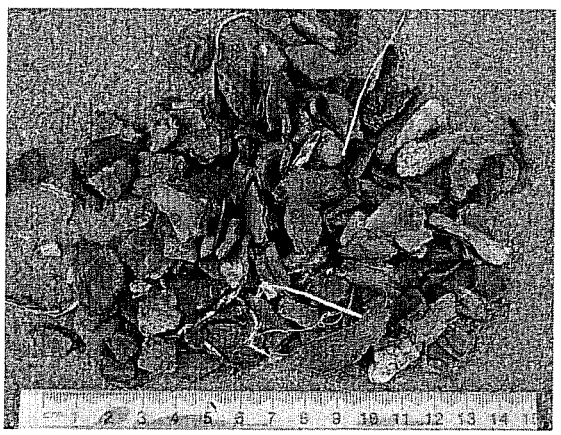
The bark below is also ideal but the effect of leaving this material in the rain is shown. These materials **must be kept dry and undercover prior to use**.



Shredded bark – up to 100mm long but only a few millimetres thick

Bulker for structure only

Wood chip and bark can sometimes be graded or screened. In these cases many of the fines are removed. This can be advantageous where structure is lack but moisture is close to being acceptable.



Decorative bark chip – may be expensive

Wood chip, more blocky and uniform than shredded material

Screened wood waste such as this can be recovered from the compost product

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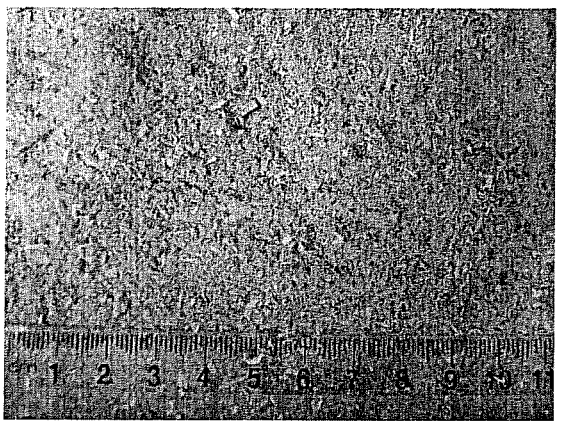
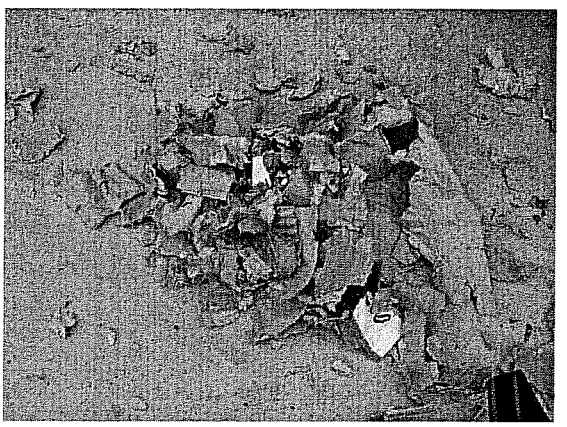
Amendments for Moisture only

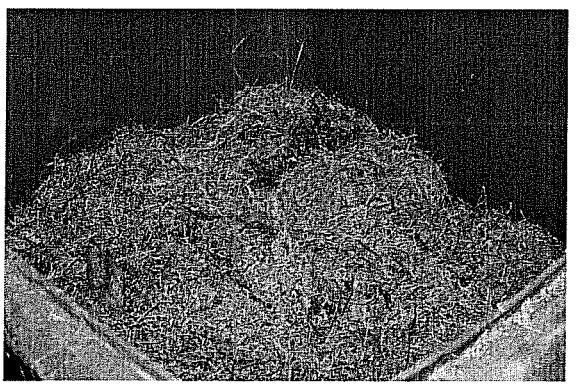
The following materials can be used to adsorb moisture and there use with smaller quantities of structural bulkers with very wet wastes can be beneficial. Excess sawdust, cardboard and paper can result in excessively high C:N ratios that retard the composting process.



Sawdust is very fine but great for absorbing moisture



Shredded cardboard can make up to 10-15% of feedstock



Straw bedding should be less than 200mm long

It is not necessary to shred cardboard as in the second photo above but by doing so you reduce its tendency to clump together when wet. Straw (photo directly above) is also best shredded or chopped to less than 200mm long.

Unsuitable Bulker

Material that is too large or too blocky is unlikely to perform well as a bulker and may cause damage to feed and discharge equipment. Blocky materials tend to also have poor surface morphology for absorbing moisture.

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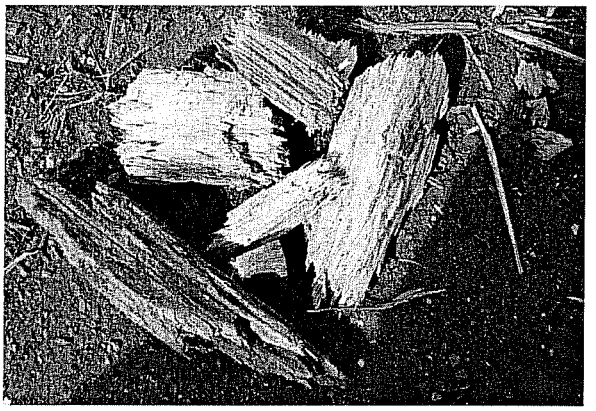
Wood blocks 50-150mm in size



Oversized shredded timber >50mm in size

Sawn timber off-cuts 10-20mm wide x >50mm long

Appendix 1

The following listed Budget Pricing is subject to properly viewing the proposed site for the facility.

The client would be responsible for payment of the following contract price to Hatch Ltd in accordance with the Terms of Payments listed in the attached *Exports Terms and conditions of sale May 08 v4.pdf.*

Pricing is in **Canadian dollars** at an exchange rate of $1NZ = $0.75CAD

Budget Price - Single HotRot 3518 and ancillary equipment which includes budget pricing for the concrete hull sections:
CAD $1,740,000.00

Budget Price - Four HotRot 1811s and ancillary equipment:
CAD $1,880,000.00

HOTROT COMPOSTING EQUIPMENT SPECIFICATIONS FOR USE

1. Design Specifications

Plant specific details regarding capacity, type and quantity of wastes to be processed, and services required are detailed in the Sale and Purchase Agreement. This Appendix details general specifications for feed quality, and operation and maintenance of equipment. This Appendix is a guide only, additional information may be found in the Manuals supplied with the equipment.

Adherence to these guidelines is a condition of warranty cover, and will ensure effective operation of the HotRot system. Failure to comply with the following guidelines may void any warranties and result in equipment damage.

2. Feed Quality

In any composting system, effective composting requires attention to moisture content, available volatile solids, C:N ratio and oxygen supply. Feed must have sufficient readily degradable organic matter. Excessive woody green waste or paper and cardboard may retard the composting processing. Food and animal wastes by contrast are readily degradable and provide good feedstock for the HotRot system.

Material being fed to the HotRot in-vessel composting unit must meet the specification for particle size and moisture content as outlined below. In addition, the material should:

- Have an organic content of greater that 80%.
- Be free of toxic compounds such as pesticides, herbicides and fungicides, as well as household bleaches and cleaning compounds.
- Be free of toxic metal compounds and paint.
- Have a C:N ratio of less than 40:1 and greater than 10:1.

