APPENDIX - D

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2. Executive Summary

The community of Cape Dorset is currently operating a metals waste disposal site. The Hamlet of Cape Dorset has expressed concern over the appearance, environmental impacts and public safety and health risks this site may pose. Regulators have expressed concern over the volume of waste at the site, the lack of segregation of materials, the presence of improperly stored hazardous wastes and the flow of surface runoff through the site.

All suggested options for managing the waste require a preparatory phase involving sorting of the waste, removing and disposing of hazardous materials, and compaction of materials into manageable sized bales to decrease transport costs and storage requirements.

The options considered include disposal at sea, disposal at a landfill, on-site storage and sealift backhaul. Disposal at sea and disposal at a landfill were determined to be cost-prohibitive and unacceptable from a community perspective. Furthermore no practical locations for landfilling of the material are currently available. On-site storage was also rejected as this option merely defers the problem to a later date and does not satisfy the community's immediate concerns regarding the aesthetics of the site.

The recommended option, therefore, was sealift backhaul.

3. Background

The Hamlet of Cape Dorset is located on Dorset Island near Fox Peninsula at the southwest tip of Baffin Island (Attachment 1, Project Location Map). The community has a population of approximately 1236, over 90% of which are Inuit. Employment is related to the provision of basic consumer services and the export of native art. The community is supplied with basic services such as electricity which is regionally generated and also utilizes propane and petroleum products for fuel and home heating. The Hamlet is challenged by the local geography and climate, both which create natural barriers to transportation services. The community imports many of its basic needs through annual re-supply via sealift during the summer months and transport by air year round.

3.1. Geology

Located within the Canadian Shield, the local geology consists of undulating, exposed PreCambrian bedrock (primarily granite and gneisses). Surficial materials where present, consist of glacially deposited sands, silts, clays and gravel (till). Cape Dorset is also located within the continuous permafrost zone.

4. Project Scope

The scope of work for this project as defined in the original proposal provided by concentric to the Hamlet of Cape Dorset included the following.

1. Travel to Cape Dorset to meet with the Hamlet council and/or the Mayor to discuss the history, background and possible remedial techniques to bring the metals waste disposal site into compliance with applicable environmental legislation.

2. Review of all relevant information regarding the metals waste disposal site.

3. Survey the site to ascertain the amounts and types of materials present.

4. Identify the process or processes required to ensure that the metals disposal site meets environmental standards and guidelines.

5. Provide recommendations in the form of a report that will be available for the Hamlet Council and Government of Nunavut.

5. Regulatory Background

The management of solid waste within communities such as Cape Dorset is multi-jurisdictional. The day to day management of existing solid waste sites is, to a large extent, controlled at the community level. Regulatory oversight, however, is provided by various departments within both the territorial and federal governments.

The regulations regarding the management of solid waste are designed to ensure the protection of environmental quality and human health. They include, therefore, such regulations as the Nunavut Environmental Protection Act (R.S.N.W.T. 1988, c.E-7) and the Nunavut Public Health Act (R.S.N.W.T. 1988, c.P-12).

The Government of Nunavut, Department of the Environment is responsible for upholding the Nunavut Environmental Protection Act and hence regulating the disposal and management of solid waste. Definitions under the Environmental Protection ACT are somewhat vague. Subsection 5 of the Act states:

"Discharge of contaminants
5. (1) subject to subsection (3), no person shall discharge or permit the discharge of a contaminant into the environment".

Please note that there are no exceptions pursuant to Subsection (3) that apply to the Cape Dorset site.

Subsection 12 of the EPA deals with offenses and punishment. As noted in this section, anyone who is in contravention of section 5 is guilty of an offense. The metals disposal site may be subject to censure by the Chief Environmental Protection officer. Concentric is not aware, however, of any orders that have been issued pursuant to subsection 5 that apply to the Cape Dorset site.

