3.2.3 POTENTIAL BORROW SOURCES

Seven existing borrow areas were identified at CAM-5, MacKar Inlet. All were located in the vicinity of the lower base and are associated primarily with Terrain Unit 4. The aggregate works at this site are quite extensive. Generally, the materials are coarse-grained and consist of boulders, gravels and sands.

The potential for additional gravel sources is high. No sources of fine grained materials were identified.

3.3 HYDROLOGY

Site drainage and topography of the CAM-5 site and surrounding area can be seen in Figure 3.1. The CAM-5 Module Train is located on top one of the topographical high points at an approximate elevation of 400 m, while the lower site and airstrip are located between Bagnall Lake and Committee Bay near sea level.

Surface drainage from the Module Train area to the lower site occurs generally in a northwesterly direction through two narrow elongated valleys. The two valleys run approximately parallel to each other. Several lakes connected by streams flow through the rough bouldery terrain on the valley floor. There is a lake in the more westerly valley downgradient of the upper site which partitions its discharge between the two valleys by way of a brief interconnecting valley. The two valleys join a second time before discharging immediately east of the vehicle and equipment storage pad at Bagnall Lake. Significant flow discharges at the mouth of this stream occur as a result of the large drainage area encompassed by the two valleys.

Drainage from the upper site flows primarily to the north and east as determined by local topography. Drainage east of the POL storage area is controlled by natural topographic contours which direct the drainage to the head of the more easterly valley. However, some runoff from the warehouse and garage building area flows to the south toward the water supply lake.

The water supply lake is located approximately 280 m south of the Module Train in a natural depression in the bedrock surface surrounded by boulder covered terrain. It is 18 m deep and has an approximate area of 0.8 ha. There are no streams or lakes which recharge or drain from the water supply lake.

The sewage outfall discharges to the steep slope immediately north of the Module Train. The effluent travels through the steeply graded boulder covered slope to a grassy, sediment rich deltaic area leading to a lake. This lake is located adjacent to the roadway approximately 1100 m from the upper site and discharges to a stream which continues through the more easterly valley described previously.

Surface drainage south of the airstrip is collected by streams and lakes at higher elevations which eventually discharge to Committee Bay, approximately 80 m south of the northwest end of the airstrip.

The active landfill for CAM-5 drains north and east along established gullies. Landfill C drains into Landfill B which flows north into Bagnall Lake.

Runoff in the immediate vicinity of the airstrip is channelled through a shallow ditch parallel to the runway on its south side. The ditch slopes to the northeast and eventually discharges to Bagnall Lake. Drainage on the north side of the runway is collected by small catchments which discharge to Bagnall Lake as well.

3.4 FLORA

The landscape at the camp is characterized by barren bedrock outcrops and knolls sparsely vegetated by mosses and lichens. Vascular plant cover is generally less than 15 percent, including purple saxifrage (*Saxifraga oppositifolia*), mountain avens (*Dryas spp.*), willow (*Salix spp.*), alpine foxtail (*Alopecurus alpinus*), wood rush (*Luzula* spp.) and other saxifrages (*Saxifraga* spp.). In lowland areas including slopes down to waterbodies, where more soil materials are present, plant cover may range from 40 to 60 percent. Where soil moisture is abundant these areas are completely covered by sedge (*Carex* spp.), cotton grass (*Eriophorum* spp.), saxifrage and mosses, providing excellent grazing for caribou.

3.5 FAUNA

3.5.1 LARGE MAMMALS

It is believed that no more than a few muskoxen (*Ovibos moschatus*) ever inhabited Melville Peninsula and it has been suggested that the species no longer exists there (Urquhart 1982). Archaeological studies during the site survey at FOX-M located east of CAM-5 discovered bones of muskox which may have come from the Hall Beach area.