3. Feed Quantity

While the feed capacity of a HotRot composting unit is highly flexible the volume of waste fed to the unit on a daily basis will greatly influence the product quality and the unit's ability to generate sufficient heat to ensure pathogen control standards are met. Where possibly feed should be delivered as evenly as possibly over a 24 hour period, however, variations in feed rate during the day and even during weekends and public holidays can be accommodated. If the feed rate is too varied, specific advice should be obtained from HotRot to minimise the effects on the HotRot system.

4. Maximum Particle Size

Coarse interlacing wastes have a number of disadvantages when fed to HotRot, due to their propensity to behave as a large single mass. These are:

- Increased strain on mechanical components
- Excessive longitudinal transport rates, and
- Reduction of system capacity by excessive void volumes.

Appropriate particle size reduction will minimise these effects and maximise system capacity.

Any 'hard' organic waste added to the HotRot composting unit must have a maximum particle size of less than 40mm in any one plane, with the ideal size being >5mm and <25mm. 'Hard' organic materials are defined as:

- Wood, wood chip, chipped or shredded branches and prunings, and bark.
- Bones

Stones, bricks or pieces of broken stones, bricks or concrete, glass and plastic must have a maximum particle size of less than 15mm in any one plane and should constitute <5% of the feed stock mass.

Cardboard boxes and paper must be smaller than A4 (297mm x 210mm) and have a maximum thickness of 7mm. It is recommended, however, that pieces of cardboard should ideally be less than 150mm by 200mm (1/2 A4).

The size of soft organic waste such as fruit and vegetables will be dictated by the ability of the feed system to transport this material. In general material should be less than 200mm in size.

5. Feed Moisture Content

The moisture content of the feed material is the most critically important variable for the composting process and will require maximum operator vigilance.

Efficient composting requires the feed moisture content to be 40-55% by mass. Food waste (including fruit and vegetables and animal by-products) will tend to have moisture content of 80-90% and will need to be balanced by the addition of dry materials. Dry materials can include:

- Paper and cardboard
- Wood chips
- Shredded green waste

If paper or cardboard are added, these must be kept dry prior to use. It should be noted that the amount of paper and cardboard should be restricted to no more than 10% by mass of the total mass of material to be composted. As such some wood chip or shredded green waste will also be required.

Wood chip, such as from shredded pallets, is an ideal bulking agent as the material is dry and maintains its structure during the composting process. Shredded green waste can be used but the presence of green leafy material should be minimised, as this tends to increase the moisture content of this material; the material should be well shredded as detailed above.

The moisture content of material fed to the HotRot system must be between 40 and 55% by mass. Moisture content is calculated by the following:

% Moisture = (weight loss of sample on drying/initial weight) x 100

6. Feed Structure

After moisture content feed structure is also important. If sludge or food waste is the predominant waste to be processed, wood waste in the form of chipped wood, bark or green waste, will need to be added to provide structure. This is regardless of whether the waste in question meets the moisture requirements outlined above. The amount of wood waste that will be needed is dependent of the waste being processed but as a minimum would be expected to be 15-25% by mass when dealing with sludge or food.

Cardboard does not provide structure and while useful in adjusting moisture content cannot be used to substitute wood waste for structural purposes.

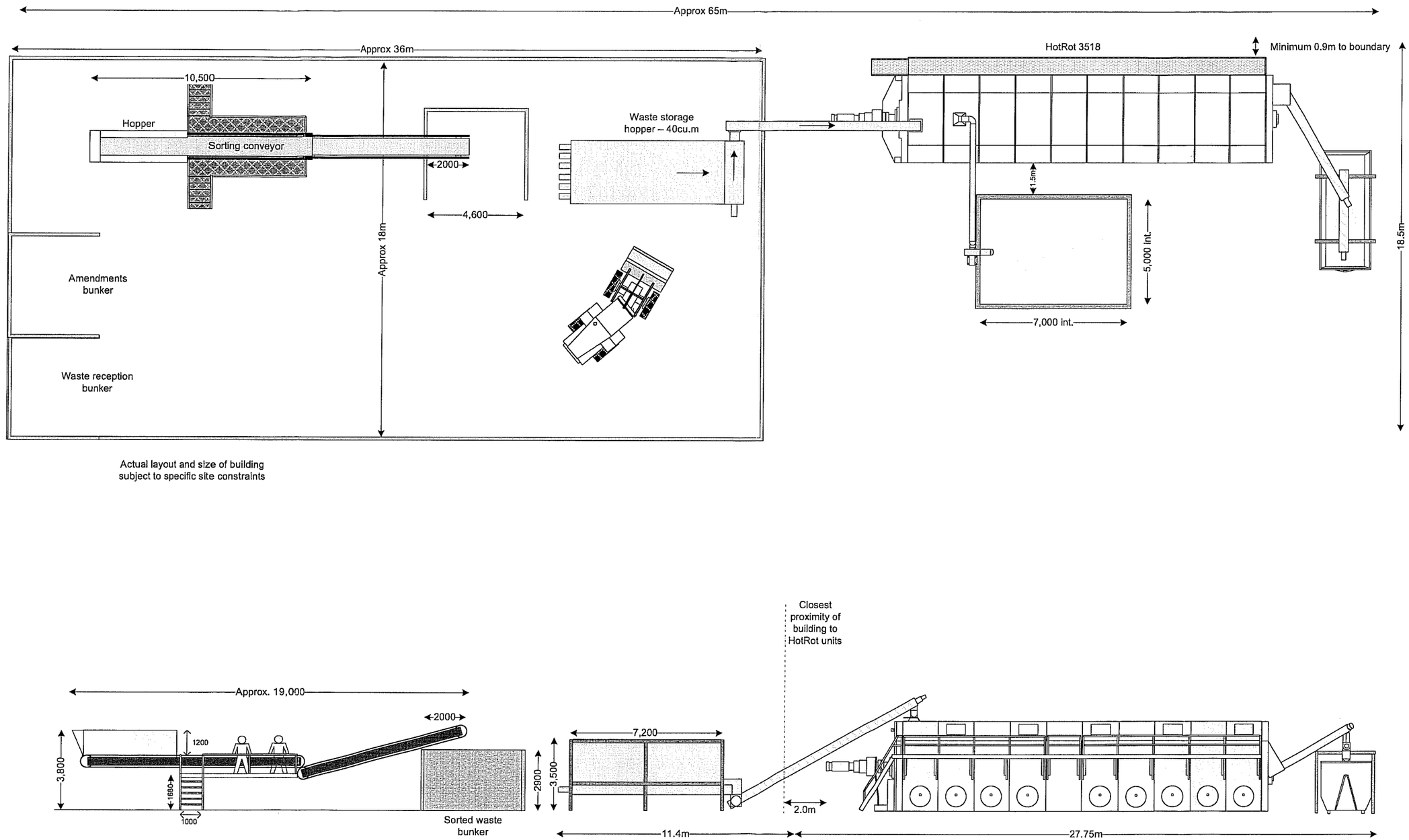
7. Maintenance

The operator is responsible for routine maintenance and servicing as outlined in the Operators Manuals. A maintenance log shall be maintained, failure to do so may void any equipment warranties.

Any faults or damage to equipment during the Warranty Period must be reported to the Vendor as soon as identified and no later than 48 hours after the fault or damage occurred or could reasonably be expected to have been identified.

8. Limits to Motor Currents

The maximum current draw for each HotRot main drive is limited within the Control System in order to protect the motor and gearbox. Even though the motor should have the capacity to draw additional current the current limits set in the control system must not be altered or overwritten. Any adjustment to these values will void any and all warranties relating to the motor, gearbox and shaft assembly.