In addition, to facilitate compliance with the Environmental Protection Act, seven guides have been developed by the Department of the Environment for materials (principally hazardous) considered to be contaminants under the Act. These documents provide guidance on the correct management of these materials. Management practices which fall outside these guidelines, therefore, are subject to enforcement.

Similarly, in order to protect human health and safety, the Government of Nunavut, Department of Health and Social Services must also play a role in regulating solid waste sites. Finally, solid waste disposal may also come under the scrutiny of Indian and Northern Affairs Canada who are responsible for enforcing water licences issued under the Nunavut Waters & Nunavut Surface Rights Tribunal Act (S.C. 2002, c. 10). A key component of any water licence is the analysis of solid waste disposal and its effects on the quality and quantity of inland waters.

Any strategies developed to deal with existing solid waste or its future management, therefore, will necessarily involve input from various levels of government. The execution of such strategies, however, will likely rest at the community level.

5.1. Indian and Northern Affairs Canada Reports

Two municipal water use inspection reports (January 15, 2001 and October 6, 2003) have been issued for Cape Dorset by Indian and Northern Affairs Canada. These reports, which were presented in a previous study issued by Dillon Consulting (2003), made note of several issues relating to the metals waste disposal site. Items of particular concern noted in the report included; lack of segregation of the materials, no containment of the hazardous materials, and no viable measures in place to contain runoff that flows into Telik Inlet from the dump site. Since these reports were issued, some segregation of materials has taken place and a berm has been constructed around the northern edge of the site to prevent surface runoff from entering Telik Inlet. Otherwise the site remains largely unchanged.

Indian and Northern Affairs Canada, Nunavut District Office was contacted for updated inspection reports. At the time this report was prepared, however, no response had been received. More recent inspection reports, therefore, may be available for future review and consideration.

6. Previous Studies

The Government of Nunavut previously commissioned studies to assess the environmental impact of solid waste management in the territory. A summary of two of these studies, one of which was specific to Cape Dorset follow. It's noteworthy that the present report does not attempt to replicate either of these studies but rather makes reference to pertinent sections of them in order to provide relevant information.

6.1. Dillon Consulting – Cape Dorset Solid Waste Improvement Study

The Dillon Consulting Limited study was conducted in 2003 at the Cape Dorset site. This study involved the analysis of both the community municipal landfill and the metals waste disposal site. Dillon's objectives were to assess the disposal and storage facilities as well as to determine the means by which these sites might be upgraded and/or expanded to accommodate future waste materials that would be generated in the following 20 years.

With respect to the metals disposal site, Dillon suggested four potential options for managing the waste. These included storage of the material at its current location, removal of the waste to a landfill, disposing of the material at sea, or transport of the metal waste to the south where it could be sold for scrap. All of the proposed management options called for a reduction in the volume of scrap metal via shredding and/or compaction.

6.2. Environmental Protection Service - Management Options for End-of-Life Vehicles (ELVs) in Nunavut

A second study (2006) was prepared by the Environmental Protection Service of the Government of Nunavut. This study discussed both the current means of managing end of life vehicles (ELV's) as well as future management strategies for ELVs in several communities throughout Nunavut. Although the report focused solely on ELVs, the options presented could also be applied to other recyclable scrap metal such as that present in Cape Dorset. Disposal at sea and disposal in a landfill were presented in the report as potential options for managing the waste, but were discounted due either to high cost or lack of community support. The report focused, therefore, on the means by which the ELVs could be completely removed from the communities and shipped south for recycling.

In addition to the above, several other studies regarding scrap metal recycling in remote northern communities were reviewed. Relevant information from these was incorporated into the current report where applicable.

7. Site Description

7.1. Location

The metals disposal site is located roughly 0.5 km west of the Hamlet of Cape Dorset. It is accessed from a gravel lane which branches off the main road leading to the sewage lagoons and the municipal landfill (Attachment 2, Site Location). The site is situated adjacent to Telik Inlet with its northern border located within approximately 40 meters of the waters edge. The nearest residence is located approximately 25 meters east of the disposal site.

