Tom Schroeter
July 8/93

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Red Mountain Project

PROSPECTUS

Submitted to:

Mine Development Assessment Branch
Victoria, British Columbia

Submitted by:

LAC

Lac Minerals Ltd.
Vancouver, British Columbia

May 1993

Rescan

PROJECT FACT SHEET

CORPORATE DATA

Project Name:	Red Mountain Project
Company Name and Address:	Lac Minerals Ltd. 204 - 698 Seymour Street Vancouver, B.C. V6B 3K6 Telephone: (604) 687-7091 Fax: (604) 683-5113
Contact/Title and Address:	Mr. David Cawood Project Manager P.O. Box 337 Stewart, B.C. V0T 1W0 Telephone: (604) 636-2120

PROJECT DETAILS

Project Location:	18 kilometres E/NE of Stewart, B.C. 55°57'N Latitude 129°42'W Longitude
Exploration Cost to Date:	$7.5 million
Estimated Development Cost:	Offsite - $61 million; onsite - $115 million
Estimated Total Capital Cost:	Offsite - $79 million; onsite - $135 million
Minerals:	Gold, silver
Mining Method and Production Rate:	Open-stope longhole mining; 1,500 tpd

Process Plant/Mill:	Alternative 1 - offsite at Westmin's Premier Mill Alternative 2 - onsite in underground or surface mill
Ore Beneficiation Process:	Flotation/Cyanide Leaching or Direct Cyanide Leaching
Proposed Mine Life:	8 years

MINERAL RESERVES

Resources:	Geological: 2.5 million tonnes @ 12.8 gm/T Au uncut and 38.1 gm/T Ag
Cut-off Grade:	3 gm/T
Potential for Additional Reserves:	Good

ACCESS/TRANSPORTATION

Road and Tramway (During Exploration and Operations):	Stewart Highway (Hwy. 37) to Bitter Creek (11 kilometres); Bitter Creek (along Bitter Creek Valley) to Red Mountain lower tram terminal (15 kilometres); tramway from end of access road to north face of Red Mountain (2.3 kilometres)
Air Access (During Exploration):	By helicopter from Stewart

POWER SUPPLY

Diesel generation during exploration and development
B.C. Hydro during operations

WORKFORCE INFORMATION

Construction Workforce: (Annual Average)	Offsite alternative: 180 Onsite alternative: 300
Operation Workforce: (Annual Average)	150
Housing Options:	Stewart (daily bus transport to mine)
Proposed Workforce Rotation/Schedule:	Mine: 2 10-hour shifts/day, 7 days/week Mill: 2 12-hour shifts/day, 7 days/week

PRELIMINARY DEVELOPMENT SCHEDULE

Detailed Feasibility Study:	March 1994
Application for Mine Development Certificate:	June/July 1994
Site Construction Startup:	January 1995
Mine Production Startup:	Offsite alternative: September 1995 Onsite alternative: September 1996

1.0 INTRODUCTION

1.1 Preamble

Lac Minerals Ltd. is a North American-based mining company that presently owns and operates eleven mines, six of which are located in Canada. The Red Mountain property, the subject of this Prospectus, hosts gold and silver mineralization and is located in the Coastal Mountain Range near the Town of Stewart, British Columbia (Figure 1-1).

Located in a cirque between the Cambria Ice Field and Bromley Glacier, at an elevation between 1,500 and 2,000 metres, the Red Mountain project area is characterized by rugged, steep terrain and difficult weather conditions. Access to the Red Mountain property is presently via helicopter from Stewart with a nominal flight time of roughly 10 to 15 minutes. Permanent access would encompass the use of the paved Stewart Highway (Hwy. 37) for 11 kilometres; then, an additional 15 kilometres along the Bitter Creek valley to the base of a proposed tramway at 550 metres elevation. The tramway would connect the end of the access road to the north face of Red Mountain at 1,630 metres elevation, some 2.3 kilometres (Figure 1-2).

This Prospectus describes the present conceptual plans for developing and operating the Red Mountain project and for ensuring that it is managed in an environmentally acceptable manner. Complementing a report already submitted to government entitled *Red Mountain Project - Baseline Environmental Monitoring Protocols* (April 1993), the *Red Mountain Project Prospectus* is submitted as a foundation for government reviewers to establish terms-of-reference for development approval (*i.e.* issuance of a Mine Development Certificate) and the acquisition of subsequent operating permits. The document is structured to first provide an understanding of the exploration history and geology of the property, an outline of project development concepts (*e.g.* mining and milling), followed by a discussion of existing environmental conditions at and surrounding the project area. Finally, a brief description of the monitoring programs is presented. These programs have been established to ensure that data necessary for environmental management planning are collected in support of the intended Application for a Mine Development Certificate. The environmental program at Red Mountain has

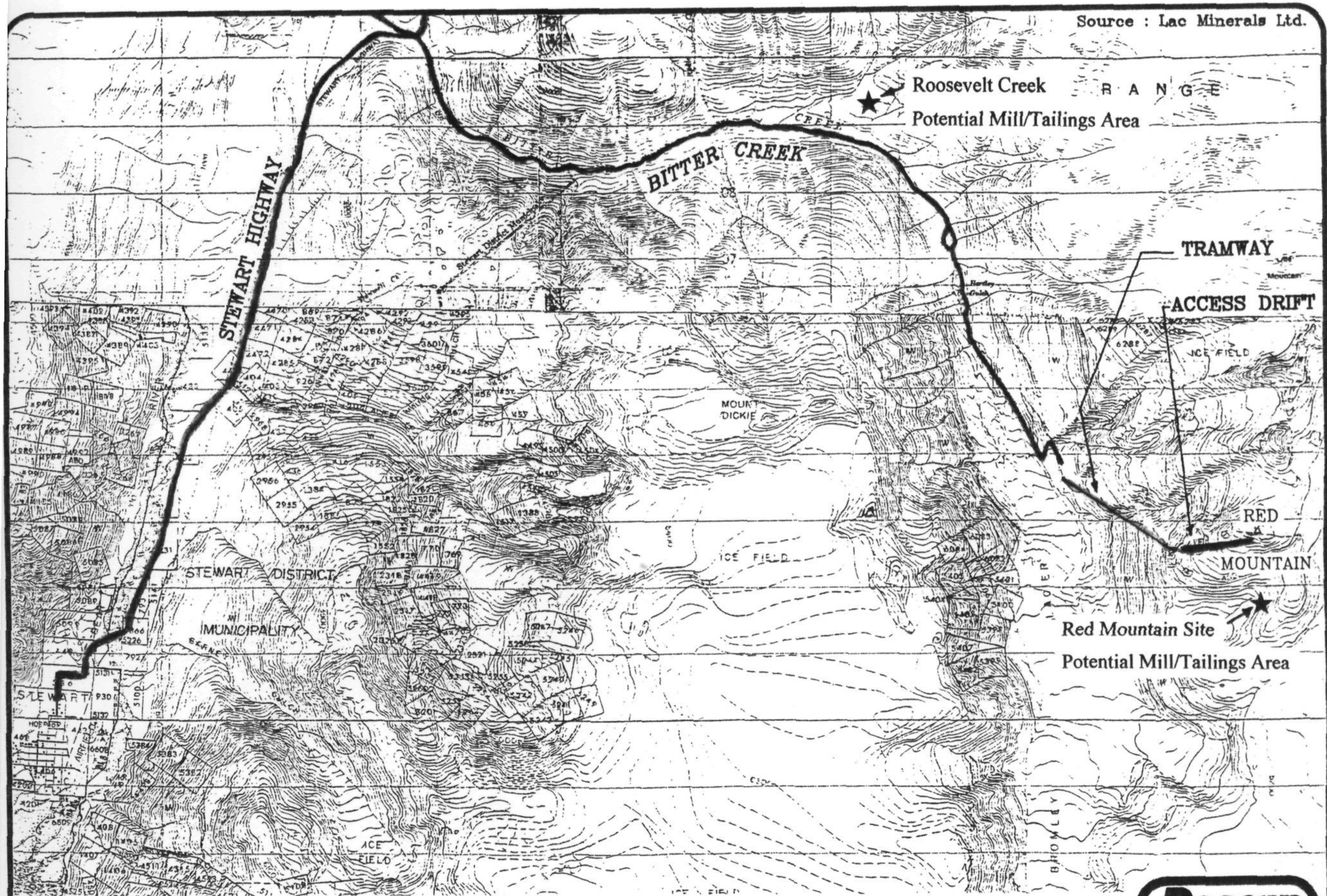

Figure 1-2 : RED MOUNTAIN-ACCESS AND SITE LOCATION been designed to ensure that project development, operation and ultimately, closure, are completed in a manner consistent with Lac's commitment to environmental protection (Appendix A).

