CIRQUE PROPERTY

PROSPECTUS

Submitted to:

British Columbia Mine Development
Steering Committee

Submitted by:

Curragh Resources Inc.
Toronto, Canada

July 1989

Rescan

CIRQUE PROJECT PROSPECTUS

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FIGURES

PROJECT FACT SHEET

CORPORATE DATA

Project Name:	Cirque Lead-Zinc-Silver Project
Company Name and Address:	Curragh Resources Inc. #1900 - 95 Wellington St., West Toronto, Ontario
Contact/Title:	Mr. Marvin Pelley, P.Eng. Executive Vice-President, Mining Toronto, Ontario Tel: (416) 363-7111 Mr. Gregg Jilson Vice-President, Exploration and Environmental 117 Industrial Road Whitehorse, Yukon Y1A 2T8 Tel: (403) 668-3578

PROJECT DETAILS

Project Location:	280 km north of Mackenzie, B.C. 57° 30'N Latitude 124° 50'W Longitude
Exploration Cost to Date:	$20.1 million
Development Cost:	$19.7 million
Estimated Total Capital Cost:	$120 million
Minerals:	Pyrite, sphalerite, galena, barite
Mining Method and Production Rate:	Room and pillar 3500 tonnes/day
Process Plant/Mill:	Sag mill, ball mill, separate lead and zinc flotation

Ore Beneficiation Process:	Crushing, grinding (sag and ball mills), flotation (lead and zinc circuits), thickeners, filtering and drying
Proposed Mine Life:	+ 16 years

MINERAL RESERVES

Reserves:	Geological:	34.6×10^6 tonnes 2.1% Pb, 7.8% Zn, 47 g/t Ag
	Preliminary Mineable:	18.9×10^6 tonnes 2.7% Pb, 9.2% Zn, 57 g/t Ag
Cut-off Grade:	8% lead and zinc for preliminary mineable	
Potential for Additional Reserves:	+ 15.4×10^6 tonnes indicated at south Cirque and potential on Fluke and Elf claims	

ACCESS/TRANSPORTATION

Road:	Williston Lake Road Omineca Road
Water:	Williston Lake barge route
Air Access:	Schedule service to Mackenzie; charter to Finbow Airstrip; and helicopter to site

POWER SUPPLY:

Diesel electric. Also considering development of transmission line to B.C. Hydro facility at Bennett Dam

WORKFORCE INFORMATION:

Construction Workforce: (Annual Average)	Approximately 200
Operation Workforce: (Annual Average)	Approximately 250; 200 on site

Housing Options:	Fly-in, fly-out operation. Single status on site camp. Housing in existing communities of Fort St. John, Mackenzie and Prince George.
Workforce Rotation/Schedule:	Mine: Seven 12-hour shifts followed by 7 days off or similar
	Mill: Seven 12-hour shifts followed by 7 days off or similar

PRELIMINARY DEVELOPMENT SCHEDULE:

Stage I Environmental Report:	January 15, 1990
Detailed Feasibility Study:	January 15, 1990
Site Construction Startup:	June 15, 1990
Mine Production Startup:	July, 1991
Mill Process Startup:	October, 1991

1.0 INTRODUCTION

1.1 Preamble

The Cirque lead-zinc-silver ore deposit, located in northwestern British Columbia 925 km north of Vancouver and 475 km northeast of Prince Rupert, constitutes the most significant discovery to date in the Gataga mineral camp. The property was acquired by Curragh Resources Inc. in 1985 from Cyprus Anvil Mining Corporation. Curragh Resources Inc. is a Canadian-controlled company originally organized to acquire the assets of the Cyprus Anvil Mining Corporation from Dome Petroleum Company.

The total geological ore reserve is about 50 million tonnes of 9.5% combined lead-zinc and 42 grams/tonne silver in the Cirque and South Cirque deposits. In the Cirque deposit a higher grade portion (above an 8% Pb and Zn cutoff grade) is estimated to average 12% Pb and Zn and 57 grams/tonne silver. This Prospectus outlines the project proposed by Curragh Resources Inc. for the mining of this higher grade ore reserve. It presents short discussions on the Cirque deposit geology, the planned production mining, milling, and related infrastructure development, and an overview of the existing land use, environmental setting, and proposed or ongoing environmental and socioeconomic assessment of the project.

1.2 Project Location and Setting

The Cirque deposit is located 280 km north of Mackenzie, the nearest railhead, at 57° 30' N and 124° 50' W (Figure 1-1). The local terrain can be described as a highlands-foothills transition between the northcentral plateau to the west and Rocky Mountains to the east. The area was opened to development by the construction of the Bennett Dam in the 1960's, with the communication and transportation infrastructure developed further since then in support of expanding oil, gas, and pulp and paper interests in the area.

1.3 Historical Perspective

The Gataga camp deposit, of which Cirque is a part, was discovered by Canex Exploration (Placer Development Ltd.) in 1974 while prospecting geochemical