7.2. Site Plan

The waste at the metals disposal site may be divided into two main areas (Attachment 2, Site Plan). The first area (upper site) is located on the southern part of the site adjacent to the main road leading to the sewage lagoons and municipal landfill. The materials found in upper site are distributed among several moderately sized piles. Some segregation of the material has taken place in this area, but the majority of the piles are of mixed composition.

The second main area (lower site) is located on the northern half of the site adjacent to Telik Inlet. Two large piles are located on the west side of the main access road. The remaining waste is distributed among several smaller piles present on the east side of the main access road. An approximately 1.5 meter high berm surrounds the entire northern edge of the lower site. Materials in this area have been roughly sorted.

The upper and lower piles of waste are roughly 100 meters apart and are connected by the gravel access lane. Surficial drainage at the site is generally to the northeast towards Telik Inlet.

7.3. Existing Facilities

Existing facilities at the metals disposal site are minimal. There are no structures nor are there any mechanisms in place such as bins or signs which would assist in segregating the waste for recycling or other forms of waste management. Further, there are no measures in place for the containment or proper handling of any hazardous materials.

7.4. Site Access

The metals disposal site is currently completely open to the public. No fencing or signs are present on-site to restrict when the site may be accessed. At this time, there are no administrative controls in place that limit either the quantity or type of materials being dumped. There are also no restrictions regarding where on the site these materials may be deposited.

7.5. Current Community Involvement

Members of the community currently do not follow any firm rules or maintain any order when depositing materials at the dump. The situation could be improved with appropriate on-site

management as well as public education. As has been noted in previous reports, the dump is not well managed and items are left randomly at the site. The items left by community residents are diverse covering a full spectrum of expired consumer goods as well as light commercial items and rotting carcasses of various animals.

8. Site History

8.1. Age of the site

It is estimated based on the types of materials present on-site that the metals waste disposal site has been in operation for at least 30 years. Anectodal evidence provided by Cape Dorset council members suggests that this site may have formerly been occupied by a community landfill. Aerial photographs were reviewed from the National Air Photo Library for the years 1969, 1972, 1983, 1987, 1989, and 1992. Results of the aerial photograph review are presented in **Table 1** below. A summary of the overall observations follows Table 1

Table 1: Aerial Photograph Review – Observations

Year	Photo No.	Observations
1969	A21180-73	Site appears to be vacant.
1972	A24735-62	A road is visible leading to what is the current-day metals disposal site. Small debris piles are scattered throughout both the upper and lower portions of the site.
1983	A26393-18	A large clearly visible debris pile is present on the upper portion of the site immediately adjacent to the where the road for the disposal site branches off from the main road. A large cleared area is visible on the lower portion of the site although debris piles are not evident in this photo.
1987	A27162-102	Site is generally similar to the 1983 aerial photograph.
1989	A27464-14	Site is generally similar to the 1987 aerial photograph.
1992	A27863-94	A large clearly visible debris pile is present on the upper portion of the site immediately adjacent to the where the lane leading to the disposal site branches off from the main road. A large cleared area is visible on the lower portion of the site as are several debris piles.

Based on the historical photographs, it appears that the site has been occupied by a waste disposal site since the early 1970s. Given the small scale of the photographs, it was not possible to distinguish whether the debris piles noted in the earlier photographs were associated with a former municipal landfill or were the beginnings of the current metals disposal site. Municipal waste therefore may be present on the metals site.

8.2. Site Use

Historically the site has been used for about thirty years. Its use, however, has accelerated during the past twenty years as more consumer goods have made their way to the north. As these goods have passed their useful life, they have been dumped at the site in a random fashion.

