SUMMARY OF PROPOSED SOLID WASTE FACILITY
IQALUIT, NUNAVUT

Dillon Consulting Limited
May 2001

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1.0 INTRODUCTION

In January 2001, Dillon Consulting Limited (Dillon) prepared a draft report for the Municipality of Iqaluit entitled, "Solid Waste Facility Site Selection, Draft Report". Outlined in the report were a number of solid waste disposal site options. These solid waste management (SWM) site options were ranked by the SWM steering committee which was comprised of town council members and the public. The recommended option is an incinerator facility located at the existing municipal garage site on Federal Road with an ashfill system at the current landfill site in West 40. The purpose of this document is to summarize this recommendation, the facility components, and facility sizing.

2.0 BACKGROUND

The existing Iqaluit landfill facility was built in 1995, and was intended as a temporary site until funding for a permanent solution could be allocated. Waste disposal techniques at the existing landfill include burning, compaction and covering with granular fill. Due to the limited size of the existing landfill, burning is necessary to reduce the volume of waste. There is concern from both the regulatory agencies and the public regarding health risks and the unpleasant sight and odors emitted by burning at the landfill.

In October 1999, the Municipality of Iqaluit, in conjunction with the Department of Community Government & Transportation (CG&T), commissioned a Solid Waste Management Planning Study for Iqaluit. The study was completed by JL Richards & Associates and Golder Associates Limited in September 2000. Extensive community consultations were completed as part of the study to address residents' concerns. One recommendation from this study was to develop an incinerator and ash disposal facility to address the long term solid waste management of the community.

Current estimates indicate that the existing landfill will reach its design capacity prior to November 2001. As a result, there was an immediate need to select the long term solid waste management system and the locations for the components of this new system. In October 2000, the Municipality retained Dillon to complete a solid waste facility site selection. This study was the next step in addressing the long term solid waste management issues in Iqaluit.

3.0 FACILITY DESCRIPTIONS

This section describes the proposed solid waste management system including facility locations, sizes, and rationale for selection of the sites.

3.1 Location

The proposed incinerator facility location is on the municipal garage property on Federal Road in Iqaluit.

The proposed ashfill location is the existing landfill site at West 40. The locations of the incinerator and ashfill are illustrated in Figure 1. Figure 2 is an airphoto of Iqaluit with an overlay of the proposed incinerator and ashfill sites.