MacKar Inlet is located approximately 60 km north of the Northeastern Keewatin caribou calving ground which is an 11000 km^2 area of special interest to the Government of the Northwest Territories (Ferguson 1987). Barren-ground caribou (*Rangifer tarandus groenlandicus*) in this region belong to the Melville Herd which was estimated at over 40000 in 1983 (Heard *et al.* 1986). This spring survey indicated that approximately 2500 animals were on the northern half of Melville Peninsula at that time. Calving usually occurs during the first half of June after which cows and calves apparently move north (Ferguson 1987). Approximately 20 caribou were observed near the landfill during the site visit in July. Station personnel reported that caribou are commonly seen at the site during the summer.

Polar bears (*Ursus maritimus*) in this area are within Management Zone C which may support one of the largest polar bear populations in the Canadian Arctic (Urquhart and Schweinsburg 1984). Wager Bay, Southhampton Island, and an area immediately south of Hall Beach are important summer retreats for bears of Foxe Basin which is largely ice-free during that season (Urquhart and Schweinsburg 1984). Polar bears have been reported at this station and one was observed at the airstrip during the site visit. Stenhouse *et al.* (1988) found that 71 percent of the problem polar bears killed in the Northwest Territories occurred in the Baffin region.

3.5.2 OTHER TERRESTRIAL MAMMALS

Arctic fox (*Alopex lagopus*) were not observed at the station but are probably present in the area. This species is usually attracted by artificial food sources (landfill and litter), foraging around construction camps is common (Eberhardt *et al.* 1982). Home range size with territories overlapping petroleum development facilities have been reported as 20.8 km^2 and 3.7 km^2, for adults and juveniles respectively (Eberhardt *et al.* 1982).

A wolf (*Canis lupus*) was observed at this site walking along a road. This was unusual as no other individuals were sighted during the 21 site surveys in 1990 and station personnel report their occurrence at these sites as rare. Observations of other terrestrial furbearers at this station were not recorded although the short-tailed weasel (*Mustela erminea*) is known to occur on Melville Peninsula (Carbyn 1987; Fagerstone 1987).

An arctic ground squirrel (*Spermophilus parryii*) was found at the site where it had made a den beneath a pile of rocks. Other mammals which probably occur in the area include arctic hare (*Lepus arcticus arcticus*), collared lemming (*Dicrostonyx torquatus lentus*) and brown lemming (*Lemmus sibiricus*) (Banfield 1974).

3.5.3 MARINE MAMMALS

Beluga (*Delphinapterus leucas)* and narwhal (*Monodon monoceros*) whales migrate westward through Lancaster Sound into Parry Channel from Baffin Bay after ice-break-up in the spring (June-July)(Read and Stephansson 1976). At this time, most marine mammals concentrate in the main channel of Lancaster Sound with smaller numbers migrating to Barrow Strait and few or none penetrating into Viscount Melville Sound. Some whales do enter the Gulf of Boothia by moving south along the east coast of Somerset Island. Narwhals have a similar summer migration route although they may enter Lancaster Sound somewhat later in the spring (Sergeant and Hay 1978).

Preferred summer habitats and areas of major concentrations of beluga and narwhal are northwest of the study area at Brentford Bay near Bellot Strait. Station personnel reported that narwhal are occasionally seen in the bay at MacKar Inlet during summer.

The endangered bowhead whale (*Balaena mysticetus*) migrates into Lancaster Sound in June and July. It is unlikely to be encountered in the study area, preferring, like the narwhal, the fiords of northern Baffin Island during the summer (Arctic Pilot Project 1979).

During the open water season (summer) walrus (*Odobenus rosmarus*) concentrate in Lancaster Sound in the vicinity of southwest Devon Island in numbers of less than 400 animals (Sergeant and Hay, 1978). Walrus enter the Gulf of Boothia along the east coast of Sommerset Island as far south as Lord Mayor Bay. Walrus are unlikely to be seen in and around MacKar Inlet since only periodic migrations are made south of Somerset Island (Read and Stephansson 1976).