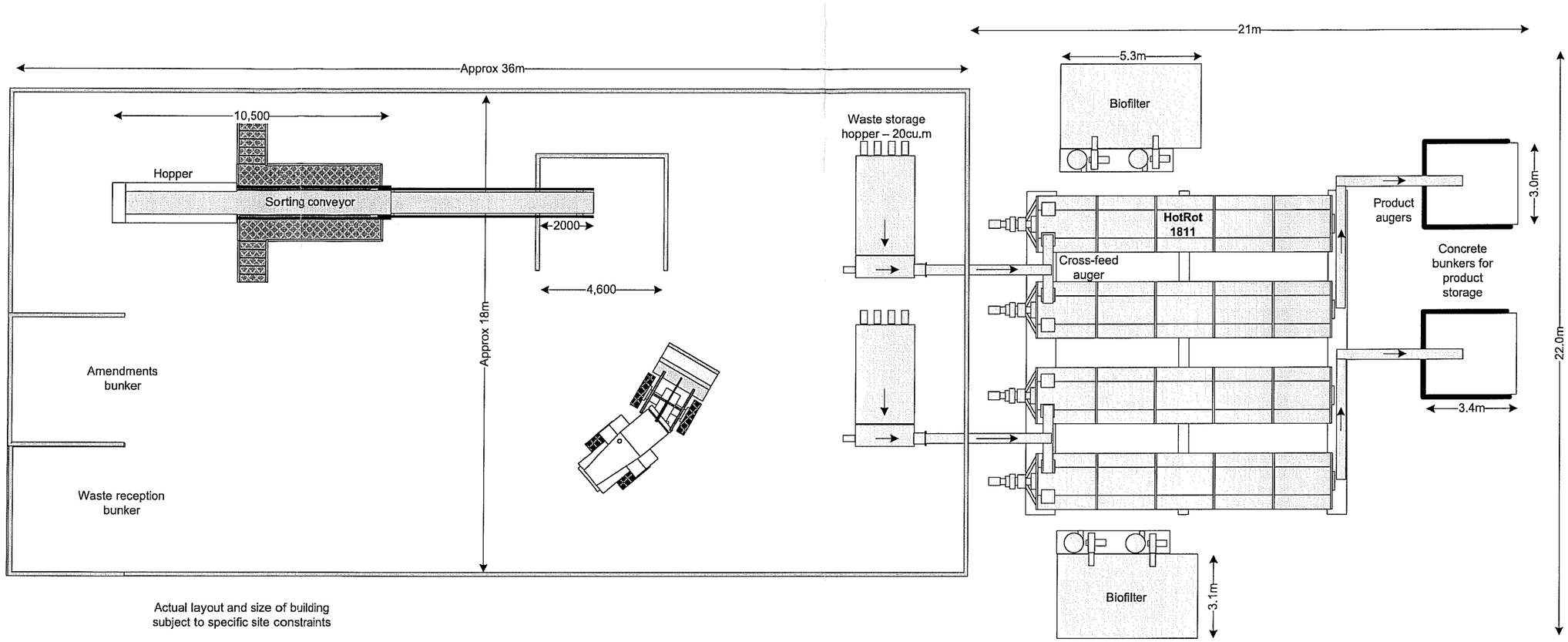


Single 3518 SSO Oct 08.vsd

HotRot COMPOSTING SYSTEMS

Concept Drawing only – not for manufacture
3,500-4,500 tonne per annum plant
Drawn by PWR Oct 08

Indicative site layout – 4 HotRot 1811s – SSO composting



Actual layout and size of building subject to specific site constraints

Four 1811s SSO Oct 08.vsd

APPENDIX C

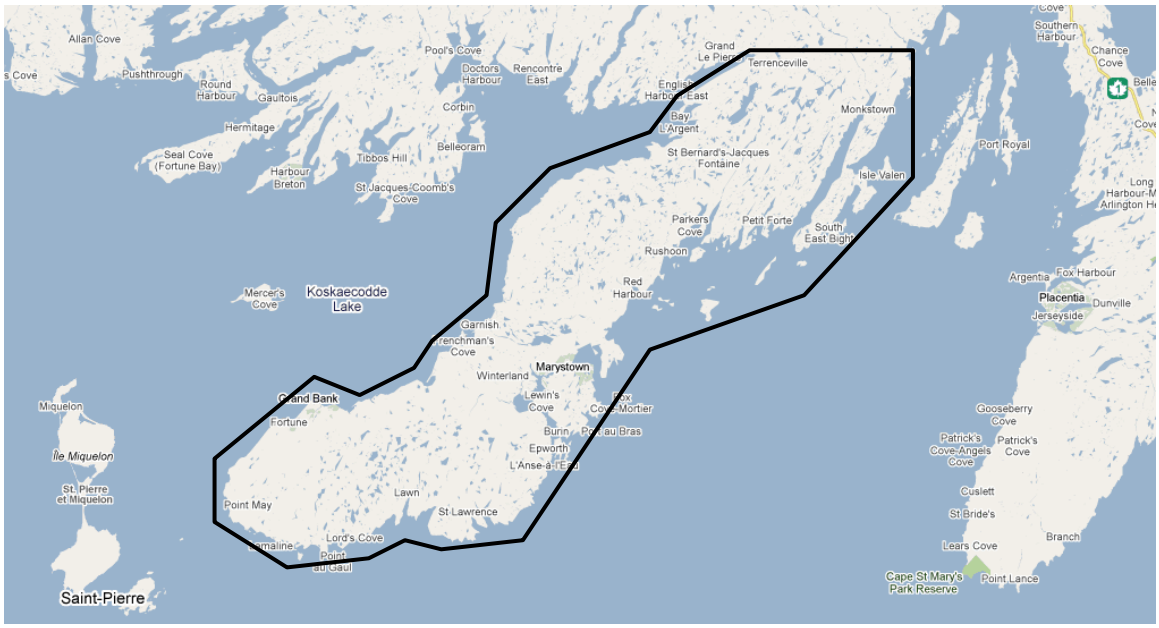
Burin Peninsula Waste Management Corporation Sources Separated Organics (SSO) Processing Facility Conceptual Evaluation, Stearns and Wheler, June 2010

BURIN PENINSULA WASTE MANAGEMENT CORPORATION
SOURCE SEPARATED ORGANICS (SSO) PROCESSING FACILITY

Conceptual Evaluation

Draft Report Submitted to

BAE-Newplan Group



STEARNS & WHELER
CLIENTS | PEOPLE PERFORMANCE

June 2010

BURIN PENINSULA WASTE MANAGEMENT CORPORATION
SOURCE SEPARATED ORGANICS (SSO) PROCESSING FACILITY

Conceptual Evaluation

Draft Report Submitted to:

BAE-Newplan Group Limited
1133 Topsail Road, Mount Pearl
Newfoundland, Canada
A1N 5G2

Submitted by:

Stearns & Wheler GHD
One Remington Park Drive
Cazenovia, New York 13035

June 2010

TABLE OF CONTENTS

BAE-NEWPLAN GROUP
BURIN PENINSULA SOURCE SEPARATED ORGANICS PROCESSING FACILITY
CONCEPTUAL EVALUATION

1.0 INTRODUCTION

1.1 GENERAL

This conceptual evaluation for the Burin Peninsula Source Separated Organics (SSO) Processing Facility was prepared for SNC♦Lavalin Inc./BAE-Newplan Group Limited (BNG) in accordance with our agreement for Independent Contractor's Services dated April 30, 2010. This conceptual evaluation will be used by BNG for the ongoing development of an SSO Processing Facility as part of the integrated Solid Waste Management Plan for Burin Peninsula and for permitting purposes.