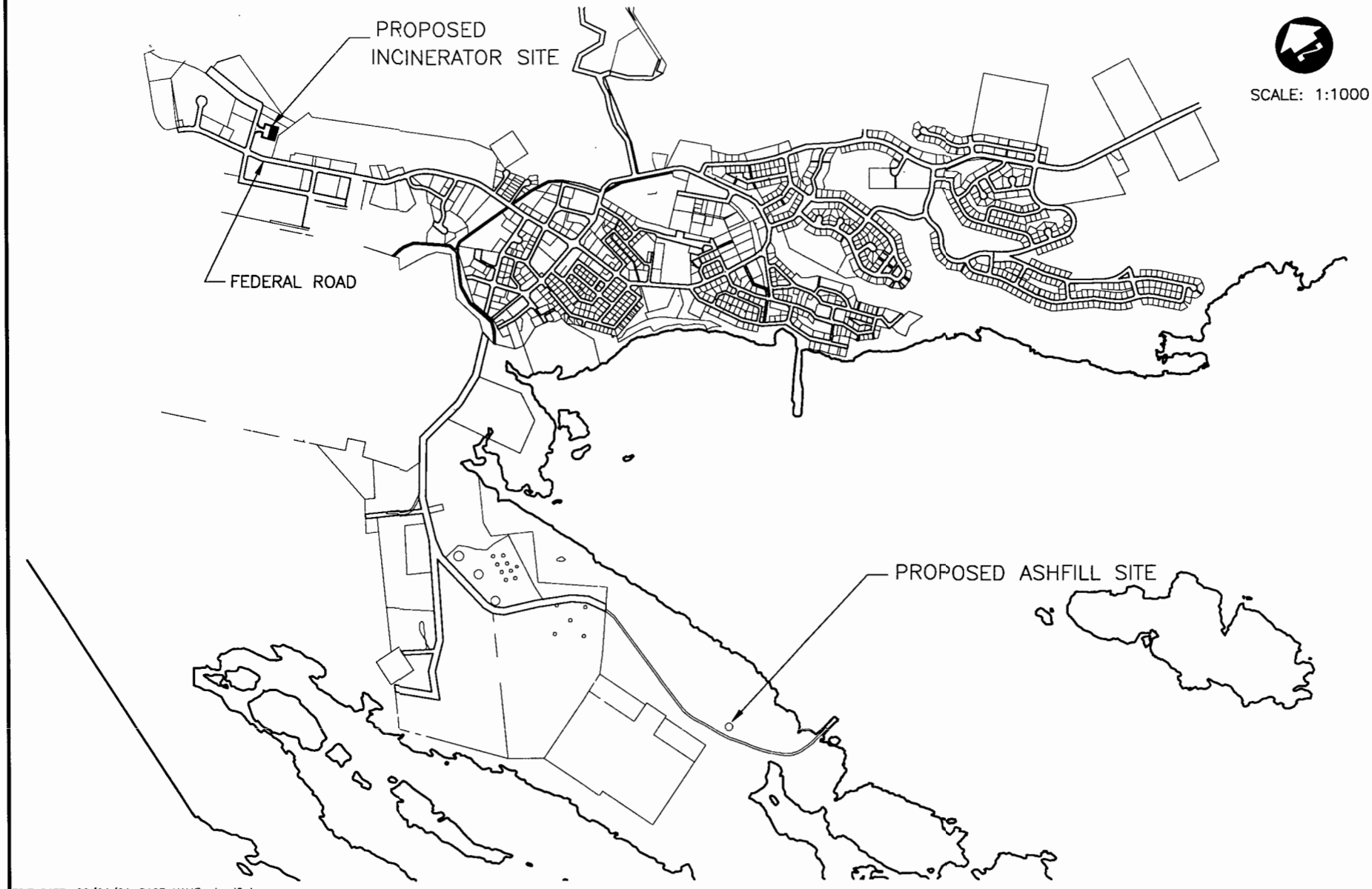
3.2 Location Rationale

The following briefly describes some important aspects associated with locating the incinerator facility at the municipal garage site on Federal Road:

- The site is adjacent to buildings which can utilize waste heat generated by the incinerator;
- The site is located in an industrial zone rather than residential/commercial zone; and
- The site is not a tourist area or recreation area.

The following briefly describes some important aspects associated with locating the ashfill facility at the West 40 site:

- The existing road to the landfill would be utilized for the ashfill therefore major road upgrades would not be required;
- This existing road is currently cleared and sanded during the winter as it is used for the tank farm access road. The road is also fairly flat therefore trucks would have little difficulty delivering ash to the site during winter months;
- This site is considered an environmentally impacted site therefore the continued use of the site as an ashfill would prevent impacting another area;
- The existing operator building would be utilized therefore the construction of a new building would not be necessary;
- Power is currently supplied to the site therefore the installation of poles and wires to the site would not be required;
- The route from the incinerator site to the ashfill site is not through residential areas; and
- Using the existing landfill site for the ashfill also significantly reduces the cost of closing/capping landfill sites as there would only be the cost to close the West 40 site in 20 years time rather than the West 40 site in next couple of years and the ashfill site in 20 years.



