

---

# BELL ISLAND Solid Waste Management Strategy

Bell Island, Newfoundland

---

**Prepared for:**  
Eastern Waste Management Committee

**Prepared by:**  
BAE-Newplan Group Limited  
1133 Topsail Road  
Mount Pearl, NL A1N 5G2

**Project No.**  
723408

**Date**  
May 2010

E	10/05/27		Draft	MS		
D	10/05/11		Draft	KT	MS	WM
C	10/03/26		Draft	KT	MS	WM
B	10/02/24		Draft	KT	MS	WM
A	09/12/15		Draft	KT	MS	WM
Rev.	Date yyyy/mm/dd	Page No.	Description	Prepared By	Reviewed By	Approved By



	<b>Page No.</b>
<b>1 INTRODUCTION .....</b>	<b>4</b>
<b>2 METHODOLOGY .....</b>	<b>8</b>
2.1 Questionnaire .....	8
2.2 Bell Island Ferry Service.....	8
<b>3 POPULATION AND WASTE GENERATION RATES .....</b>	<b>11</b>
3.1 Determination of Waste Generation Rate.....	11
3.2 Residential vs. Industrial, Commercial and Institutional (IC&I) Waste.....	13
3.3 Bell Island Waste Analysis .....	14
<b>4 WASTE QUANTITY AND COMPOSITION .....</b>	<b>16</b>
4.1 Industrial Commercial and Institutional (IC&I) waste.....	16
4.2 Special and Other Wastes.....	16
<b>5 CURRENT WASTE DISPOSAL SYSTEM .....</b>	<b>18</b>
5.1 Current Waste Disposal Site .....	18
5.1.1 Operations.....	18
5.2 Current Waste Collection Vehicles.....	21
<b>6 WASTE MANAGEMENT OPTIONS .....</b>	<b>22</b>
<b>7 PRELIMINARY COST ESTIMATES .....</b>	<b>24</b>
7.1 Cost Methodology and Assumptions .....	24
7.2 Cost Estimates .....	26
7.2.1 Option 1 – Collect all waste in a 37-yd <sup>3</sup> compactor and truck directly to the RHB Regional Waste Management Facility .....	26
7.2.2 Option 2 – C&D/bulk waste Public Drop Off Site for Direct Haul to RHB Regional Waste Management Facility .....	27
7.2.3 Option 3 – Direct Haul to RHB with C&D/Bulk Disposal on Bell Island.....	29
7.2.4 Option 4 – Local Waste Management Facility.....	31
7.2.5 Option 5 – Local Waste Management Facility with C&D/bulk waste Public Drop-Off Site.....	34
7.2.6 Option 6 – Collect all waste in Pick up Truck for Transport to a Local Waste Management Facility with C&D/bulk waste Public Drop Off Site.....	36
7.2.7 Option 7 – Collect all waste in Pick up Truck for Transport to a Self Contained Compactor Bin with C&D/bulk waste Public Drop Off Site .....	39
<b>8 CONCLUSIONS .....</b>	<b>42</b>
<b>9 PROS AND CONS .....</b>	<b>44</b>
<b>10 RECOMMENDATIONS .....</b>	<b>48</b>

**List of Appendices**

- A – Site Photographs
- B – Concept Plan of Typical Transfer Station
- C – Questionnaire Results
- D – Bell Island Ferry Schedule
- E – Ferry Information Sheets

**List of Figures**

Figure 1-1: Study Region and Communities.....5  
Figure 5-1: Waste Disposal Site .....20

**List of Tables**

Table 3-1: Summary of Estimated Waste Generation Rates in the Study Area..... 13  
Table 3-2: Projected Annual Generation of Residential vs. IC&I Waste for the Current Users of the Bell Island Site..... 14  
Table 5-1: Current Operating Costs of Bell Island Landfill Site..... 19  
Table 5-2: Current Collection and Transportation Costs..... 19  
Table 5-3: Breakdown of Costs based on current collection methods..... 19  
Table 5-4: Current Collection Practices on Bell Island..... 21  
Table 7-1: Capital Cost of Collection (Option 1) ..... 27  
Table 7-2: Annual Costs for Direct Haul to RHB Site (Option 1)..... 27  
Table 7-3: Annual Estimated Cost of Residents of Bell Island (Option 1)..... 27  
Table 7-4: Estimated Capital Costs for C&D/Bulk Waste Public Drop off Site (Option 2)..... 28  
Table 7-5: Estimated Annual Operating Cost of C&D/Bulk Waste Public Drop off Site (Option 2) ..... 28  
Table 7-6: Estimated Operational and Transportation Costs for Public Drop off Site (Option 2) 29  
Table 7-7: Annual Estimated Cost for Residents of Bell Island (Option 2) ..... 29  
Table 7-8: Estimated Capital Cost (Option 3) ..... 30  
Table 7-9: Estimated Annual Operating Cost of C&D/Bulk Waste Landfill (Option 3) ..... 30  
Table 7-10: Estimated Total Cost of C&D/Bulk Waste Landfill with Direct Haul of Remaining Waste to RHB Site (Option 3)..... 30  
Table 7-11: Annual Estimated Cost for Residents of Bell Island (Option 3)..... 31  
Table 7-12: Estimated Capital Cost for LWMF (Option 4)..... 32  
Table 7-13: Estimated Annual Operational Costs of LWMF (Option 4) ..... 33  
Table 7-14: Annual Collection and Transportation Costs to RHB Site (Option 4)..... 33  
Table 7-15: Annual Estimated Cost for Residents of Bell Island (Option 4)..... 33  
Table 7-16: Estimated Annual Capital Cost of LWMF and C&D/Bulk Waste Public Drop off Site (Option 5)..... 35  
Table 7-17: Estimated Annual Operation Cost of LWMF and C&D/Bulk Waste Public Drop off Site (Option 5)..... 36  
Table 7-18: Annual Collection and Transportation Costs to RHB Site (Option 5)..... 36  
Table 7-19: Estimated Cost for Residents of Bell Island (Option 5)..... 36  
Table 7-20: Estimated Annual Capital Cost of LWMF and C&D/Bulk Waste Public Drop-off Site (Option 6)..... 38  
Table 7-21: Estimated Annual Operation Cost of LWMF and C&D/Bulk Waste Public Drop off Site (Option 6)..... 38  
Table 7-22: Annual Collection and Transportation Costs to RHB Site (Option 6)..... 39

Table 7-23: Estimated Cost for Residents of Bell Island (Option 6).....39  
Table 7-24: Estimated Annual Capital Cost of Contained Compactor Bin and C&D/Bulk Waste  
Public Drop off Site (Option 7) .....40  
Table 7-25: Estimated Annual Operation Cost of Contained Compactor Bin and C&D/Bulk  
Waste Public Drop off Site (Option 7) .....41  
Table 7-26: Annual Collection and Transportation Costs to RHB Site (Option 7).....41  
Table 7-27: Estimated Cost for Residents of Bell Island (Option 7).....41  
Table 8-1: Summary Table: Bell Island Waste Management Study .....42  
Table 9-1: Summary Table of Pros and Cons for each Option .....44

# 1 INTRODUCTION

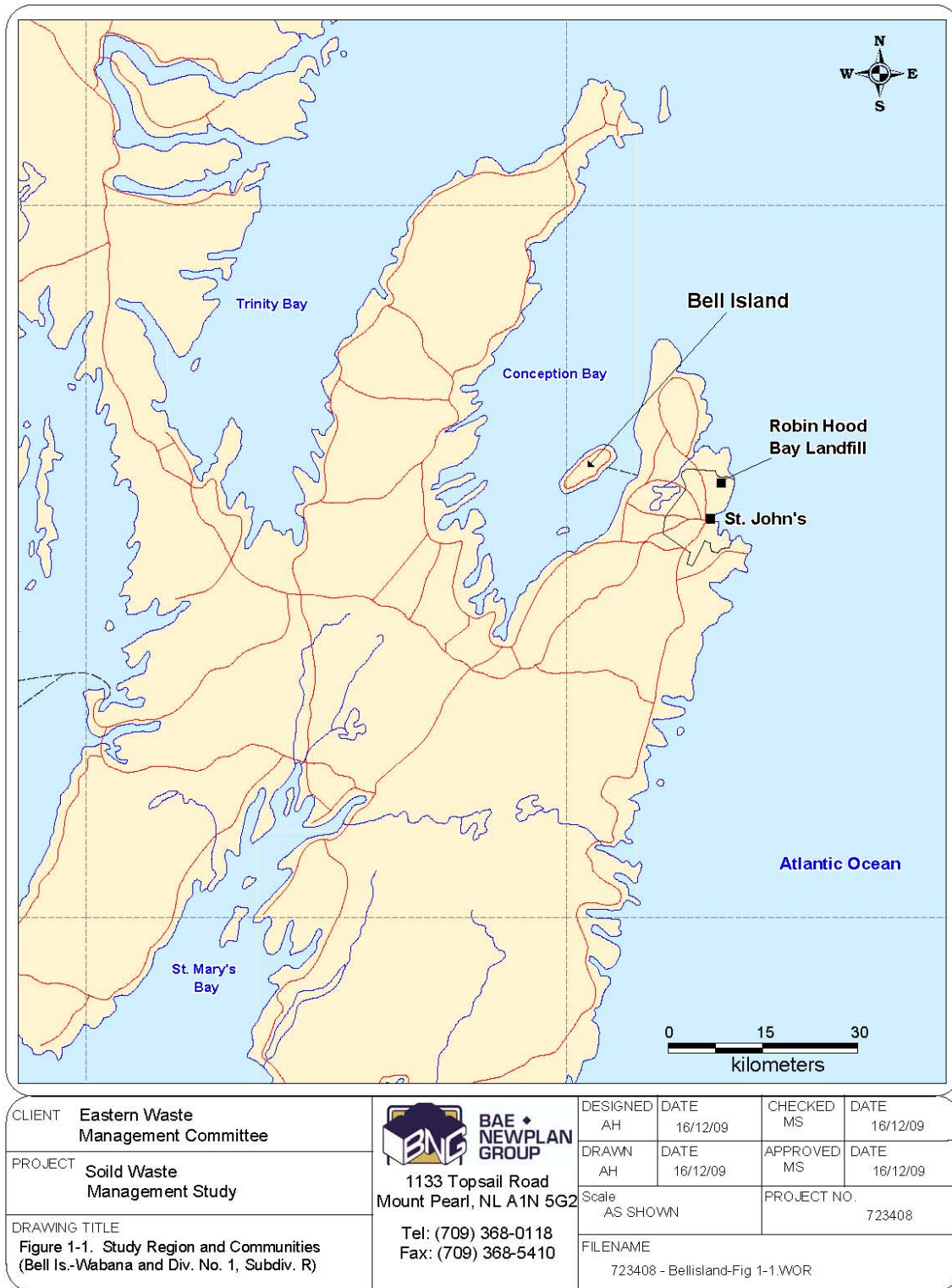
In September 2009, The Eastern Waste Management Committee, in cooperation with the Department of Municipal Affairs, retained BAE-Newplan Group (BNG) to undertake a study to investigate disposal options for Bell Island, with consideration given to accommodate waste from the Town of Wabana and the communities of Freshwater and Lance Cove. Freshwater and Lance Cove are unincorporated areas and will be referred to jointly as Division No. 1, Subdivision R, as identified by Statistics Canada.

The waste management practices on Bell Island do not meet the current provisions of the Provincial Waste Management Strategy. Therefore, it is necessary to investigate and evaluate options that can effectively and efficiently meet the goals of the Province's Waste Management Strategy.

The purpose of this study is to identify and describe economical and environmentally responsible waste management options for the communities located on Bell Island.

This study also provides an estimated total of capital, operational and collection / transportation cost items for each option along with pros and cons.

The study region is located on Bell Island, Newfoundland, as illustrated in Figure 1-1.



**Figure 1-1: Study Region and Communities.**

This report will identify the most practical and cost efficient options available to the region by evaluating the following:

- Waste types and quantities generated;
- Current and other waste disposal information and the costs associated with transportation and operation; and
- Proposed regionalized approach to waste collection whereby all waste generated is transported to the Robin Hood Bay (RHB) Regional Waste Management Facility.

Based on information collected from private contractors, waste haulers, municipal representatives, and from previous reports, this study will investigate the following:

- Collect all waste in a 37-yd<sup>3</sup> compactor and truck directly to the RHB Regional Waste Management Facility. Construction and Demolition Debris (C&D) / bulk waste, metals and Household Hazardous Waste (HHW) delivered to RHB by residents and businesses;
- Collect all waste in a 37-yd<sup>3</sup> compactor and truck directly to the RHB Regional Waste Management Facility with C&D/bulk waste drop off site located on Bell Island. C&D waste would be transported to the RHB Regional Waste Management Facility for final disposal;
- Collect all waste in 37-yd<sup>3</sup> compactor and truck directly to RHB with metals storage and C&D/bulk waste disposal on Bell Island;
- Construct a LWMF on Bell Island and transport waste to the RHB Regional Waste Management Facility in a 53' transfer trailer for disposal. C&D/bulk waste material to remain in C&D/bulk waste landfill;
- Construct a LWMF on Bell Island and transport waste to the RHB Regional Waste Management Facility in a 53' transfer trailer for disposal with C&D/bulk waste drop off site located on Bell Island. C&D waste would be transported to the RHB Regional Waste Management Facility for final disposal;
- Collect all waste in a pick up truck for transport to a LWMF on Bell Island and transport waste to the RHB Regional Waste Management Facility in a 53' transfer trailer for disposal with C&D/bulk waste drop off site located on Bell Island. C&D waste would be transported to the RHB Regional Waste

Management Facility for final disposal; and

- Collect all waste in a pick up truck for transport to a self contained roll off compactor bin on Bell Island. Bin would be transported to the RHB Regional Waste Management Facility for disposal when required. C&D/bulk waste drop off site located on Bell Island, with transportation to the RHB Regional Waste Management Facility for final disposal.