9. Site Characteristics

9.1. Geographic characteristics

The site is subject to extreme cold weather with sub-zero conditions typically lasting for between seven and eight months. These freezing temperatures have an impact on access to the dump for the purpose of compacting and removing materials as well as access to the region as a whole. The only viable way to import or export goods of any kind to or from the community is by way of the ocean. Accordingly, any attempts to remove materials would be restricted to a few summer months each year at best. Some materials that are dumped on the site are affected by the freezing temperatures whilst others are not. Petroleum byproducts for example do not freeze they become a slow moving sludge in freezing conditions. Ethylene glycol, found in anti-freeze and windshield washer fluid also tend to thicken in sub-zero temperatures but do not entirely lose their liquid qualities, thereby presenting a year round environmental hazard.

9.2. Waste Characteristics

As noted above, the metals disposal site may be divided into two main areas, the upper site and the lower site (see Attachment 2, Site Plan and Appendix A, Photographs). Waste in the upper site represents approximately 25% of the total volume of materials in the metals dump. Items present in the upper site are largely unsorted and generally consist of mixed light metal. Heating oil tanks and drums, fiberglass tanks and metal pipes, however, have been segregated. Some miscellaneous vehicles, white goods, and general refuse are scattered about this area.

Waste contained in the lower site constitutes roughly 75% of the total volume. Over 40% of this in turn is found in two large piles situated on the west side of the lower site. The largest of the two is composed predominately of cars, trucks, and heavy commercial vehicles. The other consists of corrugated metal and mixed heavy and light steel. To the east of these two piles are several smaller waste piles the largest of which are composed of unsorted light metal, appliances, snowmobiles, tires and pipes. Other materials on-site in smaller quantities include steel ribbon, sheet metal shelves, electronics, mattresses, bicycles and general refuse

In addition to the above, hazardous materials including partially full paint cans, vehicle batteries and vehicles fluids are present at the site. CFCs and HFCs in refrigeration equipment present at the site may also be a concern. The majority of these types of wastes are located at the lower site although some are scattered throughout the upper site as well.

9.3. Regulatory Oversight

There has been minimal regulatory oversight with no local policing of the dumpsite being evident. Various levels of government and legislative authorities have provided reports and commissioned studies both which provided recommendations regarding the management of the site. As at this writing, however, only the most rudimentary recommendations have been implemented.

10. 2009 Site Visits

A visual inspection of the site was conducted by Concentric in July, 2009 followed by a second visit in August to conduct a detailed volumetric survey of the metals disposal site. The July inspection consisted of several site visits, the making of observational notes and meetings with community officials.

10.1. Meeting with Community Officials

Discussions were had with the Hamlet Council and the Senior Administrative Officer, Mr. John Ivey. During our discussions, concern was expressed for the aesthetics of the site, the distance of the site from the water and the tidal land bridge, and the presence of improperly stored hazardous materials. The council made it clear that their preference was for the complete removal of the metals from the dump site.

10.2. Site Inspection

During the July inspection of the metals disposal site, several issues of concern were noted. The section of the berm located directly north of the main pile of vehicles had been breached. Surface water was observed to be moving through the site towards Telik Inlet. Several vehicles were sitting in water and were leaking fluids into the water and on to the ground surface. Animal carcasses and potentially hazardous wastes including batteries, paint cans, and drums were scattered throughout the site (Appendix A, Photographs). It should be noted that during the three days that Concentric was in Cape Dorset, the berm was repaired and absorbent pads were placed beneath the leaking vehicles.

10.3. Earlier recommendations

Previous studies have made recommendations such as moving materials further from the high water line and building a berm, these two things have been done. Further recommendations have included segregating the waste into piles according to type and taking steps to facilitate recycling of certain types of material. While there have been some attempts at segregation, the task is far from complete and a recycling programme has yet to be implemented.

10.4. Site Survey

A survey of metals disposal site was conducted by concentric in August of 2009 (see attachment 3). The estimated total volume of waste at the site is 11,800 m^3. This is divided among the upper site which has a waste volume of roughly 3000 m^3 and the lower site which has a volume of roughly 8800 m^3.