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PROJECT
SOLID WASTE FACILITY SITE SELECTION
IQALUIT, NUNAVUT

TITLE
PROPOSED LOCATION FOR INCINERATOR ON FEDERAL ROAD
AND ASHFILL AT EXISTING SITE

PROJECT NUMBER
00-8308

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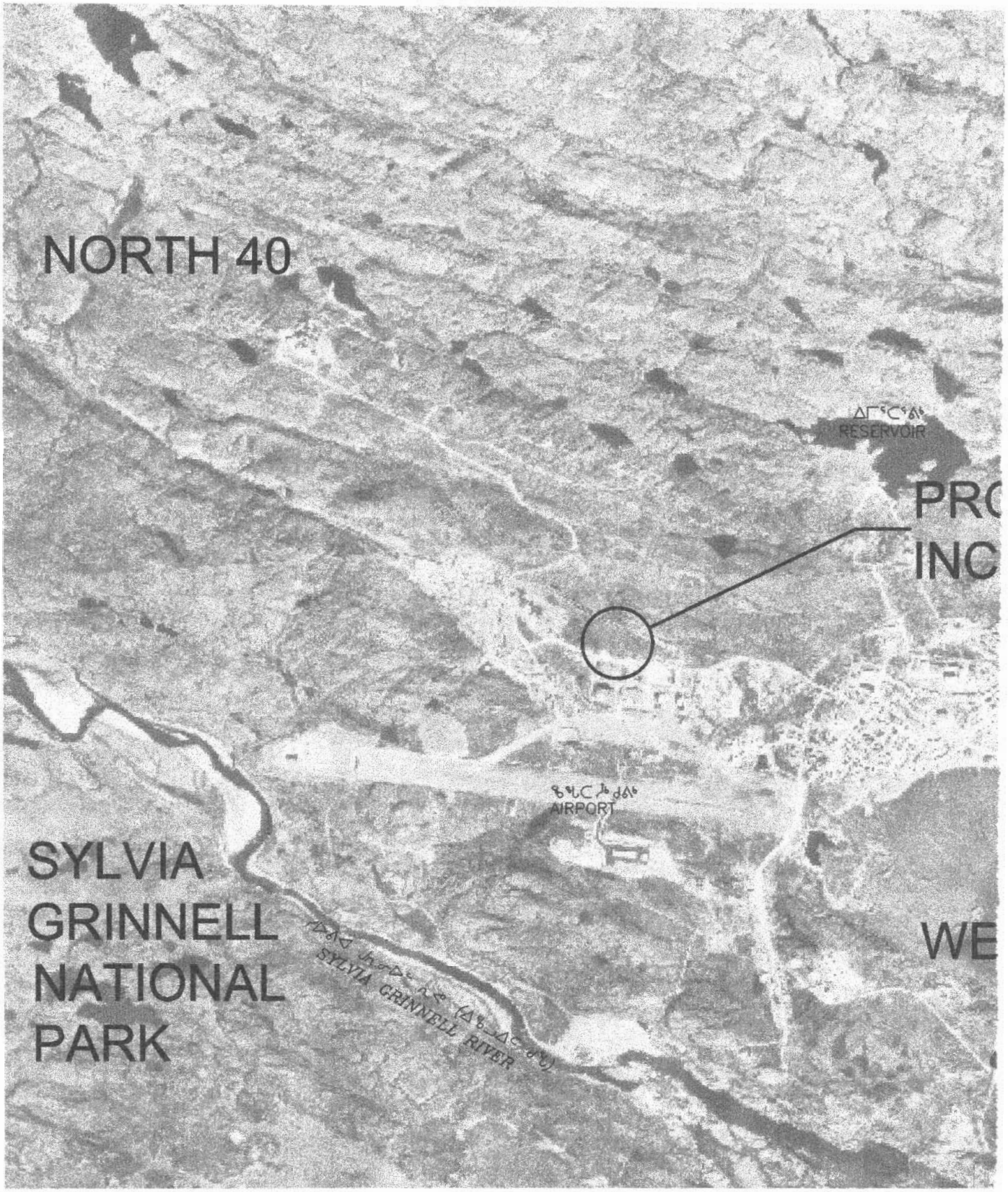
FIG 1



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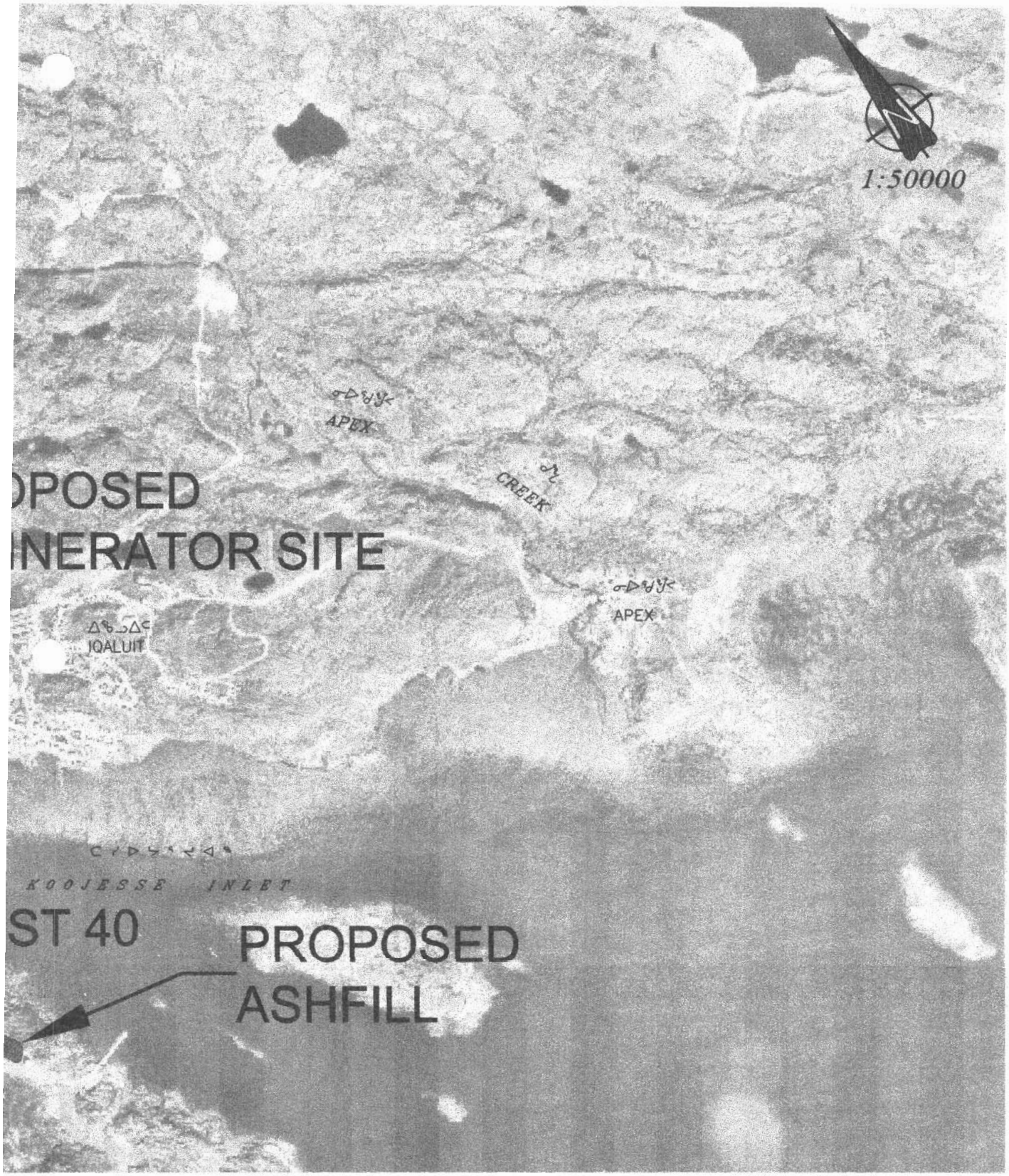

