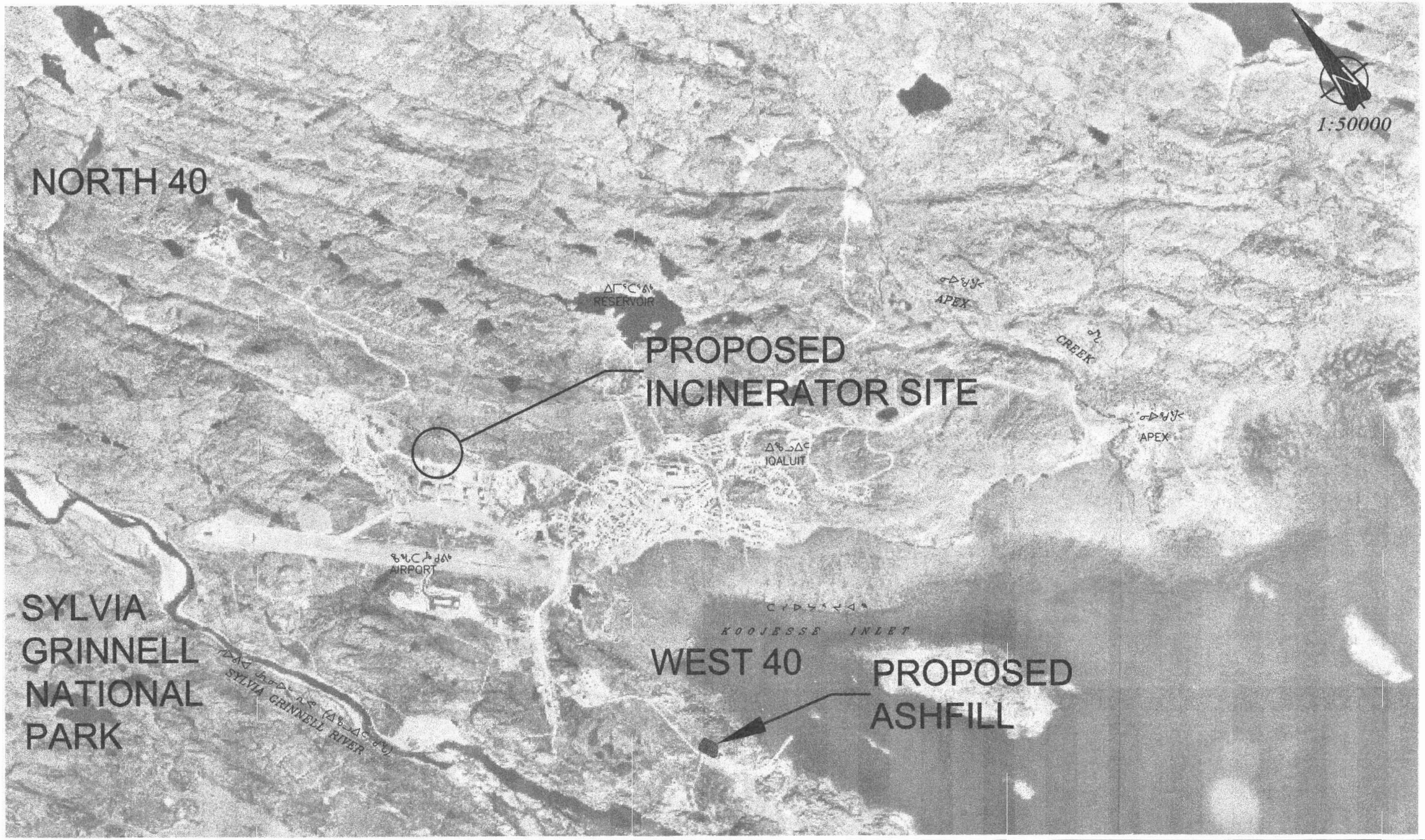


DILLON CONSULTING

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
DATE	APR 01
FIGURE NUMBER	FIG 2

EDIT DATE: 04/21/01 ACAD FILE: G:\CAD\00-8308\RECMND_OPTION\FIG2.dwg
BASE NAME: ipndb.dwg LOG FILE: N/A

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.