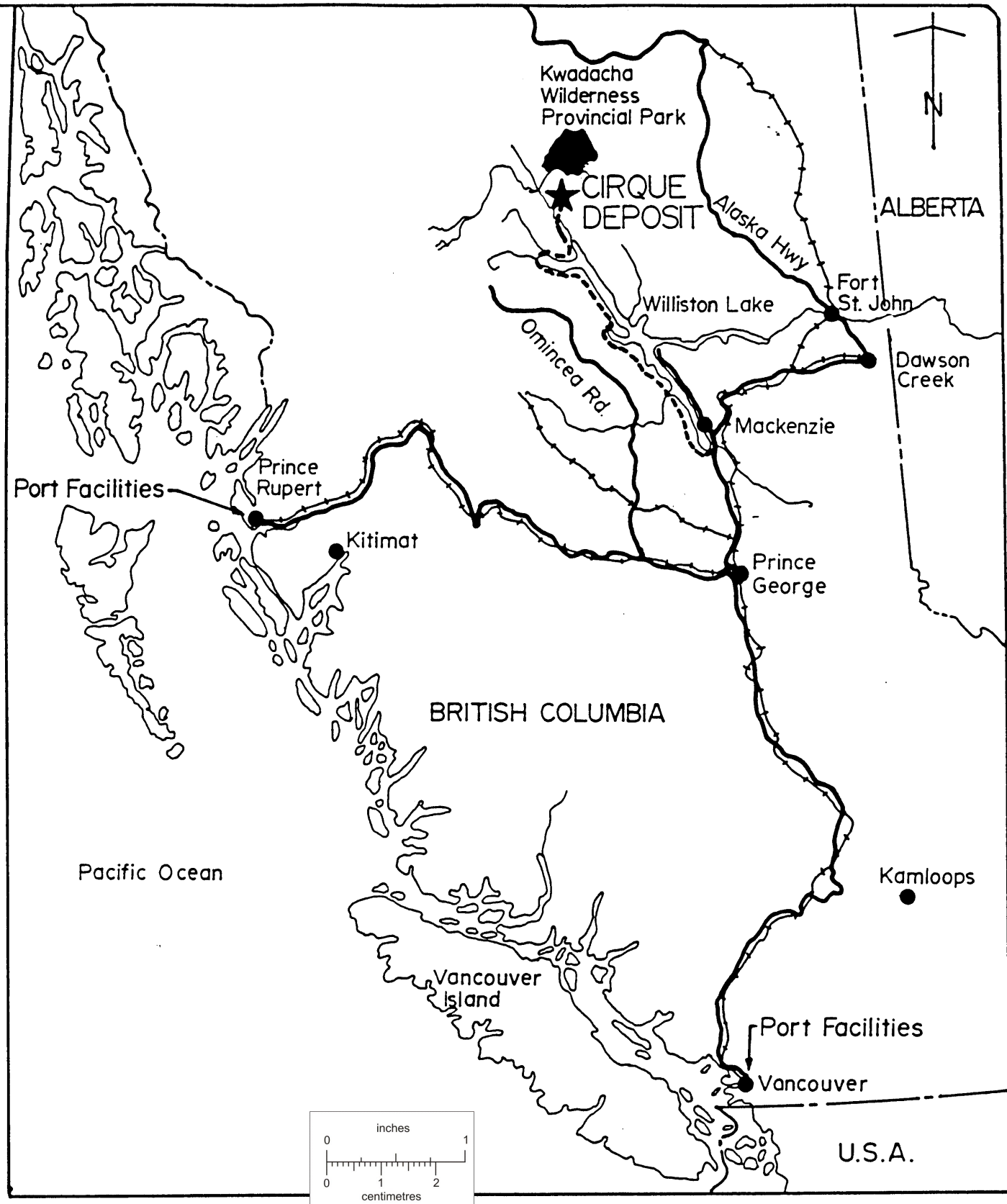

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Figure 1-1: Location Map

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anomalies from a 1970 survey by General Crude Oil Ltd., Pembina Pipeline Ltd., and Sun Oil Ltd. The Cirque discovery itself, located about 80 km southeast of the original Driftpile Creek Gataga discovery, was made in 1977 through a joint venture between Cyprus Anvil and Hudson's Bay Oil and Gas Ltd. A total of 20 million dollars was spent on the project by these owners between 1978 and 1982. This included 11 million dollars on exploratory drilling and 5.3 million dollars on road and airstrip construction.

A metallurgical study by Kamloops Research and Assay Laboratory Ltd., in 1981, indicated that this Cirque deposit would produce an ore concentrate of excellent quality with little deleterious side products. Thus after Curragh Resources Inc. acquired the property, an economic study was commissioned in 1986 which estimated that the lead-zinc Paid Metal production cost would be very competitive.

2.0 GEOLOGY AND RESERVES

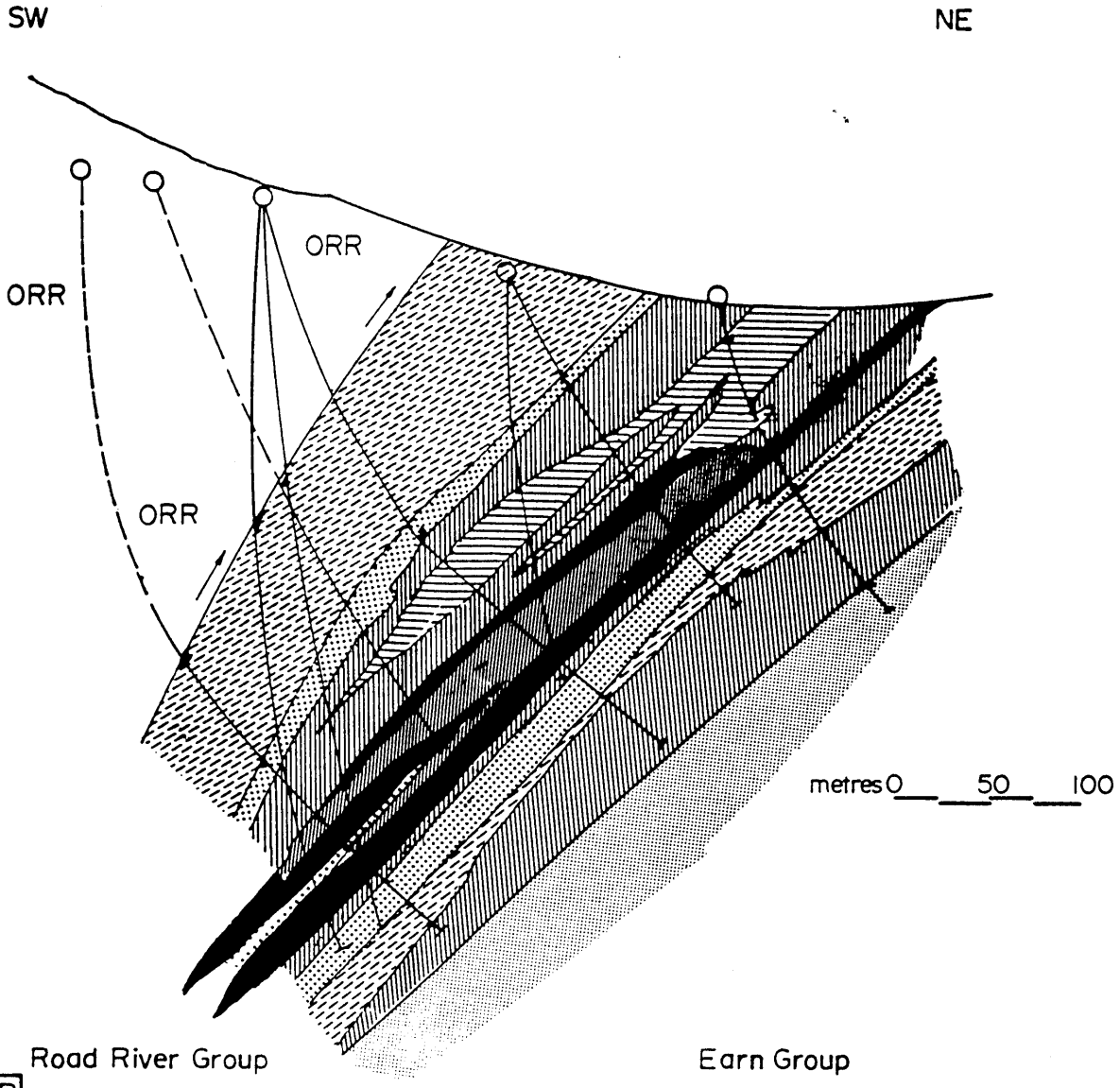
2.1 Geology

The Gataga camp is a late-Paleozoic stratiform deposit within the Selwyn basin sub-province of the Canadian Cordillera. This basin is bordered by the Cassiar platform on the west and the Mackenzie platform on the northeast and extends from northcentral B.C. to Alaska. The basin consists primarily of chert, shale, and coarser grained clastic sedimentary rocks with minor volcanic components. The stratigraphy consists of carbonaceous, pelitic sedimentary rocks with minor clastic components (i.e. Road River Formation) overlain by a chaotic assemblage consisting of turbidity fans, submarine density flows, and slump breccias with interbedded shale and chert (i.e. Earn Group). The Earn Group is the host of the Gataga camp.

At the Cirque deposit, the Earn Group consists of the Gunsteel, Akie, and Warneford Formations (Figure 2-1). The Gunsteel is the primary host of the Cirque deposit. It is characterized by black, carbonaceous, locally pyritic, siliceous shale and ribbon bedded porcellanite approximately 140 m thick. The porcellanite members occur at the upper and lower contacts and are 10-20 m thick. The Akie Formation consists of soft, grey, laminated shales and in the vicinity of the Cirque deposit is interbedded with it (Figure 2-1). It contains minor calcareous siltstone and intraformational siltstone breccia beds, some of which are also found within the ore deposit. The Warneford Formation, which consists of coarse sandstone and chert pebble conglomerate interbedded with grey to black shale, is not abundant at Cirque.

The Cirque deposit geometry can be described as a plunging, elongate, east tapering, lensoid body 1000 m long, 300 m wide, and 2-60 m thick. It dips 30-45° to the southwest and plunges 30° to the south. Thus in plan view the deposit extends north-south, with the up plunge end truncated by the present day erosion surface (Figure 2-1).