Due to annual ice conditions in the central arctic, most marine mammals either do not penetrate into or migrate from Lancaster Sound prior to winter freeze-up (September). An exception are the seals which occur year-round in the region although, depending on the species, there are shifts in distribution in relation to preferred ice habitats. The two most common seal species, bearded (*Erignathus barbatus*) and ringed (*Phoca hispida*) seals, extend southward into Pelly Bay and Committee Bay (Read and Stephannson, 1976). No marine mammals were observed at MacKar Inlet during the site visit.

3.5.4 RAPTORS

No raptors were reported or observed during the site visit although Snowy Owls (*Nyctea scandiaca*), Peregrine Falcon (*Falco peregrinus*), Gyrfalcon (*Falco rusticolus*), and Rough-legged Hawk (*Buteo lagopus*) are known to occur in this region.

3.5.5 OTHER AVIFAUNA

Intensive field surveys at Scarpa Lake, approximately 120 km east of MacKar Inlet, in 1981-1982 located 40 species of birds (Montgomerie *et al.* 1983). Species observed and their relative abundance in this area may be comparable to what exists at MacKar Inlet. Detailed observations of avifauna were not recorded at this station other than a sighting of three Tundra Swans (*Cygnus columbianus*).

3.5.6 FISH

MacKar Inlet is located on Committee Bay, which has a small commercial harvest of Arctic char (*Salvelinus alpinus*). Station personnel also fish recreationally for Arctic char.