1.2 Project Location and Setting

The Red Mountain property is located in northwestern British Columbia, approximately 18 kilometres east/northeast of Stewart, at 55°57'N and 129°42' W (Figures 1-1 and 1-2). The ore deposit is situated under the summit of Red Mountain, at an elevation of about 1,700 to 2,000 metres above sea level. The surrounding area is rugged, with steep terrain and a challenging climate. The project site is drained by Goldslide Creek which flows southwest to the side of Bromley Glacier and also by Rio Blanco Creek. Goldslide Creek is a tributary to Bitter Creek, via Bromley Glacier which, in turn, drains into the Bear River and eventually into the Portland Canal near Stewart.

Red Mountain has recently been exposed by a retreating glacier, resulting in natural acid-leaching due to the oxidation of specific minerals (see Section 6.2.2). This naturally-occuring phenomenon renders the area unique in its environmental characteristics (*e.g.* affects water quality in the upper tributaries of Bitter Creek), which must be carefully considered when interpreting baseline information and future monitoring data.

1.3 Historical Perspective

Following limited gold exploration in the last years of the 19th century, and the early part of this century, the Red Mountain property was evaluated for molybdenum occurrences in the 1960s and 1970s. A molybdenum showing as well as native gold were discovered in 1965 at the south side of Red Mountain (Erin Showing, McAdam Point). Additional small molybdenum showings were located during subsequent exploration programs in the central cirque of Red Mountain. Significant gold values (up to 37 g Au/t) were obtained in 1973 from Lost Mountain (R.H.S. claims), a nunatak immediately south of Red Mountain and separated from the latter by the northern branch of Bromley Glacier. Red Mountain remained unexplored for gold, as it was mainly regarded as a setting favourable for porphyry molybdenum-style mineralization. The reactivation of gold exploration in the area during the mid-to-late 1980s focused on the Iskut and

Sulphurets Gold Camps and the surroundings of the historic Silbak-Premier mine further to the north, all of which are situated in geological environments similar to that of Red Mountain.

The following is a chronological summary of exploration activity on the immediate Red Mountain Deposit.

1899/1902	Discovery and small-scale mining of placer gold in Bitter Creek.
1915	Shipment of 15 tons of hand-sorted ore from the Silver Tunnel, Roosevelt #1 claim, on Roosevelt Creek, a tributary of Bitter Creek, to Trail; smelter returns averaged 0.26 oz/t Au, 101 oz Ag/t, 34% Pb, and 8% Zn.
1965	Discovery of molybdenite mineralization and visible gold at McAdam Point (Erin Showing; MI103P/220); rock sampling, geological mapping, hand trenching, diamond drilling (one 70 metres AX hole). The rock sampling yielded an average of 0.0475% MoS_2 over 137 metres. One of the trenches yielded values of up to 64.45 g Au/t over 0.61 metres.
1967	Northgate Explorations Ltd.: geological mapping, geochemistry (263 samples, analyzed for copper, molybdenum, zinc); diamond drilling; 613 metres in 5 holes; 4 holes within the hornblende porphyry in the Red Mountain cirque area, 1 hole in the granodiorite at McAdam Point.
1966/73	Rehabilitation and extension of the underground workings at the Silver Tunnel vein on Roosevelt #1 claim; production of about 5,000 tonnes of unknown grade; the ore was processed at the Adam custom mill on lower Bitter Creek.
1976	Jack Claims staked by J. Howard (central and southern portions of Red Mountain) and optioned to Zenore Resources Ltd.

1977/78 Zenore Resources Ltd.: logging and re-sampling of the 1967 drill core; these samples were assayed for molybdenum only; geological mapping, rock geochemistry (assayed for copper, molybdenum, and gold), petrographic study.

1978/80 Falconbridge Nickel Mines Ltd.: reconnaissance program for porphyry copper-molybdenum targets in the Stewart area. eg. Mt. Patullo

circa 1988 Prospecting, staking + option of ground by C. Kowall, while on BC Gov't FAME (Prospecting) Grant

1988/89 Staking of Red Mountain by Wotan Resources Inc.

1989 Red Mountain and Bria Wotan properties optioned to Bond Gold Canada Inc.; discovery and drill testing of the Marc Zone (3,623 metres; values of up to 9.88 g Au/t and 42.29 g Ag/t over a core length of 66 metres) and Brad Zone (1,107 metres; values up to 7.22 g Au/t over 1.5 metres) gold-silver mineralization; airborne EM and magnetic survey.

1990 Exploration of Marc Zone and adjacent area (11,615 metres of drilling) by Bond Gold Canada Inc. A resource estimate based on 1990 results consisted of 913,000 tonnes at 12.20 g Au/t (uncut) and 36.08 g Ag/t.

1991 Lac Minerals Limited acquired 100% of Bond Gold Canada Inc. A 2400 metre drill program was completed on the Marc and AV zones.

1992 A 4000 metre drill program increased the Red Mountain resource and indicated excellent potential for expansion.

Figure 1-3 illustrates the present land status of the area.

1993 – Prospectus submitted to BC Mine Devel. Assess. Br. Reserves estimated at 2.5 million tonnes grading 12.8 g/t Au and 38.1 g/t Ag (using a 3g/t Au cutoff)

– Sept. 24/93 Lac Minerals' News Release – 2 new zones discovered (JW + 141) = potential for >2 million oz Au.