1.2 SCOPE OF WORK

Under this agreement, our scope of work includes the following tasks:

- Planning and Coordination – Review past reports to gain information pertaining to potential processing of SSO and available feedstocks. Discuss parameters with BNG that may influence design criteria as work proceeds.
- Preliminary Screening of Technologies – A summary of SSO feedstocks and tonnages has been developed previously and submitted to BNG. Under this report, the previously confirmed information has been used to develop the remaining process design parameters.
    - o Determine feedstock and bulking agent tonnages and densities to size the processing and storage areas and research appropriate SSO composting technologies.
    - o Based on a preliminary screening evaluation, summarize potential composting options, including key parameters, design inputs, and estimated capital and operating costs based on literature searches and past experience.
    - o Determine the preliminary cost-effectiveness of an SSO facility by comparing composting technologies with the Burin Peninsula Waste Management Corporation's (BPWMC) existing transportation and disposal cost of $60/tonne for solid waste.

- Prepare Summary Report – A description of the available organic feedstock, preliminary screening results and preferred composting option is presented in this report.

1.3 PROJECT GOALS AND OBJECTIVES

The following goals have been established for the project:

- The primary goal for the Burin Peninsula SSO Processing Facility is to avoid transportation and disposal costs for the organic fraction of the waste stream, potentially saving significant cost to the BPWMC.
- The SSO Processing Facility should be relatively simple to operate and manage.
- Compost must meet the Canadian Council of Ministers of the Environment (CCME) standards.
- Provide processing flexibility to take advantage of opportunities and markets. This flexibility should be both in feedstock, bulking agents, and alternative uses of the final product.
- Provide for ”Active Composting” within a “controlled environment” for a minimum of 28 days. Odour control is a key consideration.
- The project should target a 50 percent diversion rate in accordance with provincial guidelines.

2.0 EXISTING WASTE MANAGEMENT PROGRAM

The Burin Peninsula Waste Management Corporation (BPWMC) manages the planning and implementation of a modern waste management system on the Burin Peninsula. The Burin Peninsula Area spans approximately 4,000 square kilometres in the south-eastern region of Newfoundland. In 2006, the Consensus Canada found the Burin Peninsula having a population of 21,233, a decrease from the 2001 estimate. For future waste projections and considerations, a constant population of 20,000 was used.

2.1 WASTE CHARACTERISTICS

Edwards and Associates completed a study in 2008 that identified the anticipated tonnage of waste generated within the Burin Peninsula Waste District. The waste identified residential; construction and demolition (C&D); and institutional, commercial and industrial (IC&I) sources. In addition, the study identified potential sources of

disposal from areas within and immediately adjacent to the Burin Peninsula Waste District. However, based on the results of the initial cost analyses, the conceptual evaluation currently includes analysis of processing source separated organics (SSO) as a separate waste stream within the Burin Peninsula Waste District.

Based on previously completed studies, the Burin Peninsula waste stream consists of approximately 15,476 tonnes of mixed solid waste and recyclables per year based on 2.12 kg/cap/day. For planning purposes, waste characteristics were determined using data developed from other waste studies performed in Canada. The resulting waste characterization is summarized on Table 1.

TABLE 1

Solid Waste Composition in 2009 for the Burin Peninsula Region

Category and Material	Tonnes/Year
Recycling	
Paper	5,417
Plastic	1,702
Metals	774
Glass	619
Composting	
Organics	4,488
C&D Waste	
Inert Waste	929
Wood	774
HHW	155
Other	619

2.2 WASTE STREAM DIVERSION

Composting the organic fraction of solid waste in the Burin Peninsula Region reduces the volume of waste to be transported out of the Region for disposal or processing. Of the materials listed in Table 1, 4,488 tonnes per year of organic material and 5,417 tonnes per year of paper products are best suited for composting. If only the organic material is composted, the compost facility would be smaller and would require less

capital investment; however, the unit processing cost would be higher. Composting both paper and organic material would incur a larger capital investment but a smaller operating cost per tonne as a result of economy of scale. In addition, less bulking material would be required with the addition of paper, and less waste material would be transported out of the Region. Since both options have benefits to the Region, processing organics only or processing organics and paper were both evaluated.

3.0 PRELIMINARY SCREENING EVALUATION

3.1 ALTERNATIVE PROCESSING OPTIONS

There are a number of SSO processing options that range from simple windrows and turning (no forced aeration) to fully enclosed and automated systems. Tables 2 and 3 show typical composting options available to the BPWMC with various parameters listed for each option. It should be noted that these are generic-type systems since there are numerous variations that may be applied to each process. The intent of these tables is to assist in screening potential processes that may be suited to Burin Peninsula.

The simplest and least expensive option, open windrows (long rows of feedstock), includes a front-end loader to mix SSO with bulking agents and to manually turn windrows. Static, aerated piles are similar to open windrows but are condensed on an aeration pad with no space between the rows, and forced air is blown from the bottom of the pile to accelerate decomposition as a result of bacterial activity. Forced aeration increases the decomposition rate in lieu of mechanical mixing and also allows for odour control measures through the use of organics (wood chips or yard waste) on top of the piles. However, both of these processes are performed outdoors and are subject to local weather conditions.

There are a variety of options for enclosed or covered static aerated piles. Containers or tunnels work well for variable feedstock. Large operations in harsh climates would be best suited for processes within a structure or building. Other options include synthetic covers over windrows or static aerated piles that use less space while effectively processing organics.

High-end systems include an enclosed agitated bed compost process that is more suited to larger volumes of waste since it is capital intensive and highly automated. Although it is the most expensive option, it can decrease the amount of bulking agent required and produces a consistent compost product for a wide variety of feedstock.

3.2 FEEDSTOCK AND BULKING AGENTS

In Tables 2 and 3, each process is considered with a feedstock option for both organic material only and organic material with paper. Although increasing the amount of feedstock will increase the overall land requirements and subsequent capital and operating costs, mixing paper with organics will decrease processing costs per tonne of feedstock (based on a volume relationship). In addition, the amount of bulking material needed for the feedstock will be reduced (a potential cost savings during operations).

The availability of typical bulking agents such as wood chips and yard waste may not be readily available in the Region. For a dense and relatively wet feedstock like SSO, bulking material is needed to create a more porous and uniform material that will promote aerobic decomposition through air movement and oxygen uptake and will help minimize odour by avoiding anaerobic conditions (off-gas by-products formed in the absence of oxygen). Adding paper to the organic material may provide additional bulk to the feedstock but may not completely replace the need for additional bulking agents. An alternative to traditional bulking agents such as wood chips or yard waste could be other natural products such as sea shells that would not readily decompose. The shells could then be screened from the compost and be reused as a bulking agent. Although purchasing bulking agents is undesirable, this evaluation includes an allowance for purchase of some bulking agents. However, transporting bulking agents into the Region is counter productive to the primary purpose of this evaluation, i.e., decreasing transportation and disposal costs.

3.3 SELECTED OPTION FOR CONCEPTUAL REVIEW

In order to complete a preliminary screening of available technologies, the goals listed in Section 1.3 are summarized and listed in order of priority:

- Operating cost
- Simplicity of operations
- Quality compost
- Process flexibility
- ”Active Composting” within a “controlled environment”
- Odour control

Operating Cost Considerations

Table 3 presents a summary of potential project costs and operating costs for new composting facilities using various technologies. These cost projections are based on recent project experience, literature searches, and information from equipment vendors and suppliers. It should also be noted that the unit cost projections were estimated based on composting facilities that process fewer than 10,000 tonnes per year. Therefore, unit cost projections (capital costs) may appear high due to the scale of the facility. That is, economy of scale is more readily achieved for larger feedstock volumes that will lower project cost on a unit basis.