3.6 HERITAGE RESOURCES

Three archaeological localities were identified through information supplied by station personnel. The Bagnall Lake 1 locality contains 21 features in four concentrations. The features are represented by a hunting blind, nine caches, two shelters, three tent rings, a possible grave, and five unidentified structures which may have been used for multiple functions. The age of the features appear to range from relatively recent (post-dating construction of the station) to perhaps several centuries. Considerable disturbance to the site features has occurred through road construction, gravel extraction, and natural erosion. Some structures have been totally disturbed.

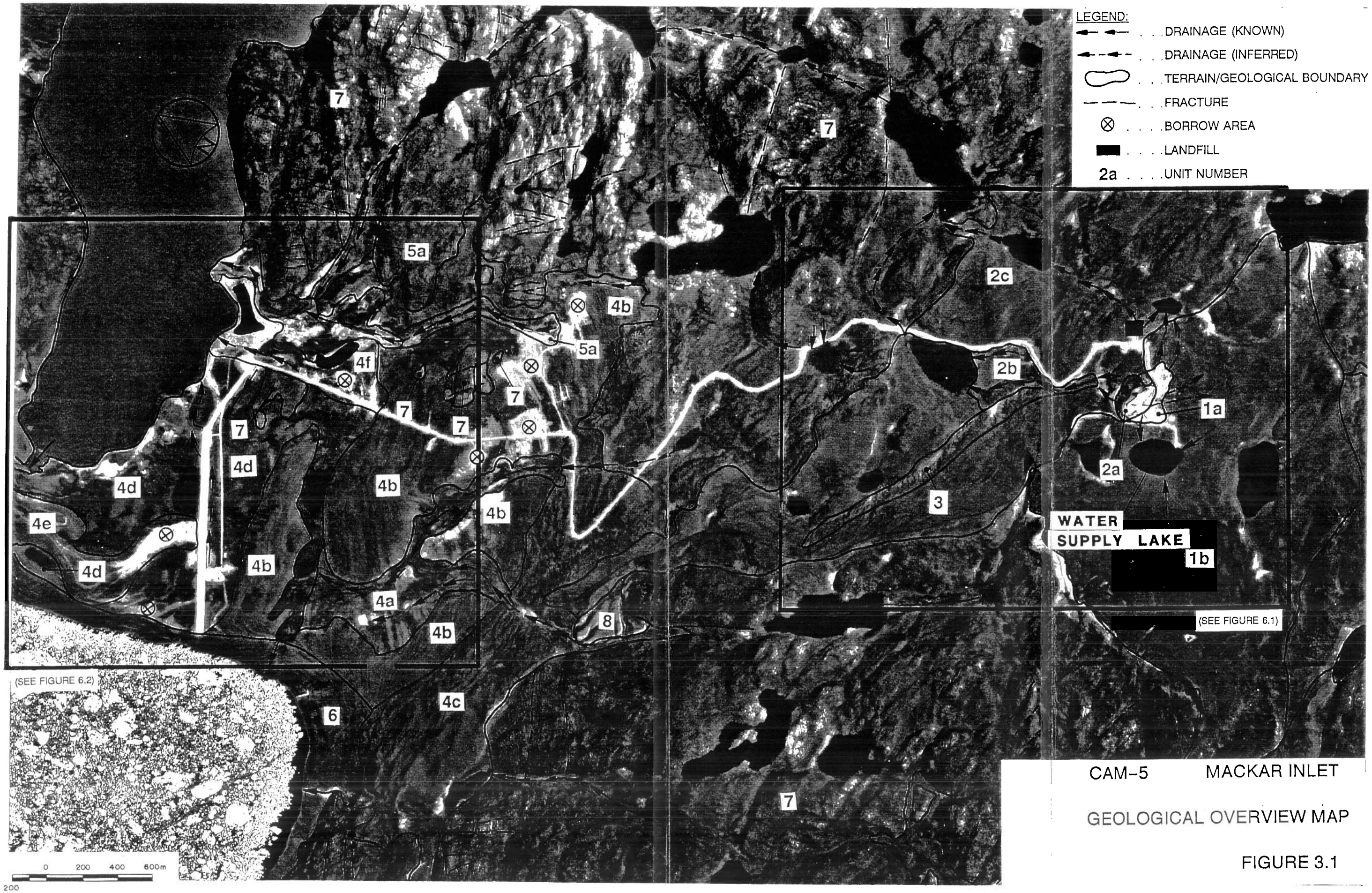
The Bagnall Lake 2 locality contains two concentrations of features. The first consists of a complete tent ring and a partial tent ring which is presently eroding into the river. These features appear to pre-date the construction of the station. The second concentration consists of an *inuksuk*, an associated cache and a tent ring. This locality appears to be prehistoric in age. To the west of the runway is a large Inuit site containing 22 features including tent rings, partial tent rings, caches, and hearths. Although the precise age of the site can not be determined it is thought to represent occupation from perhaps 100 to 200 years ago. This site may be affected by continued gravel extraction.