Based on observations of the materials present on-site, the waste was classified into six categories with associated volumes. These are listed in Table 1 below.

Table 1: Estimated Volumes of Materials at the Cape Dorset Metals Disposal Site

Material Class	Volume (m^3)	Percentage of Total Volume
Vehicles (including snowmobiles)	2900	25
Mixed Light Metal	6300	54
Appliances	1100	9
Oil Tanks and Barrels	600	5
Tires	400	3
Other	500	4
TOTAL	**11800**	**100**

Total weight of the materials is estimated to be 2100 metric tonnes. Estimates of the total tonnage at the site were calculated by cross referencing the current survey with data available from the Dillon report. The Dillon report estimated weight using a matrix that combined volume and estimates of content density. It is the adjustment of volume that provides a percentile basis for the estimation of weight. Concentric also independently calculated weight using data from its own volumetric survey and approximate material densities. An average of this value and the value determined by adjusting Dillon's data were used to obtain the estimate of total tonnage.

10.5. Current Waste Management Practices

At this time there are no viable or sustainable waste management practices or protocols in place nor are there any measures in place to inhibit random dumping at the site. Regulatory officials have already expressed concern over the volume of waste at the site, the lack of segregation and the presence of uncontained hazardous wastes. Community officials have in addition, expressed concern over the aesthetics of the site and its distance from the tidal land bridge. Although no orders are known to have been issued against the site, continuing with this modus operandi would likely be unacceptable from a regulatory perspective and merely defers the problem to a later date.

No concerns have been expressed from regulators regarding the geographic location of the site. Storage of the waste at its current location, therefore, is a possibility. Certain immediate measures, however, would need to be implemented to satisfy the specific regulatory concerns noted above. These include segregation of the waste so that like materials can be grouped together, proper containment of hazardous wastes, disposal of non-metallic items at the local

landfill and a system of drainage installed to ensure that surface water is not moving through the disposal site and into Telik Inlet.

Even if the above measures are implemented, at some point, whether now or in the future, a plan will need to be introduced to reduce the volume of the existing waste as the dump surpasses its capacity. In addition, on-site storage of the waste in its current form, does not address the communities concerns of the aesthetics of the site and its distance from the tidal land bridge.

11. Waste Management Options

Options for managing the metal waste within Cape Dorset may involve removal, on-site storage, or a combination of the two. A discussion of potential options is discussed in the following sections.

11.1. Preparation of Material for Waste Removal

Prior to the removal of any of the metals material, whether to dump elsewhere or sell as scrap, a major preparatory phase must be carried out. This would involve:

1. sorting the waste items;
2. removing and disposing of hazardous materials; and
3. compaction of materials into manageable sized bales.

Each of the waste removal options will require that the volume of waste is reduced in order to decrease transport costs and storage requirements. This reduction could best be achieved by using a portable baling machine. Rough estimates provided by an equipment recycling company have suggested that if the recyclable material is properly compacted and baled, the volume can be reduced by about 75%. Accordingly, it is estimated that the total volume can be reduced to approximately 3000m^3 (rounded).

In general, sorting of the material would involve its separation in to three main groups, light metal that can be compacted; heavy metal items that must be torch-cut; and non-metallic items that may be disposed of in a landfill. Some management options such as disposal at sea (discussed in Section11.1.2) may involve an added level of segregation. Timing will be a critical issue due to the short season. Accordingly, sorting of the waste should take place when it can be most easily and economically accomplished. This may be immediately prior to compacting the waste or in conjunction with the process. Hazardous wastes such as fluids in vehicles (fuel, lubricants, coolant and windshield fluid) or drums, battery acid, paint, CFCs and possibly PCBs from items such as appliances and air-conditioning systems must be removed and dealt with according to government regulations. It should be noted that removal of CFCs must be done by a licensed technician. In addition, tires must be removed from vehicles and fuel tanks properly decommissioned prior to compaction.