As previously stated, the primary goal for the Burin Peninsula SSO Processing Facility is to avoid transportation and disposal costs for the organic fraction of the waste stream. Currently, the average annual transportation and disposal cost is approximately $60/tonne for MSW. From an operating cost perspective, it is projected that synthetic covered, aerated windrows (Process No. 4) and an enclosed agitated bed compost system (Process No. 5) would likely exceed $60/tonne to operate, as well as requiring the highest capital investment; thus, these systems were eliminated from further consideration.

Simplicity of Operations

In terms of operation simplicity, an open windrow system is the easiest to operate but requires weekly turning of the windrows throughout the year. Although labour and equipment requirements are minimal, process controls such as temperature and moisture are difficult to maintain and are influenced by seasonal variations and climate conditions. Since windrows rely on mechanical mixing and aeration, it also offers the greatest potential for odour migration. Compost quality would generally be acceptable if managed properly, but the paper fraction of the feedstock would be subject to release due to wind. Given the changing weather conditions on the Burin Peninsula, this process was eliminated from further consideration.

Open or enclosed static aerated compost systems appear to offer competitive operating cost compared to the current cost for transportation and disposal. These systems require greater capital investments but use relatively simple operational methods to produce a consistent compost product with minimal odours. Operating a static aeration system in a container or tunnel can eliminate the handling issues associated with working outdoors, as well as provide a “controlled environment,” but this has a larger land area required, larger operating cost and a significantly larger capital cost. However, both process

options (No. 2 and 3) remained for further consideration, but with the understanding that the enclosed processes require significant additional capital investment.

Compost Quality

There is significant history and experience with static aeration systems, and both "open systems" and "enclosed systems" have proven effective in producing a consistent compost that satisfies CCME Compost Quality Guidelines.

Process Flexibility

Static aeration systems provide process flexibility for various types of feedstock, volume of feedstock, operational controls for changing seasons, temperature controls, moisture controls, and odour control. Containerized systems may offer more automated sensing options for temperature but do not allow full site view of the feedstock as it is processing in order to note subtle changes in the piles, such as air flow and moisture accumulation.

Active Composting Within a Controlled Environment

The most reliable method of achieving a consistent compost product is to control the environmental conditions that can affect the compost process. Climate and day-to-day weather conditions impact feedstock mixing, moisture control, oxygen content, processing times, and throughput volumes (the amount of material that can be processed over a given period of time). This potentially has significant consequences to storing and marketing compost if space is limited or markets are seasonal. Indoor mixing and processing offers the greatest opportunity for controlling the environment but adds significant capital cost to the project, especially if buildings are enclosed and additional air treatment is required. However, operational costs are not significantly increased if processes can be covered but not fully enclosed (i.e., does not require separate air treatment systems).

Odour Control

As previously discussed, static aeration systems are very effective in controlling odours.

Selected Option for Further Consideration

Based upon the results of the preliminary screening of technologies, and in consideration of specific site and weather considerations, a "hybrid process" was selected that utilizes a static aeration system within a covered building (open-sided

building). The capital cost is likely to be more than an outdoor facility but less than a fully enclosed building with ventilation systems. In addition, many compost facilities are utilizing fabric buildings as a reasonable alternative to conventional buildings. The fabric building provides a "controlled environment" with lower capital and operating costs than a system that utilizes containers or tunnels. A further description of the process and evaluation of the process is described as follows.

4.0 CONCEPTUAL PLAN AND DEVELOPMENT CONSIDERATIONS

Based on the initial screening of composting technologies, sheltered static aerated piles satisfied initial screening criteria and were selected as a potential viable alternative to transporting and disposing of organic material and paper waste. The process was further evaluated for cost in order to complete a comparative economic analysis. A conceptual layout is shown on Figure 1 to capture the process schematically and to estimate cost.

4.1 OVERVIEW OF SHELTERED STATIC AERATED PILES PROCESS

Sheltered static aerated piles is a process where source-separated organics are received and mixed with bulking agents, such as wood waste (wood chips), yard waste, or alternative materials, and placed on an aeration pad for processing. For SSO that also contains paper, cardboard, or large food items, a shredder may be used in the mixing area for size reduction as a pre-processing step (refer to Appendix A for typical shredder examples). The aeration pad would typically include a system of perforated pipes and aeration blowers that regularly feed air from the bottom of the piles through the organic materials to control the rate of decomposition and compost production. The receiving and mixing area, bulking agent and feedstock storage areas, and aeration pad are housed under an enclosed building or roofed shelter. This method does not require the material to be turned, and generally completes the active phase of composting within 30 days. The material can then be removed from the pad and cured in windrows for two to three months as a final processing step. The compost is then processed through a trommel screen to remove inorganic materials and to recover bulking agents (refer to Appendix B for examples of trommel screens). A similar process was recently tested utilizing static aerated piles to compost green waste and pre-consumer food waste with excellent results.

In order to protect equipment and materials from the weather and to provide for year-round operations, a roofed shelter, such as a pre-engineered fabric-covered building could be used (refer to Appendix C for an example of a typical fabric building). The building would be sized to accommodate feedstock storage, the receiving and mixing

area, the aeration pad and blowers, and process equipment. To provide natural ventilation and reduce operating costs (when compared with conventional container or tunnel processes), the roofed shelter would include an air gap between the perimeter push walls or have open ends to allow for air flow within the building.

The sheltered static aerated system process schematic in Figure 1 illustrates the process flow for both organic material only and organic material with paper waste feedstocks. Both feedstock options are shown inside the same sized structure with the organics-only option allowing room for curing and storage. Figure 1 also shows how a phased program could be implemented by introducing the organics-only approach and then expanding to the organics and paper approach. If a larger building were initially constructed, the excess space would allow for some internal curing prior to screening. The increase in the volume of feedstock material would result in a larger aeration pad and relocating the curing area outdoors. Extending the aerated pad would require limited additional capital cost.

4.2 ESTIMATED PROBABLE CAPITAL AND OPERATING COSTS

Based upon the technology screening results, an opinion of probable construction and first-year operation and maintenance costs was completed for the sheltered static aerated piles process for both the organic material only and organic material and paper waste feedstock options. The intent of the analysis is to determine if the expected range of costs for this composting process compares favorably with the BPWMC's current transportation and disposal costs. The values are based on past project experience and literature searches.

Tables 4 and 5 compare the opinion of probable construction cost and first-year operation and maintenance (O&M) costs for both feedstock options. For an organic material only feedstock, the estimated construction cost is $5.84 million CAD (2010). The estimated first-year O&M cost is $263,000 CAD which relates to an estimated annual O&M cost of $58 CAD/tonne of organic material. For a feedstock of organic material and paper waste, the estimated construction cost is $7.32 million CAD (2010). The estimated first-year O&M cost is $389,000 CAD which relates to an estimated annual cost of $39 CAD/tonne of organic material and paper waste. Both feedstock options will result in an annual O&M cost that is less than the current transportation and disposal (T&D) cost of $60 CAD/tonne MSW, with the processing of both organic material and paper wastes presenting the lowest annual O&M cost per tonne.