Substantial disturbance has already occurred at the Bagnall Lake 1 site. Additional disturbance may result from continued gravel mining and road construction, as well as station decommissioning. It is recommended that a full archaeological assessment program, including detailed survey, mapping, and test excavation be conducted at the identified sites. All site areas are to be avoided until this program has been completed. In addition, it is recommended that an archaeological assessment program be conducted prior to the occurrence of any potential disturbance on the north side of the river.

A separate report documenting the heritage resources study on the site has been filed with the Prince of Wales Northern Heritage Centre with copies to USAF and DND (Fedirchuk et al, 1990).

3.7 LAND USE

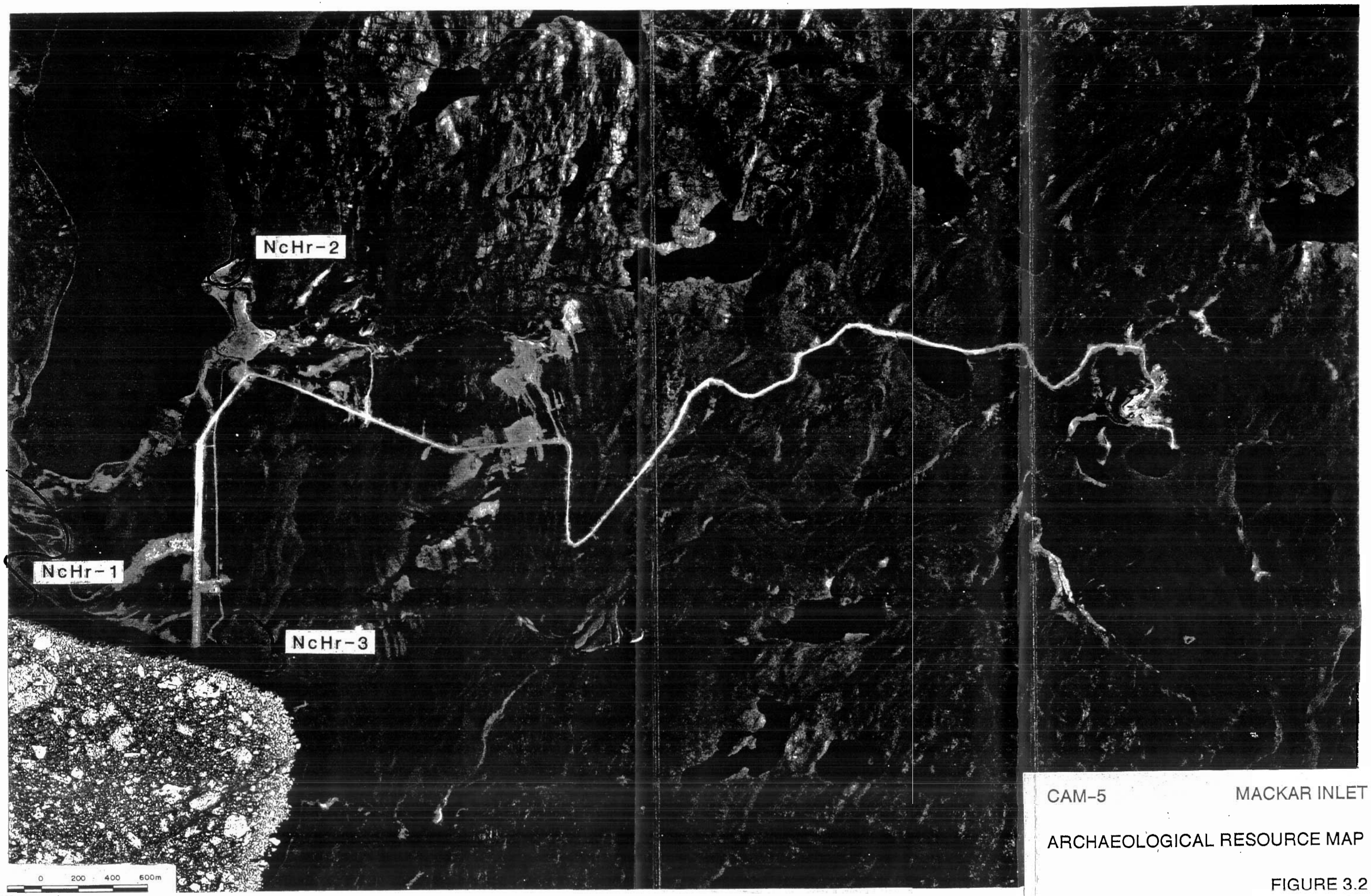
No ecological sites are designated in this area. Occasional hunting for polar bear occurs in the area by hunters from Igloolik and Hall Bay communities located on the eastern shore of the Melville Peninsula.



CAM-5 MACKAR INLET

GEOLOGICAL OVERVIEW MAP

FIGURE 3.1



CAM-5 MACKAR INLET

ARCHAEOLOGICAL RESOURCE MAP

FIGURE 3.2

4.0 SITE INFRASTRUCTURE

4.1 BUILDINGS

The facilities on CAM-5 MacKar Inlet are described in detail in the Base Civil Engineering data which appear as Appendix A. Figure 4.1 illustrates the location of the facilities. Facilities and features are labelled as per the BCE facility index. An aerial view of the site is shown in Plate 1.

4.2 FUEL STORAGE AND DISTRIBUTION

Fuel storage facilities at CAM-5 MacKar Inlet are summarized in Table 4.1.

Table 4.1

CAM-5, MacKar Inlet: Fuel Storage Facilities

1.	Diesel Oil: Total Capacity	384 m^3
	a) Airstrip area (2 steel tanks) (69 m^3 ea.):	138 m^3
	b) Building site area (1 steel tank):	246 m^3
2.	Mogas: Total Capacity	46 m^3
	a) Airstrip area (one steel tank):	23 m^3
	b) Building site area (one steel tank):	23 m^3

1 m^3 = 264 US Gal.