11.2. Disposal at Sea

Disposing of waste materials at sea is permitting in accordance with the Canadian Environmental Protection Act, 1999 (CEPA). The Act restricts what types of material may be disposed of and sets forth guidelines for its disposition. The disposal at sea program is administered by Environment Canada (EC) and is controlled by a system of permits obtained through EC and administered in accordance with the regulations provided under the CEPA. The application process is very complex and requires meticulous planning. A summary of the main requirements of the program as well as some of the most important considerations of this method of disposal are discussed below.

The disposal at sea program facilitates the dumping of a variety of "clean" material that is both environmentally and ecologically sound. The most common material being disposed of at sea is dredged sediment, making up roughly 90% of the material dumped in this way. However, bulky substances, including those "primarily composed of iron, steel, concrete or other similar matter", may also be disposed of providing that they will not have a significant adverse effect on the sea or seabed.

Assessment of the Proposed Disposal Site

A detailed description of the proposed disposal site must be undertaken. In general, less information will be required for pre-existing disposal sites if they have been used in the last 10 years. When this is not the case considerably more information must be provided. According to Mr. Mark Dahl, Ocean Disposal Specialist at Environment Canada (EC), no ocean disposal has taken place within Nunavut during the last 10 years. As such, an assessment of any proposed new site near Cape Dorset must include studies of the geological, chemical and biological characteristics of the ocean floor as well as the physical, chemical and biological characteristics of the water column. In addition, a description of the surrounding physical, biological and human environments must be included. To obtain the above information, long-term studies to acquire baseline data may be required.

Waste Characterization

According to the disposal at sea regulations, a detailed description and characterization of the waste must be provided. If the description and characterization is inadequate because its impact on human health and the environment cannot be assessed, then the application will be refused.

The waste characterization would include for example, the source, type, dimensions, previous uses, physical, chemical biochemical and biological properties of the material. In addition, it must be demonstrated that the materials to be disposed of are free of contaminants and floating debris.

According to EC official Mark Dahl, disposal of scrap metal has not been undertaken for some time. He added that typically this type of disposal is for large chunks of inert steel such as whole ships. He emphasized that the cleaning requirements are extremely stringent requiring for example, the removal of any fuels, lubricants, wiring, tires, batteries, fiberglass, engines and anything that may float or leach. Materials would then have to be steamed cleaned to remove any potential remaining contaminants. In Mr. Dahl's view, the cleaning costs would likely outweigh the cost of shipping the material off-site. He also felt that some of the waste at the Cape Dorset site (vehicles, appliances, heating oil tanks, drums etc.) would likely be rejected.

Environmental Assessment (EA)

The scope of the environmental assessment extends beyond the proposed dump site and gives consideration to other factors such as the impact or effects of the transportation process itself. The EA process would involve an assessment of the potential effects of the material at each stage of its disposal and the subsequent presence of the material on "human health, living resources,

amenities, and other legitimate uses of the sea". This process provides the basis for approval or rejection of the disposal and for determining monitoring requirements.

Alternatives to Disposal at Sea

A key aspect of the disposal at sea application process is a risk assessment of potential alternatives for managing the waste. According to CEPA, applications to dispose of waste at sea must demonstrate that other waste management options such as re-use or off-site recycling have been considered and discounted. The permit will be refused if any other opportunities exist to manage the waste without endangering human health or the environment or incurring excessive costs.

Community Support

According to Mark Dahl, communities in the north have traditionally been opposed to disposing of substances at sea. In 1994 for example, a permit to dispose of scrap metal at sea near Lougheed Island was issued to Panarctic Oils Ltd. Despite Panarctic being on the brink of starting the project, the permit was rescinded due to public concern and no disposal of scrap took place.