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CINERATOR ON FEDERAL ROAD
T EXISTING SITE

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3.3 Facility Components

Incineration facilities are used to reduce the volume of municipal waste through burning at very high temperatures. Incineration of municipal waste results in ash residue that is placed in an ashfill. Air emissions from the facility are controlled to ensure compliance with all applicable regulations and guidelines.

This incinerator facility would consist of:

- An industrial building which would house the incinerator and emissions control equipment, a tipping floor where the municipal waste is stored, an ash pit for temporary ash storage, control room, washrooms, and a lunchroom.
- An outside storage area for metals, hazardous waste, and construction/demolition waste. These would be temporary storage sites for public drop off and the municipality would eventually transport the waste to the ashfill to a designated area for each type of waste.
- Fencing to secure the site.

A suggested layout of the incinerator site is present in Figure 3.

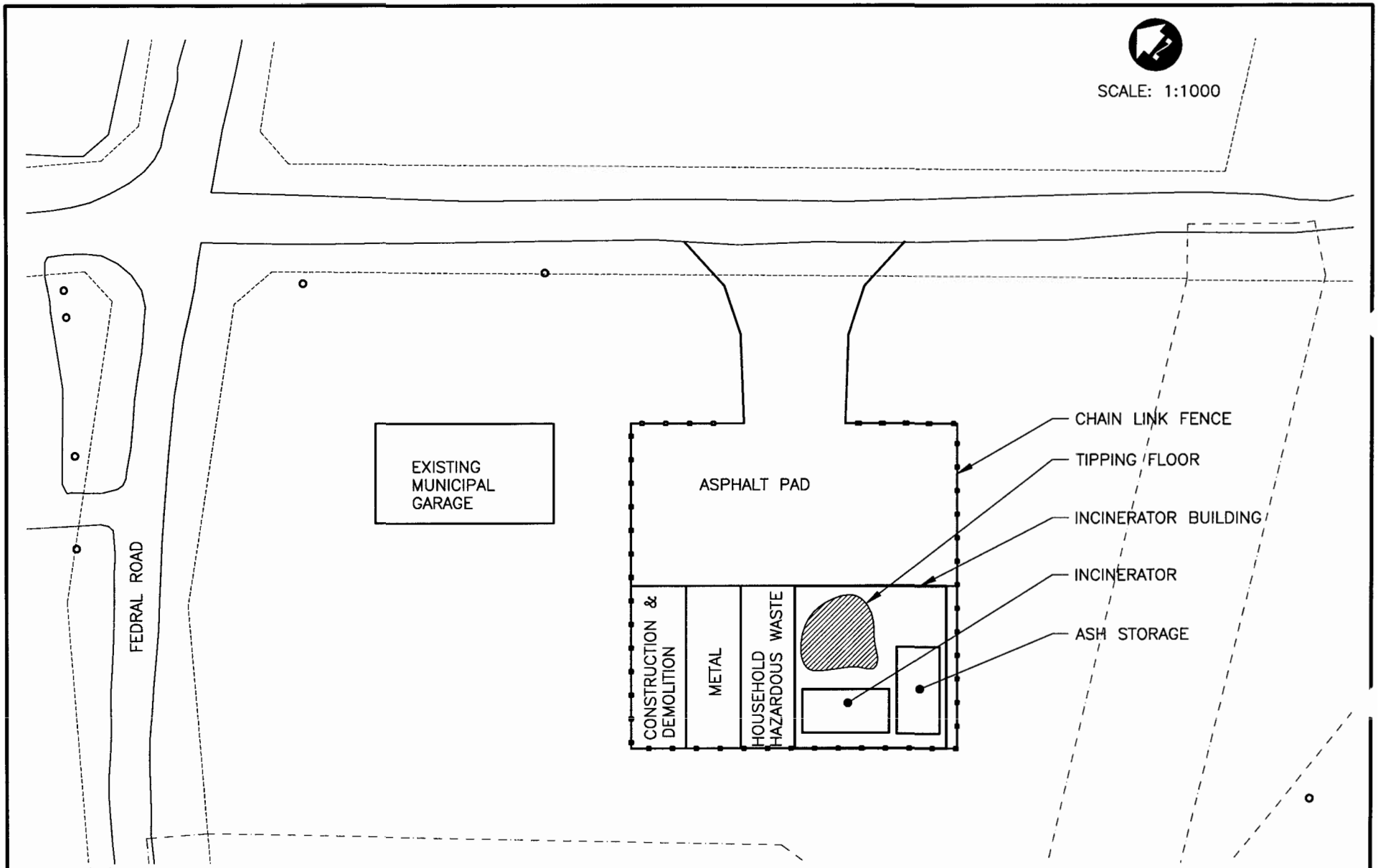
The ashfill process is very similar to sanitary landfilling. It involves disposing of incinerator ash on a controlled site by spreading the ash in layers, and then covering the ash with soil to reduce air borne ash. An ashfill utilizes a much smaller area of land than a landfill as the total waste volume is reduced by approximately 75%.