The deposit consists of three facies, with a barite rich facies fringed by pyritic and laminar banded pyritic facies. The baritic facies consists of fine to medium grained barite and <40% sulphides, with the sulphides occurring as 1-5 mm thick laminations of pyrite, sphalerite, and to a smaller degree galena. By comparison, the pyritic facies,



Road River Group

ORR Undivided

Silurian Siltstone

Earn Group

Akie FM

Shale (DAp)

Siltstone & Breccia (DAs)

Gunsteel FM

Porcellanite (DGc)

Siliceous Shale (DGpr)

Laminar Banded Pyrite

Baritic Facies

Pyritic Facies

inches 0 1

0 1 2 centimetres

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Figure 2-1: Ore Body Stratigraphy

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which grades into the baritic, contains from 40 to 100% pyrite, sphalerite, and galena, in a gangue of barite with minor mounts of quartz and carbonate. The laminar banded pyritic facies consists of 0.1 to 20 cm thick beds of fine framboidal pyrite in a siliceous shale. The sphalerite, galena, and barite occur as sparsely disseminated grains in these layers.

Overall, the pyritic facies dominates in the northern part of the Cirque deposit and the baritic facies in the southern part (Figure 2-1), with the laminar banded pyritic facies occurring to the east and above the baritic and pyritic facies (Figure 2-1). The ore grade of the laminar banded facies is low, constituting only a minor part of the total lead-zinc-silver reserve.

2.2 Advanced Feasibility

An underground exploration program is proposed to verify the previous drill indicated reserve estimate, to confirm the surrounding geology, to classify the rock conditions, and to obtain bulk ore samples for metallurgical process testing. This exploratory program has been approved and is underway. The duration is estimated to be seven months including mobilization and surface plant setup.

The most suitable location for the exploration portal is considered to be west of the deposit in the hanging wall (Figure 2-2). This site provides a reasonable and safe collar location with adequate space for a plant and camp nearby. The drivage in waste to the ore zone will be 900 m at -11% from a collar elevation of 1630 m. The proposed decline is 4 m high and 3.4 m wide, with short remuck stations excavated at 150 m intervals. Actual exploration will consist of a drift on the long section of the ore zone and mined in association with diamond drilling from the drift to define the ore deposit geometry. The drift will be 600 m long, driven at a maximum +18% inclination and result in the mining of 30 thousand tonnes of rock of which 2/3 may be acid generating. Only minor quantities of ore will be mined. Waste will be stored in the Cache Creek drainage basin in a dump at the portal if not acid generating or on a properly prepared stockpiling pad if potentially acid generating. Site preparation will include surface drainage and substrate permeability control. Water quality in the drainage basin will be routinely tested to guard against acid leaching conditions in the ore stockpile.

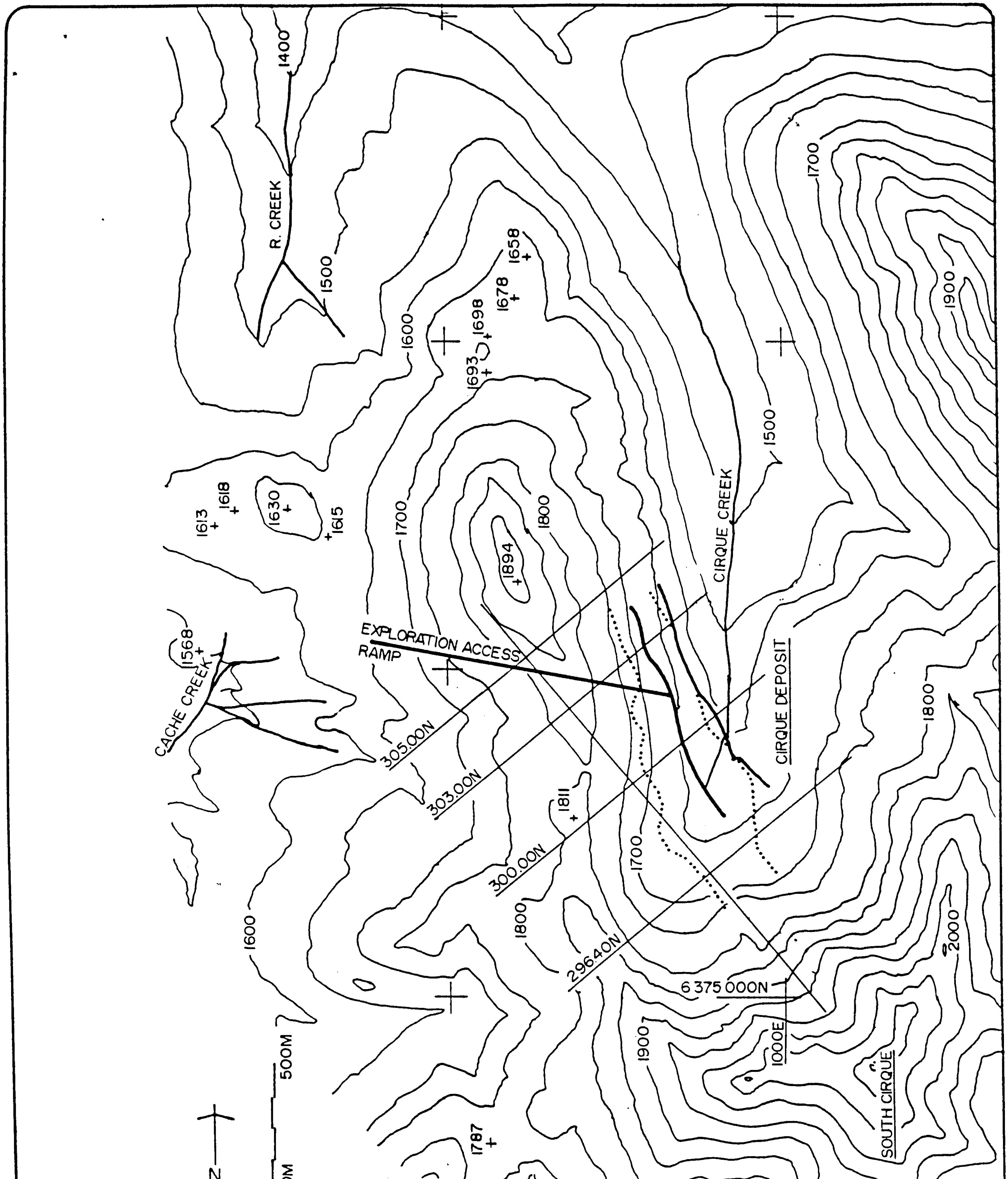

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Figure 2-2: Exploration Adit Location

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3.0 PRELIMINARY DEVELOPMENT

A preliminary three year development schedule has been proposed and is presented in Figure 3-1. The first year will be devoted to the underground exploration program, engineering studies, metallurgical testing, environmental and socioeconomic impact assessment and permit applications. This will form the basis of the Stage I report submission in January, 1990.

If a favourable production decision is arrived at during the winter of 1990, site preparation, mine development, and engineering and procurement will begin, with surface construction beginning by the summer of 1990.