It is important to recognize, however, that a variety of project-specific considerations will impact the actual construction and operating cost for the composting process. The

opinion of probable construction costs in Table 4 will vary depending on site selection, the work required to prepare the site, final building size, etc. Available bulking agents and unexpected repairs will alter the opinion of probable O&M costs presented in Table 5.

5.0 SUMMARY AND RECOMMENDED NEXT STEPS

Based upon this conceptual evaluation, our recommendation is to further explore the sheltered static aerated piles composting process. Of the composting technologies that were examined for SSO processing, sheltered static aerated piles have a lower land area requirement, minimal operational requirements, produce a quality compost product, and offer process flexibility and reliable odour control methods. Facility permitting, construction duration, and baseline economics appear better than those for the other composting technologies.

The following are issues that were not specifically addressed as part of this conceptual evaluation (or scope of services) but should be considered prior to a preliminary design process for a sheltered static aerated piles process.

- SSO Collection Costs – An investigation into the current and expected collection plan and annual cost for SSO will provide the BPWMC with an overall cost projection and feasibility assessment for the process. If the feedstock cannot be supplied to the composting facility for a reasonable cost, it may be more economical to transport the material out of the region.
- Funding – A review of the provincial government's policy and procedure to obtain the funding for the capital cost will be a key element in the decision to move forward with the composting process implementation. The current opinion of per-tonne costs used for comparison with current T&D costs is based solely on O&M costs and does not include capital debt retirement.
- Site Development Synergies – An analysis of the BPWMC's long-term plan in correlation with the compost facility implementation will highlight costs that will already be incurred (i.e., road construction), that are already planned, and that the compost facility would benefit from.
- Regional Feedstock and Bulking Agents – A formal evalluation to identify actual waste composition and available bulking agents (i.e., shells) in the Burin Peninsula Region will help design a facility with appropriately sized equipment and process areas.

- Compost Market – A study on the local compost users can give the BPWMC an idea of demand and the compost quality required in the region.

Tables

TABLE 1

Solid Waste Composition in 2009 for the Burin Peninsula Region

Category and Material	Tonnes/Year
Recycling	
Paper	5,417
Plastic	1,702
Metals	774
Glass	619
Composting	
Organics	4,488
C&D Waste	
Inert Waste	929
Wood	774
HHW	155
Other	619

TABLE 2

Parameters for Each Composting Process

Process		Feedstock	Bulking Agent (BA)[1]	Pre-Processing	Odour Control Measures	Curing/ Storage	Land Area Requirement (ha)
1	Open Windrows	Organics	2 : 1	Mixing w/Bulking Agent (BA)	Compost or Yard Waste Layer	Outside	1.1
		Organics and Paper	2 : 1	Small Shredder, and Mixing w/BA			2.4
2	Static, Aerated Piles	Organics	3 : 1	Mixing w/BA	Compost or Yard Waste Layer	Outside	0.7
		Organics and Paper	2 : 1	Small Shredder, and Mixing w/BA			1.1
3	Enclosed Static Aerated Containers or Tunnels (with spaces between each)	Organics	3 : 1	Mixing w/BA	Inside Building- Air Control System	Inside or Outside	1.7
		Organics and Paper	2 : 1	Small Shredder, and Mixing w/BA			2.8
4	Synthetic Covered Aerated Windrows	Organics	2 : 1	Mixing w/BA	Synthetic Cover Material	Outside	0.5
		Organics and Paper	1.5 : 1	Small Shredder, and Mixing w/BA			0.8
5	Enclosed Agitated Bed Compost System	Organics	1 : 1	Shredding	Inside Building - Air Control System	Inside or Outside	0.5
		Organics and Paper	0.5 : 1	Shredding			0.8

[1] Approximate volume ratio requirements, depends on actual moisture contents and Carbon and Nitrogen ratios

TABLE 3

Costs and Benefits for Each Composting Process

	Process	Feedstock	Challenges and Cost Considerations	Benefits	Estimated Project Costs[1] ($/tonne)	Estimated Annual O&M Costs[1] ($/tonne)
1	Open Windrows	Organics	Large land area required, large amount of bulking agent required, low O&M, seasonal operations	Outdoors – no building cost, low O&M costs	100 – 200	40 – 60
		Organics and Paper	Large land area required, large amount of bulking agent required, low O&M, seasonal operations	Outdoors – no building cost, low O&M costs	75 – 125	30 – 40
2	Static, Aerated Piles	Organics	Outdoor mixing and handling, weather challenges, large amount of bulking agent required, O&M cost of forced air	Outdoors – no building cost, reasonable O&M cost	400 – 600	50 – 65
		Organics and Paper	Outdoor mixing and handling, weather challenges, large amount of bulking agent required, O&M cost of forced air	Outdoors – no building cost, reasonable O&M cost	300 – 400	35 – 45
3	Enclosed Static Aerated Containers or Tunnels	Organics	Alternative bulking agent may be used, large building and odour control cost, O&M cost of forced air	Odour, noise, and aesthetic concerns minimized, controlled process, operational year round.	700 – 900	50 – 60
		Organics and Paper	Alternative bulking agent may be used, large building and odour control cost, O&M cost of forced air	Odour, noise, and aesthetic concerns minimized, controlled process, operational year round.	500 – 700	45 – 55
4	Synthetic Covered Aerated Windrows	Organics	Outdoor mixing, relatively efficient use of space, high capital cost, low O&M cost	Odour and aesthetic concerns minimized, efficient use of space	500 – 600	70 – 85
		Organics and Paper	Outdoor mixing, relatively efficient use of space, high capital cost, low O&M cost	Odour and aesthetic concerns minimized, efficient use of space	400 – 500	60 – 75
5	Enclosed Agitated Bed Compost System	Organics	Efficient use of space, large capital and operating costs	Odour, noise, and aesthetic concerns minimized, efficient use of space, controlled process, less bulking agent required	800 – 1,000	75 – 90
		Organics and Paper	Efficient use of space, large capital and operating costs	Odour, noise, and aesthetic concerns minimized, efficient use of space, controlled process, less bulking agent required	600 – 800	60 – 75

[1] Costs based on project experience, literature search, and information from vendors and suppliers for feedstock quantity less than 10,000 tonnes per year.

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PROJECT: Burin Peninsula SSO Processing Facility
Conceptual Evaluation

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TABLE 4

OPINION OF PROBABLE CONSTRUCTION COSTS (CONCEPTUAL PLANNING LEVEL)

Major Components	Cost	
	Option 1*	Option 2**
Aeration Pad (concrete, blowers (8/14) , piping, valves, gauges, stones)	$400,000	$675,000
Process: Equipment (Shredder, Trommel Screen, Containers)	$650,000	$650,000
Mixing Pad (Asphalt , crushed stone, drainage)	$320,000	$320,000
Fabric Covered Building with Foundation	$2,950,000	$4,100,000
Electrical and Site Utilities	$120,000	$120,000
Site and Civil Work	$200,000	$200,000
Roadways and Driving Structures	$230,000	$230,000
Miscellaneous (Motorized Doors, Air Compressor System, etc)	$50,000	$50,000
Total Cost in USD (2010):	**$4,920,000**	**$6,350,000**
Total Cost in CAD (2010)†:	**$5,170,000**	**$6,670,000**
13% Harmonized Sales Tax in CAD (2010)	$670,000	$870,000
Subtotal in CAD (2010)	$5,840,000	$7,540,000
15% Engineering Fees in CAD (2010)	$880,000	$1,130,000
Total Project Cost in CAD (2010)†:	**$6,700,000**	**$8,700,000**