The ashfill site would consist of:

- Soil berms to control runoff.
- A high density polyethylene liner may be required to line the bottom and sides of the ashfill.
- Fencing to prevent people and wildlife from entering the site.
- Metals storage area.
- Household hazardous waste storage area.
- Operator building.

A schematic of a typical ashfill is presented in Figure 4.

Prior to the design and construction of the ashfill, the characterization of contents of the old dumping site which is adjacent to the existing West 40 landfill, would be required. In constructing the ashfill, the existing landfill and area outside of the current landfill boundaries would be graded and the ashfill liner and berms would be constructed on top of the existing waste mass. A sedimentation pond would be constructed to collect runoff and to retain and settle particles in the liquid before it is discharged. Areas would be designated within the ashfill site for storage of hazardous waste, metals, and recyclables.



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PROJECT
SOLID WASTE FACILITY SITE SELECTION
IQALUIT, NUNAVUT

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PROPOSED INCINERATOR LOCATION

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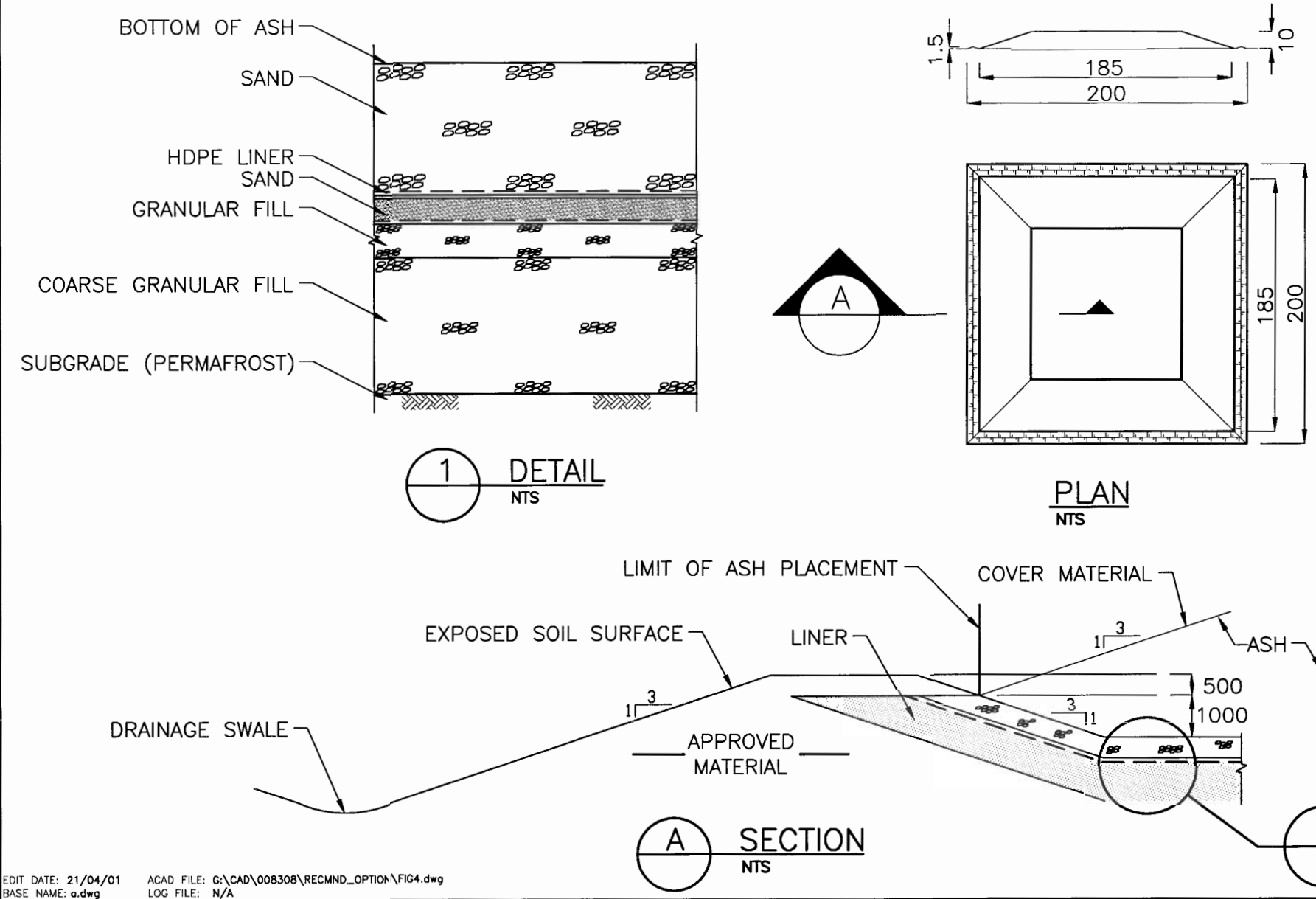
FIGURE NUMBER
FIG 3