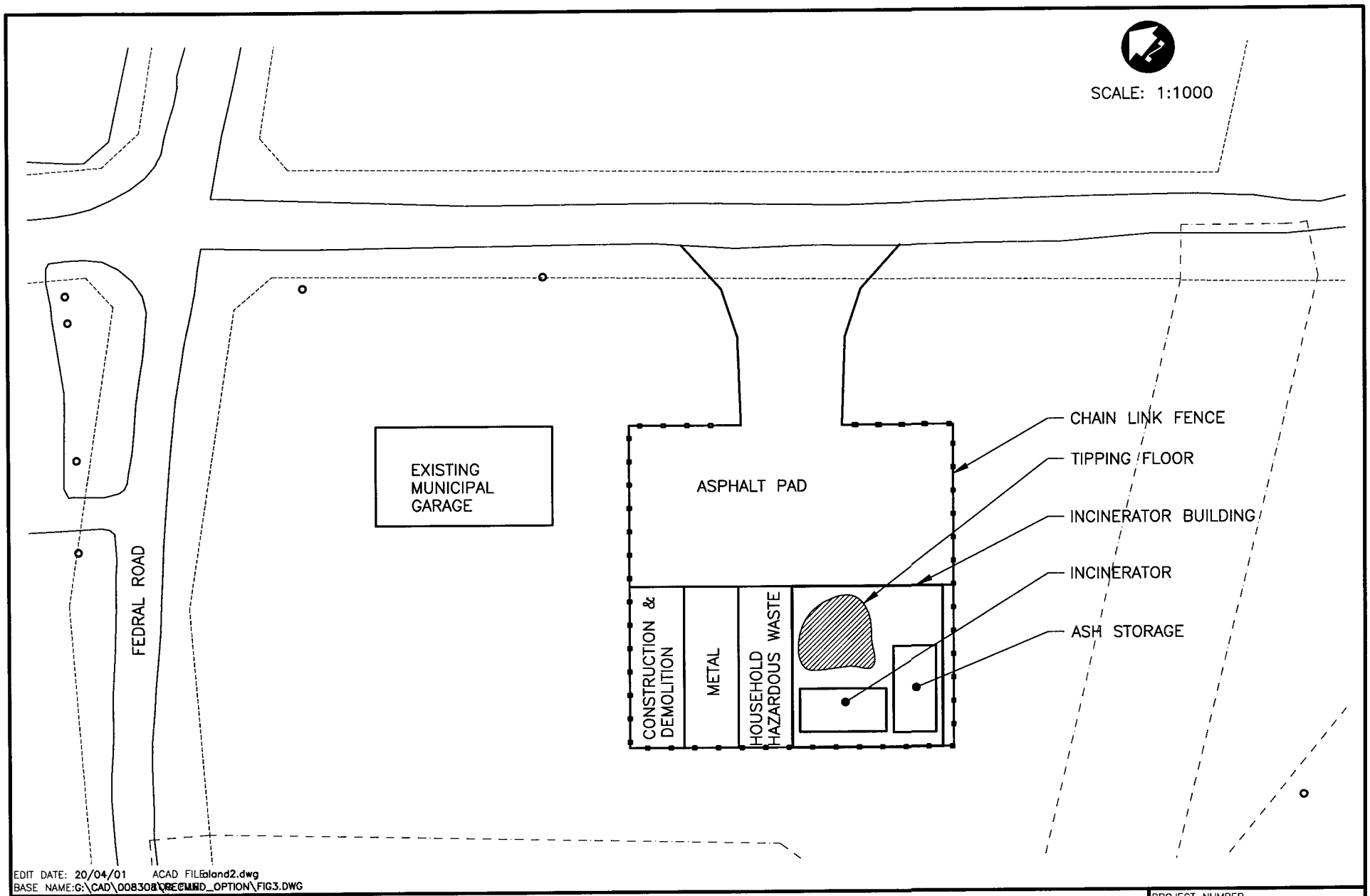
The ashfill process is very similar to sanitary landfilling. It involves disposing of incinerator ash on a controlled site by spreading the ash in layers, and then covering the ash with soil to reduce air borne ash. An ashfill utilizes a much smaller area of land than a landfill as the total waste volume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