* Option 1: Includes organic feedstock only (4,500 TPY)
** Option 2: Includes organic and paper feedstock (10,000 TPY)
† Based on a $1.05 Exchange Rate

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TABLE 5

OPINION OF PROBABLE FIRST YEAR OPERATION AND MAINTENANCE COSTS

Major Components	Cost	
	Option 1*	Option 2**
Personnel (including benefits) One heavy equipment operator One laborer (two with Option 2) Half time Site Manager	$150,000	$200,000
Purchase of Bulking Agents***	$50,000	$75,000
Equipment Fuel and Repairs	$20,000	$40,000
Power Cost (Blowers)	$20,000	$35,000
Miscellaneous Maintenance and Site Work	$10,000	$15,000
Compost Testing and Reporting	$5,000	$10,000
Capital Repair Fund	$15,000	$25,000
Total Annual Cost in USD (2010):	**$270,000**	**$400,000**
Total Annual Cost in CAD (2010)†:	**$284,000**	**$420,000**
Total Annual Cost per Tonne in USD (2010):	**$60**	**$40**
Total Annual Cost per Tonne in CAD (2010)†:	**$63**	**$42**

* Option 1: Includes organic feedstock only (4,500 TPY)

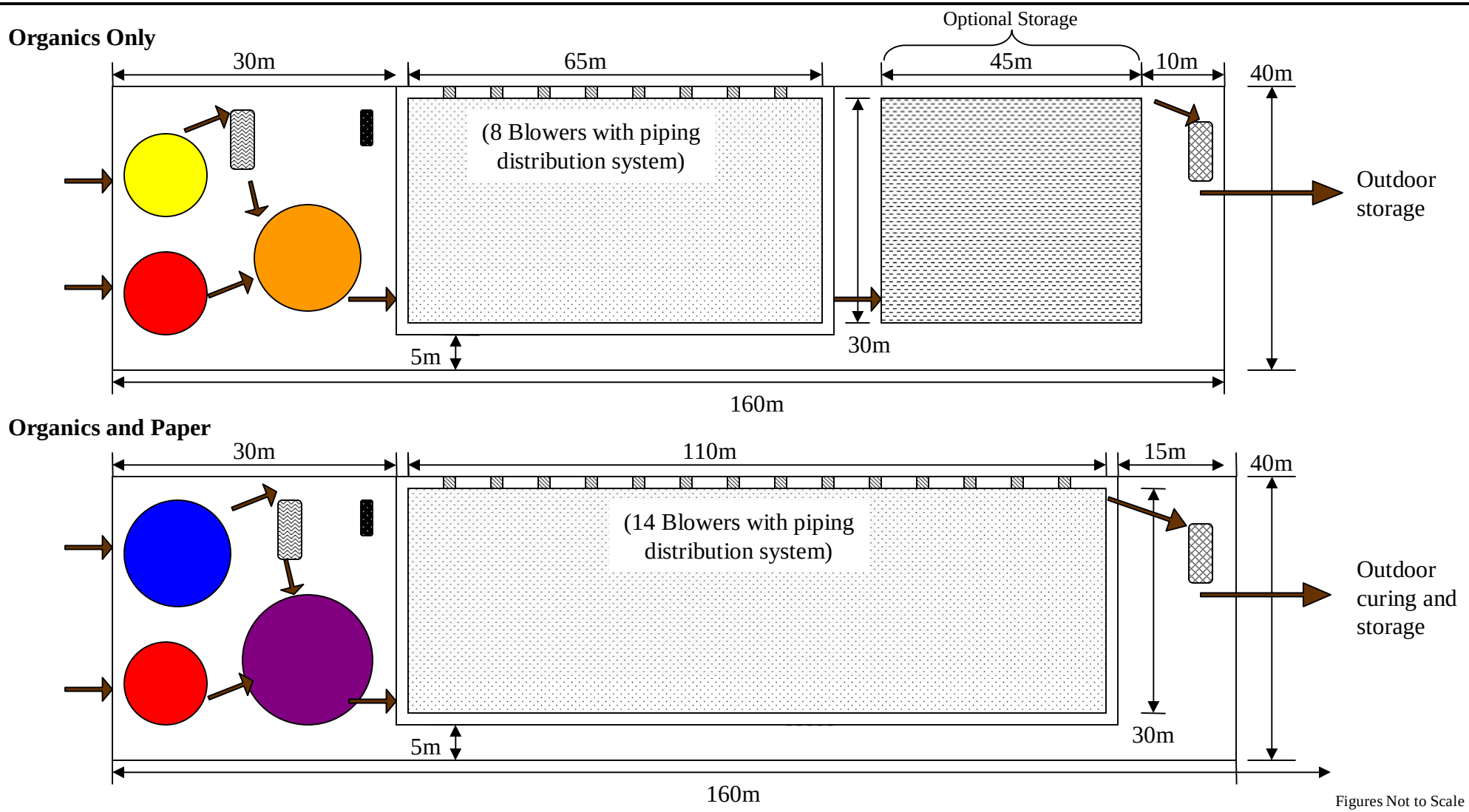
** Option 2: Includes organic and paper feedstock (10,000 TPY)

*** Bulking Agents (yard waste and brush) should be available for no cost but an allowance for when regional material not available

† Based on a $1.05 Exchange Rate

Figures

Figure 1 – Process Schematic – Static Aerated System



Legend:

Bulking Agent		Organics and Paper		Rejects Rolloff		Screen	
Organics		Organics and Bulking Agent		Blowers		Curing Area	
		Organics, Paper and Bulking Agent		Aeration Pad		Shredder	

Prepared For:
BAE-Newplan Group,
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Date: June 2010