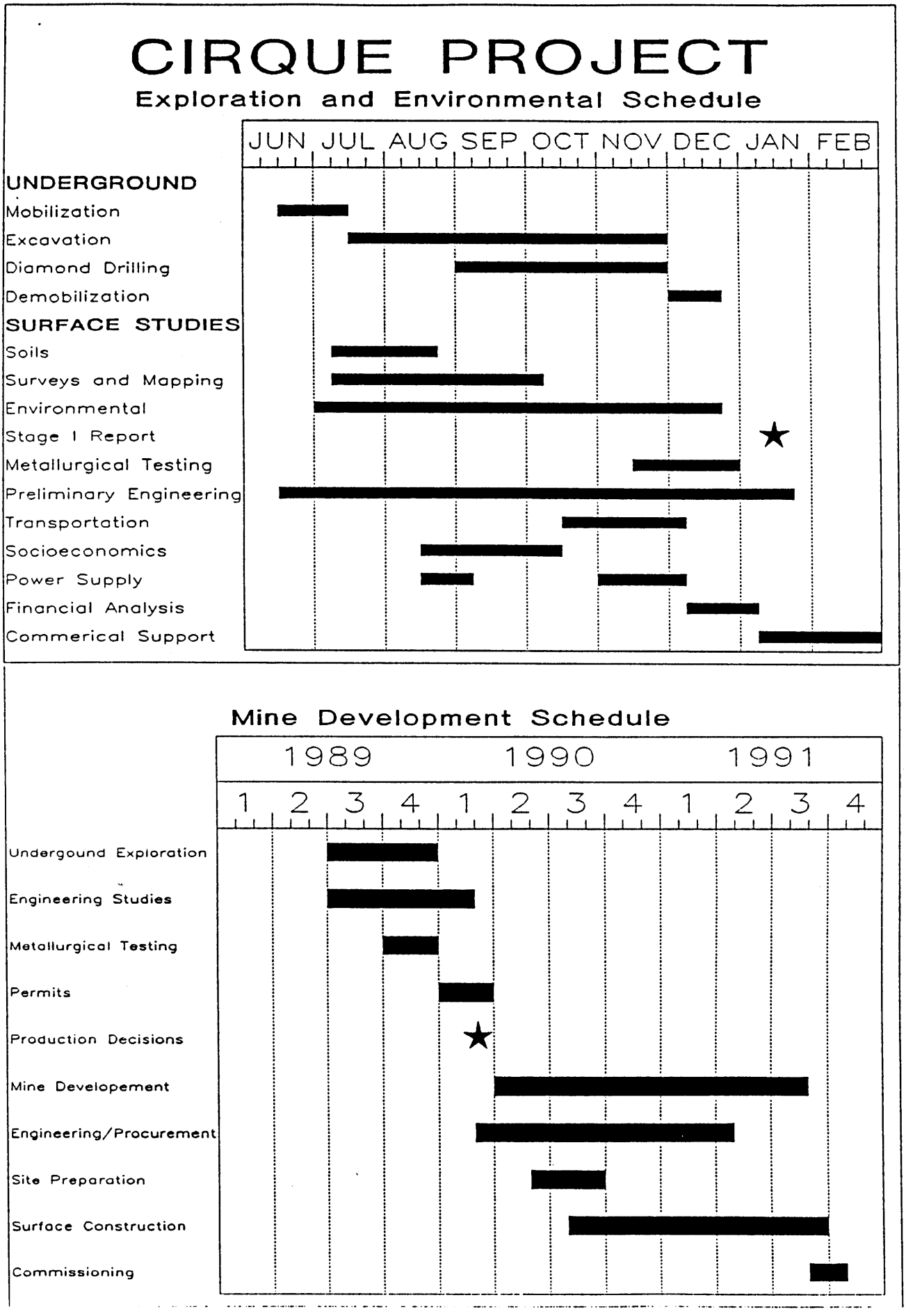

CIRQUE PROJECT
Exploration and Environmental Schedule
JUN JUL AUG SEP OCT NOV DEC JAN FEB
UNDERGROUND
Mobilization
Excavation
Diamond Drilling
Demobilization
SURFACE STUDIES
Soils
Surveys and Mapping
Environmental
Stage I Report
Metallurgical Testing
Preliminary Engineering
Transportation
Socioeconomics
Power Supply
Financial Analysis
Commerical Support
Mine Development Schedule
1989
1990
1991
1 2 3 4 1 2 3 4 1 2 3 4
Undergound Exploration
Engineering Studies
Metallurgical Testing
Permits
Production Decisions
Mine Developement
Engineering/Procurement
Site Preparation
Surface Construction
Commissioning

FIGURE 3-1

4.0 PROPOSED MINING PLAN

4.1 Production Rate and Mine Life

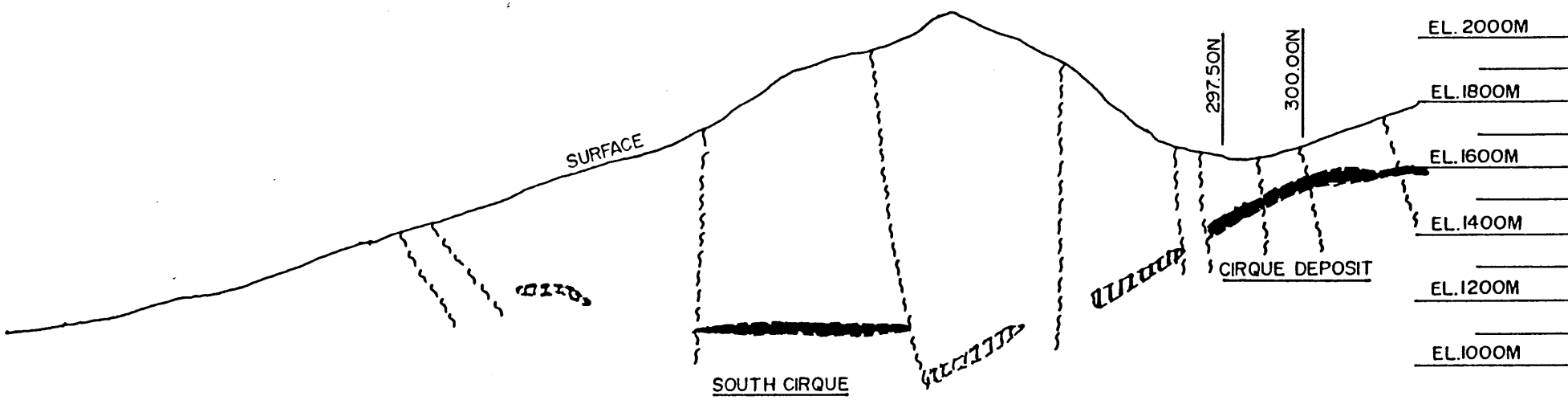
There are currently two options being investigated for production access to the ore deposit. One is access by the proposed development ramp and portal in the Cirque-Cache area (Figure 2-2). The second alternative is a portal on the northwest side of the Paul River valley (see Section 5.0 and Figure 5.2).

The underground mining rate is anticipated to be 3500 tonnes of ore per day (1.2 million tonnes per year). The deposit will be divided into 5 mining blocks to facilitate proper sequencing of stope preparation, ventilation, and ore haulage. At this production rate, the life of the high grade ore body will be approximately 16 years. However, at least some mining of the lower grade ore is also anticipated, and could extend the expected life of the mine to 20 years. The proximity of a second identified lead-zinc-silver ore body (i.e. South Cirque deposit, Figure 4-1) would facilitate future exploration and mining of this reserve. Mining this South Cirque deposit would extend the mine life to 30 years.

4.2 Mining Method

Mining will be by the room and pillar method. For practical reasons, the mining operation will be divided into two stages with the second stage considered optional. In the first stage, during which 86% of the high grade ore body will be mined, up dip rooms will be developed via upper and lower drifts driven on strike. These rooms will be slashed up dip with adequate height to enable longhole drilling and blasting of the remaining ore. In the second (optional) stage, the mined out stopes will be filled so that the stope support pillars can be mined.

A crusher complex will be located below surface consisting of the crusher itself, a 24 hr. capacity storage bin, waste handling facilities, electrical room, compressor room, and mine water sump and treatment facilities if required. The mining blocks will be connected to the crusher complex by means of haulageways. These drifts will be located in the footwall. The primary crushed ore will be transported to the production adit conveyor belt system by means of ramps and additional haulageways.



SECTION Looking WEST

Known Sulphides

Exploration targets

0 10M 50M

inches
0 1
0 1 2
centimetres

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Figure 4-1: Mine Longitudinal Section

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Once underground exploration and pre-production work is completed, excavation of waste rock will be minimal. Only new haulageways to the crusher and additional exploration will produce any significant added waste rock. This will either be hauled to the surface via the exploration adit or crusher waste rock bypass, or stored in mined out stopes.