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PROJECT	SOLID WASTE FACILITY SITE SELECTION IQALUIT, NUNAVUT
TITLE	TYPICAL ASHFILL
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3.4 Facility Sizing

The site selection process is dependent on the size of the facilities, therefore, determination of the incinerator and ashfill sizes was required. The following provides a summary of the process used to size these facilities.

The sizes of the incinerator and ashfill are based on a 20 year life span which would be to the year 2021. A 20 year population projection and the average quantity of waste produced per person was used to determine the facility size.

Ashfill Size

The volume of solid waste to be landfilled over the 20 year period is estimated to be 1.18 million m^3 uncompacted. A portion of this waste is not combustible such as metals, hazardous waste, glass, ceramics, and textiles. Based on the existing Iqaluit waste stream, it is estimated that 84% of the solid waste generated in the community is combustible. An incinerator typically reduces the volume of combustible waste by approximately 85 to 90%.

The quantity of ash to be landfilled over 20 years was estimated to be 99,000 m^3 (119,000 tonnes). The remaining waste, which could not be incinerated, would be placed in designated areas within the ashfill. The volume of this waste is approximately 190,000 m^3 uncompacted.

In determining the area required for the ashfill, the following assumptions were made:
- soil berm height of 1.5 meters with 3:1 slopes,
- ash height of 10 meters with 3:1 slopes,
- ratio of ash to cover of 6:1,
- ash density of 1200 kg/m^3, and
- compacted waste density of 400 kg/m^3 (moderate compaction of the non-combustible waste).

The resulting ashfill area is approximately 4.2 hectares (10.5 acres). This area is two times larger than the size of the existing landfill site at West 40.

If the height of the ash within the ashfill site is increased to 15 meters, the active ashfill area could be reduced to 3.5 hectares (8.8 acres).

Incinerator Size

For the purpose of this study it was assumed that the incinerator would be designed to handle the quantity of waste projected for the year 2021. The quantity of combustible waste for the year 2021 is estimated to be 69,000 m^3/yr or 28 tonnes/day (189 m^3/day).