Job No: 8614385

Burin Peninsula Waste Management Corporation
Burin Peninsula, Newfoundland

Figure 1: Source Separated Organics Process Schematic – Static Aerated System

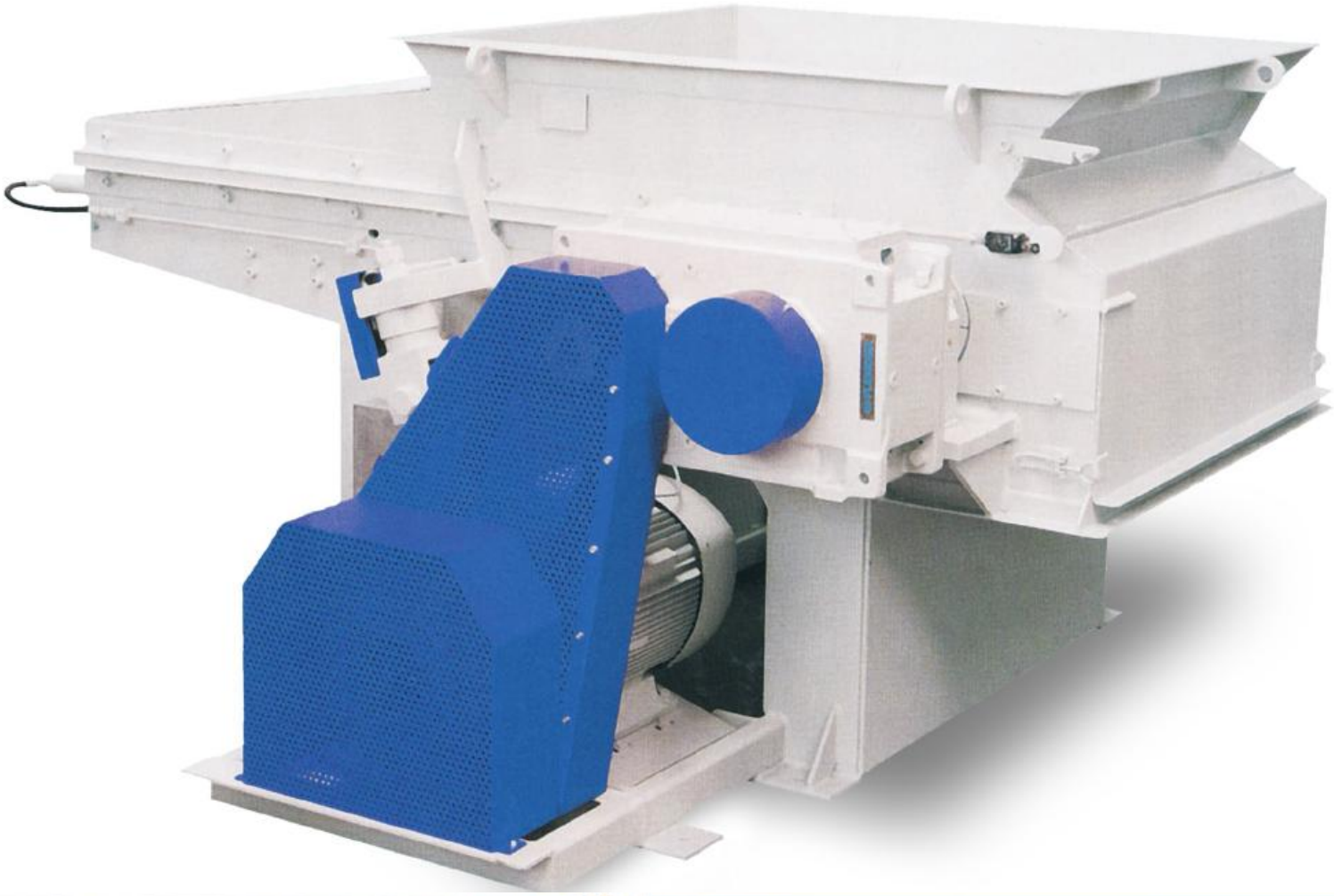
Appendices

Appendix A – Example Shredder Visuals

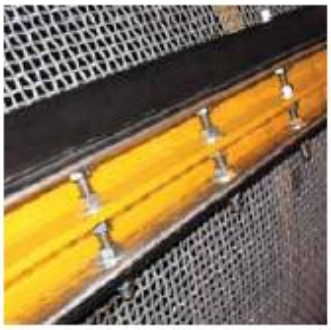
Appendix B – Example Trommel Screen Visuals

Appendix C – Example Fabric Building Visuals

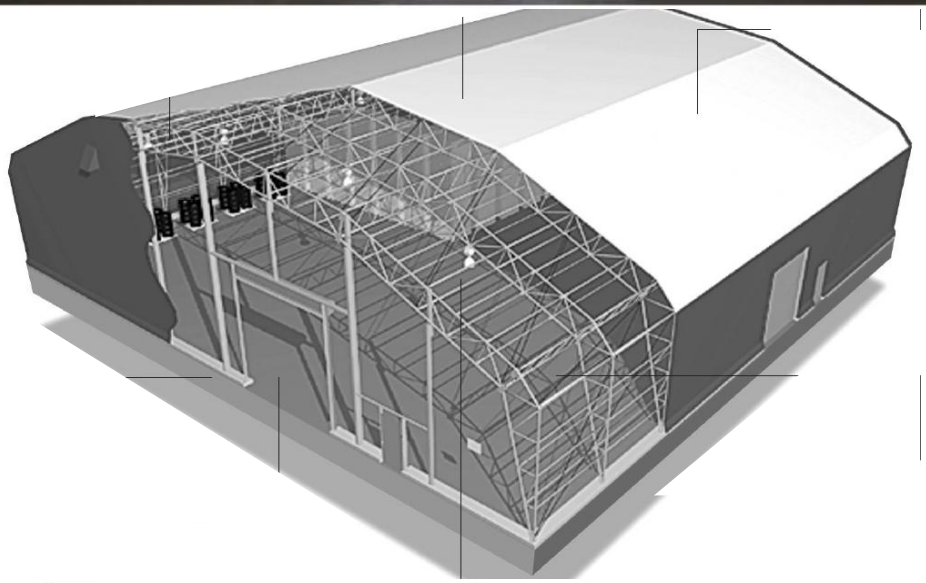
Appendix A: Example Shredder Visuals

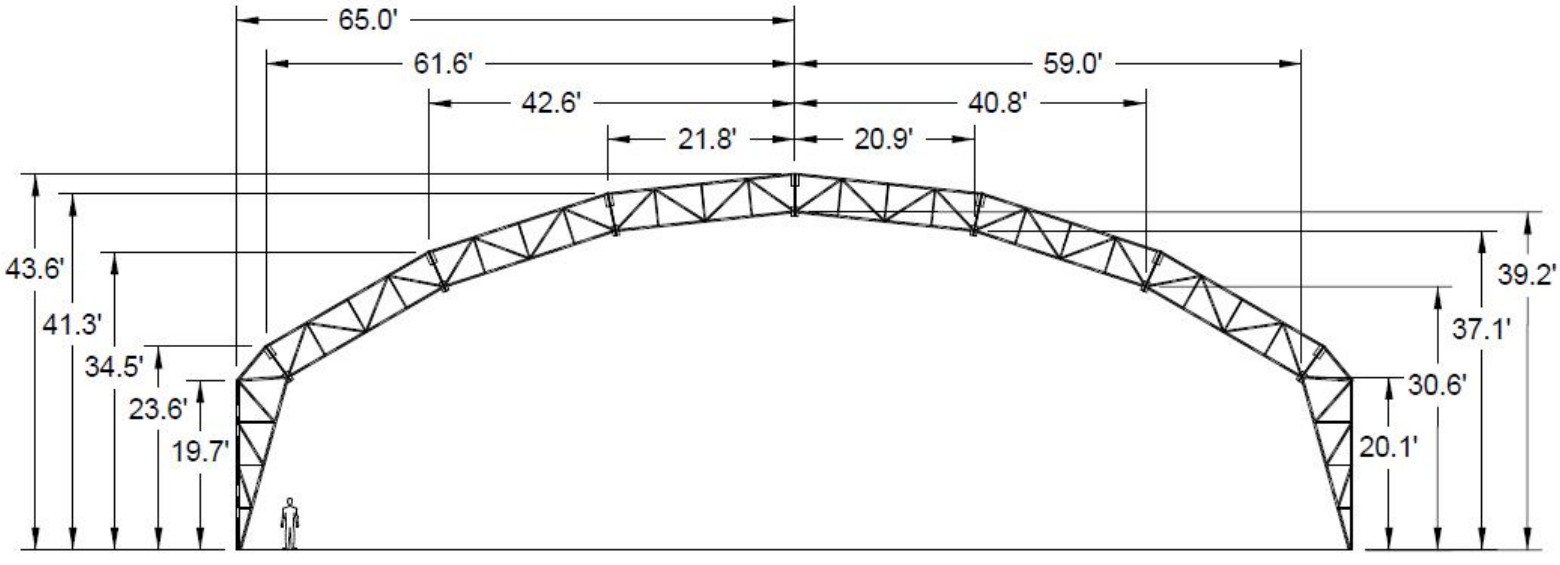


Appendix B: Example Trommel Screen Visuals



Appendix C: Example Fabric Building Visuals





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