Product is delivered by airlift for off-loading into receiving tanks. Mogas is trucked to the site. Diesel fuel is transferred via a 50 mm pipeline to the building site tanks. The diesel fuel is distributed to the module train, garage and warehouse via the pumphouse and pipeline. The total length of the pipeline including building feeder lines is about 6800 m. Drum stocks are transferred using portable pump units or tank vehicles as required.

4.3 WASTE TREATMENT

Wastewater and liquid sewage is collected in internal storage tanks within the module train, the only building with sanitary facilities. The wastewaters only undergo partial primary treatment within the storage tanks prior to periodic discharge to the outfall area. The outfall area is located northeast of the building compound as shown in Plate 2.

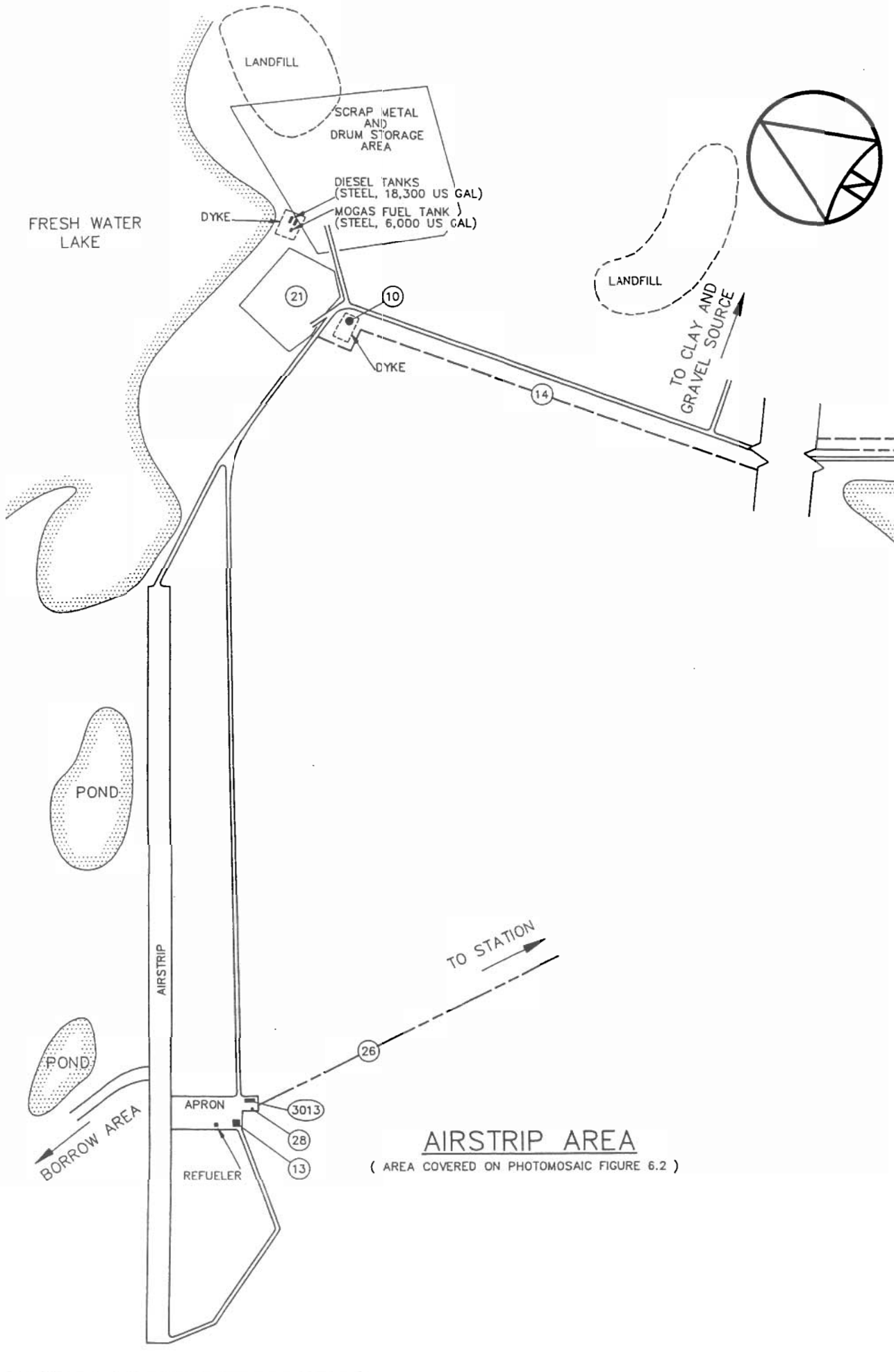
The module train is also equipped with emergency dry head toilets. When full, the waste is transferred to steel drums and transported to disposal areas.