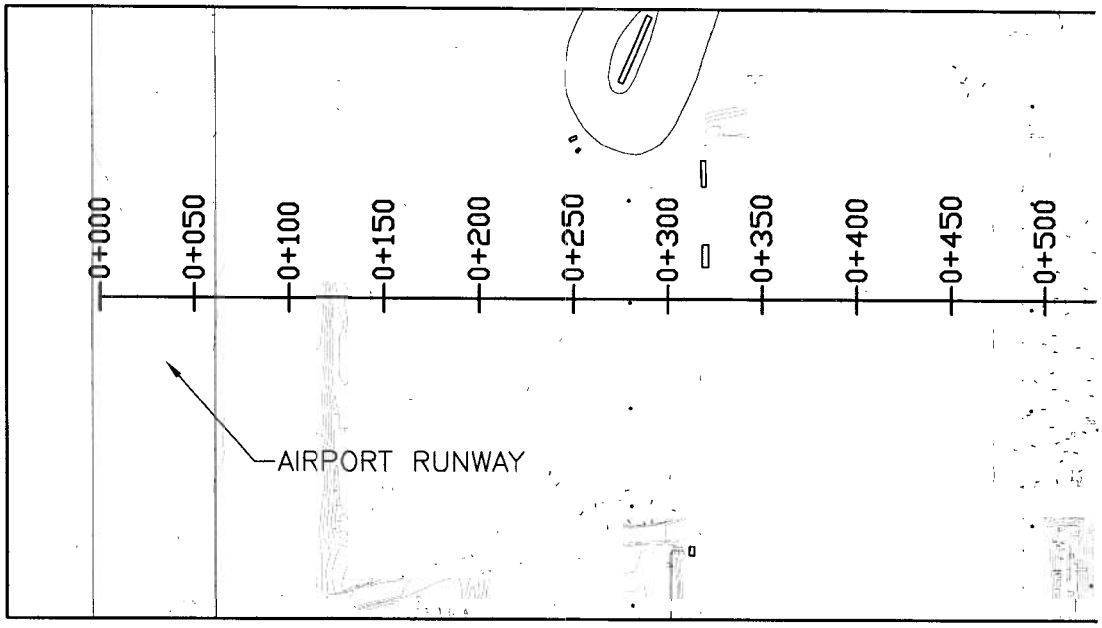
4.0 AIRPORT CONCERNS

The proposed incinerator and ashfill locations were presented to Richard MacKenzie, Director of Nunavut Airports CG&T, and John Hawkins, Manager Facilities, Nunavut Airports Division, CG&T.

One of the main concerns in locating an incinerator near the airport is the location and height of the emissions stack. The preliminary stack heights which the incinerator manufacturers proposed for Iqaluit ranged from 13 to 18 meters. Using this height, the top elevation of the stack would be approximately 45 meters above mean sea level. The hill located adjacent to the proposed stack has an elevation of 52.5 meters therefore the stack is a lower elevation than the nearby landscape. Figure 5 illustrates a plan and profile of the proposed incinerator site relative to the airport runway. The drawing indicates the estimated elevations of the incinerator building and stack along with the adjacent hill.

Upon reviewing the incinerator stack location, CG&T indicated that the safe allowable height may be 60 meters above sea level. They indicated that the proposed incinerator location should be acceptable as it is adjacent to the runway and is therefore not in the landing path. Mr. Hawkins indicated there may be a requirement for painting the stack, and placing red obstruction lights on the stack. CG&T indicated that when the site was confirmed, the Municipality should submit an application and the stack height calculations would then be completed.

Dillon also submitted a letter to CG&T describing the operations of the proposed ashfill and metals disposal area at the West 40 site. CG&T's letter of response indicated that the ashfill at West 40 does not appear to affect the airport adversely.



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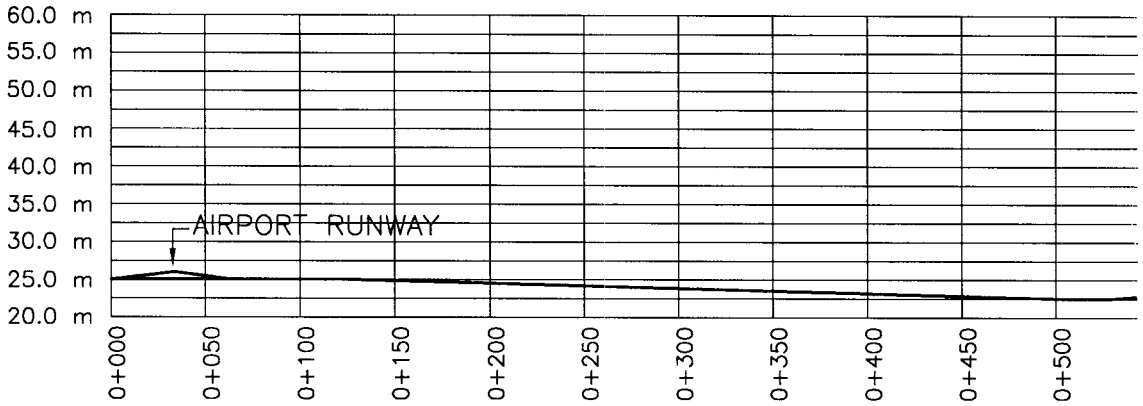

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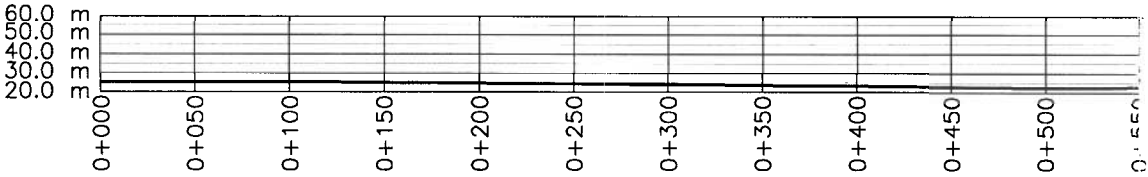