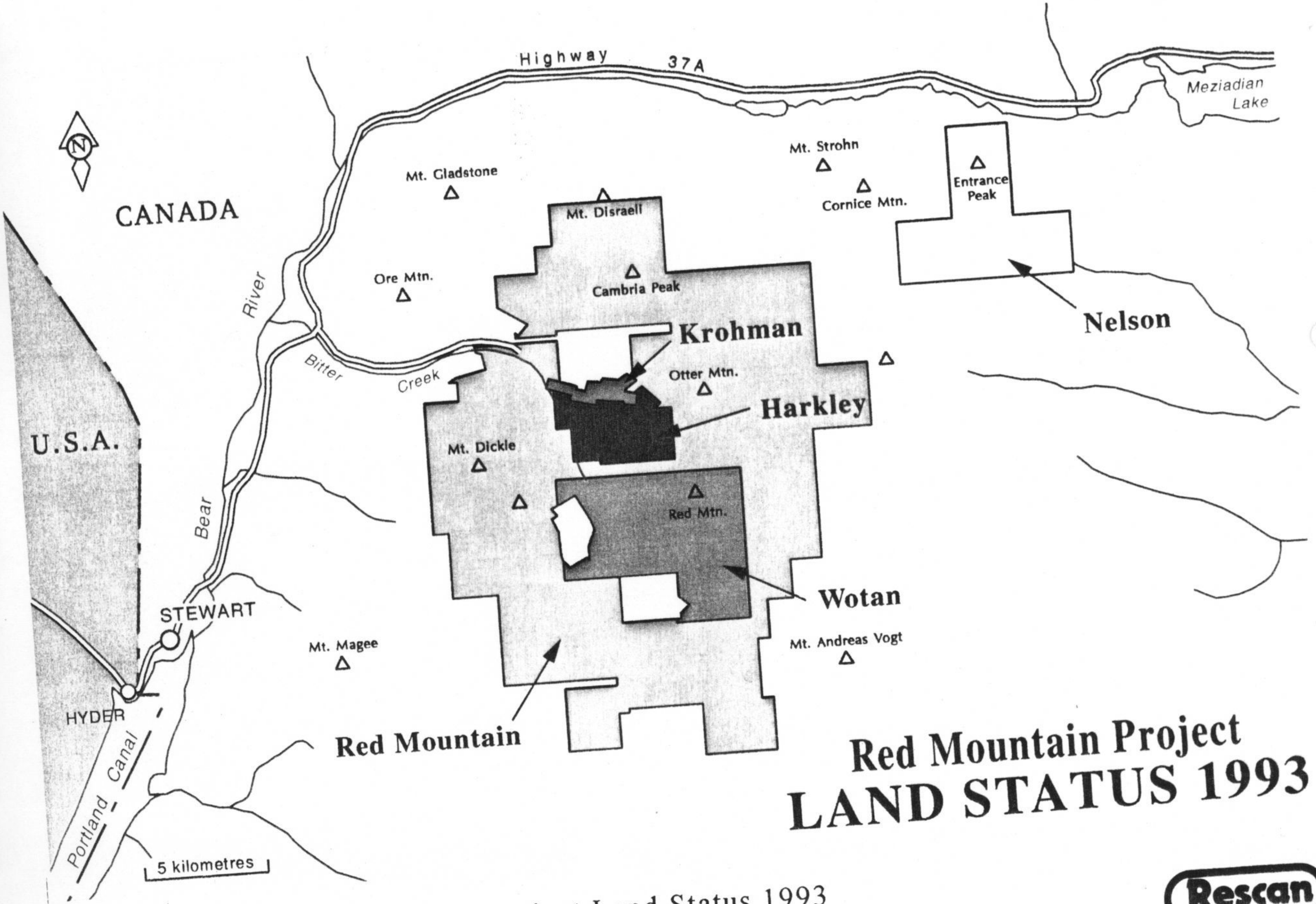

Figure 1-3: Red Mountain Project Land Status 1993

4. PROPOSED MILLING PLAN

2.0 GEOLOGY AND RESERVES

2.1 Regional Geology

The Red Mountain property is situated within a broad, north-northwest trending volcano-plutonic belt composed of Upper Triassic Stuhini Group and Upper Triassic to Lower - Middle Jurassic Hazelton Group. This belt has been termed the "Stewart Complex" and forms part of the Stikinia Terrane. The Stikinia Terrane, together with the Cache Creek and Quesnel Terranes, constitute the Intermontane Superterrane which is believed to have accreted to North America in Middle Jurassic time. To the west, the Stewart Complex is bordered by the Coast Plutonic Complex. Sedimentary rocks of the Middle to Upper Jurassic Bowser Lake Group overlay the complex to the east.

The Jurassic stratigraphy was established by Grove (1986) during regional mapping between 1964 and 1968. Formational subdivisions have been and are in the process of being modified and refined as a result of recent work being undertaken in the Stewart, Sulphurets, and Iskut areas by the Geological Survey Branch of the BCMEMPR, the Geological Survey of Canada and the Mineral Deposits Research Unit at the University of British Columbia. A sedimentological, stratigraphic, and structural synthesis is emerging for this area.

The Stewart Complex is the setting for the Stewart (Silbak-Premier, Big Missouri), Iskut (Snip, Johnny Mountain, Eskay Creek), Sulphurets, and Kitsault (Alice Arm) gold/silver mining camps. Mesothermal to epithermal, depth-persistent gold-silver veins form one of the most significant types of economic gold deposits. There is a spatial as well as temporal association of this gold mineralization with Lower Jurassic calc-alkaline intrusions and volcanic centres.

The historic Silbak-Premier gold-silver mine located 21 kilometres northwest of Red Mountain produced 59,872 kg gold and 1,294,800 kg silver between 1918-1976, and 1989-90.

References?

2.2 Red Mountain Property Geology and Mineralization

The only available published geological map that covers the Red Mountain area is the 1:100,000 scale Unuk River-Salmon River-Anyox map (Grove, 1986). According to Grove, the property area is underlain by Lower to Middle Jurassic rocks of the Hazelton Group (Unuk River and Salmon River Formations) which have been intruded by Middle Jurassic and Early Tertiary stocks and dykes. The younger intrusive sequence forms part of the Coast Plutonic Complex.

The portion of the property located east of Bromley Glacier is underlain by rocks of the Lower Jurassic Unuk Formation. This formation consists of sediments, volcaniclastics, crystal and lithic tuffs and limestones. Rocks of the Upper Jurassic Salmon River Formation, a sequence of fine to coarse-grained sediments, limestones, rhyolites and crystal and lithic tuffs, are exposed west of Bromley Glacier. The Betty Creek and Mount Dilworth Formations, which stratigraphically underlie the Salmon River Formation, have not been identified on Red Mountain.

Rocks underlying Red Mountain are porphyritic textured massive bedded, and intrusive rocks, volcaniclastics, argillite, calcareous siltstente and limestone. Porphyritic textured rocks at Red Mountain represent a suite of intrusive (feldspar hornblende porphyry) and extrusive rocks (crystal tuffs and porphyritic massive flows). Consistent recognition of intrusive and extrusive rocks is difficult. A north-east trending magnetic high centred in Goldslide Creek cirque could be the Goldslide intrusive dated at 200 ma. Reference ?!

A granodioritic to quartz-monzonitic intrusion, the Erin Stock, is exposed at the southern tip of Red Mountain and appears to continue south under the Bromley Glacier onto Lost Mountain. The stock and associated aplitic dykes intrude a sequence of thinly bedded argillites, calcareous sediments and intermediate pyroclastics. The sediments have been extensively skarnified and hornfelsed. The stock itself is cut by a number of fine-grained basaltic dykes. A Lower Tertiary age of 45 +/- 2 Ma has been determined from a biotite sample by argon-argon methods. (reference!)

Several sets of dykes cut the sedimentary and volcaniclastic rocks at Red Mountain, including:

a) potassium feldspar porphyritic dykes - light grey with subhedral feldspar crystal and quartz eyes in aphanitic matrix, mainly northeast trending. The appearance and relative age relationships indicate that these dykes may correlate with the Early Jurassic Texas Creek intrusive suite.

b) microdioritic dykes - green-grey, fine-grained, feldspar-hornblende porphyritic, generally northwest trending and southwest dipping. Plagioclase occurs as anhedral grains up to 1 millimetre, with hornblende as anhedral to prismatic crystals up to 1.5 millimetres.

c) lamprophyre dykes - green-grey, with minor vesicles and typically composed of green acicular hornblende and plagioclase in a dense matrix. These dykes have a north-northwesterly trend and cut all other types of dykes. They appear to be related to the Oligocene-Miocene lamprophyre dyke suite known from the Stewart area.

Red Mountain is characterized by an extensive gossan covering approximately 12 square kilometres. The property attracted exploration activities for porphyry molybdenum-type targets in the 1960's. The molybdenite mineralization is controlled by northerly trending fractures along the northern contact of the Erin Stock (McAdam Point). The most significant mineralization is restricted to within 25 metres of the contact and overall occurrences were judged as non-economic. An occurrence of visible gold with values up to 27.42 g Au/t over 0.91 metres, 30.85 g Au/t over 0.61 metres and 64.45 g Au/t over 0.61 metres have been mentioned for this area in reports from the 1960's. The Marc and AV Zones are located under the summit of the Red Mountain (Figure 2-1). The discovery of the Marc Zone by Bond Gold Canada Inc. in 1989 resulted from tracing heavily mineralized float uphill to its bedrock source. Mineralization is exposed at the foot of a vertical cliff (elevation 1,930 metres) and extends at surface for about 30 metres along strike with a width varying from 3 to 20 metres.