5.0 PROPOSED ORE BENEFICIATION PROCESS

Several mill locations are currently under review. The site will be finalized once the production portal and tailings alternatives are evaluated and clarified. Currently there are two alternative concepts for a mill site location, one in the Cirque-Cache area and a second in the Paul River valley. If the Cirque-Cache mill site were selected the tailings pond location would either be in the Cirque-Cache area or in the Paul River valley.

The recovery process will consist of a standard grinding-flotation beneficiation process. The primary crushed ore (i.e. -200 mm) will be delivered by conveyor belt from the mine portal to the 3500 tonne capacity coarse ore bin. This ore will then be milled using a combination of SAG and ball mill grinding. Separate flotation circuits will be used to concentrate the liberated lead and zinc minerals (Figure 5-1). The resulting slurries will be thickened, pressure filtered, dried, and then transported by conveyor belt to a product storage bin. Tailing from the mill will be transported by pipeline to a tailings disposal site.

A number of locations are being considered for the tailings-impoundment pond (Figure 5-2). The ultimate site location will be based on hydrological studies, avalanche assessment and detailed soils analysis, using both test pits and borehole soil sampling. These data will provide information on the distribution of foundation properties and burrow materials suitable for dam construction. Due to the concern for tailings acid generation, eventual mine abandonment may require permanent flooding of the tailings pond. Hence, an additional site selection criteria will be a location, in relation to local hydrological and topographical properties, that facilitate this possible abandonment plan. These analyses will form part of a comprehensive waste management evaluation for the project. Burrow materials will also be tested for acid generation (see Section 8.1.3).

Since climatic conditions preclude a net evaporative loss of waste water from the tailings pond, it will be necessary to decant water either into Paul River, Cirque Creek, or Cache Creek. Which watercourse receives the decant will depend on the ultimate location of the tailings pond. In any case, the discharge will be routinely tested for its adherence to the CCREM guidelines.

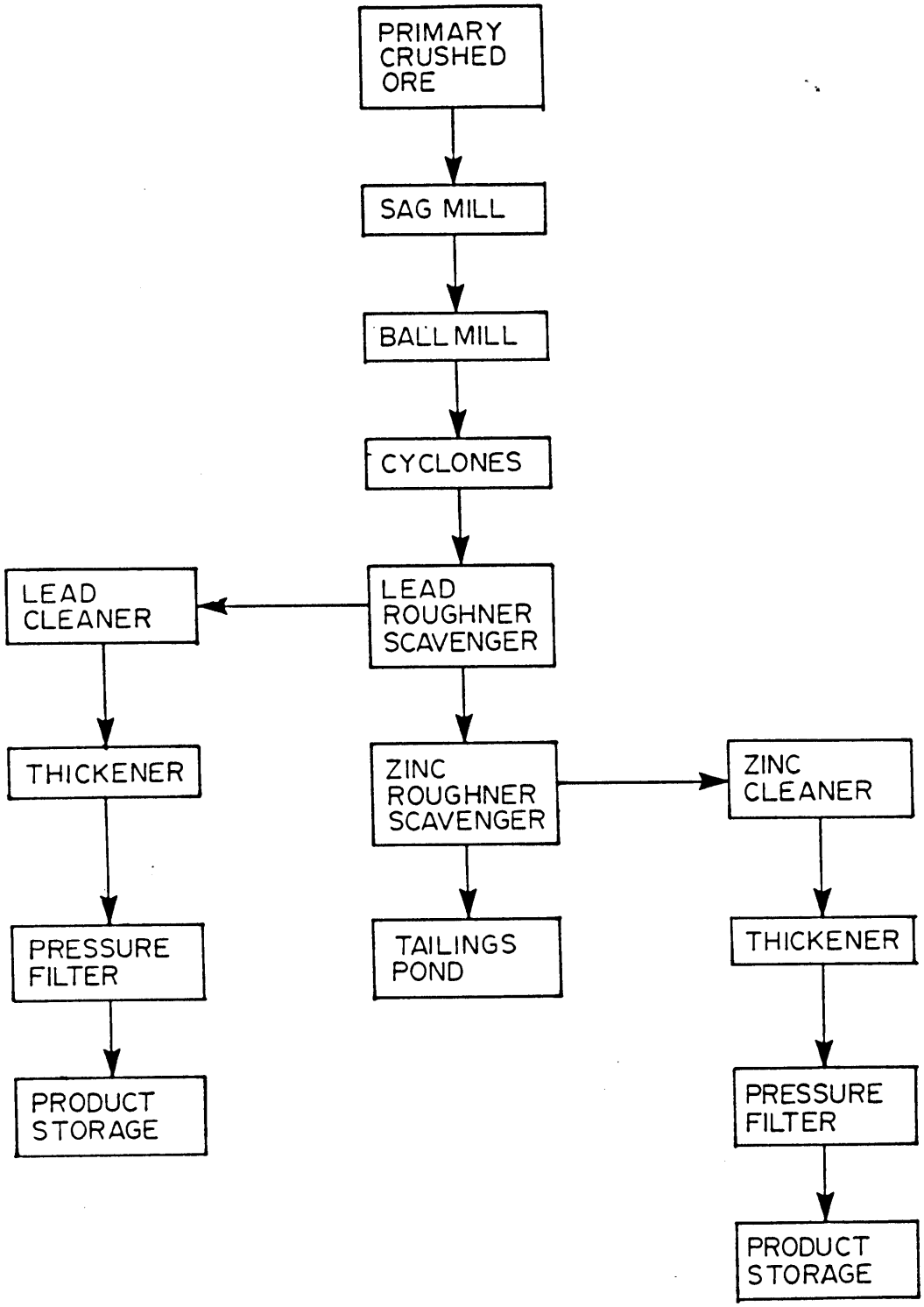

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Figure 5-1: Ore Beneficiation Process