The first five options investigated will be analysed for each of the following collection alternatives:

- Using a 37-yd<sup>3</sup> single stream compactor truck, co-mingled collection;
- Using a 37-yd<sup>3</sup> split stream compactor truck, 4 stream collection (garbage, organics, paper and recyclables); and
- Using a 37 yd<sup>3</sup> split stream compactor truck, 2 stream collection (organics and remaining waste).

Options 6 and 7 will be analysed for the following collection alternative:

- a) Using a pick up truck, co-mingled collection.

## **2 METHODOLOGY**

This investigation has utilized information previously collected during the *Greater Avalon Region Solid Waste Management Plan and Central Newfoundland Solid Waste Management Plan (BAE-Newplan Group 2002, 2004)*. Information was also collected through questionnaires completed by residents of Bell Island, interviews with town officials, operators and manufacturers of waste collection vehicles, as well as government and waste management regulators.

The costs, methods and statistics provided in this report are based on an annual period, unless otherwise stated.

The options available for waste disposal systems were analyzed based on cost, efficiency and benefit to the study region.

### **2.1 QUESTIONNAIRE**

A questionnaire was prepared and mailed out to each household on Bell Island. 5.6% (69) of the questionnaires were returned and analyzed. Appendix C gives a copy of the form that was used, the number of responses given to each question, and a list of typical comments that were received.

### **2.2 BELL ISLAND FERRY SERVICE**

The Bell Island Ferry service between Bell Island and Portugal Cove typically operates on a fixed daily schedule as per the Schedule included in Appendix D.

Passengers, including commercial passengers, are not required to book for a specific crossing but must arrive at the terminal to line up prior to departure. There is an estimated 700 to 900 passengers that travel daily with the majority traveling from Portugal Cove between the times of 2:00pm and 6:50pm during the winter and between 10:40am and 7:30pm during the summer. The majority of the passengers travel from Bell Island between the times of 5:55am and 2:00pm during the winter and between the times of 5:55am to 7:20am and 9:50am to 1:20pm during the summer. The carrying capacity of the Beaumont Hamel is 33 vehicles and 103

passengers and the carrying capacity of the Flanders is 36 vehicles and 240 passengers.

There has been some question as to the reliability and potential effect that the ferry would have on potential waste management options. To address possible concerns, the following was examined:

- Best times for vehicles to make the crossing to avoid delays;
- Number of days the crossing was operating with only one (1) ferry;
- Longest time there was only one ferry operating;
- Percentage of time a scheduled run is cancelled annually; and
- Increase in population during summer months.

To answer these questions, ferry logs were provided by the Department of Works, Services and Transportation and analyzed to make the following statements:

**1. Best times for vehicles to make the crossing to avoid delays**

It has been determined that for options 1 through 3 the garbage truck could avoid delays by travelling to Bell Island during an early morning trip, i.e. 7:50am or 8:50am, and return to Portugal Cove during an early evening trip, i.e. 6:10pm or 6:50pm. A review of the log books revealed that these times were most likely to have zero cars waiting in line for a later ferry. Four (4) of the months that were reviewed in detail (August 2008, November 2008, March 2009 and August 2009) revealed that there were zero cars left waiting in line.

Ferry service is not considered to be an issue for options 4, 5 and 6 as the trailers can be transported to the RHB Regional Waste Management Facility during the dangerous good run on the ferry.

If the waste collection contractor is not from Bell Island they could depart Portugal Cove from Monday to Friday on any of the six (6) trips between 6:20 am to 9:20 am and leave Bell Island on any of the ten (10) trips between 2:00 pm to 10:35 pm. If the waste collection contractor is from Bell Island they could depart Bell Island from Monday to Friday on the 7:20 am trip and leave Portugal Cove on any of the five (5) trips between 8:50 am and 12:40 pm. It should be noted that during the summer

months, it seems as though the best times to use the ferry from Portugal Cove would be the 8:50 am or the 9:20 am trip.

**2. Number of days the crossing was operating with only one (1) ferry**

There were fifty six (56) days in total that the Bell Island Ferry service was operating with only one (1) ferry. In addition, during the one (1) year period reviewed, there were fifteen (15) days that the Bell Island ferry service was interrupted. Out of those fifteen (15) days there was only one (1) day that the ferry was tied up for the entire day, which was due to ice. Five (5) of the fifteen (15) days, the ferry was only tied up during the last run of the evening.

**3. Longest stretch there was only one ferry operating**

The longest stretch that the Bell Island Ferry service was operating with only one (1) ferry was twenty five (25) days.

**4. Percentage of time a scheduled run is cancelled annually**

During a year there are approximately 7,019 scheduled sailings from Portugal Cove to Bell Island and another 7,019 scheduled sailings from Bell Island to Portugal Cove. Out of those scheduled, approximately 450 sailings were cancelled. It is estimated that 6.5% of the time a scheduled sailing is cancelled.

**5. How much of a population increase occurs during summer months**

There is an increase in population during the summer months of approximately 40%. During the summer months the number of passengers that went to Bell Island was compared to the number of passengers that left Bell Island for each month.

### 3 POPULATION AND WASTE GENERATION RATES

Populations and dwelling information was obtained from Statistics Canada Community Profiles and/or from the Provincial Department of Finance, Statistics Division. As explained further in this report, waste tonnage is directly related to population and waste generation rates.

#### 3.1 DETERMINATION OF WASTE GENERATION RATE

In the report written by BAE-Newplan Group in 2002 entitled '*Central Newfoundland Solid Waste Management Plan – Phase I Report*', annual waste generation rates from other provinces and past studies were analyzed in efforts to determine a valid per capita waste generation rate for Newfoundland.

The Nova Scotia Department of Environment and Labour conducts an annual survey of individual municipalities' waste generation and diversion rates for landfills; as well, municipalities in Ontario have conducted a number of waste audits and studies. These reports summarize that waste generation rates obtained are wide-ranging, indicating the difficulty in characterizing the waste generation rates of one region based on the rates of another.

Therefore, it was necessary to supplement with studies completed specifically for the province of Newfoundland. The following is a list of studies consulted:

- Jacques Whitford Environment Limited. Assessment for the Economic Potential for Waste Diversion in Newfoundland and Labrador, Draft Report. September 2001;
- BAE-Newplan Group Limited. Regional Solid Waste Site Selection Study for Fogo Island. 2002;
- Central Engineering Consultants of Newfoundland Limited (CECON). *Solid Waste Management Study: Badger's Quay and Area*. 1995;
- Central Engineering Consultants of Newfoundland Limited (CECON). *Twillingate Solid Waste Management Study*. 1993;
- Davis Engineering and Associates Limited. Solid Waste Management Study – Alexander Bay – Eastport Peninsula Area. 1995;

- Newfoundland and Labrador Consulting Engineers LTD. *Regional Solid Waste Disposal for Botwood and Area*. 1986; and
- Town of Grand Falls – Windsor. *Regionalized Solid Waste Management for central Newfoundland*. 1997.

According to these reports, rural waste generation rates varied slightly, however, a value of 1.3 kg/person/day (used in Jacques Whitford, 2001) appears reasonable and consistent when compared to other jurisdictions.

Information was also gained from scale data obtained in 2000 – 2001 from the RHB Sanitary Landfill in St. John's. Tonnages here reveal that 2.51 kg/person/day is an acceptable estimated waste generation rate for an urban area.

Furthermore, to confirm the validity of these values, BAE-Newplan Group compared estimated calculations to actual scale data submitted by the Corner Brook Waste Management Site for the year of 2008. Scale data at the Wild Cove Waste Disposal Site indicated that the total tonnage of waste in 2008 was 26,809 tonnes, which agrees with BAE-Newplan's estimated values.

### **Waste Generation Rate**

As discussed above, the average person in an urban area is estimated at 2.51 kg/person/day and 1.3 kg/person/day in a rural area. It is assumed that many of the residents of Bell Island leave the Island daily to work. This generates waste within another community, thus making it difficult to determine whether to classify the region as rural or urban. It was determined that the estimated waste generation rates for Bell Island should be 1.9 kg/person/day, which is the average between urban and rural rates. Table 3-1 shows the estimated waste generation rates for communities in the study area.

**Table 3-1: Summary of Estimated Waste Generation Rates in the Study Area.**

Community	Type	Population (2006 Stats. Canada Census)	Dwelling Count (2006 Stats. Canada Census)	Estimated Waste Generation (kg/person/day)	Estimated Waste Generation (tonnes/year)
Wabana	Urban/ Rural	2,418	1,040 <sup>1</sup>	1.9	1,677
Division No. 1, Subdivision R	Urban/ Rural	366	199	1.9	254
<b>Total</b>	-	<b>2,784</b>	<b>1,239</b>	-	<b>1,980<sup>2</sup></b>

<sup>1</sup> According to 2006 Statistics Canada Census there are 1,173 dwellings, however only 1,040 of them are occupied by usual residents.

<sup>2</sup> 2.5% was added to the waste generation rate to account for population increase during the summer months.

### 3.2 RESIDENTIAL VS. INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL (IC&I) WASTE

Following determination of an estimated annual volume of waste, the waste stream must then be characterized. To characterize the waste generated, it is important to make a distinction between residentially generated waste and waste generated by the industrial, commercial and institutional (IC&I) sector. Waste generation and characteristics for these sectors vary depending on where the materials are generated (urban or rural sources). This is especially true for the IC&I portion. Variations among regions are also expected because of cultural and/or regulatory differences.

Since no actual residential vs. IC&I ratio data for *urban* communities is available for the study region, data from the RHB Sanitary Landfill was incorporated into this section of the report (Robin Hood Bay Sanitary Landfill, 2000-2001). This data indicated that 34% of the waste received at the RHB site is residential and 66% is IC&I. These estimates are in agreement with a study conducted for Environment Canada (Resource Integration Systems Limited, 1996) which estimated that 60% of the solid waste generated in the province in 1992 was IC&I generated waste, while the residential portion made up 34%.

With respect to residential vs. IC&I ratios for *rural* communities, the study team utilized ratios identified in the ‘Central Newfoundland Solid Waste Management Plan

– Phase I’ (BAE-Newplan Group, 2002). This report reviewed comparable studies completed for various communities in Newfoundland and Nova Scotia (e.g.: Regional Solid Waste Management Study Area for Placentia and Area – 1995; Solid Waste Management Study, Markland – Heart’s Desire – 1993). Based on a weighted average of this data, residential vs. IC&I ratios of 73% residential and 27% IC&I were calculated for rural communities.

Since Bell Island may be considered to be urban/rural area, it is assumed that the rate for residential versus IC&I waste for communities within the study area is 54% residential and 46% IC&I an average between the typical urban/rural ratio.

This report assumes that IC&I waste is collected with residential waste in the study area.

Table 3-2 shows the estimated IC&I waste generation rates for the study areas.

**Table 3-2: Projected Annual Generation of Residential vs. IC&I Waste for the Current Users of the Bell Island Site**

Type of Community	Population	Dwellings	Estimated Annual Tonnage of Waste	Waste Generation (tonnes/year)			
				Residential		IC&I	
				%	Tonnage	%	Tonnage
Urban/Rural	2,784	1,239	1,980	54	1,069	46	911

### 3.3 BELL ISLAND WASTE ANALYSIS

#### Town of Wabana

The Town of Wabana undertook a (10) ten day visual assessment between February 20, 2009 and March 6, 2009 to identify and understand the volume of waste entering the landfill.

Based on the information provided by the Town of Wabana, we have been able to determine that an average of approximately 530 bags of waste is disposed of at the landfill daily. The actual volume, weight, composition and percentage by sector could not be determined based on the information presented.

### **Eastern Waste Management Committee**

A waste analysis was carried out by the Greater Avalon Regional Waste Management Committee, now Eastern Waste Management, between July 2009 and August 2009. During that time, samples were selected from incoming loads, sorted and weighed. The raw data from this analysis was presented to BNG. Based on the data provided, the following was determined:

	<b>PERCENTAGE</b>
Organics	30%
Recyclable/Refundables	33%
Waste	37%
<b>TOTAL</b>	100%

Although the above information is provided it is felt that not enough information is provided to identify accurate generation rates or composition by sector.

## **4 WASTE QUANTITY AND COMPOSITION**

The quantity of MSW generated is a major consideration in the selection of a new disposal method. Since waste that enters the current landfill site is not weighed, exact quantities are not known and the exact composition is unavailable. As previously discussed, information pertaining to municipal solid waste quantities was determined based on a daily generation rate of 1.9 kg/person/day for an urban/rural area. A density of 150 kg/m<sup>3</sup> was assumed as a typical figure for uncompacted residential waste.

### **4.1 INDUSTRIAL COMMERCIAL AND INSTITUTIONAL (IC&I) WASTE**

As previously mentioned, in the absence of a weighing or sorting system, precise data is unavailable in relation to the composition of waste generated by the industrial, commercial and institutional (IC&I) sector. The volume of IC&I waste is included with the total waste volume as it is picked up with residential waste in rural areas, but it is picked up separately in urban areas. Therefore, based on the rates identified in the Central Newfoundland Solid Waste Management Plan, Phase I Report (2002), it can be assumed that the rate of residential versus IC&I waste for typical communities within Newfoundland are 73% residential and 27% IC&I in rural areas, and 34% residential and 66% IC&I in urban areas. It was determined that the rate of residential versus IC&I waste within this study region should be 54% residential and 46% IC&I, which is the average of typical urban versus residential rates.