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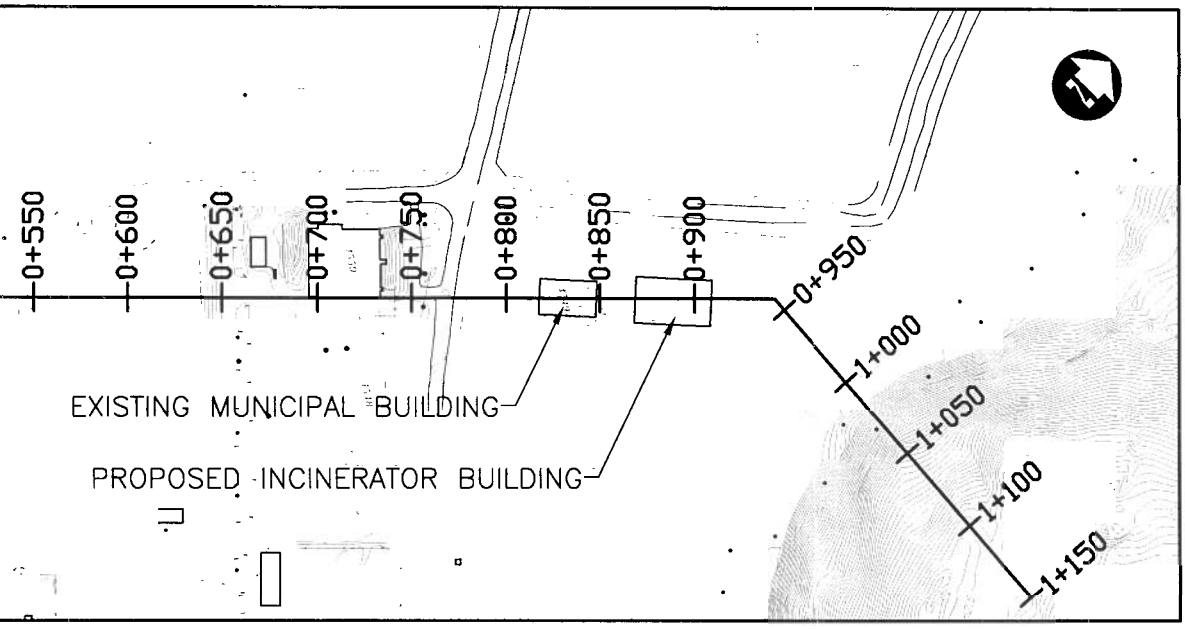

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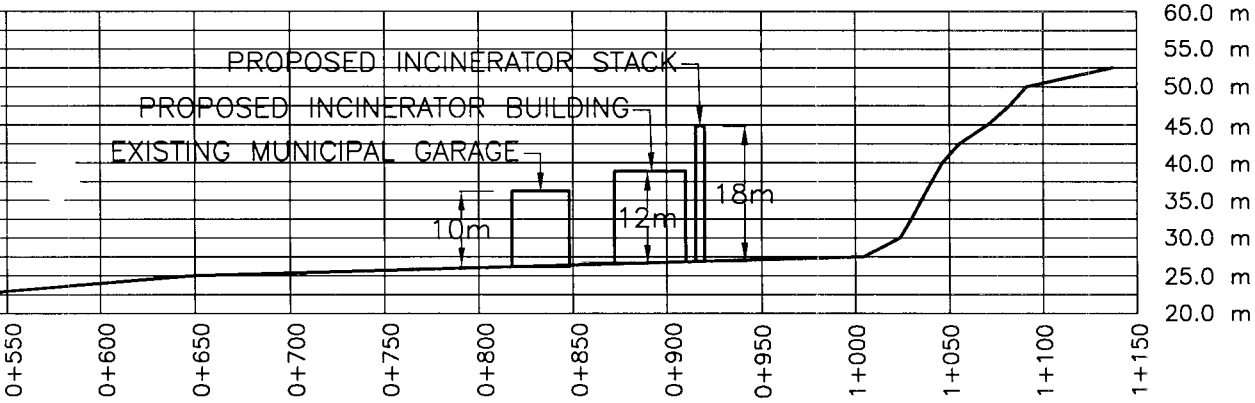

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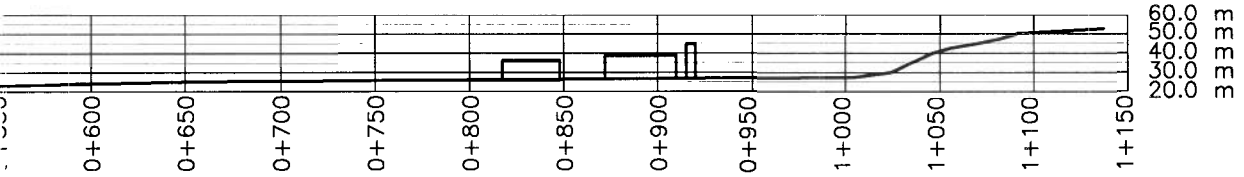

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