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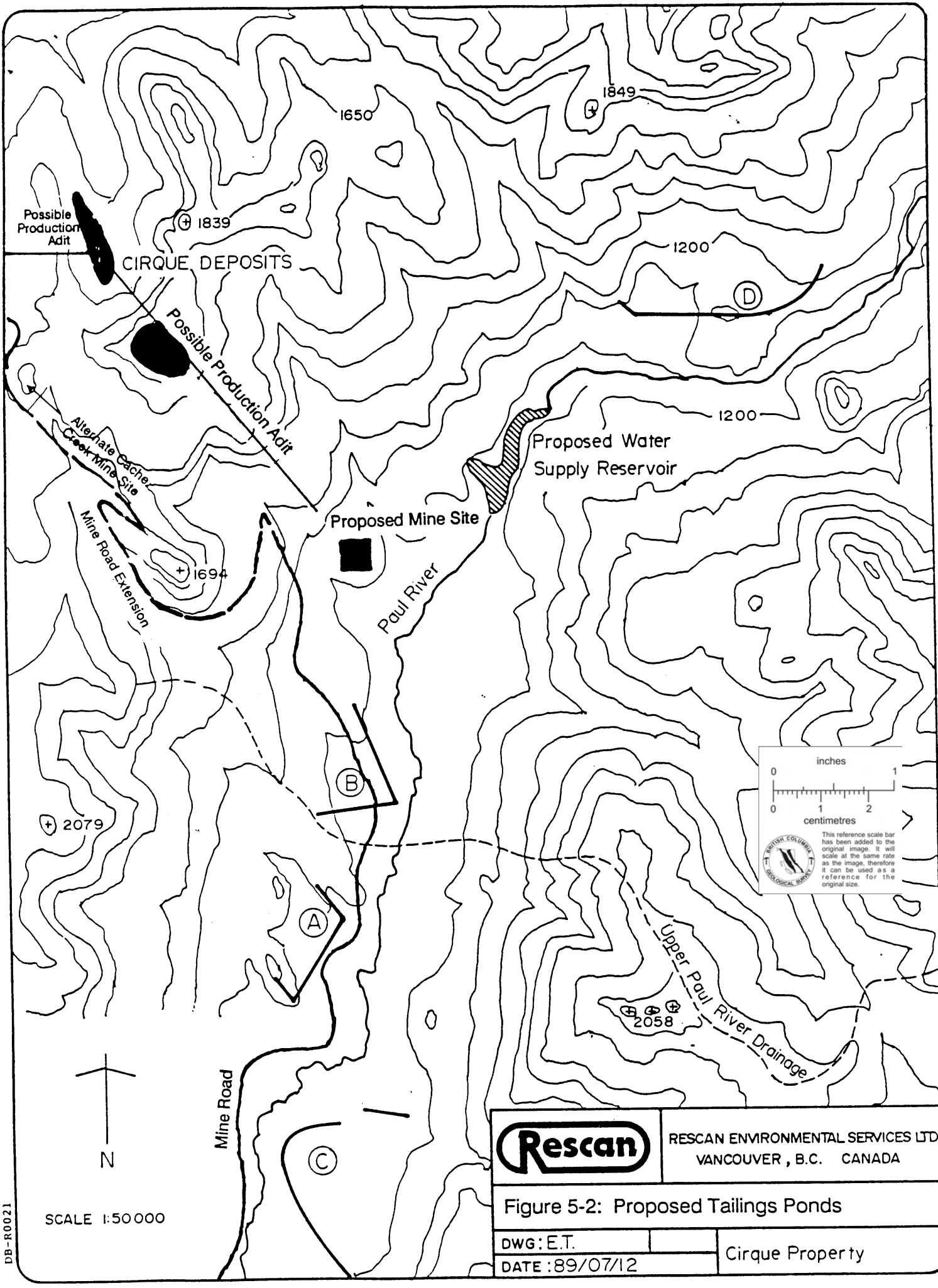
1650
1849
1839
Possible Production Adit
CIRQUE DEPOSITS
1200
D
Possible Production Adit
Alternate Cache Creek Mine Site
1200
Proposed Water Supply Reservoir
Proposed Mine Site
Mine Road Extension
1694
Paul River
B
2079
A
Upper Paul River Drainage
2058
Mine Road
C
N
SCALE 1:50000
inches
0
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2
centimetres
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Figure 5-2: Proposed Tailings Ponds
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The source water for the mill will probably be the Paul River, however, the Cache Creek drainage will also be investigated.

6.0 EXISTING LAND USE AND ENVIRONMENTAL SETTING

6.1 Biophysical Setting

Climatologically, northwest British Columbia is characterized by long, cold winters and short, cool summers with moderate precipitation (i.e. 400-500 mm/yr.) uniformly distributed over the year. A significant snow pack develops during the winter and hence stream flow is seasonal. The proposed mine site will be located either within or adjacent to the Paul River, Cache Creek, or Cirque Creek drainages, though all are part of the Finlay River drainage basin. Stream flow information is only available for the Upper Paul River basin, which at 63 km^2 represents approximately 0.5% of the total Finlay River drainage basin. In 1981, the measured flow rates ranged from a low of 220 L/s in December to a high of 3660 L/s in June.

6.2 Land Use Overview

Existing land use includes traplines, native food and sports fishing, and perhaps hunting. Sports angling has been observed in the Finlay River, Pretzel Lake, and Rainbow Lakes (i.e. the latter two located in the Paul River drainage), with the lakes producing high quality rainbow trout. The Finlay River also produces rainbow trout, Dolly Varden char, and arctic grayling. However, angling in the rivers and streams is less successful due to the generally elevated sediment loading and fluctuating flow conditions. In any case, recreational fishing can be expected to increase in the area with improved access provided by the Finlay River forestry road and the Paul River mine access road. The influx of the mine labour force will also increase the outdoor recreational use of the area.

While the project area is not characterized by intensive native food fishing, some fish are taken from Pretzel and Rainbow Creeks, with the catch dominated by arctic grayling and rainbow trout. Some additional native food fishing also occurs in unnamed tributary #1, the Finlay River (from September to freeze-up), and at the mouth of the Paul River. Ice fishing is also practised on the lakes during winter. The importance of this native food fishery is qualified somewhat by the Department of Health and Welfare notification to the Ft. Ware band that fish caught in the lower reaches of the Finlay River (and Williston Lake) show evidence of elevated mercury levels.

The Paul River drainage basin and adjacent areas are known feeding ranges (i.e. primarily winter) for moose and other grazers and browsers such as goat, sheep, caribou, and black bear. The importance of the area to moose has been increased by the creation of Williston Lake and a concomitant 50% reduction in its historical wintertime feeding range.

The Paul and Finlay Rivers, Pretzel and Rainbow Creeks, as well as Pretzel and Rainbow Lakes, are known to contain adult Dolly Varden char, rainbow trout, arctic grayling, and a number of coarse fish species. Sections of these rivers are also known to support fish spawning. These areas appear to be restricted geographically due to a generally unsuitable gravel substrate and elevated turbidity.