Because disposal at sea is very rare in the north, there are a lack of studies from which comparative cost information can be drawn. The complex application process involving lengthy and detailed site studies and assessments, the stringent sorting and cleaning requirements and the cost of dealing with any waste which cannot be disposed of at sea will make this option cost prohibitive. Furthermore, it is very unlikely that this option would receive community support.

11.3. Burial of the Waste

A second option for managing the materials at Cape Dorset site is burial at a landfill. This process is regulated by the Environmental Protection Act. According to the Guideline for the General Management of Hazardous Waste (February 1998) "it is not acceptable for hazardous waste to be abandoned, poured down sewers, dumped on land or discarded at a landfill". If the scrap metal is to be land-filled all of the hazardous waste materials must be removed first. These materials include but are not limited to, batteries, oil-based paint, waste oil, solvents, fuel, propane tanks, CFCs, PCBs and electronic equipment. In addition, the preparatory steps discussed in section 11.1.1 would have to be undertaken to minimize the volume of material to be disposed of.

The most likely landfill location for disposal of the waste would be at the existing community dump. However, this site does not have the capacity to accommodate the volume of waste present at the metals disposal site. The second alternative for burial would be the creation of a landfill in the existing sewage lagoons that are eventually scheduled to be decommissioned. The process of creating a new landfill is complex and cost prohibitive. Proper design, management and maintenance are critical to minimize the environmental impact. Further, the licensing process itself is time-consuming and involved. Currently the sewage lagoons are in-use and although due to be decommissioned a date is yet unknown. Given the community's desire to

expedite clean-up of the metals disposal site, the landfill option is not considered feasible at this time. In any case, cost estimates for landfill creation suggest that the cost/benefit would far outweigh those of the sealift backhaul protocol (discussed in section 11.1.4) making this option impractical from a cost perspective.

11.4. On-Site Storage

The potential management options noted above all involve removal or partial removal of the metal waste from its current location. Another consideration would be the storage of waste in its current location. If properly managed this option would extend the life and the capacity of the dump. In order to satisfy the community's concern regarding the aesthetics of the dump site and as a means to control surface runoff from entering Telik Inlet, a containment berm could be constructed around the site. The material would have to undergo the same preparatory phase as discussed for the waste removal options. In addition, all items which cannot be compacted and baled such as mattresses, fiberglass tanks and general refuse would have to be transported to the local landfill. Although this is a potential option, it would not entirely resolve the community's concerns regarding the aesthetics of the site or the impaired access to the tidal land bridge. In addition, whether now or in the future, a plan will need to be implemented to ensure the abatement of materials as the dump surpasses its capacity. Over time the baled material stored on site would degenerate and the bales would fall apart creating the need for a second compaction process prior to ultimate removal.

11.5. Sealift Backhaul

Complete removal from the site is not only the method preferred by the Cape Dorset council but also the best all round resolution to the issue of the growing dump. If the metals waste is to be removed from the site, oceanic shipment is the only way to achieve that goal. No overland access is available and the landing strip is unable to accommodate large commercial aircraft.

Practical considerations include seasonal access to the site and labour to prepare materials for baling in addition to the actual baling process itself and the eventual shipping of the materials. The whole project will be constrained by climactic conditions and could potentially take several seasons to fully implement.

We have been in communication with one contractor who may have the capacity to provide an on-site baling service. At this writing we are awaiting cost estimates but hope to be able to include them in the final draft of our report.

The preparation for compaction is very labour intensive and likely to consume the best part of an entire summer season. This would require a team to strip out batteries, drain fluids and remove vehicle tires, gas tanks and CFCs from refrigeration units and air conditioning systems. Additionally, heavier scrap metals that cannot be compacted will need to be cut up into smaller units in preparation for shipment.