The Marc and AV Zones occur within altered bedded andesitic volcaniclastic rocks and altered massive feldspar-hornblende porphyry and crystal tuffs. The bedded units generally strike northwest and are folded about northwest trending anticlinal and synclinal axes that have been mapped in the vicinity of the two

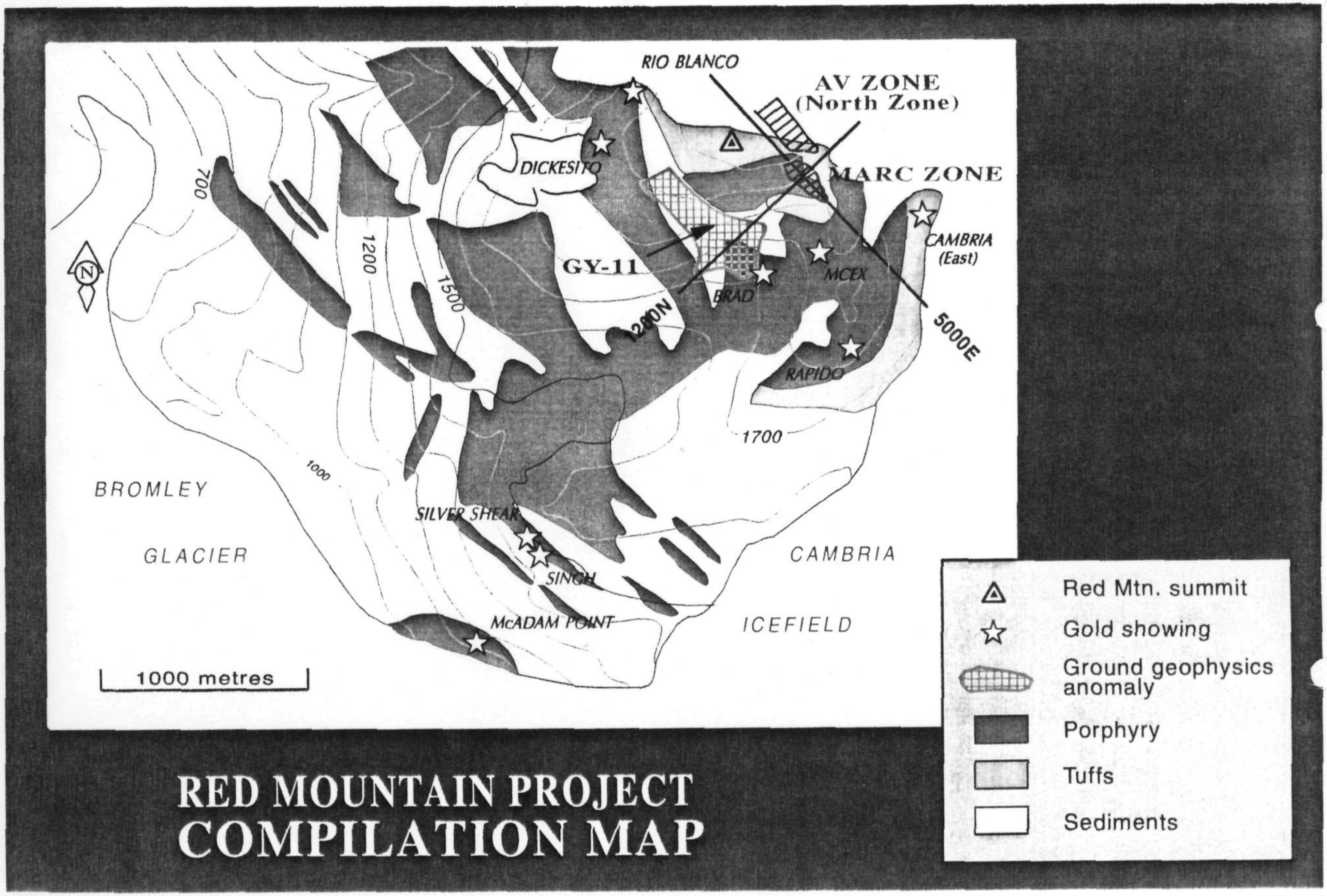

Figure 2-1: Red Mountain Project Compilation Map

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zones. Ore grade gold mineralization is associated with a wide zone of Na_2O depletion that is best developed in the footwall to the ore. Arsenic enrichment (>100 ppm) is widespread and best developed in the hanging wall to the ore zones. Antimony enrichment (>20 ppm) is restricted to the ore zones. The similar chemistry of the units, as well as the presence of porphyritic fragments in the volcaniclastic rocks, suggests a common origin.

Zn ?

Hydrothermal alteration consists of strong to pervasive sericitization, moderate to strong pyritization, moderate chloritization and moderate silicification and widespread potash feldspar alteration. The silicification reflects mainly an increase in modal quartz as a consequence of sericitization. Moderate to strong potassic alteration as well as albitization occur locally. Tourmaline is prevalent in the vicinity of the mineralized zones.

Significance, importance?

Mineralization consists of densely disseminated to massive (>60%) pyrite and/or pyrite stringers and veinlets and variable amounts of associated pyrrhotite and sphalerite as well as minor chalcopyrite, arsenopyrite, galena, tetrahedrite and various tellurides. Several phases of mineralization and deformation are indicated by the presence of different generations of pyrite as well as breccia fragments consisting of pyrite. High grade gold values are usually associated with the semi-massive, coarse-grained pyrite aggregates, but also occur with stockwork pyrite stringers and veinlets. Gold occurs as native gold, electrum and as tellurides. Visible gold is rare.

Native gold, as observed in polished thin sections, ranges in size from 10 to 500 microns and occurs as threads, interstitial pockets, and partial networks within the pyrite as well as moulded onto the periphery of pyrite fragments within the gangue. Hessite (Ag_2Te), altaite ($PbTe$), petsite (Ag_3AuTe_2), calaverite ($AuTe_2$), sylvanite ($AuAgTe_4$), native tellurium, aurostibite ($AuSb$), bournontite ($PbCuSb_3$), hedleyite (Bi_7Te_3), native bismuth and bismuthinite (Bi_7S_3) are closely associated with native gold and electrum.

Mineralogy

A UTEM geophysical zone, overlying the north end of the Marc Zones, is a silver-rich sphalerite and pyrrhotite zone with associated anomalous gold, lead and copper values. The sulphides occur as matrix fill, anastomosing stringers and fine laminae parallel to bedding within a moderately to highly brecciated sequence of tuffs. Values range up to 0.58 g Au/t, 69.22 g Ag/t, 5.60% zinc, 0.47% lead and

0.06% copper over a core length of 9 metres. Silver/gold ratios for the UTEM zone are considerably higher than those for the Marc and AV Zones gold mineralization (40 to >100 versus 1 to 10).

There are at least two sets of brittle faults which are reflected in drill core by broken and sometimes gougey ground. These occur as conjugate sets striking northeast to east and north-northwest. Important northeast striking structures are the Goldslide Creek fault, the Torresito lineament and the Rio Blanco lineament. The Goldslide Creek fault offsets the southeast extension of the Marc Zone. North-northwest trending normal faults represent brittle faults with observable displacement in rocks exposed above the Marc Zone.

2.3 Geological Resource

In longitudinal section, the Marc Zone is a 300 metre long lense-shaped body with a 150 metre vertical range that plunges at approximately 20 degrees to the northwest. Figure 2-2 is a cross-section through the Marc Zone. The AV Zone is a 275-metre long lense-shaped body with approximately a 130 metre vertical range that plunges at 20 degrees to the northwest. Figure 2-3 is a cross-section through the AV Zone.

A geological resource, calculated using a 3 gm cut-off and a minimum mining width of 3 metres, stood at 1,213,000 metric tonnes grading 12.70 g Au/t and 40.99 g Ag/t for the Marc Zone, and 1,315,000 metric tonnes grading 13.05 g Au/t and 28.64 g Ag/t for the AV Zone. A large portion of the AV zone is in the inferred resource category. Figure 2-4 is a vertical long section which shows the distribution of resource blocks in the Marc and AV Zones.