### **4.2 SPECIAL AND OTHER WASTES**

Hazardous substances and those banned from disposal at landfill sites will not be assessed in this report; however, it is recommended that programs should be established within the region to ensure safe handling, collection and transportation from households and industry.

The City of St. John's has imposed a commercial cardboard ban at its current Robin Hood Bay Waste Management Facility. As a result, commercial and institutional operations located on Bell Island will not be able to dispose of cardboard at the Robin Hood Bay site and would be required to make arrangements for disposal of

cardboard, through a recycling facility such as Scotia Recycling or Evergreen Recycling.

A Local Waste Management Facility option could provide the possibility of bailing the cardboard where it could be shipped in larger quantities to cut down on transportation costs for local businesses.

The following substances are considered unacceptable at most landfills (except under special permit) in the province and are applicable within the study region:

- Used oil and oily waste;
- Leaded sludge;
- Special waste (i.e., asbestos, fibreglass);
- Lead acid vehicle batteries;
- Ozone depleting substances;
- Petroleum contaminated soils;
- Bulk liquids and semi-solid sludges which contain free liquid;
- Septage, black water, sewage treatment sludge, etc.;
- Biomedical waste;
- Tires; and
- Cardboard.

Through discussions with staff of the RHB Waste Management Facility, it has become evident that there is a possibility that the facility may impose an organics ban. This would mean that all compostable material will have to be diverted from the landfill. Such a ban would require the household separation of organics with disposal at the Robin Hood Bay Compost Facility and would require that pick up would be done separately from the garbage stream. If this is the case, it is more likely, that at minimum, a two-stream system would be required, meaning that organics would have to be separated from garbage and recyclables.

## **5 CURRENT WASTE DISPOSAL SYSTEM**

### **5.1 CURRENT WASTE DISPOSAL SITE**

The current Bell Island Waste Disposal Site is located in the Town of Wabana, and is used by the Town of Wabana and Division No. 1, Subdivision R. The location of the site is shown on Figure 5-1.

A BNG representative conducted a site visit (see photographs in Appendix A) on November 19, 2009 and observed that the site:

- Was serviced with a gate (opened at the time of the site visit);
- Had an attendant on site;
- Was relatively clean and free of blowing debris;
- Currently had an adequate system for covering waste; and
- Had an area for scrap metal.

No pests were observed at the time of the visit, however it can be assumed that there is a rodent population on site.

#### **5.1.1 Operations**

The site is currently operated by the Town of Wabana and accepts waste from Wabana and Division No. 1, Subdivision R (Lance Cove and Freshwater). It is gated and staffed for 40 hours per week (Winter) between the hours of 7:30 am and 3:30 pm, Monday to Friday and 48 hours per week (Summer) to include Saturdays from 7:30 am to 3:30 pm.

The site includes areas for construction and demolition debris (C&D), bulk material, and metals (car wrecks and white goods). A loader is used on site to move garbage around the landfill, and garbage is covered daily. Tables 5-1 to 5-3 provide the costs associated with the current collection system and waste management site for the Town of Wabana.

**Table 5-1: Current Operating Costs of Bell Island Landfill Site**

Annual Landfill Operating Costs	Cost
<b>TOTAL OPERATING COST</b>	<b>\$78,000.00<sup>1</sup></b>
<b>COST PER TONNE Including all IC&amp;I (1,980/yr)</b>	<b>\$39.39</b>
<b>COST PER PERSON (Pop. 2,418 – Wabana)</b>	<b>\$32.263</b>
<b>COST PER HOUSEHOLD (Dwell. 1,040 - Wabana)</b>	<b>\$75.00</b>

Costs are exclusive of taxes

<sup>1</sup> Provided by Town of Wabana

**Table 5-2: Current Collection and Transportation Costs**

Actual Annual Collection and Transportation (Residential)	Cost
<b>TOTAL ANNUAL COLLECTION AND TRANSPORTATION COST</b>	<b>\$30,000.00<sup>1</sup></b>

Costs are exclusive of taxes

<sup>1</sup> Provided by Town of Wabana

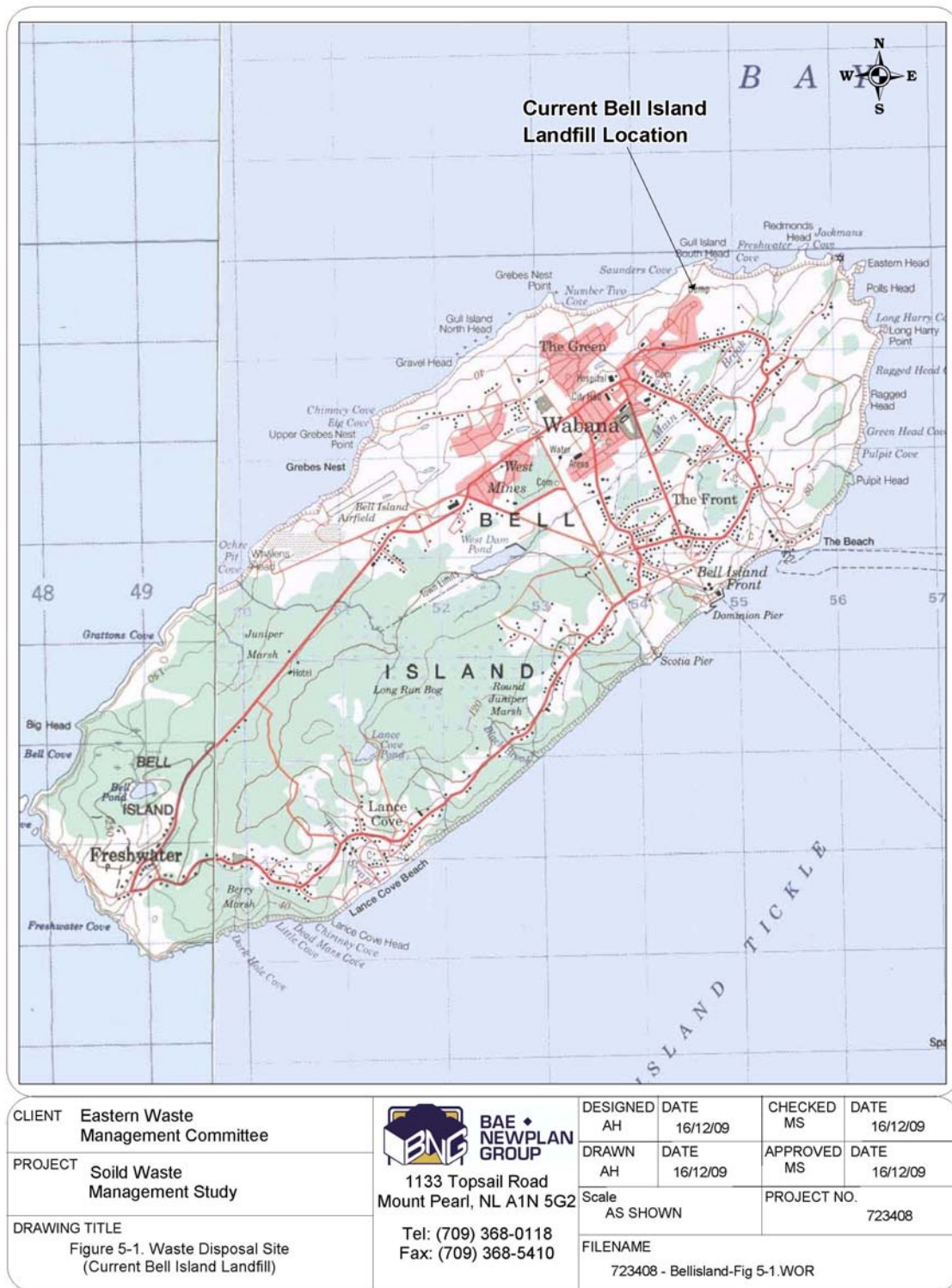
**Table 5-3: Breakdown of Costs based on current collection methods**

Community	Cost per person		Total Cost per Person	Total Cost per Household	Cost per Community
	Operating <sup>1</sup>	Transportation			
Wabana	\$32.25	\$12.42	\$44.67	\$104	\$108,000

Costs are exclusive of taxes

<sup>1</sup> Based on a 44 hour work week

***NOTE: True costs for waste collection in the remaining communities on Bell Island could not be obtained and therefore were not analyzed.***



**Figure 5-1: Waste Disposal Site**

## 5.2 CURRENT WASTE COLLECTION VEHICLES

The Town of Wabana currently utilize a compactor truck and two pick-up trucks as waste collection vehicles. Garbage is collected two days per week by a contractor, at which time the collection vehicle makes several trips to and from the waste disposal site. Current collection and disposal costs for all municipalities were not available. During the winter months the compactor is not utilized.

Division No. 1, Subdivision R currently utilize a pick-up truck as a waste collection vehicle. Garbage is collected by a contractor, at which time the collection vehicle makes several trips to and from the waste disposal site. The same contractor also uses a dump truck and pick up truck to collect waste from commercial sites throughout Bell Island. Current collection and disposal costs for all municipalities were not available.

Holding capacities were estimated based on densities of 150 kg/m<sup>3</sup> and 420 kg/m<sup>3</sup>, respectively, as typical figures for uncompacted and compacted residential waste in a collection vehicle. Based on the densities, a weight capacity of 12 tonnes is assumed for a 37 yd<sup>3</sup> compactor truck, 1.3 tonnes for a dump truck and 1 tonne for a pick up truck.

Table 5-4 displays the current type of vehicle and associated capacity used for collection in the study area communities.

**Table 5-4: Current Collection Practices on Bell Island.**

Community	Type of Collection Vehicle	Holding Capacity (tonnes)
Wabana	Compactor truck	12
Wabana	Pick-up truck	1
Division No.1 , Subdivision R	Pick-up truck	1
Commercial	Dump truck	1.3

## 6 WASTE MANAGEMENT OPTIONS

In assessing the most feasible collection and disposal program for the communities of Bell Island, (7) seven options were analyzed as follows:

- Collect all waste in a 37-yd<sup>3</sup> compactor and truck directly to the RHB Regional Waste Management Facility. Construction and Demolition Debris (C&D), bulk waste, metals and Household Hazardous Waste (HHW) would be delivered to RHB by residents and businesses;
- Collect all waste in a 37-yd<sup>3</sup> compactor vehicle and truck directly to the RHB Regional Waste Management Facility. A local C&D/bulk waste drop off site would be located on Bell Island, where residents and businesses would be responsible for delivery to the local site. The contractor would then transport C&D/bulk waste to the RHB Regional Waste Management Facility for final disposal;
- Collect all waste in 37-yd<sup>3</sup> compactor and truck directly to RHB with metals storage and C&D/bulk waste disposal on Bell Island;
- Construct a Local Waste Management Facility (LWMF) on Bell Island and transport waste to the RHB Regional Waste Management Facility in a 53' transfer trailer for disposal. C&D/bulk waste material would remain in a local C&D/bulk waste landfill;
- Construct a LWMF on Bell Island and transport waste to the RHB Regional Waste Management Facility in a 53' transfer trailer for disposal. A local C&D/bulk waste drop off site would be located on Bell Island, with transportation to the RHB Regional Waste Management Facility for final disposal;
- Collect all waste in a pick up truck for transport to a LWMF on Bell Island and transport waste to the RHB Regional Waste Management Facility in a 53' transfer trailer for disposal. C&D/bulk waste drop off site located on Bell Island, with transportation to the RHB Regional Waste Management Facility for final disposal; and
- Collect all waste in a pick up truck for transport to a 34 yd<sup>3</sup> stationary compactor bin on Bell Island and transport waste in the bin to the RHB Regional Waste Management Facility for final disposal. A C&D/bulk waste drop off will be located on Bell Island, with transportation to the RHB Regional Waste Management

Facility for final disposal.

The first five options investigated will be analysed for each of the following collection alternatives:

- Using a 37-yd<sup>3</sup> single stream compactor truck, co-mingled collection;
- Using a 37-yd<sup>3</sup> split stream compactor truck, 4 stream collection (garbage, organics, paper and recyclables); and
- Using a 37 yd<sup>3</sup> split stream compactor truck, 2 stream collection (organics and remaining waste).

Options 6 and 7 will be analysed for the following collection alternative:

- a) Using a pick up truck, co-mingled collection.

Detailed discussions and cost estimates for each option are provided in Section 7.2.

## 7 PRELIMINARY COST ESTIMATES

The following estimates are preliminary and for budget purposes only. More accurate estimates would require detailed engineering surveys and designs.

Should actual findings differ, cost estimates should be revised to incorporate any solutions to problems as they occur.