4.4 HAZARDOUS MATERIAL SURVEY

A comprehensive hazardous material inventory was not available for CAM-5. Based on retrograde plans (4700 OSS LGTT, 1989 and 1990), it is expected that the following hazardous goods may be encountered on site.

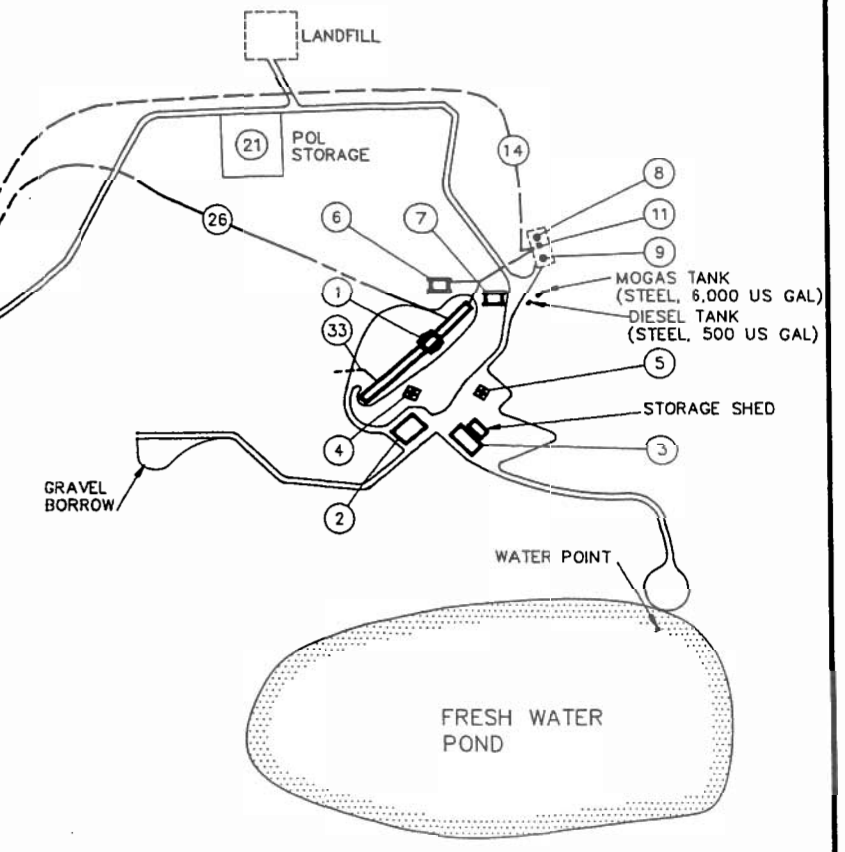
FACILITIES INDEX:

(1)	MODULE TRAIN	(7)	COMMUNICATION "BILLBOARD"	(21)	OPEN STORAGE AREA
(2)	GARAGE	(8)	DIESEL FUEL TANK (STEEL, 65,000 US GAL)	(26)	PRIMARY POWER CABLE
(3)	WAREHOUSE	(9)	DIESEL FUEL TANK (STEEL, 65,000 US GAL)	(28)	BEACON LIGHT
(4)	COMMUNICATION "DISH"	(10)	DIESEL FUEL TANK (STEEL, 65,000 US GAL)	(33)	SEWAGE LINE
(5)	COMMUNICATION "DISH"	(11)	POL PUMPHOUSE	(3009)	SHELTER HUT (NOT SHOWN)
(6)	COMMUNICATION "BILLBOARD"	(13)	UNHEATED VEHICLE STORAGE	(3010)	EMERGENCY SHELTER
		(14)	POL LINE	(3013)	AIRSTRIP HUT



AIRSTRIP AREA

(AREA COVERED ON PHOTOMOSAIC FIGURE 6.2)



STATION AREA

(AREA COVERED ON PHOTOMOSAIC FIGURE 6.1)

NOTE:

1. FOR OVERALL SITE PHOTOMOSAIC COVERAGE SEE FIGURE 3.1.
2. THE FACILITIES SHOWN ARE TAKEN FROM THE AVAILABLE AS-BUILT SITE DRAWINGS AND THE CURRENT BCE DATA (1990), AND AS VERIFIED ON SITE.
3. NUMBERED FACILITIES ARE AS GIVEN IN THE FACILITIES INDEX IN THE BCE DATA.

0 80 160 240 m

80

CAM-5 MACKAR INLET

SITE PLAN

FIGURE 4.1

- Class 2 compressed gases including acetylene, mapp gas and oxygen.
- Class 3 flammable liquids.
- Solvents and antifreeze.
- Class 8 corrosives including batteries.
- Oil, grease, lubricants and hydraulic fluids.

The status of hazardous materials should be verified prior to decommissioning. As specified in Volume 2, Section 6.2, the USAF removes all identifiable and recoverable hazardous materials as part of the standard site shut-down procedure.

4.5 SPILL HISTORY

One fuel spill was described in the spill report records for CAM-5 (Frontec/Felec Spill Reports, 1990).

The spill occurred on March 29, 1988 approximately 65 m south of the POL pumphouse (Fac 1013). Physical evidence suggests that approximately 180 L of diesel fuel was lost when a pipeline was broken, although estimates put this number as high as 1000 L. Contaminated soil was to be collected and retrograded. Corrective measures to the pipeline were completed on March 30, 1988.

5.0 ASBESTOS, PAINT, AND PCB RESULTS

5.1 ASBESTOS

5.1.1 RECORD REVIEW

The March 31, 1990 asbestos survey (DEW Surveys, 1990) conducted at the site indicated the presence of asbestos, in sheet and pipe forms. Table 5.1 summarizes the location, form, and quantity of asbestos present at the site from this survey.

Table 5.1

CAM-5, MACKAR INLET: ASBESTOS INVENTORY

Location	Form	Quantity
Module Train	Pipe Sheet	1 260 m 74 m^2
Garage	Pipe Sheet	9 m 0.4 m^2
Warehouse	Pipe Sheet	5 m 20 m^2

Note: Pipe insulation measured in lineal metres.

5.1.2 FIELD SURVEY

Five samples of insulating material were obtained during the 1990 site sampling trip. Two samples of floor tile were obtained from the module train. A third sample from the module train was taken from a hot water pipe. One sample was collected from the mechanical room in the warehouse. All samples were taken from encapsulated materials. Insulating material found at the landfill area was also tested.

5.1.3 ANALYTICAL RESULTS

Analytical results are presented in Table 5.2. Asbestos content was determined by polarized light microscopy according to NIOSH Method 9002.

Samples C5A-001 and C5A-005 from refuse in the active landfill and the Warehouse Mechanical Room (respectively), contained 70 percent chrysotile asbestos. The floor tile samples from the Module Train did not contain asbestos. The remaining sample from the hot water pipe also did not contain asbestos. According to Regulation 7/82, Alberta Occupational Health and Safety Guidelines, material with an asbestos content of greater than 1 percent is considered a hazardous good.