Marc and AV 'Reserves'

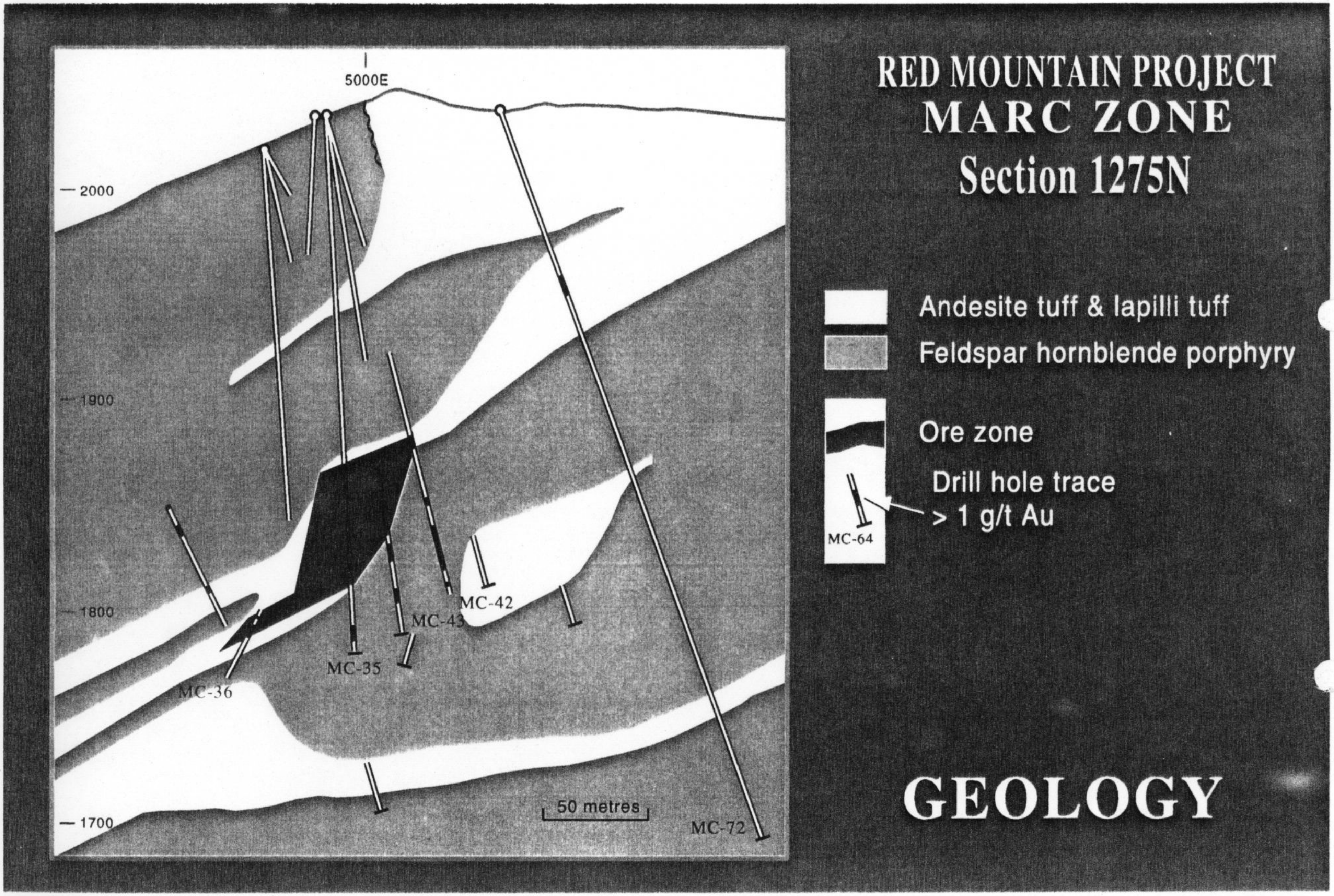

Figure 2-2: Red Mountain Project Marc Zone Section 1275N

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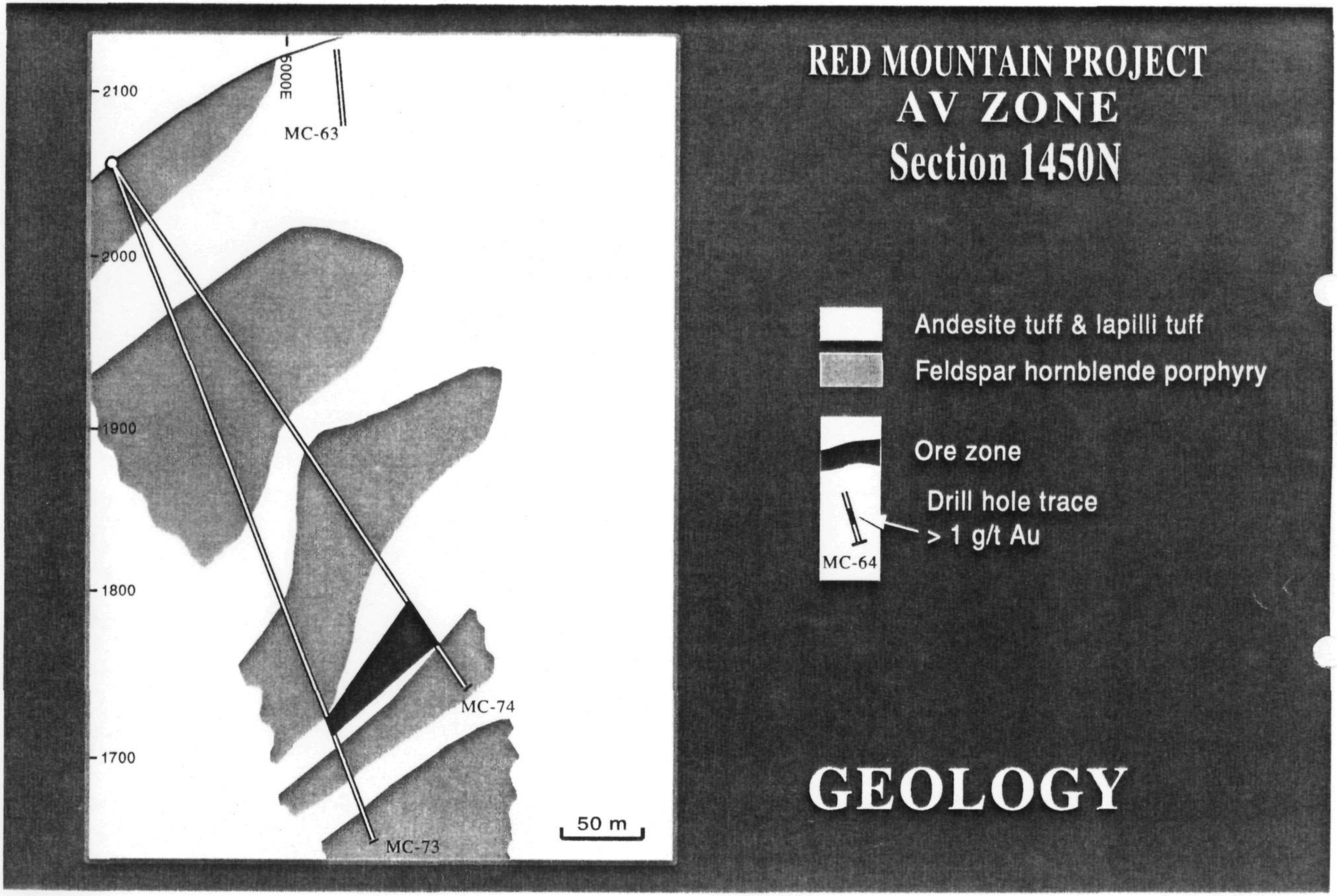