### 7.1 COST METHODOLOGY AND ASSUMPTIONS

This investigation utilized information previously collected during the *Greater Avalon Region Solid Waste Management Plan* and *Central Newfoundland Solid Waste Management Plan-Phase 1 and Phase 2* (BAE-Newplan Group, 2002, 2004). Also, information was collected through surveys with various municipalities (urban and rural) and through consultation with operators and manufacturers of waste collection vehicles. Equipment, construction and operating costs are based on cost estimates generated for the Central Newfoundland Waste Management system and from equipment suppliers. Collection assumptions used to carry out this investigation include the following:

- Curbside collection of municipal solid waste will occur once per week;
- IC&I will be collected with regular waste, with the exception of fish offal. Exact volumes of IC&I waste was not identified, however it is estimated that 46% of waste collected will be from the IC&I sector;
- 22% of the waste is considered to be C&D/bulk waste, 5% of which is metals;
- Collection of IC&I waste was included in curbside collection cost;
- Tipping fees at the RHB Regional Waste Management Facility are at a rate of \$65.00/tonne for garbage, \$20.00/tonne for organic waste and \$51.00/tonne for C&D/bulk waste;
- Number of households per community was based on the 2006 Statistics Canada Census Data;
- There is an estimated 15% increase in tonnage of waste annually during the two (2) summer months, 2.5% was added to the total tonnage to allow for this increase in tonnage of waste;

- Collection costs assume that collection services would be contracted out to private contractors;
- A 10% contingency was added to the collection cost to allow for uncontrollable circumstances;
- A 10% contingency was added to the collection cost to allow for Ferry delays;
- Collection trucks can travel with regular ferry traffic; and
- Collection and delivery of C&D/bulk waste will be the responsibility of the residents and businesses of Bell Island.

#### *Rate of Waste Pick Up*

According to the 'Central Newfoundland Solid Waste Management Plan-Phase 1 Report' (BNG, 2002), the rate of garbage collection that will be maintained by a 37-yd<sup>3</sup> compactor truck can be estimated at 60 households per hour. Therefore, for the purposes of this report, the rate of waste collection will be estimated at 60 households per hour. The overall rate of collection for the region is anticipated to decrease approximately 20% in efficiency with the effects of the winter months (17 weeks).

#### *Density of Garbage*

A density of 150 kg/m<sup>3</sup> was used as a typical figure for uncompacted residential waste. According to the 'Central Newfoundland Solid Waste Management Plan-Phase 1 Report' (BNG, 2002), the dry portion of the waste stream can be compacted to a density of 250 kg/m<sup>3</sup> and the wet portion can be compacted to a density of 420 kg/m<sup>3</sup>.

For the purposes of this report, a 70/30 (dry/wet) split of the waste stream was assumed. Converting to more appropriate units, the weighted average for density of compacted garbage is 0.32 tonne/yd<sup>3</sup>.

#### *Operating Cost of Compactor Truck*

Operating cost of a compactor truck is \$85.00/hour; this cost includes the operator, fuel, maintenance, amortization, insurance, etc.

### *Capital Cost of Organics Carts*

The capital cost of the organics cart is the purchase price plus applicable taxes. One cart will be provided for each household on Bell Island. The purchase price is approximately \$90.00 plus applicable taxes for each cart.

## **7.2 COST ESTIMATES**

The following sections will present the estimated costs for each option available.

### **7.2.1 Option 1 – Collect all waste in a 37-yd<sup>3</sup> compactor and truck directly to the RHB Regional Waste Management Facility**

This option would involve curbside collection on Bell Island using a 37-yd<sup>3</sup> compactor truck with direct haul to the RHB Regional Waste Management Facility. This option does not require design engineering or construction of a new site. Residents and businesses will be responsible for disposal of their own C&D/bulk waste, metals and HHW at the RHB site.

Three collection alternatives were reviewed for Option 1; a) using a 37-yd<sup>3</sup> single stream compactor truck – co-mingled collection; b) using a 37-yd<sup>3</sup> split stream compactor truck – 4 stream collection (garbage, organics, paper and recyclables); and c) using a 37-yd<sup>3</sup> split stream compactor truck – 2 stream collection (organics and remaining waste).

Additional costs due to ferry waiting time have been factored in.

Tables 7-1 and 7-2 provide a breakdown of the capital costs and annual disposal costs associated with transporting the waste directly to RHB site after curbside pick up. Table 7-3 provides a breakdown of fees per household for this option.

**Table 7-1: Capital Cost of Collection (Option 1)**

	Option 1a) Co-Mingled	Option 1b) 4 Stream	Option 1c) 2 Stream
Carts for Organics	\$0.00	\$111,510.00	\$111,510
<b>SUB-TOTAL</b>	<b>\$0.00</b>	<b>\$111,510.00</b>	<b>\$111,510</b>
<b>CONTINGENCY (5%)</b>	<b>\$0.00</b>	<b>\$5,575.50</b>	<b>\$5,576</b>
<b>HST (13%)</b>	<b>\$0.00</b>	<b>\$15,221.00</b>	<b>\$15,221</b>
<b>TOTAL</b>	<b>\$0.00</b>	<b>\$132,307.00</b>	<b>\$132,307</b>

**Table 7-2: Annual Costs for Direct Haul to RHB Site (Option 1)**

	Collection and Transportation Cost	Operating Cost	Total
Option 1a) Co-Mingled	\$380,000	\$0.00	<b>\$380,000</b>
Option 1b) 4 Stream	\$344,000	\$11,000 <sup>1</sup>	<b>\$355,000</b>
Option 1c) 2 Stream	\$378,000	\$11,000 <sup>1</sup>	<b>\$389,000</b>

Costs are exclusive of taxes

<sup>1</sup> Capital cart replacement

**Table 7-3: Annual Estimated Cost of Residents of Bell Island (Option 1)**

	Total Cost <sup>1</sup>	Cost per Tonne (1,980 T)	Total IC&I (911 T)	Total Residential (1,069 T)	Cost per Household (1,239 hh) <sup>2</sup>
Option 1a) Co-mingled	<b>\$380,000</b>	<b>\$192</b>	<b>\$175,000</b>	<b>\$205,000</b>	<b>\$165</b>
Option 1b) 4 Stream	<b>\$355,000</b>	<b>\$179</b>	<b>\$163,000</b>	<b>\$191,000</b>	<b>\$154</b>
Option 1c) 2 Stream	<b>\$389,000</b>	<b>\$196</b>	<b>\$179,000</b>	<b>\$210,000</b>	<b>\$169</b>

Costs are exclusive of taxes

<sup>1</sup> Costs do not include C&D and bulk waste

<sup>2</sup> Costs assume revenue from IC&I

## 7.2.2 Option 2 – C&D/bulk waste Public Drop Off Site for Direct Haul to RHB Regional Waste Management Facility

This option would be the same as option 1 with the addition of a public drop off site for the collection of C&D/bulk waste for the residents of Bell Island. The three collection options remain the same for option 2; a) using a 37-yd<sup>3</sup> single stream compactor truck – co-mingled collection; b) using a 37-yd<sup>3</sup> split stream compactor truck – 4 stream collection (garbage, organics, paper and recyclables); and c) using a 37 yd<sup>3</sup> split stream compactor truck – 2 stream collection (organics and remaining waste).

This option would require the residents of Bell Island to drop off their own C&D/bulk waste to the public drop off site, where metals will be stockpiled and collected free of charge by a metals recycler. The capital cost of option 2a is approximately \$317,000 and for Options 2b and 2c is approximately \$469,000 and includes construction of a public drop off site on Bell Island and all associated equipment. Option 2b and 2c includes the purchase of carts for organics for each household on Bell Island.

Additional costs due to ferry waiting time have been factored in.

A breakdown of capital and operating and transportation costs of the public drop off site is provided in Tables 7-4 to 7-6. Table 7-6 provides a breakdown of fees per household for this option.

**Table 7-4: Estimated Capital Costs for C&D/Bulk Waste Public Drop off Site (Option 2)**

ITEM	Option 2a) Co-Mingled	Option 2b) 4 Stream	Option 2c) 2 Stream
Site Development & Structure	\$150,000	\$150,000	\$150,000
Paving	\$20,000	\$20,000	\$20,000
Fencing & Gate	\$15,000	\$15,000	\$15,000
Signage	\$2,000	\$2,000	\$2,000
Carts for Organics	\$0	\$111,510	\$111,510
Bin	\$40,000	\$40,000	\$40,000
Landscaping	\$5,000	\$5,000	\$5,000
<b>SUB-TOTAL</b>	<b>\$232,000</b>	<b>\$343,510</b>	<b>\$343,510</b>
<b>CONTINGENCY (5%)</b>	<b>\$11,600</b>	<b>\$17,176</b>	<b>\$17,176</b>
<b>HST (13%)</b>	<b>\$31,668</b>	<b>\$46,889</b>	<b>\$46,889</b>
<b>ENG (15%)</b>	<b>\$41,290</b>	<b>\$61,136</b>	<b>\$61,136</b>
<b>TOTAL</b>	<b>\$316,558</b>	<b>\$468,711</b>	<b>\$468,711</b>

**Table 7-5: Estimated Annual Operating Cost of C&D/Bulk Waste Public Drop off Site (Option 2)**

Annual Operating Costs	Option 2a) Co-Mingled	Option 2b) 4 Stream	Option 2c) 2 Stream
Staffing - One Full-time employee (24 hr/wk @ \$20/hour)	\$24,960	\$24,960	\$24,960
Cart Replacement	\$0	\$11,151	\$11,151
Capital Replacement	\$5,250	\$5,250	\$5,250
<b>TOTAL OPERATING COST</b>	<b>\$30,000</b>	<b>\$41,000</b>	<b>\$41,000</b>

**Table 7-6: Estimated Operational and Transportation Costs for Public Drop off Site (Option 2)**

	Collection and Transportation Cost of Waste	Cost to Operate Public Drop Off	C&D/Bulk Transportation Cost and Tipping Fee	Total
Option 2a) Co-Mingled	\$380,000	\$30,000	\$41,000	<b>\$451,000</b>
Option 2b) 4 Stream	\$344,000	\$41,000	\$41,000	<b>\$426,000</b>
Option 2c) 2 Stream	\$378,000	\$41,000	\$41,000	<b>\$460,000</b>

Costs are exclusive of taxes

**Table 7-7: Annual Estimated Cost for Residents of Bell Island (Option 2)**

	Total Cost	Cost per Tonne (1,980 T)	Total IC&I (911 T)	Total Residential (1,069 T)	Cost per Household (1,239 hh) <sup>1</sup>
Option 2a) Co-mingled	<b>\$451,000</b>	<b>\$228</b>	<b>\$208,000</b>	<b>\$244,000</b>	<b>\$197</b>
Option 2b) 4 Stream	<b>\$426,000</b>	<b>\$215</b>	<b>\$196,000</b>	<b>\$230,000</b>	<b>\$186</b>
Option 2c) 2 Stream	<b>\$460,000</b>	<b>\$232</b>	<b>\$211,000</b>	<b>\$248,000</b>	<b>\$200</b>

Costs are exclusive of taxes

<sup>1</sup> Costs assume revenue from IC&I

### 7.2.3 Option 3 – Direct Haul to RHB with C&D/Bulk Disposal on Bell Island

This option would be the same as option 1 with the addition of a landfill for the disposal of C&D/bulk waste for the residents of Bell Island. The three collection options remain the same for option 3; a) using a 37-yd<sup>3</sup> single stream compactor truck – co-mingled waste; b) using a 37-yd<sup>3</sup> split stream compactor truck – 4 stream collection (garbage, organics, paper and recyclables); and c) using a 37 yd<sup>3</sup> split stream compactor truck – 2 stream collection (organics and remaining waste).

This option would require the residents of Bell Island to drop off their own C&D/bulk waste to the local landfill, where metals will be stockpiled and collected free of charge by a metals recycler. The estimated capital cost for the C&D/bulk waste landfill site is \$242,649. The estimated capital cost of option 3a is \$243,000 and for 3b and 3c is \$402,000 and includes construction of a C&D/bulk waste landfill on Bell Island and all associated equipment. Option 3b and 3c includes the purchase of carts for organics for each household on Bell Island.

A breakdown of capital, operating and transportation costs of the C&D/bulk waste Landfill is provided in Tables 7-8 to 7-10. Table 7-11 provides a breakdown of fees per household for this option.

**Table 7-8: Estimated Capital Cost (Option 3)**

	Option 3a) Co-Mingled	Option 3b) 4 Stream	Option 3c) 2 Stream
Site Work	\$22,000	\$22,000	\$22,000
5 year cell	\$147,750	\$147,750	\$147,750
Carts for Organics	\$0	\$111,510	\$111,510
<b>SUB-TOTAL</b>	<b>\$169,750</b>	<b>\$281,260</b>	<b>\$281,260</b>
<b>CONTINGENCY (10%)</b>	<b>\$16,975</b>	<b>\$28,126</b>	<b>\$28,126</b>
<b>HST (13%)</b>	<b>\$24,274</b>	<b>\$40,220</b>	<b>\$40,220</b>
<b>ENG (15%)</b>	<b>\$31,650</b>	<b>\$52,441</b>	<b>\$52,441</b>
<b>TOTAL</b>	<b>\$242,649</b>	<b>\$402,047</b>	<b>\$402,047</b>

Cost includes taxes

**Table 7-9: Estimated Annual Operating Cost of C&D/Bulk Waste Landfill (Option 3)**

Annual Operating Costs	Option 3a) Co-Mingled	Option 3b) 4 Stream	Option 3c) 2 Stream
Staffing - One Full-time employee (24 hr/wk @ \$20/hour)	\$24,960	\$24,960	\$24,960
Administration (8 hr/wk @ \$16/hr)	\$6,656	\$6,656	\$6,656
Cell capping	\$78,500	\$78,500	\$78,500
Environmental Monitoring	\$1,000	\$1,000	\$1,000
Loader (Contracted)	\$11,232	\$11,232	\$11,232
Excavation cover C&D	\$2,240	\$2,240	\$2,240
Dust Control	\$500	\$500	\$500
Animal and Rodent Control	\$1,035	\$1,035	\$1,035
Cart Replacement	\$0	\$11,151	\$11,151
Capital Replacement	\$2,000	\$2,000	\$2,000
<b>TOTAL OPERATING COST</b>	<b>\$128,000</b>	<b>\$139,000</b>	<b>\$139,000</b>

Costs are exclusive of taxes

**Table 7-10: Estimated Total Cost of C&D/Bulk Waste Landfill with Direct Haul of Remaining Waste to RHB Site (Option 3)**

	Cost of collection and Transportation	Operating Cost	Total Cost
Option 3a) Co-Mingled	\$380,000	\$128,000	<b>\$508,000</b>
Option 3b) 4 Stream	\$344,000	\$139,000	<b>\$483,000</b>
Option 3c) 2 Stream	\$378,000	\$139,000	<b>\$517,000</b>

Costs are exclusive of taxes

**Table 7-11: Annual Estimated Cost for Residents of Bell Island (Option 3)**

	Total Cost	Cost per Tonne (1,980 T)	Total IC&I (911 T)	Total Residential (1,069 T)	Cost per Household (1,239 hh) <sup>1</sup>
Option 3a) Co-Mingled	\$508,000	\$257	\$234,000	\$275,000	\$222
Option 3b) 4 Stream	\$483,000	\$244	\$222,000	\$261,000	\$211
Option 3c) 2 Stream	\$517,000	\$261	\$238,000	\$279,000	\$225

Costs are exclusive of taxes

<sup>1</sup> Costs assume revenue from IC&I

#### 7.2.4 Option 4 – Local Waste Management Facility

This option involves the construction of a local waste management facility (LWMF) to store waste from the communities located on Bell Island before it is transported to the RHB Regional Waste Management Facility for final disposal. This option will require the closure of the existing waste disposal site on Bell Island and construction of a C&D/bulk waste disposal area.