7.0 INFRASTRUCTURE

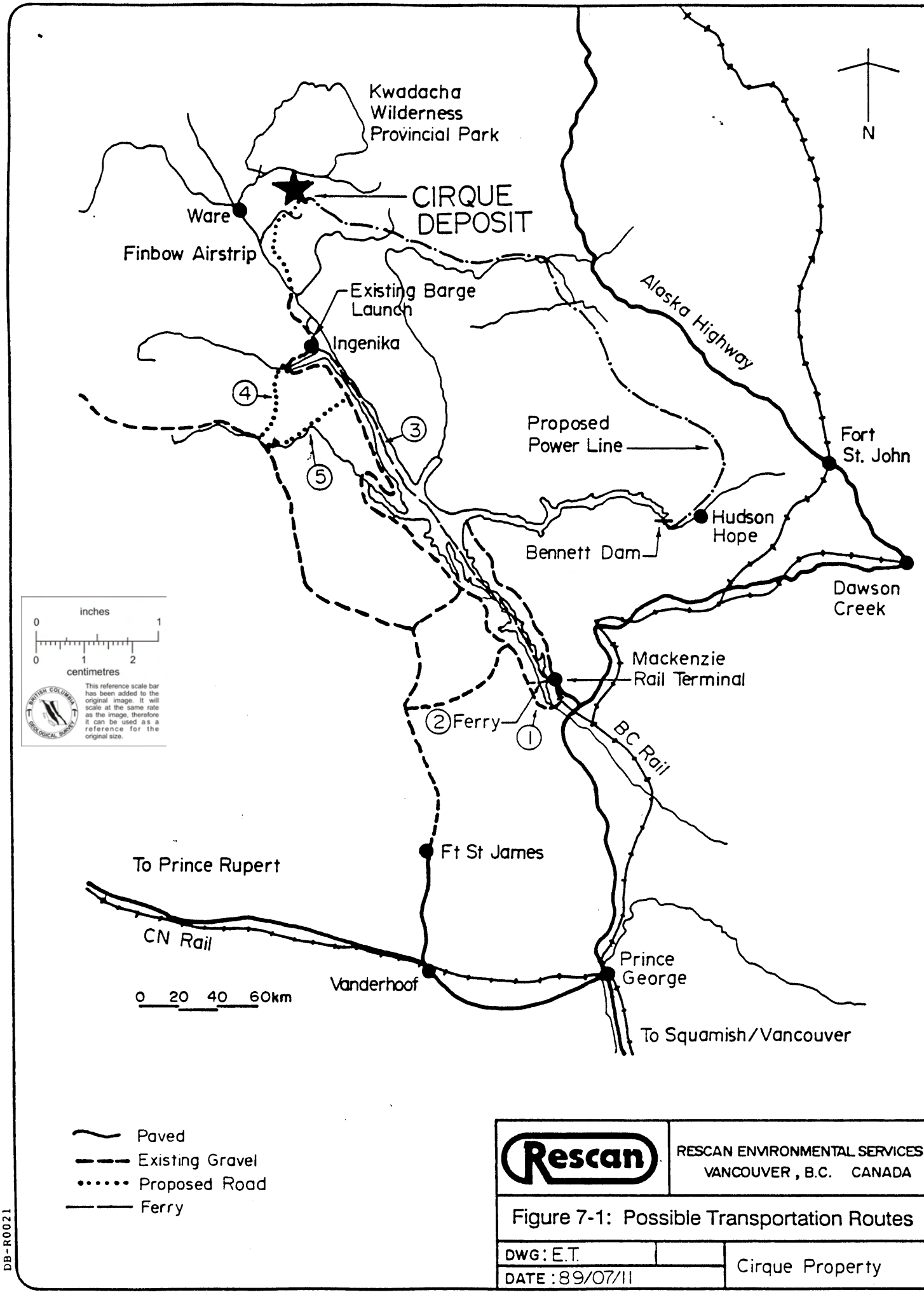
7.1 Property Access

Transportation of concentrate from, and supplies to, the mine site will probably involve a combination of road haulage and railway to the shipping port. The possible routes are presented in Figure 7-1. The existing all weather road along the west side of Williston Lake presently supports logging operations and plans call for this road to be extended northwards beyond Ingenika to the Finlay area. A transportation route from the mine access road to Mackenzie could be made possible by either upgrading this road as far as Mackenzie (i.e. #1, Figure 7-1) or including a barge route across Parsnip Reach (#2, Figure 7-1). The entirely upgraded road option would also require the construction of an underpass or overpass to connect the upgraded road to the Mackenzie railhead. From Mackenzie, concentrate would be carried by B.C. Rail to Prince George and then CN Rail to either the Port of Vancouver or Prince Rupert. A transportation route could also consist of barging along the length of Williston Lake to Mackenzie (#3, Figure 7-1). An additional option is to truck by the existing Omineca Road to Vanderhoof and then by CN Rail to either seaport, thereby bypassing Prince George and B.C. Rail (i.e. #4 or #5, Figure 7-1).

The proposed road hauling system would consist of a tractor and trailer(s) unit configuration carrying covered concentrate containers with a total capacity of 50-100 tonnes. All the route alternatives will be evaluated during project development.

7.2 Surface Facilities

The major surface facilities at the mine site will consist of a 3500 t storage bin for primary crushed ore, a concentrating building, a product storage bin, a fuel oil farm, a power house, an administration, maintenance workshops, and warehouse building complex, a cold warehouse, and a camp facility (Figure 7-2). The proposed location of a mill tailings disposal pond has not yet been finalized (see Section 5.0 and Figure 5-2).


Kwadacha
Wilderness
Provincial Park
CIRQUE
DEPOSIT
Ware
Finbow Airstrip
Existing Barge
Launch
Ingenika
Alaska Highway
Proposed
Power Line
Fort
St. John
Hudson
Hope
Bennett Dam
Dawson
Creek
Mackenzie
Rail Terminal
Ferry
BC Rail
Ft St James
To Prince Rupert
CN Rail
Vanderhoof
Prince
George
To Squamish/Vancouver
N
inches
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0 20 40 60km
Paved
Existing Gravel
Proposed Road
Ferry
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Figure 7-1: Possible Transportation Routes
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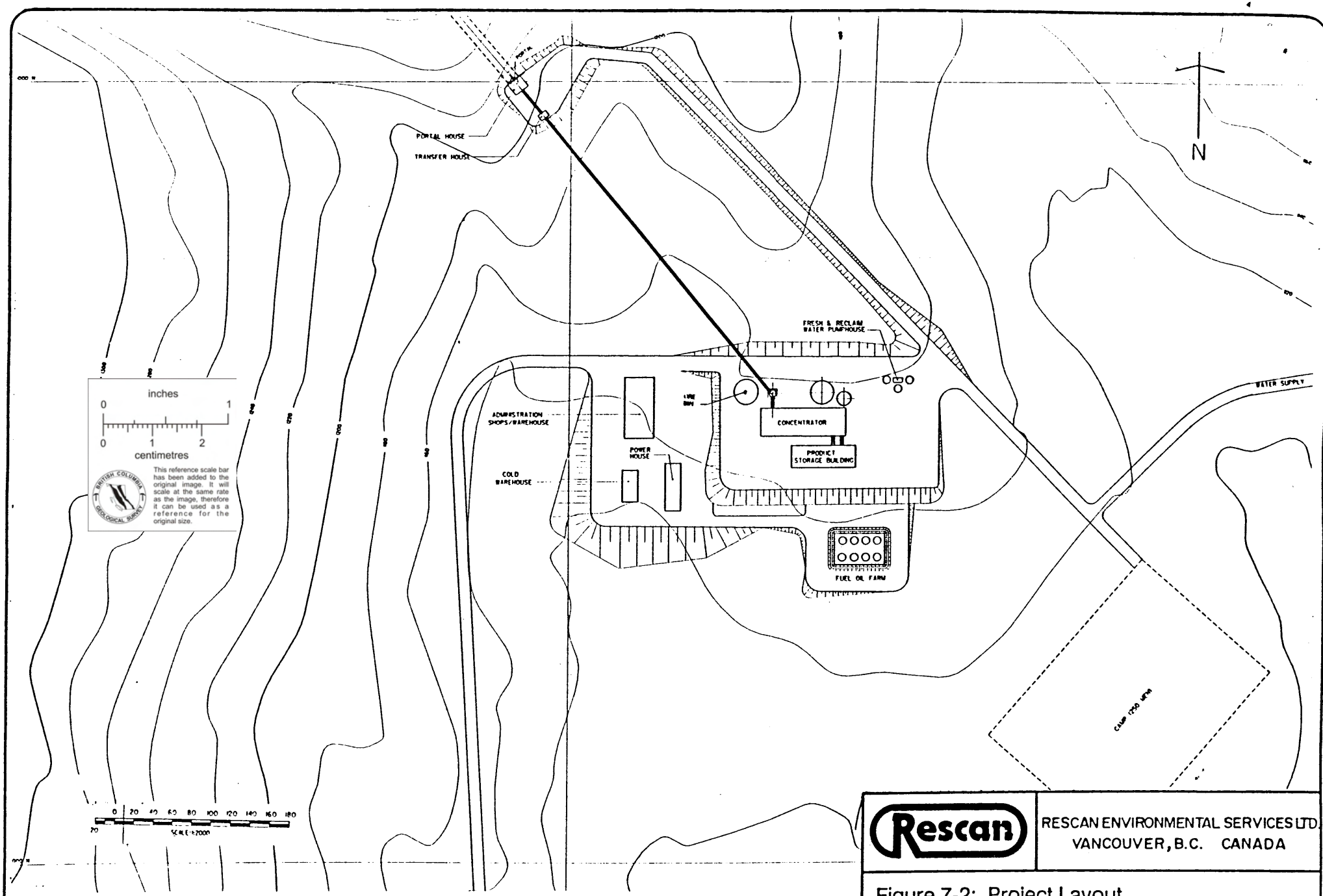

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Figure 7-2: Project Layout

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7.3 Utilities

The ultimate power supply will be subject to further study during the development program. However, the intention is to use diesel generators to supply electric power to the mine site. This approach has the added benefit of supplying waste heat for use in plant and mine air heating. The alternative is to construct a 400 km transmission line to the B.C. Hydro facility at the Bennett Dam (Figure 7-1).