Figure 2-3: Red Mountain Project AV Zone Section 1450N

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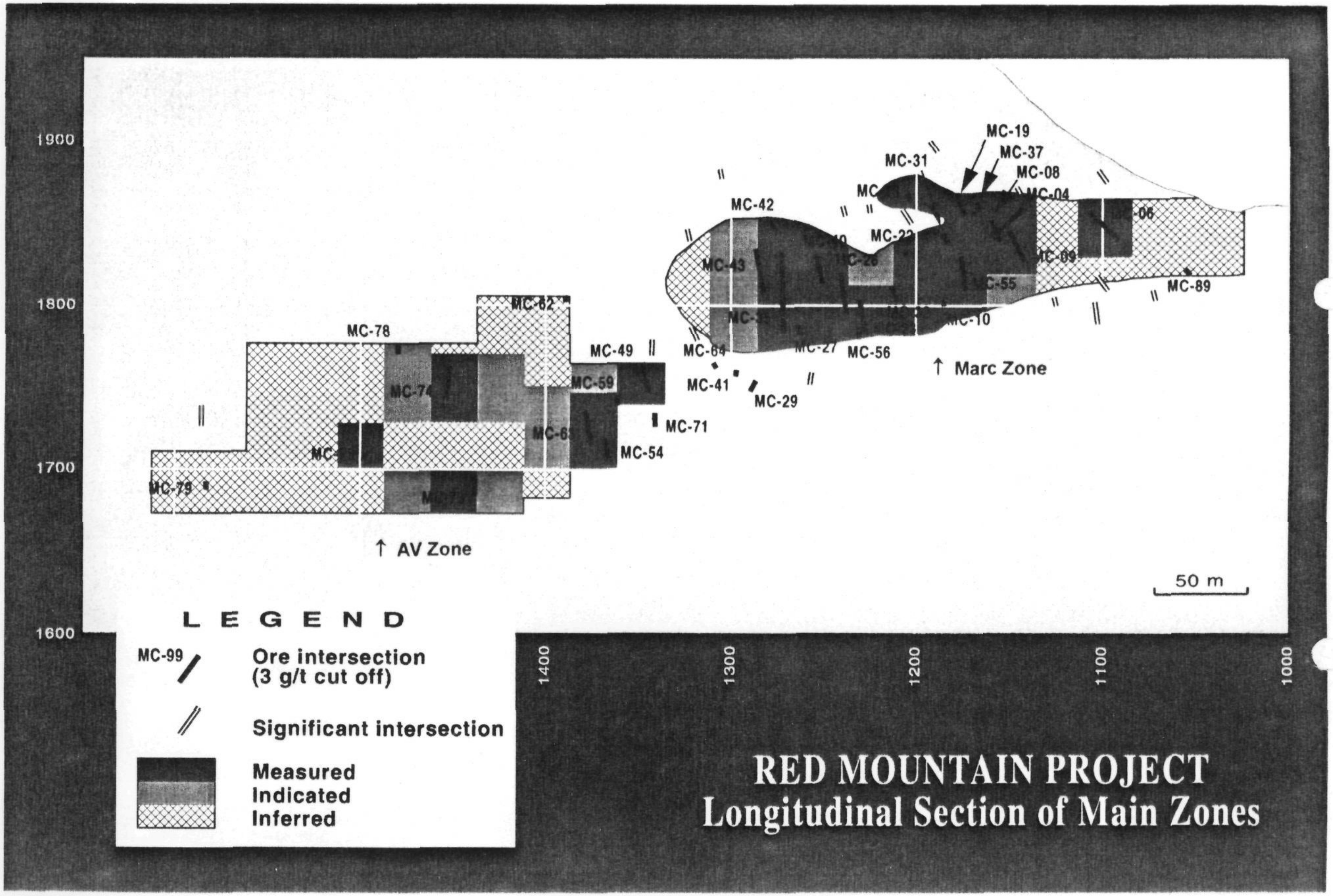

Figure 2-4: Red Mountain Project Longitudinal Section of Main Zones

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3.0 PROPOSED MINING PLAN

3.1 Production Rate and Mine Life

Project concepts are based on underground mining of the Marc/AV mineral zones at a rate of 1,500 tonnes per day, or 500,000 tonnes per year, over an eight year mining life. Access to the mining area would comprise a gravel road from Stewart Highway (Hwy. 37) to the upper end of Bitter Creek, with an aerial tramway to the west flank of Red Mountain connecting to the mine access adit.

3.2 Mining Method

Present geological information appears to indicate that ground conditions in the Red Mountain deposit are favourable for the use of a high productivity long-hole mining method. Two approaches have been considered. The first is transverse stopes accessed from development in the foot wall, to be mined in a room-and-pillar sequence using consolidated backfill for pillar recovery. The second alternative is longitudinal open stopes, with one central pillar.

The initial mining area will be the Marc Zone. Definition diamond drilling will be required during the pre-production period for stope outline. Access to the mining area from the upper terminal of the tramway will be through an adit 1.3 kilometres long, 3.5 metres high x 4.5 metres wide. Stope access will be a 3 metres high x 4 metres wide, + 15% ramp in the foot wall, which will connect to surface near the Marc Zone outcrop.

Stope dimensions for the transverse method have been assumed as follows: 15 metres wide, 25 metres high, and up to 40 metres long. The mined-out stopes will be backfilled with cemented material to allow high underground recovery. Fill sources that can be considered are development waste, material quarried on surface, and possibly cemented paste fill utilizing tailings.

The transverse stopes will be developed from the access crosscuts off the ramp, with drill drifts, mucking drifts and slot raises. Long-hole drills (down the hole) will drill off vertical slices. Mucking will be with 6 yard scooptrams, remotely operated in the stopes, and tramming to the ore pass feeding the crusher. Broken ore will be crushed underground to minus 20 centimetres, and conveyed to the tramway or the mill storage bin, depending on the processing alternative chosen (as described in Section 4.0). Tramming distances in the Marc Zone should be no more than 300 metres, so trucking of ore should not be necessary.

The longitudinal mining method will utilize the same access ramp in the foot wall, with longitudinal drill drifts in ore, and stope undercuts at the bottom of the ore zone to allow removal of broken ore through mucking cross-cuts and haulage drifts. Long-hole drilling will start at the extremities, retreating to a central pillar, which can be recovered or left in place, depending upon ground support requirements. Mucking, transport and crushing will be the same as for the transverse method. The final choice of mining method will depend on the geological, geotechnical and rock mechanics information which will be obtained during the 1993 exploration program.

Mine services will include ventilation, shops, power, water, compressed air, fuel supply, communications, and emergency refuge/accommodation (in event of fire or tramway interruption).

Waste rock produced during the development phase will be stockpiled on the surface, (on specially designed storage pads to allow collection and treatment of any acidic runoff), in the Red Mountain cirque and at the Marc Zone portal. A detailed description of the storage pads and collection/treatment systems for runoff from potentially acid-generating waste rock was filed in a Notice of Work application with the Northwest Mine Development Review Committee in April of 1993.

It is planned that the development waste will be moved back into the mine either as cemented fill in the transverse stopes, or as loose fill in the open longitudinal stopes. This material will be trucked through the Marc Zone ramp and the access adit. All fill will be moved by truck to fill raises. If possible, fill raises will be in ore, and depending on geometry, may be utilized as stope slot raises. Daily fill requirements for the transverse stoping method will be in the order of 900 to 1,000 tonnes, and cement requirements are based on a maximum of 5%.

Upon closure of the mine, all acid-generating material will have been placed underground in the mined-out stopes. All openings will be closed with grouted cement plugs, and the original groundwater regime will be reinstated to flood the mine. Plugging the mine will be facilitated by minimizing the openings to only access and ventilation requirements.

If the project is abandoned prior to production, acid-generating material will be placed underground in the decline or adit and allowed to flood. The portals will be sealed with grouted cement plugs. All remaining potentially acid-generating material on the surface will be sealed with a bentonite and geotextile mat to prevent the infiltration of precipitation and consequent release of acidic waters.

The mine will operate two 10 hour shifts per day, 7 days per week, 12 months per year. Three hundred and thirty-three operating days are required to mine 500,000 tonnes/year at a rate of 1,500 tonnes per day, which allows for 32 days of down time, including statutory holidays, and will allow up to 20 days of shutdown due to weather, road closures, *etc.*

The present plan is that all personnel will live in Stewart, and will commute to the mine on a shift basis by company bus (which will take workers from the mine to Stewart and return with the next shift). This will ensure that only one shift would be delayed at the mine in event of road closure. No private vehicles will be allowed on the Bitter Creek road during the winter season, and all vehicle movements will be monitored and controlled during the avalanche season. A comprehensive avalanche control program will be exercised during the winter months. Emergency accommodation will be available at the mine, in the event of a tramway interruption, and at the lower terminal, in case of a road closure.

responsibilities of road ?

4.0 PROPOSED MILLING PLAN

Several milling options are currently under consideration. These options will be narrowed down after metallurgical testing defines the optimum process flowsheet, and site development confirms the mining plans. Site investigation will evaluate alternative mill site locations and tailings disposal alternatives. Both offsite milling at Westmin's Premier facility, and onsite processing at Red Mountain are being considered.

The two recovery processes currently being evaluated by bench-scale metallurgical testing include flotation concentration followed by cyanide leaching of the concentrate and direct cyanide leaching.