DILLON CONSULTING

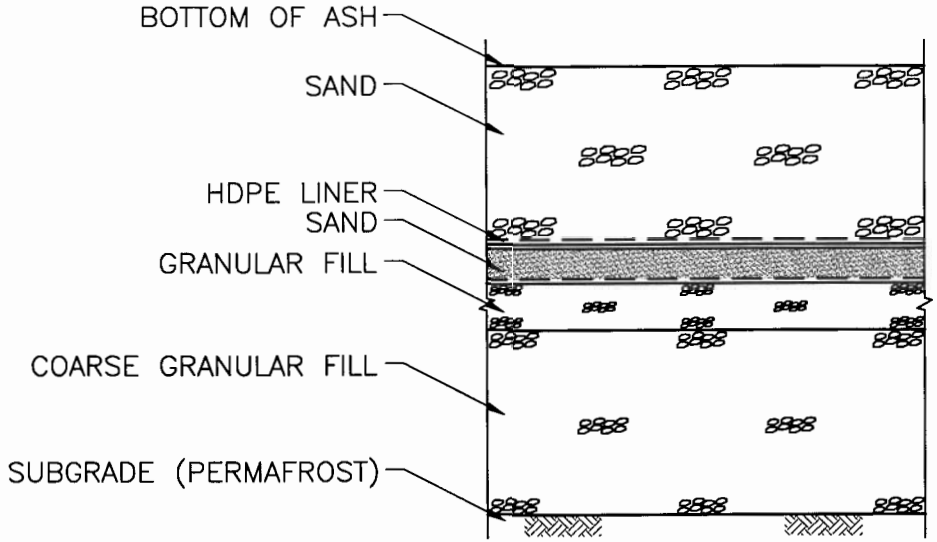
PROJECT: SOLID WASTE FACILITY SITE SELECTION
IQALUIT, NUNAVUT

TITLE: PROPOSED INCINERATOR LOCATION

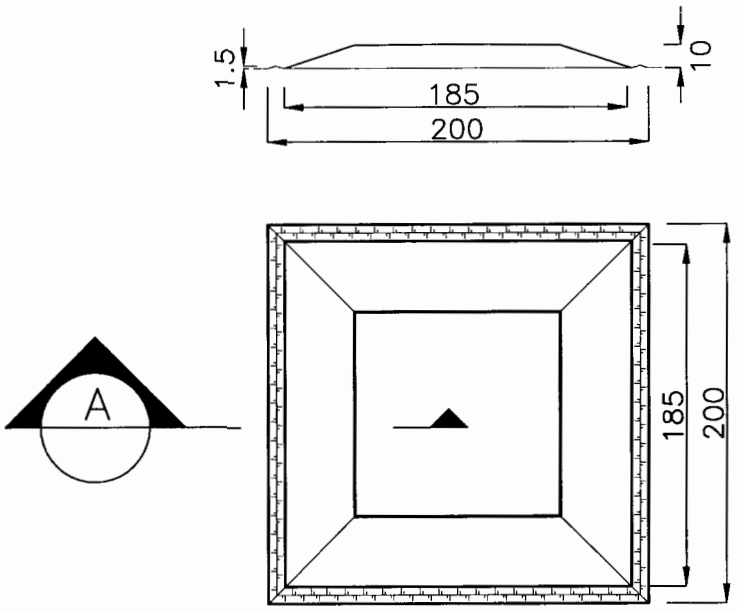
PROJECT NUMBER: 00-8308

DATE: APR 01

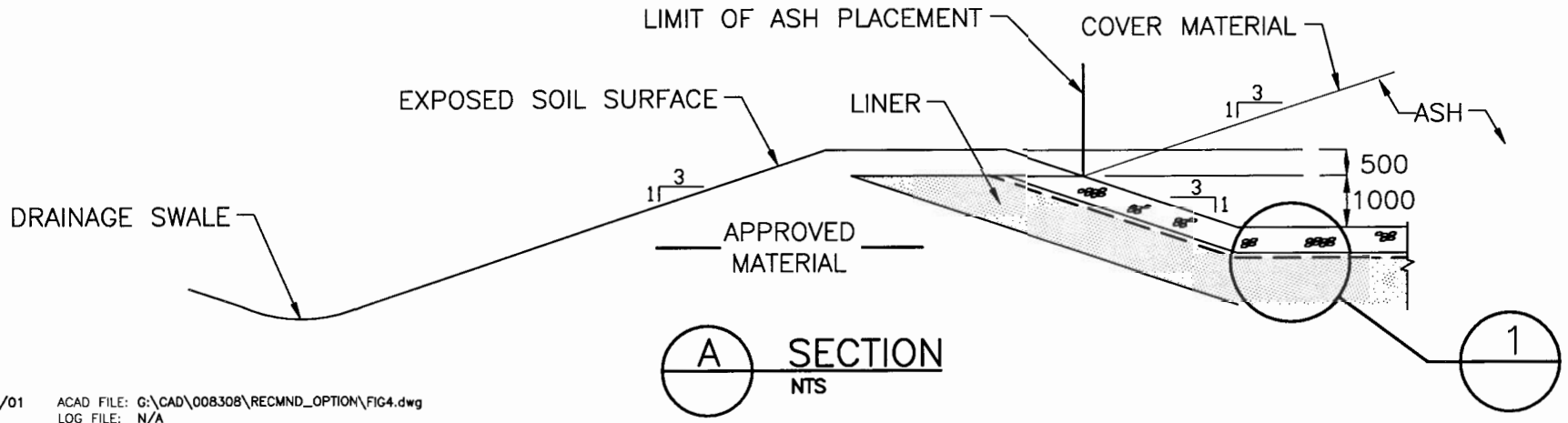
FIGURE NUMBER: FIG 3



1 DETAIL
NTS



PLAN
NTS



A SECTION
NTS

EDIT DATE: 21/04/01 ACAD FILE: G:\CAD\008308\RECMND_OPTION\FIG4.dwg
BASE NAME: a.dwg LOG FILE: N/A

DILLON CONSULTING

PROJECT: SOLID WASTE FACILITY SITE SELECTION
IQALUIT, NUNAVUT

TITLE: TYPICAL ASHFILL

PROJECT NUMBER: 00-8308

DATE: APR 01

FIGURE NUMBER: FIG 4

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).