The largest freshwater requirement for the mine is for the milling operation. With 50% of this requirement met by recycled water, a new water supply of 500 m^3/hr is required. This may be drawn from the Paul River, though Cache Creek will be tested for flow characteristics as a possible alternative. Low winter flow rates for the Paul River necessitate a 1-1.5 million m^3 storage reserve to ensure an adequate supply during these low flow periods. This requires the construction of a dam with a proposed location of 1.5 km upstream from the mine site (Figure 5-2). The reservoir created by this dam would meet the daily water requirements. The Cache Creek option would probably require a larger reservoir. The proposed Cirque property development will include an analysis of the effect of a dam and reservoir on the hydrology of the Paul River and Cache Creek.

7.4 Accommodation

A total operations workforce requirement of approximately 250 persons is envisioned using a seven days in seven days out rotation (i.e. fly in, fly out). Thus living accommodations for 250 persons is required. Kitchen, dining room, laundry, utilities, and recreation facilities will be required for only approximately 200 persons because of the workforce rotation.

The fly in, fly out workforce rotation will also require upgrading of the 1600 m airstrip near the mine site, initially designed only to serve the needs of the exploration phase of the project.

8.0 ENVIRONMENTAL CONSIDERATIONS

8.1 Environmental Program

An environmental program was initiated in June 1989 encompassing the collection and interpretation of baseline data for the climate, hydrology, water quality, fisheries/ aquatic and wildlife resources, soil/terrain, and vegetation of the Paul River basin and adjacent drainages. Some baseline information is available from earlier environmental work completed on the property under previous ownership and from various government sources, including regional analysis completed by B.C. Hydro. New data gathering efforts will focus on elaborating this earlier work. However, special attention is also being given to information gathering germaine to potential concerns regarding waste rock and tailing disposal, effluent treatment, acid generation, sediment and run-off control, and reclamation and abandonment. This environmental program will form the basis of the Stage I assessment.

8.1.1 Climate

A regional climate analysis was begun in 1980. This will be continued and augmented by a program of measuring maximum, minimum, and mean monthly temperatures, and mean monthly precipitation and wind speed and direction. Representative rainfall intensity/ duration/frequency curves and proportional snowfall characteristics will also be estimated in association with the hydrological studies (Section 8.1.2).

8.1.2 Hydrology

A surface hydrological analysis was initiated in July 1989 to assist in the design of runoff and drainage control facilities, water supply, and the tailings pond. The study will characterize the average flow distribution, and estimate high and low flow rates for the watercourses draining the mine site.

A groundwater study is also being initiated to characterize the flow regime at the mine site. This information will be used mainly to prepare project water balances and, in combination with acid generation measurements (see Section 8.1.3), identify and estimate potential contaminant transport rates.

8.1.3 Acid Generation Testwork

A detailed review of the Cirque deposit geological reports, in particular their likelihood for acid generation, has revealed some interesting information on the various rock types. Following this analysis, a number of cross-sections, delineating rock types with corresponding drill core, have been used to select appropriate samples for acid generation testwork. In total, approximately 70-5 kg samples, from both the underground access areas and the ore body, are presently being gathered, for testwork, from the project site core storage area and from the Ministry of Energy, Mines, and Petroleum Resources core storage facility at Charlie Lake (near Fort St. John). In addition to this, all materials used for construction of the water reservoir dam, tailings impoundment, and other ancillary structures will be subjected to acid base accounting tests. The field conditions of all the samples will be well documented photographically and any evidence of oxidation will be removed by scraping and washing prior to initiating the testwork.

A number of samples, selected on the basis of the acid base accounting results, will be subjected to kinetic testing using standard 1 kg humidity cells. Also, field kinetic tests will be initiated during the months of July and August 1989 using large scale (i.e. 10 kg) cells operated insitu near the proposed plant site area.

Finally, tailings generated from the metallurgical testwork will be subjected to water leach experiments to simulate reactions in an underwater environment.

8.1.4 Water Quality

A water quality monitoring program has been initiated that includes all streams and rivers potentially affected by mine development. A list of measured parameters includes pH, dissolved solids, suspended solids, conductivity, the major cations and anions, nutrients, and heavy metals.

8.1.5 Fisheries/Aquatic Resources

Previous fish and aquatic invertebrate studies are being augmented by the initiation of additional distribution surveys. In essence, this program will focus on the abundance and distribution of Dolly Varden char, Mountain Whitefish, and Rainbow trout in the Paul River and adjacent drainages, with particular emphasis on micro-habitat use by fry

and juveniles. This emphasis is based on previous fish surveys conducted in May and September 1981 that indicated Dolly Varden to be the most abundant adult sport fish in the area (i.e. 1-2 per 100 m^2), with minor occurrences of adult Mountain Whitefish and Rainbow trout. A Dolly Varden stomach analysis indicated that Northern Redbelly dace constituted an important food source, while circumstantial evidence suggested that mayflies, true flies, caddis flies, and stone flies were also important food items. Thus continuing studies will elaborate on the importance of these food sources. The previous studies also identified mid-September to mid-October as the main spawning period for Dolly Varden, with subsequent emergence estimated to occur in early May to mid-June. Though the latter is sensitive to existing water temperature and original spawning time, the new surveys are well timed to study the feeding ecology of the emerging Dolly Varden fry or early juveniles.

8.1.6 Soil Quality/Terrain

A program of examining soils and terrain features will be initiated for consideration of mine site reclamation and the location and engineering of mine site facilities. This will include a review of existing soils data plus additional data gathering in the field. Features that will be considered include slope gradient and stabilities, drainage features, particle size, and parent material origin (e.g. colluvium, alluvium, glacial till, etc.).

8.1.7 Vegetation/Wildlife

Earlier studies have indicated that wildlife of economic and recreational importance in the area include moose, deer, caribou, goats, and black bear. A review of wildlife resources has been initiated that examines published and unpublished reports, survey data, and incidental sightings from government and local contacts. Browse and pellet observations will contribute to the analysis.

A review of the available literature on vegetation, including forestry data, has been initiated. The flora of the development area is being mapped using air photo interpretation and analysis of biogeoclimatic factors.

8.2 Socioeconomic Factors

In 1980, the Cyprus Anvil Corp. commissioned a socioeconomic profile of the area. Historically, the area was used by the Sekani Indians for fur trapping. In about 1870, Fort Grahame was established on the Finlay River to facilitate trade with the Sekani, with a second post established in 1954 at Fort Ware. With the flooding in the 1960's of the Fort Grahame and Finlay River area by the Williston Reservoir, the Sekani Indians were required to relocate mainly in Ware and Ingenika.

The present populations of Fort Ware and Ingenika are estimated at approximately 250 and 80 respectively. Studies are being initiated that will evaluate the socioeconomic consequences of the Cirque project on these native communities.

In 1966, the town of Mackenzie was built at the south end of Williston Lake to serve the new development and is now the main transportation and supply route into the immediate area. Its economic base is primarily the logging and pulp and paper industries. Prince George and Fort St. John have developed into the principle transportation and communication centers for the region, connecting the Mackenzie area with the rest of the province and Canada. Prince George is also the location for the regional office of the provincial government. A great deal of interest has been expressed in the area, in generally broadening the economic base and in expanding the service industries.

The mine will create well over 200 direct jobs and an additional number in support and service jobs during the 1.5 year construction phase. Subsequently, it will create approximately 250 permanent jobs for mine employees plus 100 additional permanent jobs in secondary and service industries. With the proposed fly-in, fly-out program, the socioeconomic benefits of this workforce will be realized by the existing communities in the area with minimal additional infrastructure costs being imposed on the municipalities. Furthermore, the development of oil, gas and coal industries in northeastern B.C. has brought many technically skilled persons into the area. Hence, it is anticipated that the workforce requirement for the project will be largely satisfied by the existing communities in the area, such as Fort St. John, Mackenzie, Dawson Creek, Chetwynd and Prince George. Native people living in the Fort Ware and Ingenika villages will also be sought as a source of labour supply for the project.

Additional studies will be undertaken, as part of the environmental assessment, that contemporizes all the socioeconomic factors associated with the project.