Mill operations (either at Premier or onsite) will be continuous, with two 12-hour or three 8-hour shifts per day. As with the mining operations, personnel will be transported to the project site on a shift basis by company bus. The Premier milling option will also require the transportation of ore through the town of Stewart, and across the U.S. border at Hyder, Alaska. This transportation requirement will be duly planned during feasibility studies and in preparing the Application for Mine Development Certificate.

4.1 Process Alternatives

4.1.1 Flotation/Cyanide Leaching

The flotation/cyanide leaching process alternative is described in the flowsheet in Figure 4-1. Crushing and grinding options will be the same as for Direct Cyanide Leaching (see below). Comminution will be followed by conventional bulk sulphide flotation to concentrate the sulphide minerals which contain much of the gold. This flotation concentrate will be reground in a ball mill, then thickened in preparation for cyanide leaching and gold recovery by conventional techniques.

Inco SO_2? process,

After gold extraction, the residual cyanide will be destroyed (SO_2 or other effective process), and the leached concentrate could be considered for use as a paste backfill in the mine. The flotation tailings, which will have a much reduced sulphide concentration, could be considered for conventional disposal. Acid generation testwork will be completed on various products from the concentrator to determine the potential for, and rate of, acid production.

4.1.2 Direct Cyanide Leaching

If the Premier mill option is selected, the ore will be crushed at the mine to facilitate handling, and grinding will be by SAG/ball milling at the Premier mill. For onsite processing (Figure 4-2), the crushing could be done by a conventional three-stage system, using a jaw crusher followed by cone crushers in closed circuit with vibrating screens. The grinding circuit could use a rod mill followed by a ball mill in closed circuit with cyclone classification. A SAG/ball milling circuit will be considered for the onsite option if the ore is amenable, and if the appropriate-sized equipment can be moved into the location.

Comminution will be followed by cyanide leaching and carbon absorption in a carbon-in-leach (CIL) circuit. Gold will be eluted from the carbon, precipitated with zinc and fire-refined to produce dore bullion. The leached tailings will be treated to destroy the cyanide before deposition into the tailings pond. An alternative is to utilize a portion of the tailings as paste backfill in the mine, assuming that this is compatible with the mining method and the tailings characteristics.

4.2 Site Alternatives

4.2.1 Offsite Milling at Premier Mill

Offsite milling at Westmin's Premier mill will be given serious consideration. Key factors are the transportation of ore, suitability of the Premier processing and tailings disposal facilities, and project economics. If this option is selected, primary crushed ore (approximately 20 centimetres) will be delivered by conveyor belt from the mine area to the upper terminal of the aerial tramway. At the lower tramway terminal in Bitter Creek Valley, the ore will be transferred to a coarse ore storage bin, then loaded into highway truck-trailers for the 48 kilometre haul via Stewart and Hyder to the Premier mill.

4.2.2 Onsite Milling at Red Mountain

Possible sites for this mill include: (a) partially or fully underground, (b) within the glacial cirque at the 1550 metre elevation, or (c) on the alluvial fan at the confluence of Roosevelt Creek with Bitter Creek. The selection of the best option for processing at Red Mountain will be influenced by the availability of tailings sites, tailings disposal methods, environmental considerations, access and economics.

A number of potential tailings disposal sites have been subjected to preliminary assessment. Additional assessment of the hydrological and topographical properties of possible sites will be made in conjunction with establishing the processing scheme and mill location.

5.0 INFRASTRUCTURE

5.1 Property Access and Tramway

Owing to the steep, mountainous topography of the Red Mountain project area, coupled with difficult weather conditions and avalanche hazards, transportation represents a key project development and operating consideration. A two-staged access concept is presently being designed as follows:

Stewart Highway to Otter Creek

A 15 kilometres, all-weather, gravel-surfaced road on the northeast (true right) side of Bitter Creek will be built from the Stewart Highway (Hwy. 37) to the south side of Otter Creek at an elevation of about 550 metres, just upstream from the flood plain at Hartley Gulch (Figure 1-2). The road design will require consideration of avalanche hazard/snow removal problems, flooding, and maintenance requirements. Total distance from Stewart by road will be 26 kilometres, including 11 kilometres of the paved Stewart Highway. Two seasons will be required to construct the road. The first season (*i.e.* 1993) will see completion of a pioneer road (4-wheel drive) to the lower terminal site, with cribbing installation, surfacing, *etc.* in the second year (1994). It appears that much of the road base cut-and-fill can be accomplished with bulldozers, and minimal rock work. The road finishing material (subgrade, surfacing) is obtainable from borrow sites in the Bitter Creek valley.

Road construction for 1993 will consist of rehabilitation of the existing logging road along Bitter Creek from Hwy. 37. The road will be extended for a further 7 kilometres to the proposed lower tram terminal area. This area will then be used as a staging area for helicopter support until the tram is in operation. In addition, it is proposed that a further 3.5 kilometres of access road be constructed in the Goldslide Creek cirque in order to access the underground work from the camp. The section of road which will access the upper Marc Zone portal is designed at a maximum grade of 15%, and is only intended for transportation of personnel during the exploration phase. Appropriate safety and environmental protection measures (*e.g.* Changes In and About a Stream, *etc.*) will be undertaken. A wildlife assessment along the access corridor was completed in 1991. A comprehensive avalanche warning, monitoring and control program will be instituted during winter months. A detailed Notice of Work application for road development and upper tram terminal rock work was filed with the Northwest Mine Development Review Committee in April 1993.

Bitter Creek Valley to Red Mountain

A 2.3 kilometres reversing cable tramway will be installed to access the north face of Red Mountain from the lower terminal at Otter Creek. A cable tramway can be installed in stages, thus reducing expenditure commitments. As well, if the project is abandoned, the cable tramway can be removed with minimal environmental disturbance.

For the offsite processing alternative (or the onsite alternative with a mill located in the Bitter Creek valley) tramming would be designed to transport ore down to the lower terminal in 10 tonne skips. The tramway would also service the mine by moving people and materials. Given an onsite milling scenario (with the mill located at Red Mountain), the tramway would be used for mine service only.

The tramway will transport people in a 60 to 70 person cabin installed around one of the ore skips. The other skip will have equipment for handling supplies and materials. The cabin side will be equipped with track-rope brakes for personnel safety. The tramway includes a standby diesel drive in the event of power failure, which can operate the tramway at about half-speed. The installed power will be in the range of 950 to 1,000 kilowatts, most of which is for braking. It is essential that the wind regime (velocity, direction, duration, *etc.*) be determined along the cable car route. Critical areas are the upper terminal and midway tower locations. Meteorological equipment is being installed during the summer of 1993 to collect reliable data on wind speed, direction and duration.

The lower tram terminal will be built on a rock outcrop south of Otter Creek, at the upper end of the Bitter Creek flood plain. The upper tram terminal will be on the north face of Red Mountain at a nominal elevation of 1,630 m. One tower, 30 metres high, will be required between Rio Blanco and Little Otter Creek. Upper tram terminal excavations must be completed during 1993, so that a temporary "winch" tram can be installed. This will allow the project scheduling commitments to be met for advanced exploration purposes.