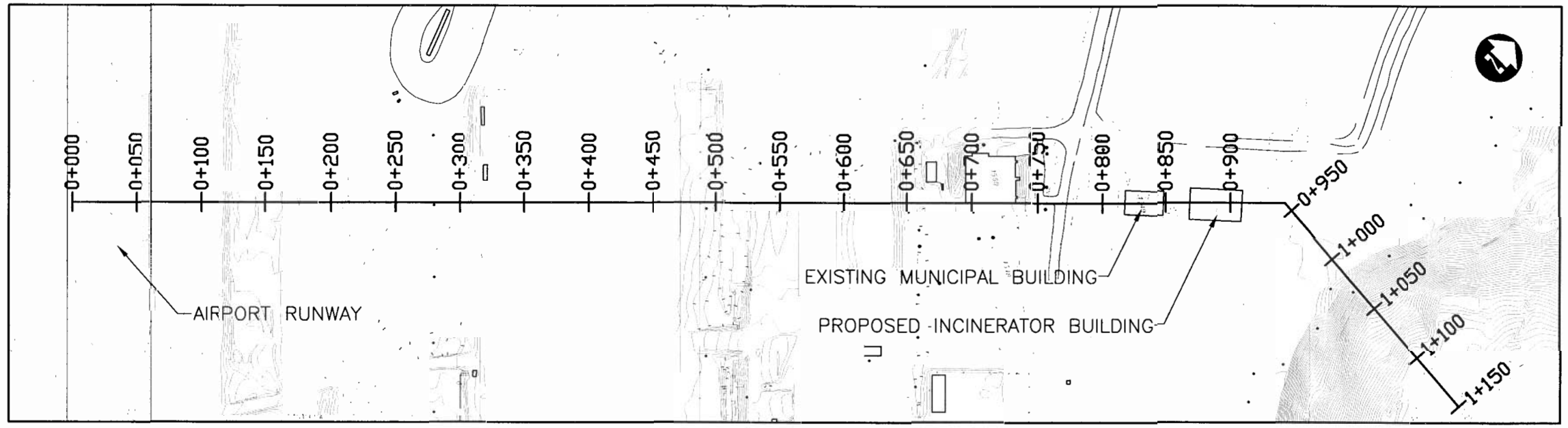
4.0 AIRPORT CONCERNS

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.

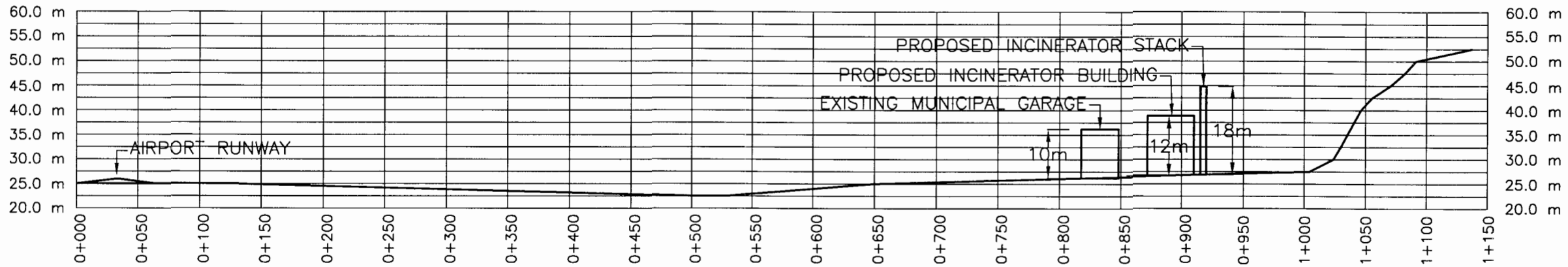
One of the main concerns in locating an incinerator near the airport is the location and height of the emissions stack. The preliminary stack heights which the incinerator manufacturers proposed for Iqaluit ranged from 13 to 18 meters. Using this height, the top elevation of the stack would be approximately 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.

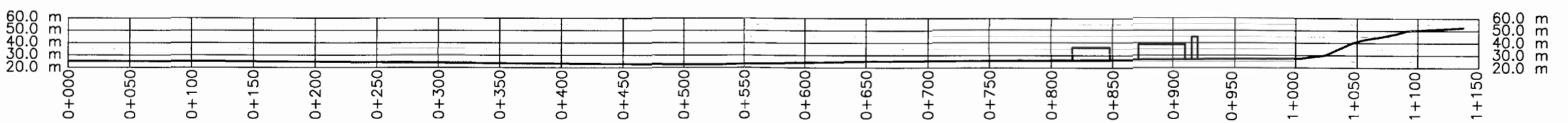
Dillon also submitted a letter to CG&T describing the operations of the proposed ashfill and metals disposal area at the West 40 site. CG&T's letter of response indicated that the ashfill at West 40 does not appear to affect the airport adversely.



PLAN
SCALE 1:4000



PROFILE 1
SCALE 1:4000 H
1:1000 V



PROFILE 2
SCALE 1:4000 H
1:4000 V

DILLON CONSULTING

PROJECT
SOLID WASTE FACILITY SITE SELECTION
IQALUIT, NUNAVUT

TITLE
PLAN AND PROFILE FOR
AIRPORT RUNWAY – INCINERATOR STACK

PROJECT NUMBER
00–8308

DATE
APR 01

FIGURE NUMBER
FIG 5