Three collection options were reviewed for Option 4; a) using a 37-yd<sup>3</sup> single stream compactor truck – co-mingled collection; b) using a 37-yd<sup>3</sup> split stream compactor truck – 4 stream collection (garbage, organics, paper and recyclables); and c) using a 37 yd<sup>3</sup> split stream compactor truck – 2 stream collection (organics and remaining waste).

Based on an annual waste of 1,980 t/yr, it is estimated that a 53' transfer trailer will be required to travel to the RHB site on a weekly basis.

The development will consist of the following components:

- Access Road;
- Scale;
- Enclosed loading area and Scale House;
- Construction and Demolition Landfill;
- Household Hazardous Waste Area; and
- White Goods and Metals Storage Area.

A concept plan showing a typical transfer station layout is included in Appendix B.

The capital cost of option 4a is approximately \$3,069,000 and will increase for option 4b is approximately \$3,986,000 and 4c is approximately \$3,604,000. The cost includes construction of a LWMF on Bell Island and all associated equipment. Options 4b and 4c include the purchase of carts for organics for each household on Bell Island. Additionally, a major factor that should be acknowledged is the availability and timing of the Bell Island Ferry. However with approximately one trip per week this is less of a factor.

Once complete, it is recommended that an attendant be on site at least 24 hours per week to oversee operations of the site.

A breakdown of capital, operating, curbside collection and disposal costs to RHB are included in Tables 7-12 to 7-14. Table 7-15 provides a breakdown of fees per household for this option.

**Table 7-12: Estimated Capital Cost for LWMF (Option 4)**

Item	Option 4a) Co-Mingled	Option 4b) 4 Stream	Option 4c) 2 Stream
Land (legal Surveys)	\$10,000	\$10,000	\$10,000
Site Development includes access road, power, water, sewer	\$340,000	\$340,000	\$340,000
Building	\$1,120,000	\$1,680,000	\$1,400,000
Paving	\$87,500	\$87,500	\$87,500
Fencing & Gate	\$15,000	\$15,000	\$15,000
Signage	\$2,000	\$2,000	\$2,000
C&D/Bulk Storage/Landfill	\$240,000	\$240,000	\$240,000
HHW Storage	\$90,000	\$90,000	\$90,000
Groundwater Monitoring	\$30,000	\$30,000	\$30,000
Landscaping	\$5,000	\$5,000	\$5,000
BKHO	\$120,000	\$120,000	\$120,000
Scales	\$75,000	\$75,000	\$75,000
Transfer Trailer	\$100,000	\$100,000	\$100,000
Carts for Organics	\$0	\$111,510	\$111,510
Bin	\$10,000	\$10,000	\$10,000
Landscaping	\$5,000	\$5,000	\$5,000
<b>SUB-TOTAL</b>	<b>\$2,249,500</b>	<b>\$2,921,010</b>	<b>\$2,641,010</b>
<b>CONTINGENCY (5%)</b>	<b>\$112,475</b>	<b>\$146,051</b>	<b>\$132,051</b>
<b>HST (13%)</b>	<b>\$307,057</b>	<b>\$398,718</b>	<b>\$360,498</b>
<b>ENG (15%)</b>	<b>\$400,355</b>	<b>\$519,867</b>	<b>\$470,034</b>
<b>TOTAL</b>	<b>\$3,069,387</b>	<b>\$3,985,645</b>	<b>\$3,603,592</b>

**Table 7-13: Estimated Annual Operational Costs of LWMF (Option 4)**

Annual Operating Costs	Option 4a) Co-Mingled	Option 4b) 4 Stream	Option 4c) 2 Stream
Staffing - One Full-time employee (24 hr/wk @ \$20/hour)	\$24,960	\$24,960	\$24,960
Administration (8 hr/wk @ \$16/hr)	\$6,656	\$6,656	\$6,656
Cell capping	\$78,500	\$78,500	\$78,500
Environmental Monitoring	\$1,000	\$1,000	\$1,000
Loader	\$11,232	\$11,232	\$11,232
Excavation cover C&D	\$2,240	\$2,240	\$2,240
Loader Service and Maintenance	\$2,500	\$2,500	\$2,500
Power and Building Maintenance	\$7,800	\$7,800	\$7,800
Service and Maintenance Program for Weigh Scales	\$3,000	\$3,000	\$3,000
Dust Control	\$500	\$500	\$500
Cart Replacement	\$0	\$11,151	\$11,151
Animal and Rodent Control	\$1,035	\$1,035	\$1,035
Transportation & Disposal Costs of HHW (1.5 @ \$500/T)	\$2,350	\$2,350	\$2,350
Capital Replacement	\$70,000	\$70,000	\$70,000
Transfer Trailer	\$6,000	\$6,000	\$6,000
<b>TOTAL OPERATING COST</b>	<b>\$218,000</b>	<b>\$229,000</b>	<b>\$229,000</b>

Costs are exclusive of taxes

**Table 7-14: Annual Collection and Transportation Costs to RHB Site (Option 4)**

	Cost of collection and Transportation	Operating Cost	Total Cost
Option 4a) Co-Mingled	\$311,000	\$218,000	<b>\$529,000</b>
Option 4b) 4 Stream	\$276,000	\$229,000	<b>\$505,000</b>
Option 4c) 2 Stream	\$321,000	\$229,000	<b>\$550,000</b>

Costs are exclusive of taxes

**Table 7-15: Annual Estimated Cost for Residents of Bell Island (Option 4)**

	Total Cost	Cost per Tonne (1,980 T)	Total IC&I (911 T)	Total Residential (1,069 T)	Cost per Household (1,239 hh) <sup>1</sup>
Option 4a) Co-mingled	<b>\$529,000</b>	<b>\$267</b>	<b>\$243,000</b>	<b>\$285,000</b>	<b>\$230</b>
Option 4b) 4 Stream	<b>\$505,000</b>	<b>\$255</b>	<b>\$232,000</b>	<b>\$273,000</b>	<b>\$220</b>
Option 4c) 2 Stream	<b>\$550,000</b>	<b>\$278</b>	<b>\$253,000</b>	<b>\$297,000</b>	<b>\$240</b>

Costs are exclusives of taxes

<sup>1</sup> Costs assume revenue from IC&I

### **7.2.5 Option 5 – Local Waste Management Facility with C&D/bulk waste Public Drop-Off Site**

This option involves the construction of a local waste management facility (LWMF) to store waste from the communities located on Bell Island before it is transported to the RHB Regional Waste Management Facility for final disposal. This option will require the closure of the existing waste disposal site on Bell Island and construction of a C&D/bulk waste public drop off site. The residents of Bell Island will be required to drop off their own C&D/bulk waste to the drop off site, where metals will be stockpiled and collected free of charge by a metals recycler.

Three collection options were reviewed for Option 5; a) using a 37-yd<sup>3</sup> single stream compactor truck – co-mingled collection; b) using a 37-yd<sup>3</sup> split stream compactor truck – 4 stream collection (garbage, organics, paper and recyclables); and c) using a 37 yd<sup>3</sup> split stream compactor truck – 2 stream collection (organics and remaining waste).

Based on an annual waste of 1,980 t/yr, it is estimated that a 53' transfer trailer will be required to travel to the RHB site on a weekly basis.

The development will consist of the following components:

- Access Road;
- Scale;
- Enclosed loading area and Scale House;
- Construction and Demolition Landfill;
- Household Hazardous Waste Area;
- White Goods and Metals Storage Area; and
- Public drop off for C&D/bulk waste.

A concept plan showing a typical transfer station layout is included in Appendix B.

The capital cost of option 5a is approximately \$2,701,000 and will increase for options 5b to approximately \$3,617,000 and approximately \$3,235,000 for option 5c. The cost includes construction of a LWMF and a C&D/bulk waste public drop off site on Bell Island and all associated equipment. Options 5b and 5c include the

purchase of carts for organics for each household on Bell Island. Additionally, a major factor that should be acknowledged is the availability and timing of the Bell Island Ferry. However, with approximately one trip per week this is less of a factor.

Once complete, it is recommended that an attendant be on site at least 24 hours per week to oversee operations of the site.

A breakdown of capital, operating, curbside collection and disposal costs to RHB are included in Tables 7-16 to 7-18. Table 7-19 provides a breakdown of fees per household for this option.

**Table 7-16: Estimated Annual Capital Cost of LWMF and C&D/Bulk Waste Public Drop off Site (Option 5)**

Item	Option 5a) Co-Mingled	Option 5b) 4 Stream	Option 5c) 2 Stream
Land (legal Surveys)	\$10,000	\$10,000	\$10,000
Site Development includes access road, power, water, sewer	\$340,000	\$340,000	\$340,000
Building	\$1,120,000	\$1,680,000	\$1,400,000
Paving	\$87,500	\$87,500	\$87,500
Fencing & Gate	\$15,000	\$15,000	\$15,000
Signage	\$2,000	\$2,000	\$2,000
HHW Storage	\$90,000	\$90,000	\$90,000
Landscaping	\$5,000	\$5,000	\$5,000
BKHO	\$120,000	\$120,000	\$120,000
Scales	\$75,000	\$75,000	\$75,000
Transfer Trailer	\$100,000	\$100,000	\$100,000
Carts for Organics	\$0	\$111,510	\$111,510
Bin	\$10,000	\$10,000	\$10,000
Landscaping	\$5,000	\$5,000	\$5,000
<b>SUB-TOTAL</b>	<b>\$1,979,500</b>	<b>\$2,651,010</b>	<b>\$2,371,010</b>
<b>CONTINGENCY (5%)</b>	<b>\$98,975</b>	<b>\$132,551</b>	<b>\$118,551</b>
<b>HST (13%)</b>	<b>\$270,202</b>	<b>\$361,863</b>	<b>\$323,643</b>
<b>ENG (15%)</b>	<b>\$352,302</b>	<b>\$471,814</b>	<b>\$421,981</b>
<b>TOTAL</b>	<b>\$2,700,978</b>	<b>\$3,617,237</b>	<b>\$3,235,184</b>

**Table 7-17: Estimated Annual Operation Cost of LWMF and C&D/Bulk Waste Public Drop off Site (Option 5)**

Annual Operating Costs	Option 5a) Co-Mingled	Option 5b) 4 Stream	Option 5c) 2 Stream
Staffing - One Full-time employee (24 hr/wk @ \$20/hour)	\$24,960	\$24,960	\$24,960
Administration (8 hr/wk @ \$16/hr)	\$6,656	\$6,656	\$6,656
Backhoe	\$11,232	\$11,232	\$11,232
Backhoe Service and Maintenance	\$2,500	\$2,500	\$2,500
Power and Building Maintenance	\$7,800	\$7,800	\$7,800
Service and Maintenance Program for Weigh Scales	\$3,000	\$3,000	\$3,000
Dust Control	\$500	\$500	\$500
Cart Replacement	\$0	\$11,151	\$11,151
Animal and Rodent Control	\$1,035	\$1,035	\$1,035
Transportation & Disposal Costs of HHW (1.5 @ \$500/T)	\$2,350	\$2,350	\$2,350
Capital Replacement	\$70,000	\$70,000	\$70,000
Transfer Trailer	\$6,000	\$6,000	\$6,000
Transport and Tipping Fee to RHB	\$41,000	\$41,000	\$41,000
<b>TOTAL OPERATING COST</b>	<b>\$177,000</b>	<b>\$188,000</b>	<b>\$188,000</b>

Costs are exclusive of taxes

**Table 7-18: Annual Collection and Transportation Costs to RHB Site (Option 5)**

	Cost of Collection and Transportation	Operating Cost	Total Cost
Option 5a) Co-Mingled	\$312,000	\$177,000	<b>\$489,000</b>
Option 5b) 4 Stream	\$277,000	\$188,000	<b>\$465,000</b>
Option 5c) 2 Stream	\$323,000	\$188,000	<b>\$511,000</b>

Costs are exclusive of taxes

**Table 7-19: Estimated Cost for Residents of Bell Island (Option 5)**

	Total Cost	Cost per Tonne (1,980 T)	Total IC&I (911 T)	Total Residential (1,069 T)	Cost per Household (1,239 hh) <sup>1</sup>
Option 5a) Co-Mingled	<b>\$489,000</b>	<b>\$247</b>	<b>\$225,000</b>	<b>\$264,000</b>	<b>\$213</b>
Option 5b) 4 Stream	<b>\$465,000</b>	<b>\$235</b>	<b>\$214,000</b>	<b>\$251,000</b>	<b>\$203</b>
Option 5c) 2 Stream	<b>\$511,000</b>	<b>\$258</b>	<b>\$235,000</b>	<b>\$276,000</b>	<b>\$223</b>

Costs are exclusive of taxes

<sup>1</sup> Cost assumes revenue collected from IC&I

### 7.2.6 Option 6 – Collect all waste in Pick up Truck for Transport to a Local Waste Management Facility with C&D/bulk waste Public Drop Off Site

This option involves the construction of a local waste management facility (LWMF) to store waste from the communities located on Bell Island before it is transported to

the RHB Regional Waste Management Facility for final disposal. This option will require the closure of the existing waste disposal site on Bell Island and construction of a C&D/bulk waste public drop off site. The residents of Bell Island will be required to drop off their own C&D/bulk waste to the drop off site, where metals will be stockpiled and collected free of charge by a metals recycler.