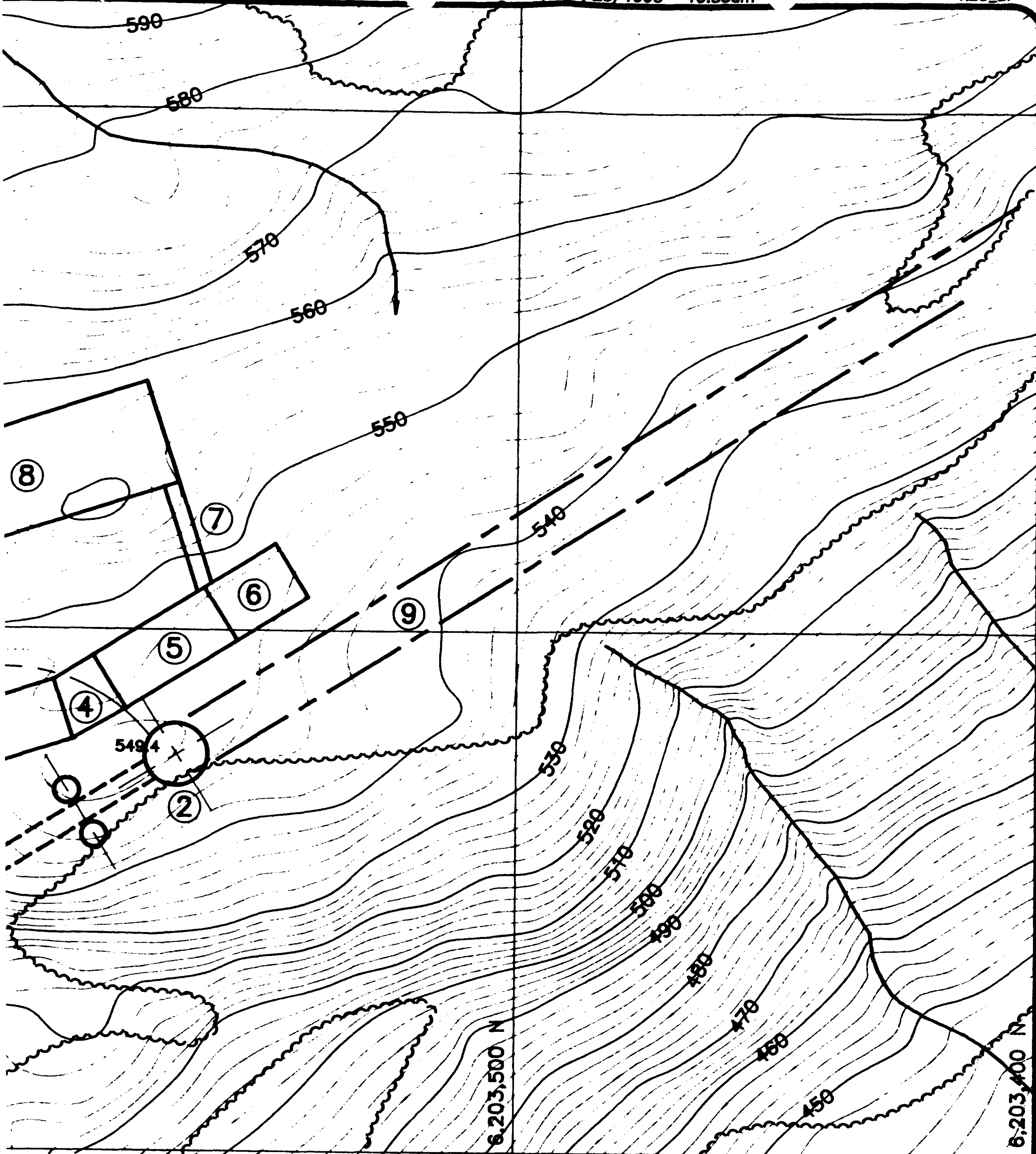
5.2 Surface Facilities

Surface facilities do not exist onsite at present. In addition to the access development discussed above (surface road and tramway), ultimate surface facilities will include offices, a warehouse, fuel storage, and a maintenance shop for mobile equipment (Figure 5-1). Depending on the milling option chosen (onsite *vs.* offsite at Premier Mill), ore handling facilities may be required which would include a 2,000 tonne, underground ore bin and truck-loading facility at the lower tram terminal. A mine changehouse will be constructed along with emergency accommodations designed to house project workers in the event of a road closure. Permanent housing will not be provided onsite. Rather, workers will be transported by company bus on a shift basis from Stewart.

Telephone communications will comprise a cellular system with coverage common to the British Columbia mainland.

During the project exploration period, electrical power will be diesel-generated. Should the project proceed to development and operations, a high-voltage power line will be constructed from the main Stewart power line, up Bitter Creek, to the lower tram terminal. Natural hazards and environmental considerations would be factored into the design and alignment of the power line. Standby diesel generation capacity would be maintained at the lower tram terminal for emergency power to surface and mine facilities.

As discussed earlier, neither a final mill location nor tailings impoundment site have yet been selected from a number of alternatives.



0 10 20 40 60 80m

Scale 1 : 1,000

SURFACE FACILITIES

Rescan

Fig 5–1

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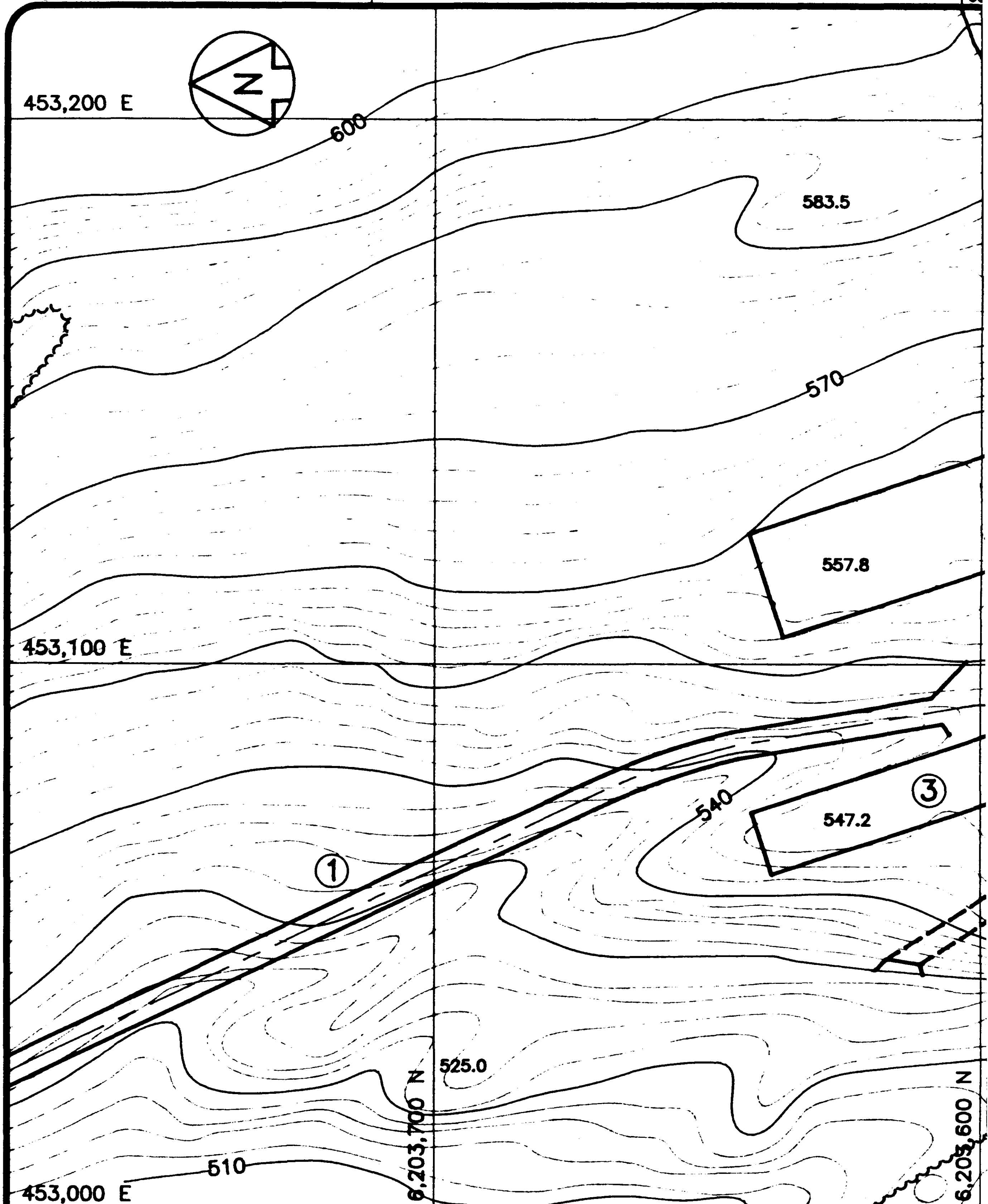

① Access Road
② Tramway
③ Changehouse
④ Covered Driveway
⑤ Warehouse/Shop
⑥ Office
⑦ Covered Walkway
⑧ Accommodation
⑨ Laydown Area

LAC

Figure 5-1 :