Schedule

Single Season disposal:
To schedule a single season, four month, clean up would require an operation with the most precise timing in every step and facet. If one thing were to go wrong or cause a delay the cost could skyrocket very quickly. This would involve having contractors (or trained local labour) ready to commence sorting and preparing materials as soon as the weather permits. It would also require having a baler shipped as soon as conditions would allow to ensure the longest possible time is available to be able to deal with unforeseeable issues that may arise.

The material would need to be sorted, cleaned, baled, loaded and shipped between the time the first sailing in July and the final sailing in roughly early October. We have been advised that the baling time by a professionally trained crew under good conditions would be between six to eight weeks. This time would include some preparation.

Dual Season disposal:
A dual season, phased, approach is preferred for all of the reasons aforementioned especially cost. If something went wrong in the process the cost of having an idle baler shipped twice or sitting in adverse weather conditions for an entire year would be unacceptable. The first season would be used to sort the materials, remove hazardous chemicals, and cut up large items in preparation for the second season of baling and shipping. Local labour could be trained to complete this phase or a contractor could be hired.

Estimated Costs
In progress.

11.6. Recommendations

Given the cost of shipping a portable baler to the community on a lease or contract basis it would not be prudent to move to that step without having some certainty that the proper preparation can be carried out in a timely manner. Accordingly, a two phase approach would be recommended involving one season spent segregating and preparing the materials for compaction and a second season spent completing the compaction (baling) and shipping of materials.

Once the material is removed from the site it would be worthwhile conducting a Phase II environmental assessment to determine nature and extent of any contamination which may have resulted from the long-term storage of wastes at this site. A Phase II assessment is also recommended given that there is anecdotal evidence of this site being the former location of the municipal landfill.

12. Future Site Management

Once the existing material has been removed from the metal disposal site and a cleanup completed, the site may be restructured to accept future metal waste. Short or long term on site storage necessitates a proper management and control strategy. The following represents some of the considerations for adequately managing the on-site storage and recycling process.

12.1. Site Security

Fencing and a gate that restricts access would go a long way to developing a viable control measure both in terms of access to the dump as well as managing the storage of different types of materials. Signs indicating materials allowed or not allowed should be posted at the entrance. Access to the site should be limited to certain times. When open, a site supervisor should be on hand to ensure the items get deposited in the correct locations and any hazardous components are dealt with appropriately.

12.2. Collection and Segregation

It is essential that future disposal at the site is conducted in a controlled manner. Waste should be segregated at the time of disposal to facilitate processing. According to the Guide for Recycling Scrap Metal from Northern Manitoba and Nunavut, one way to increase revenue from the sale of the scrap is to sort the material into ferrous and non-ferrous piles as non-ferrous metal is worth up to eight times more. The waste should be further sorted into like materials as items require different levels of processing and some are not acceptable for recycling. Covered bins could be used to segregate certain waste types and/or signs could be used to direct users to the appropriate disposal areas.

12.3. Environmental Management

It is critical that all hazardous materials are dealt with correctly and efficiently. Appropriate containers that are sealable and leak proof must be provided. These should also be appropriately labeled. Attention must also be given to the storage of incompatible wastes. Information on storage requirements for specific wastes is available in seven guides developed by the Nunavut Environmental Protection Services. It should be noted that the removal of CFC's must be done by a licensed technician.

12.4. Removal

Depending on the rate of generation, a schedule for the removal of scrap metal should be established. It may be more cost effective to look to a regional approach whereby scrap metal is shipped to a centralized location such as Iqaluit to baled and shipped south for recycling. Costs for compacting equipment and shipping could be shared among the participating communities. Alternately, a small relatively inexpensive compactor could be purchased by the Hamlet of Cape Dorset to process the scrap metal on an ongoing basis. The feasibility of this option, however, has yet to be thoroughly investigated.

12.5. Local Employment

Future management and administration of scrap metal recycling could offer training and employment opportunities for local members. Training could be provided in for example, hazardous waste management and the proper techniques of preparing scrap metal for baling.