One collection option was reviewed for Option 6; a) using a pick up truck – co-mingled collection. Due to the likely requirement to use carts for organic waste collection 4 stream and 2 stream collection are not feasible.

Based on an annual waste of 1,980 t/yr, it is estimated that a 53' transfer trailer will be required to travel to the RHB site on a weekly basis.

The development will consist of the following components:

- Access Road;
- Scale;
- Enclosed loading area and Scale House;
- Household Hazardous Waste Area;
- White Goods and Metals Storage Area; and
- Public drop off for C&D/bulk waste.

A concept plan showing a typical transfer station layout is included in Appendix B.

The capital cost of option 6a is approximately \$2,701,000. The cost includes construction of a LWMF and a C&D/bulk waste public drop off site on Bell Island and all associated equipment. Additionally, a major factor that should be acknowledged is the availability and timing of the Bell Island Ferry. However, with approximately one trip per week this is less of a factor.

Once complete, it is recommended that an attendant be on site at least 24 hours per week to oversee operations of the site.

A breakdown of capital, operating, curbside collection and disposal costs to RHB are included in Tables 7-20 to 7-22. Table 7-23 provides a breakdown of fees per household for this option.

**Table 7-20: Estimated Annual Capital Cost of LWMF and C&D/Bulk Waste Public Drop-off Site (Option 6)**

Item	Option 6a) Co-Mingled
Land (legal Surveys)	\$10,000
Site Development includes access road, power, water, sewer	\$340,000
Building	\$1,120,000
Paving	\$87,500
Fencing & Gate	\$15,000
Signage	\$2,000
HHW Storage	\$90,000
Landscaping	\$5,000
BKHO	\$120,000
Scales	\$75,000
Transfer Trailer	\$100,000
Carts for Organics	\$0
Bin	\$10,000
Landscaping	\$5,000
<b>SUB-TOTAL</b>	<b>\$1,979,500</b>
<b>CONTINGENCY (5%)</b>	<b>\$98,975</b>
<b>HST (13%)</b>	<b>\$270,202</b>
<b>ENG (15%)</b>	<b>\$352,302</b>
<b>TOTAL</b>	<b>\$2,700,978</b>

**Table 7-21: Estimated Annual Operation Cost of LWMF and C&D/Bulk Waste Public Drop off Site (Option 6)**

Annual Operating Costs	Option 6 Co-Mingled
Staffing - One Full-time employee (24 hr/wk @ \$20/hour)	\$24,960.00
Administration (8 hr/wk @ \$16/hr)	\$6,656.00
Backhoe	\$11,232.00
Backhoe Service and Maintenance	\$2,500.00
Power and Building Maintenance	\$7,800.00
Service and Maintenance Program for Weigh Scales	\$3,000.00
Dust Control	\$500.00
Animal and Rodent Control	\$1,035.00
Transportation & Disposal Costs of HHW (1.5 @\$500/T)	\$2,350.00
Capital Replacement	\$70,000.00
Transfer Trailer	\$6,000.00
Transport and Tipping Fee to RHB	\$41,000
<b>TOTAL OPERATING COST</b>	<b>\$177,000</b>

Costs are exclusive of taxes

**Table 7-22: Annual Collection and Transportation Costs to RHB Site (Option 6)**

	Cost of collection and Transportation	Operating Cost	Total Cost
Option 6a) Co-Mingled	\$265,000	\$177,000	<b>\$442,000</b>

Costs are exclusive of taxes

**Table 7-23: Estimated Cost for Residents of Bell Island (Option 6)**

	Total Cost	Cost per Tonne (1,980 T)	Total IC&I (911 T)	Total Residential (1,069 T)	Cost per Household (1,239 hh) <sup>1</sup>
Option 6a) Co-Mingled	<b>\$442,000</b>	<b>\$223</b>	<b>\$203,000</b>	<b>\$238,000</b>	<b>\$192</b>

Costs are exclusive of taxes

<sup>1</sup> Cost assumes revenue collected from IC&I

### 7.2.7 Option 7 – Collect all waste in Pick up Truck for Transport to a Self Contained Compactor Bin with C&D/bulk waste Public Drop Off Site

This option will require a compactor bin operation on Bell Island that would receive waste from the communities before it is transported to the RHB Regional Waste Management Facility for final disposal. This option will require the closure of the existing waste disposal site on Bell Island and construction of a C&D/bulk waste public drop off site. The residents of Bell Island will be required to drop off their own C&D/bulk waste to the drop off site, where metals will be stockpiled and collected by a metals recycler.

One collection option was reviewed for Option 7; a) using a pick up truck – co-mingled collection. Due to the likely requirement to use carts for organic waste collection 4 stream and 2 stream collection are not feasible.

Based on an annual waste of 1,980 t/yr, it is estimated that the site would require 3 34 yd<sup>3</sup> self contained compactor bins. Two bins would be connected to an enclosed structure and one bin would be used as a spare. The bin would be required to travel to the RHB site approximately 3 times/wk.

The development will consist of the following components:

- Access Road;
- Scale;
- Enclosed loading area and Scale House;

- Household Hazardous Waste Area;
- White Goods and Metals Storage Area; and
- Public drop off for C&D/bulk waste.

The capital cost of Option 7 is approximately \$1,180,000. The cost includes construction of a LWMF and a C&D/bulk waste public drop off site on Bell Island and all associated equipment. Additionally, a major factor that should be acknowledged is the availability and timing of the Bell Island Ferry.

Once complete, it is recommended that an attendant be on site at least 24 hours per week to oversee operations of the site.

A breakdown of capital, operating, curbside collection and disposal costs to RHB are included in Tables 7-24 to 7-26. Table 7-27 provides a breakdown of fees per household for this option.

**Table 7-24: Estimated Annual Capital Cost of Contained Compactor Bin and C&D/Bulk Waste Public Drop off Site (Option 7)**

Item	Option 7 Co-Mingled
Land (legal Surveys)	\$10,000
Site Development includes access road, power, water, sewer	\$250,000
Building	\$250,000
Paving	\$87,500
Fencing & Gate	\$15,000
Signage	\$2,000
HHW Storage	\$90,000
Landscaping	\$5,000
Scales	\$75,000
Compactor Bin (3)	\$60,000
Roll Off Bin (2)	\$20,000
<b>SUB-TOTAL</b>	<b>\$864,500</b>
<b>CONTINGENCY (5%)</b>	<b>\$43,225</b>
<b>HST (13%)</b>	<b>\$118,004</b>
<b>ENG (15%)</b>	<b>\$153,859</b>
<b>TOTAL</b>	<b>\$1,179,589</b>

**Table 7-25: Estimated Annual Operation Cost of Contained Compactor Bin and C&D/Bulk Waste Public Drop off Site (Option 7)**

Annual Operating Costs	Option 7a) Co-Mingled
Staffing - One Full-time employee (24 hr/wk @ \$20/hour)	\$24,960.00
Administration (8 hr/wk @ \$16/hr)	\$6,656.00
Contractual Services (4 hrs/mth)	\$5,000.00
Power and Building Maintenance	\$3,500.00
Service and Maintenance Program for Weigh Scales	\$3,000.00
Dust Control	\$500.00
Animal and Rodent Control	\$1,035.00
Transportation & Disposal Costs of HHW (1.5 @\$500/T)	\$2,350.00
Capital Replacement	\$30,000.00
Compactor Maintenance	\$3,000.00
Transport and Tipping Fee to RHB	\$41,113.00
<b>TOTAL OPERATING COST</b>	<b>121,000.00</b>

Costs are exclusive of taxes

**Table 7-26: Annual Collection and Transportation Costs to RHB Site (Option 7)**

	Cost of collection and Transportation	Operating Cost	Total Cost
Option 7 Co-Mingled	\$287,000	\$121,000	\$408,000

Costs are exclusive of taxes

**Table 7-27: Estimated Cost for Residents of Bell Island (Option 7)**

	Total Cost	Cost per Tonne (1,980 T)	Total IC&I (911 T)	Total Residential (1,069 T)	Cost per Household (1,239 hh) <sup>1</sup>
Option 7 Co-Mingled	\$408,000	\$206	\$188,000	\$220,000	\$178

Costs are exclusive of taxes

<sup>1</sup> Cost assumes revenue collected from IC&I

## 8 CONCLUSIONS

**Table 8-1: Summary Table: Bell Island Waste Management Study**

Option	Capital Cost <sup>1</sup>	Collection and Transportation Costs	Operating Cost <sup>2</sup>	Total Cost	Cost/Tonne	Cost for IC&I	Cost for Residential <sup>3</sup>	Cost Per Household <sup>3</sup>
<b>Option 1: Direct Haul to RHB Regional Waste Management Facility</b>								
a) Collect waste in 37yd <sup>3</sup> single stream compactor truck - co-mingled	\$0	\$380,000	\$0.00	\$380,000	\$192	\$175,000	\$205,000	\$165
b) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 4 stream (garbage, organics, paper and recyclables)	\$132,000	\$344,000	\$11,000	\$355,000	\$179	\$163,000	\$191,000	\$154
c) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 2 stream (organics and remaining waste)	\$132,000	\$378,000	\$11,000	\$389,000	\$196	\$179,000	\$210,000	\$169
<b>Option 2 - Direct Haul to RHB &amp; C&amp;D/Bulk Public Drop Off with Disposal of C&amp;D/Bulk at RHB</b>								
a) Collect waste in 37yd <sup>3</sup> single stream compactor truck - co-mingled	\$317,000	\$380,000	\$71,000	\$451,000	\$228	\$208,000	\$244,000	\$197
b) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 4 stream (garbage, organics, paper and recyclables)	\$469,000	\$344,000	\$82,000	\$426,000	\$215	\$196,000	\$230,000	\$186
c) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 2 stream (organics and remaining waste)	\$469,000	\$478,000	\$82,000	\$460,000	\$232	\$211,000	\$248,000	\$200
<b>Option 3 - Direct Haul to RHB with C&amp;D/Bulk Disposal on Bell Island</b>								
a) Collect waste in 37yd <sup>3</sup> single stream compactor truck - co-mingled	\$243,000	\$380,000	\$128,000	\$508,000	\$257	\$234,000	\$275,000	\$222
b) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 4 stream (garbage, organics, paper and recyclables)	\$402,000	\$344,000	\$139,000	\$483,000	\$244	\$222,000	\$261,000	\$211
c) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 2 stream (organics and remaining waste)	\$402,000	\$378,000	\$139,000	\$517,000	\$261	\$238,000	\$279,000	\$225
<b>Option 4: Local Waste Management Facility with Disposal of Waste at RHB &amp; C&amp;D/Bulk on Bell Island</b>								
a) Collect waste in 37yd <sup>3</sup> single stream compactor truck - co-mingled	\$3,069,000	\$311,000	\$218,000	\$529,000	\$267	\$243,000	\$285,000	\$230
b) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 4 stream (garbage, organics, paper and recyclables)	\$3,986,000	\$276,000	\$229,000	\$505,000	\$255	\$232,000	\$273,000	\$220
c) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 2 stream (organics and remaining waste)	\$3,604,000	\$321,000	\$229,000	\$550,000	\$278	\$253,000	\$297,000	\$240

Option	Capital Cost <sup>1</sup>	Collection and Transportation Costs	Operating Cost <sup>2</sup>	Total Cost	Cost/Tonne	Cost for IC&I	Cost for Residential <sup>3</sup>	Cost Per Household <sup>3</sup>
<b>Option 5: Local Waste Management Facility and C&amp;D/Bulk Public Drop off Site with Disposal of Waste at RHB</b>								
a) Collect waste in 37yd <sup>3</sup> single stream compactor truck - co-mingled	\$2,701,000	\$312,000	\$177,000	\$489,000	\$247.00	\$225,000	\$264,000	\$213
b) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 4 stream (garbage, organics, paper and recyclables)	\$3,617,000	\$277,000	\$188,000	\$465,000	\$235	\$214,000	\$251,000	\$203
c) Collect waste in 37yd <sup>3</sup> split stream compactor truck - 2 stream (organics and remaining waste)	\$3,235,000	\$323,000	\$188,000	\$511,000	\$258	\$235,000	\$276,000	\$223
<b>Option 6: Local Waste Management Facility and C&amp;D/Bulk Public Drop off Site with Disposal of Waste at RHB</b>								
a) Collect waste in pick up truck - co-mingled	\$2,701,000	\$265,000	\$177,000	\$442,000	\$223	\$203,000	\$238,000	\$192
<b>Option 7: Self Contained Roll Off Compactor and C&amp;D/Bulk Public Drop off Site with Disposal of Waste at RHB</b>								
a) Collect waste in pick up truck - co-mingled	\$1,180,000	\$287,000	\$121,000	\$408,000	\$206	\$188,000	\$220,000	\$178

<sup>1</sup> Includes HST and Engineering Costs

<sup>2</sup> Includes transportation and tipping fee of C&D waste

<sup>3</sup> Costs assume revenue collected from IC&I

## 9 PROS AND CONS

**Table 9-1: Summary Table of Pros and Cons for each Option**

Options	Cost Rating		Pros	Cons
	Capital	Total Operational <sup>1</sup>		
<b>Option 1: Direct Haul to RHB Regional Waste Management Facility</b>				
Option 1 a) Collect waste in 37 yd <sup>3</sup> single stream compactor truck – Co-mingled collection	1	2	<ul style="list-style-type: none"> <li>No C&amp;D/bulk waste landfill on Bell Island.</li> <li>Current WDS will be closed.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> <li>Residents would be responsible for disposal of their own C&amp;D/bulk, metals and HHW at the RHB site.</li> <li>Provides lowest level of diversion.</li> <li>Potential for illegal dumping.</li> <li>No provision for separate organic collection.</li> </ul>
Option 1b) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 4 stream collection	2	1	<ul style="list-style-type: none"> <li>Provides highest level of diversion.</li> <li>No C&amp;D/bulk waste landfill on the island.</li> <li>Current WDS site will be closed.</li> <li>Provides for separate organic collection.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> <li>Residents would be responsible for disposal of their own C&amp;D/bulk, metals and HHW at the RHB site.</li> <li>Potential for illegal dumping.</li> </ul>
Option 1c) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 2 stream collection	2	3	<ul style="list-style-type: none"> <li>No C&amp;D/bulk waste landfill on the island.</li> <li>Current WDS site will be closed.</li> <li>Provides for separate organic collection.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> <li>Residents and businesses are responsible for disposal of their own C&amp;D/bulk, metals and HHW at the RHB site.</li> <li>Potential for illegal dumping.</li> </ul>

Options	Cost Rating		Pros	Cons
	Capital	Total Operational <sup>1</sup>		
<b>Option 2 – C&amp;D/Bulk Waste Public Drop Off Site with all waste trucked to RHB Regional Waste Management Facility</b>				
Option 2 a) Collect waste in 37 yd <sup>3</sup> single stream compactor truck – Co-mingled collection	1	2	<ul style="list-style-type: none"> <li>Residents and businesses will have a location on Bell Island to dispose of C&amp;D/bulk waste.</li> <li>No waste is land filled on the island.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> </ul>
Option 2b) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 4 stream collection	1	1	<ul style="list-style-type: none"> <li>Residents and businesses will have a location on Bell Island to dispose of C&amp;D/bulk waste.</li> <li>No waste is land filled on the island.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> </ul>
Option 2c) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 2 stream collection	1	3	<ul style="list-style-type: none"> <li>Residents and businesses will have a location on Bell Island to dispose of C&amp;D/bulk waste.</li> <li>No waste is land filled on the island.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> </ul>
<b>Option 3 - Direct Haul to RHB with C&amp;D/Bulk Disposal on Bell Island</b>				
Option 3 a) Collect waste in 37 yd <sup>3</sup> single stream compactor truck – Co-mingled collection	1	2	<ul style="list-style-type: none"> <li>Residents and businesses will have a location on Bell Island to dispose of C&amp;D/bulk waste.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> </ul>
Option 3b) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 4 stream collection	2	1	<ul style="list-style-type: none"> <li>Residents and businesses will have a location on Bell Island to dispose of C&amp;D/bulk waste.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> </ul>
Option 3c) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 2 stream collection	2	3	<ul style="list-style-type: none"> <li>Residents and businesses will have a location on Bell Island to dispose of C&amp;D/bulk waste.</li> </ul>	<ul style="list-style-type: none"> <li>The garbage truck would have to use the ferry during regularly scheduled trips.</li> <li>Potential for service disruptions due to ferry delays.</li> </ul>

Options	Cost Rating		Pros	Cons
	Capital	Total Operational <sup>1</sup>		
<b>Option 4 – Local Waste Management Facility</b>				
Option 4 a) Collect waste in 37 yd <sup>3</sup> single stream compactor truck – Co-mingled collection	1	2	<ul style="list-style-type: none"> <li>The transfer trailer could travel on the ferry during the dangerous goods run 75% of the time.</li> <li>Highest level of service to residents.</li> </ul>	
Option 4b) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 4 stream collection	3	1	<ul style="list-style-type: none"> <li>The transfer trailer could travel on the ferry during the dangerous goods run 75% of the time.</li> <li>Highest level of service to residents.</li> </ul>	
Option 4c) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 2 stream collection	2	3	<ul style="list-style-type: none"> <li>The transfer trailer could travel on the ferry during the dangerous goods run 75% of the time.</li> <li>Highest level of service to residents.</li> </ul>	
<b>Option 5 – Local Waste Management Facility and C&amp;D/Bulk Waste Public Drop off Site with Disposal of Waste at RHB</b>				
Option 5a) Collect waste in 37 yd <sup>3</sup> single stream compactor truck – Co-mingled collection	1	2	<ul style="list-style-type: none"> <li>The transfer trailer could travel on the ferry during the dangerous goods run 75% of the time.</li> <li>Highest level of service to residents.</li> </ul>	
Option 5b) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 4 stream collection	3	2	<ul style="list-style-type: none"> <li>The transfer trailer could travel on the ferry during the dangerous goods run 75% of the time.</li> <li>Highest level of service to residents.</li> </ul>	
Option 5c) Collect waste in 37 yd <sup>3</sup> split stream compactor truck – 2 stream collection	2	3	<ul style="list-style-type: none"> <li>The transfer trailer could travel on the ferry during the dangerous goods run 75% of the time.</li> <li>Highest level of service to residents.</li> </ul>	
<b>Option 6 - Local Waste Management Facility and C&amp;D/Bulk Public Drop off Site with Disposal of Waste at RHB</b>				
Collect waste in pick up truck – Co-mingled collection	1	1	<ul style="list-style-type: none"> <li>The transfer trailer could travel on the ferry during the dangerous goods run 75% of the time.</li> <li>Highest level of service to residents.</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to support a 2,3 or 4 stream system,.</li> <li>Collection vehicle would not be able to support a compost cart system.</li> </ul>

Options	Cost Rating		Pros	Cons
	Capital	Total Operational <sup>1</sup>		
<b>Option 7 - Self Contained Roll Off Compactor and C&amp;D/Bulk Public Drop off Site with Disposal of Waste at RHB</b>				
Collect waste in a pick up truck – Co-mingled collection	1	1	<ul style="list-style-type: none"> <li>Provides a high level of service to residents.</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to support a 2,3 or 4 stream system,.</li> <li>Collection vehicle would not be able to support a compost cart system.</li> <li>Compactor bin has less capacity than compactor truck, therefore creates the need to make multiple trips throughout the week.</li> </ul>

<sup>1</sup> Includes collection and transportation costs

DRAFT

## 10 RECOMMENDATIONS

Based on the conclusions detailed in Section 8, the following provides a breakdown of recommendations for Bell Island:

- Option 1 would provide the lowest operating cost for the residents of Bell Island; however, it also provides the lowest level of service. In this option residents and businesses would be responsible for delivering their own C&D, bulk waste, metals and HHW to the RHB facility. Due to the low level of service to the residents and businesses of Bell Island this option is not considered to be practical.
- Options 3 and 4 provide the ability keep C&D waste on Bell Island and remove the need to transport C&D waste to Robin Hood Bay. Although, it reduces the transportation costs, the costs associated with the construction and operation of a C&D landfill makes this less economical.
- Options 2, 5, 6 and 7 provide a higher level of service while providing the residents and businesses of Bell Island a public drop off to dispose of their C&D, bulk waste, metals and HHW. Options 2, 5, 6 and 7 also provide the next lowest operating cost for the residents on Bell Island. Option 2 has a significantly lower capital cost than options 5, 6 and 7.
- Option 6 and 7 allows collection using smaller vehicles than compactor trucks.
- Overall, Options 2, 5, 6 and 7 offer the most efficient and economic levels of service to the residents of Bell Island.

## **APPENDIX 'A'**

### **SITE PHOTOGRAPHS**

DRAFT



Photograph 1: Bell Island Waste Disposal Site Entrance



Photograph 2: Bell Island Waste Disposal Site



Photograph 3: Bell Island Waste Disposal Site

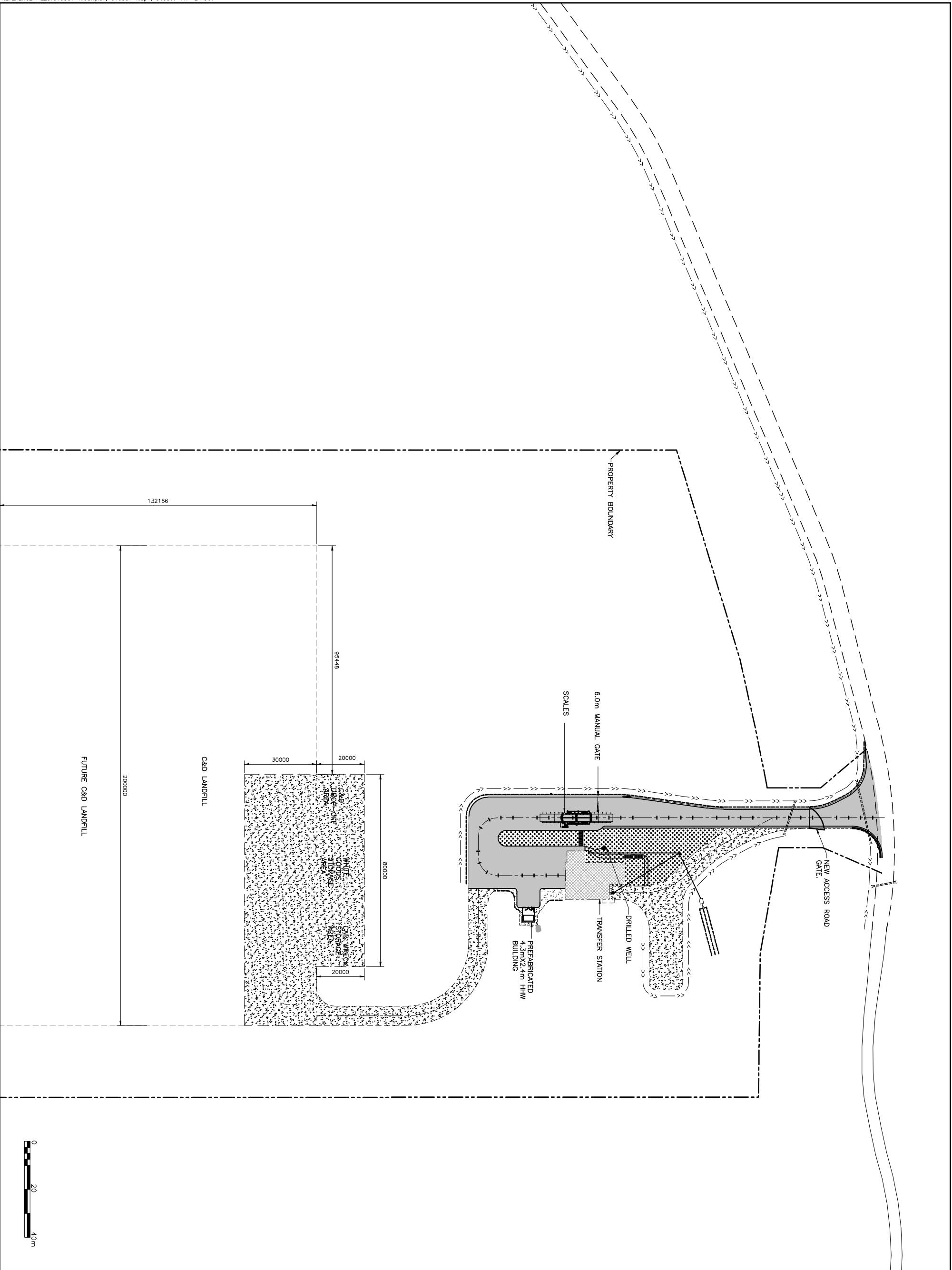


Photograph 4: Bell Island Waste Disposal Site

## **APPENDIX 'B'**

### **CONCEPT PLAN OF TYPICAL TRANSFER STATION**

DRAFT



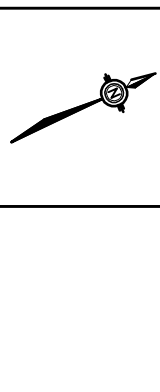
CONTRACTOR MUST VERIFY ALL DIMENSIONS AND CONDITIONS ON SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS PROJECT. DIMENSIONS SHOWN ON THIS DRAWING ARE TO BE ROUNDED UP OR DOWN AS NECESSARY TO FIELD CONDITIONS. REFER TO GRAPHIC SCALE BY 10% SCALE DRAWINGS FOR CONSTRUCTION.

SYMBOL	DESCRIPTION
+	TEST PIT LOCATION
⬇	PERCOLATION TEST LOCATION
•	POLE
≡≡≡≡	NEW CULVERT
≡≡≡≡	EXISTING CULVERT
	SLOPED EMBANKMENT
->->	EXISTING DITCH
->->	NEW DITCH
—	ROAD SIGNS
≡≡≡≡	WETLAND
▭	AREA OF ASPHALT
▭	AREA OF GRAVEL - 150mm CLASS 'A'
▭	AREA TO BE LANDSCAPED

## PROGRESS PRINT

09-12-14

REV.	ISSUED FOR	REVISIONS	REVISED BY	APP. BY	DATE
A					



PERMIT HOLDER STAMP



**BAE • NEWPLAN GROUP LIMITED**  
 1183 TOPSAIL RD., MOUNT PEARL, N.L. A1H 5G2  
 TEL: (709) 368-0118, FAX: 368-3541

CLIENT  
**EASTERN WASTE MANAGEMENT NEWFOUNDLAND & LABRADOR**

PROJECT  
**BELL ISLAND WASTE MANAGEMENT STUDY**

TITLE  
**TYPICAL TRANSFER STATION**

DESIGNED BY	W.M.	CHECKED BY	DATE
J.L.B. <td></td> <td></td> <td></td>			

SCALE	CLIENT PROJ. No.	SCALE
AS SHOWN	723408	

DRAWING No.	REV.
PR1 - XX - CV - XX - 001	A

## **APPENDIX 'C'**

### **QUESTIONNAIRE RESULTS**

**DRAFT**

## BELL ISLAND WASTE MANAGEMENT STUDY

A Waste Management Study is currently being conducted in cooperation with the Bell Island Waste Management Steering Committee and the Eastern Waste Management Committee. We are asking the residents of Bell Island to take the time to fill out the following questionnaire to aid us in collecting the necessary information to determine a means of addressing waste management on Bell Island.

Completed forms can be dropped off, **by Monday, November, 23, 2009** at the Town of Wabana Council Office, Wabana Complex, West Mines Road or mailed to:

Wabana Town Council  
P.O. Box 1229  
Bell Island, NL  
A0A 4H0, Canada

If you require further information on regional waste management or on the guidelines of this study, please contact Eastern Waste Management at 576-7960 or by email at [info@easternwaste.ca](mailto:info@easternwaste.ca).

### 1. Do you currently:

Recycle  Yes **55/69**  No **13/69** If yes, what type of materials products?

**Beverage containers, paper, scrap metal.**

Backyard Compost  Yes **25/69**  No **41/69**

If no, would you?  Yes **20/69**  No **19/69**

### 2. Are you prepared to separate your waste into as many as 4 waste categories (i.e. paper, containers, compost and garbage)?

Yes **40/69**  No **24/69**

### 3. Do you use an existing Green Depot to dispose of used beverage containers?

Yes **40/69**  No **17/69** If no, would you? **4/69 said yes, 5/69 said no**

### 4. How many times per week do you go to the existing waste disposal site?

Once per week **1/week = 9/69**  Once per month **1/month = 23/69**  Once per year **1/year = 12/69**  Never **Never = 20/69**

**5. What type of waste do you bring there?**

Regular household garbage     Wood waste and other construction materials

Furniture     White goods, such as fridges and washers     Other Metals

**Garbage = 31/69, wood = 21/69, furniture = 11/69, white goods = 9/69 and other metals = 11/69**

**6. Do you have any objections to having a construction and demolition (C&D) landfill site located on Bell Island?**

Yes     No    **Yes = 10/69, No = 57/69**

If yes, please identify reason. **Garbage will appear all over town,**

---

**7. If you had a choice, which alternative would you choose to dispose of C&D Material?**

Pay to dispose at local landfill **24/69** or

Utilize the Robin Hood Bay Facilities free of charge. **41/69**

**8. If you had a choice, which alternative would you choose to dispose of Household Hazardous Waste (i.e. paints, cleaners, etc.)?**

Pay to dispose at local landfill **21/69** or

Utilize the Robin Hood Bay Facilities free of charge. **41/69**

**9. In your opinion what is a reasonable household cost to have garbage picked up once per week?**

\$0.14 to \$0.27 per day **27/69**     \$0.27 to \$0.42 per day **13/69**     \$0.42 to \$0.55 per day **6/69**     \$0.55 to \$0.68 per day **3/69**

**10. Do you have any objections to a garbage truck travelling on the ferry during regular scheduled trips?**

Yes     No

**Yes = 29/69 No = 38/69**

**Additional Comments:**

**See Attached for some of the most frequent comments**

**Thank you for Participating.**

Additional Comments:

1. Trucks must be free of waste and odor to travel during regular hours,
2. Should have facility similar to Fogo Island.
3. Do research on garbage trucks and fires, who is responsible if this happens on the boat?
4. Before any decisions are made should have public meeting with all stakeholders.
5. Additional journeys could cause more delays for the ferry.
6. Trucking anything from Bell Island can't be accomplished without huge increases in takes, and proper equipment to do s would be expensive.
7. Waste management should be handled on Bell Island as much as possible.
8. People will lose jobs on Bell Island if they do this.
9. Maintain present site.
10. Consider cleaning up water on Fitzgerald Lane.
11. Truck should never be allowed on the ferry during commuter hours in the morning and evening.
12. Have scheduled trips without interfering with scheduled trips, i.e. Beaumont makes 2 morning trips then ties up until noon, this would be a good time.
13. How come all of these old places are closed up and no one living in them, they should be forced to be torn down.
14. A much more transparent and honest questionnaire would help.
15. Much thought needs to go into the whole idea. Don't wait to long to start making decisions, many details need to be discussed.
16. Concerned small dumps will turn up all over Bell Island.
17. There should be no added cost to tax payer.

Comments on Question 9:

1. Free pickup
  2. Taxes are supposed to cover costs.
  3. This question should only pertain to non-council residents, taxes should cover the rest.
- Don't hide the cost, state annual cost.

## **APPENDIX 'D'**

### **BELL ISLAND FERRY SCHEDULE**

**DRAFT**

# Bell Island - Portugal Cove Ferry Service

## Yearly Schedule

Day	Depart Bell Island	Depart Portugal Cove
	5:55 a.m. (Flanders)	6:20 a.m. (Flanders)
	6:50 a.m. (Flanders)	7:20 a.m. (Flanders)
	7:20 a.m. (Beaumont Hamel)	7:50 a.m. (Beaumont Hamel)
	7:50 a.m. (Flanders)	8:20 a.m. (Flanders)
	8:20 a.m. (Beaumont Hamel)	8:50 a.m. (Beaumont Hamel)
	8:50 a.m. (Flanders)	9:20 a.m.* (Flanders)
	9:50 a.m. (Flanders)	10:40 a.m. (Flanders)
	11:20 a.m.* (Flanders)	12:00 noon (Flanders)
	12:00 noon (Beaumont Hamel)	12:40 p.m. (Beaumont Hamel)
<b>Monday - Thursday</b>	1:20 p.m. (Beaumont Hamel)	2:00 p.m. (Beaumont Hamel)
	2:00 p.m. (Flanders)	2:40 p.m. (Flanders)
	2:40 p.m. (Beaumont Hamel)	3:30 p.m. (Beaumont Hamel)
	3:30 p.m. (Flanders)	4:10 p.m. (Flanders)
	4:10 p.m. (Beaumont Hamel)	4:50 p.m. (Beaumont Hamel)
	4:50 p.m. (Flanders)	5:30 p.m. (Flanders)
	5:30 p.m. (Beaumont Hamel)	6:10 p.m. (Beaumont Hamel)
	6:10 p.m. (Flanders)	6:50 p.m. (Flanders)
	6:50 p.m. (Beaumont Hamel)	7:30 p.m. (Beaumont Hamel)
	8:10 p.m. (Beaumont Hamel)	8:45 p.m. (Beaumont Hamel)
	10:35 p.m. (Beaumont Hamel)	11:10 p.m. (Beaumont Hamel)
<b>Friday</b>	5:55 a.m. (Flanders)	6:20 a.m. (Flanders)
	6:50 a.m. (Flanders)	7:20 a.m. (Flanders)
	7:20 a.m. (Beaumont Hamel)	7:50 a.m. (Beaumont Hamel)

\* indicates Dangerous Goods run on Tuesdays, regular run on other days

# Bell Island - Portugal Cove Ferry Service

## Yearly Schedule

<b>Day</b>	<b>Depart Bell Island</b>	<b>Depart Portugal Cove</b>
	7:50 a.m. (Flanders)	8:20 a.m. (Flanders)
	8:20 a.m. (Beaumont Hamel)	8:50 a.m. (Beaumont Hamel)
	8:50 a.m. (Flanders)	9:20 a.m.* (Flanders)
	9:50 a.m. (Flanders)	10:40 a.m. (Flanders)
	11:20 a.m.* (Flanders)	12:00 noon (Flanders)
	12:00 noon (Beaumont Hamel)	12:40 p.m. (Beaumont Hamel)
	1:20 p.m. (Beaumont Hamel)	2:00 p.m. (Beaumont Hamel)
	2:00 p.m. (Flanders)	2:40 p.m. (Flanders)
	2:40 p.m. (Beaumont Hamel)	3:30 p.m. (Beaumont Hamel)
	3:30 p.m. (Flanders)	4:10 p.m. (Flanders)
	4:10 p.m. (Beaumont Hamel)	4:50 p.m. (Beaumont Hamel)
	4:50 p.m. (Flanders)	5:30 p.m. (Flanders)
	5:30 p.m. (Beaumont Hamel)	6:10 p.m. (Beaumont Hamel)
	6:10 p.m. (Flanders)	6:50 p.m. (Flanders)
	6:50 p.m. (Beaumont Hamel)	7:30 p.m. (Beaumont Hamel)
	6:50 p.m. (Beaumont Hamel)	8:45 p.m. (Beaumont Hamel)
	10:35 p.m. (Beaumont Hamel)	11:10 p.m. (Beaumont Hamel)
	11:40 p.m. (Beaumont Hamel)	12:10 a.m. (Beaumont Hamel)
<b>Saturday</b>	6:50 a.m. (Flanders)	7:20 a.m. (Flanders)
	7:50 a.m. (Flanders)	8:20 a.m. (Flanders)
	8:50 a.m. (Flanders)	9:20 a.m.* (Flanders)
	9:50 a.m. (Flanders)	10:40 a.m. (Flanders)
	11:20 a.m.* (Flanders)	12:00 noon (Flanders)

# Bell Island - Portugal Cove Ferry Service

## Yearly Schedule

Day	Depart Bell Island	Depart Portugal Cove
	12:00 noon (Beaumont Hamel)	12:40 p.m. (Beaumont Hamel)
	1:20 p.m. (Beaumont Hamel)	2:00 p.m. (Beaumont Hamel)
	2:00 p.m. (Flanders)	2:40 p.m. (Flanders)
	2:40 p.m. (Beaumont Hamel)	3:30 p.m. (Beaumont Hamel)
	3:30 p.m. (Flanders)	4:10 p.m. (Flanders)
	4:10 p.m. (Beaumont Hamel)	4:50 p.m. (Beaumont Hamel)
	4:50 p.m. (Flanders)	5:30 p.m. (Flanders)
	5:30 p.m. (Beaumont Hamel)	6:10 p.m. (Beaumont Hamel)
	6:10 p.m. (Flanders)	6:50 p.m. (Flanders)
	6:50 p.m. (Beaumont Hamel)	7:30 p.m. (Beaumont Hamel)
	8:10 p.m. (Beaumont Hamel)	8:45 p.m. (Beaumont Hamel)
	10:35 p.m. (Beaumont Hamel)	11:10 p.m. (Beaumont Hamel)
	11:40 p.m. (Beaumont Hamel)	12:10 a.m. (Beaumont Hamel)
<b>Sunday</b>	7:50 a.m. (Flanders)	8:20 a.m. (Flanders)
	8:50 a.m. (Flanders)	9:20 a.m.* (Flanders)
	9:50 a.m. (Flanders)	10:40 a.m. (Flanders)
	11:20 a.m.* (Flanders)	12:00 noon (Flanders)
	12:00 noon (Beaumont Hamel)	12:40 p.m. (Beaumont Hamel)
	1:20 p.m. (Beaumont Hamel)	2:00 p.m. (Beaumont Hamel)
	2:00 p.m. (Flanders)	2:40 p.m. (Flanders)
	2:40 p.m. (Beaumont Hamel)	3:30 p.m. (Beaumont Hamel)
	3:30 p.m. (Flanders)	4:10 p.m. (Flanders)

# Bell Island - Portugal Cove Ferry Service

## Yearly Schedule

<b>Day</b>	<b>Depart Bell Island</b>	<b>Depart Portugal Cove</b>
	4:10 p.m. (Beaumont Hamel)	4:50 p.m. (Beaumont Hamel)
	4:50 p.m. (Flanders)	5:30 p.m. (Flanders)
	5:30 p.m. (Beaumont Hamel)	6:10 p.m. (Beaumont Hamel)
	6:10 p.m. (Flanders)	6:50 p.m. (Flanders)
	6:50 p.m. (Beaumont Hamel)	7:30 p.m. (Beaumont Hamel)
	8:10 p.m. (Beaumont Hamel)	8:45 p.m. (Beaumont Hamel)
	10:35 p.m. (Beaumont Hamel)	11:10 p.m. (Beaumont Hamel)

## **APPENDIX 'E'**

### **FERRY INFORMATION SHEETS**

**DRAFT**