KUTCHO CREEK PROJECT
COPPER - ZINC - SILVER - GOLD DEPOSITS

STAGE II REPORT
VOLUME I APPENDIX
DETAILED MINE DEVELOPMENT PLAN

Submitted by

SUMAC MINES LTD.
and
ESSO MINERALS CANADA

MARCH 1986

Drilling will be carried out by 250 mm rotary drills with smaller holes used at pit limits for pre-shearing. Anfo will be used as the main blasting agent. Waste will be loaded into 80 tonne, rear dump, haul trucks using 12 cubic yard cable shovels. Ore will be mined using a combination of a hydraulic excavator and a cable shovel. The same trucks will be used to haul ore to the crusher. Normal types of mine support equipment will be available for work within the pit.

(c) Processing

Kutcho ore is amenable to flotation producing separate copper and zinc concentrates.

The copper concentrate is expected to average close to 26% copper due to the presence of bornite, with a recovery of about 85% of the copper, 53% of silver and 35% of gold. Zinc concentrate grades of over 50% are anticipated with 80% recovery of the zinc. The ore will be relatively soft grinding which moderates grinding power requirements although this is, in part, offset by the need for a relatively fine grind in order to achieve liberation of the economic minerals.

The flotation process which has been developed for the copper and zinc separation is relatively complex. At present, a bulk-differential method is considered to be the most effective, based on cyanide free concepts. Metallurgical test work is

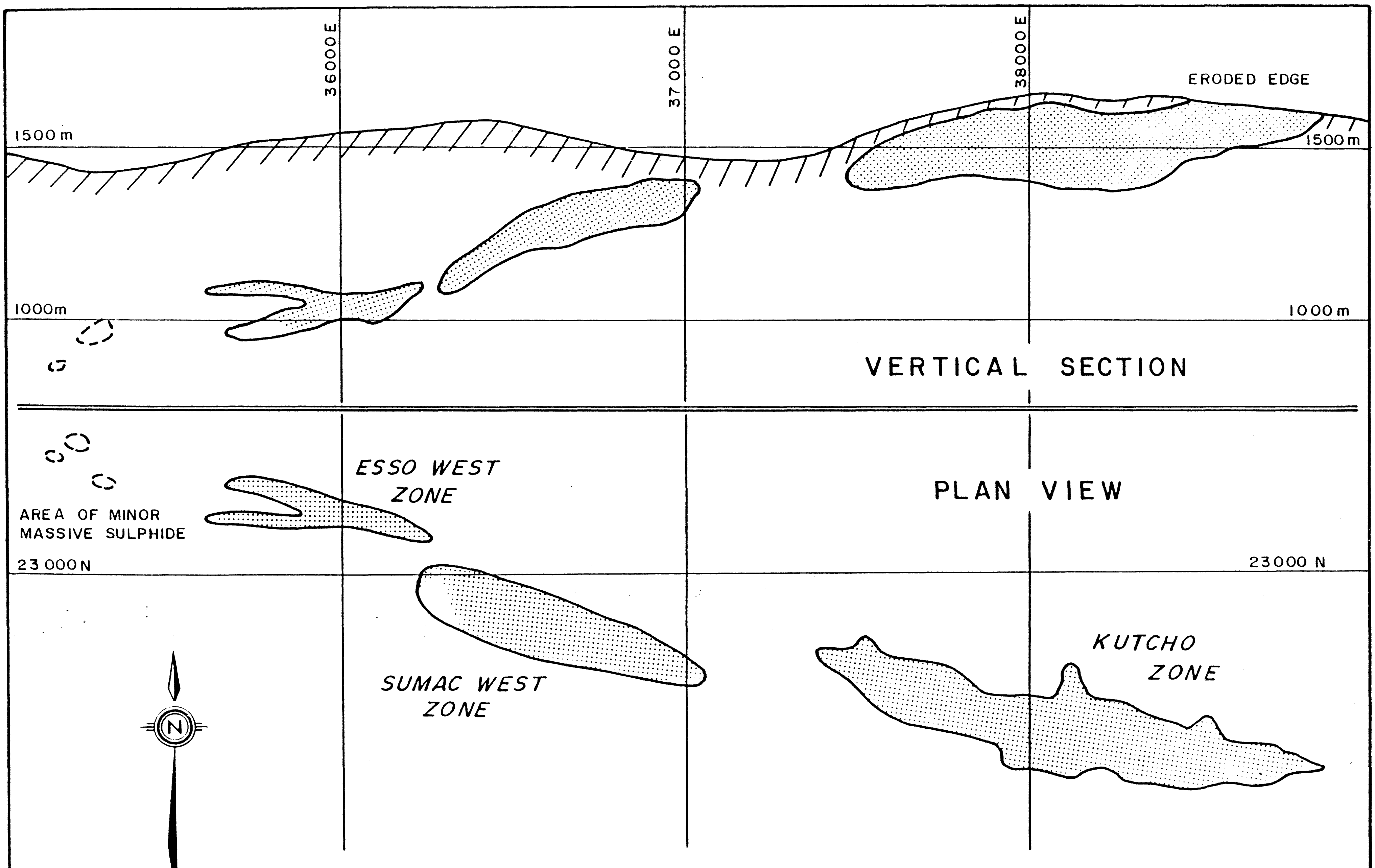
2
GEOLOGY AND ORE RESERVES

2.1 REGIONAL GEOLOGY

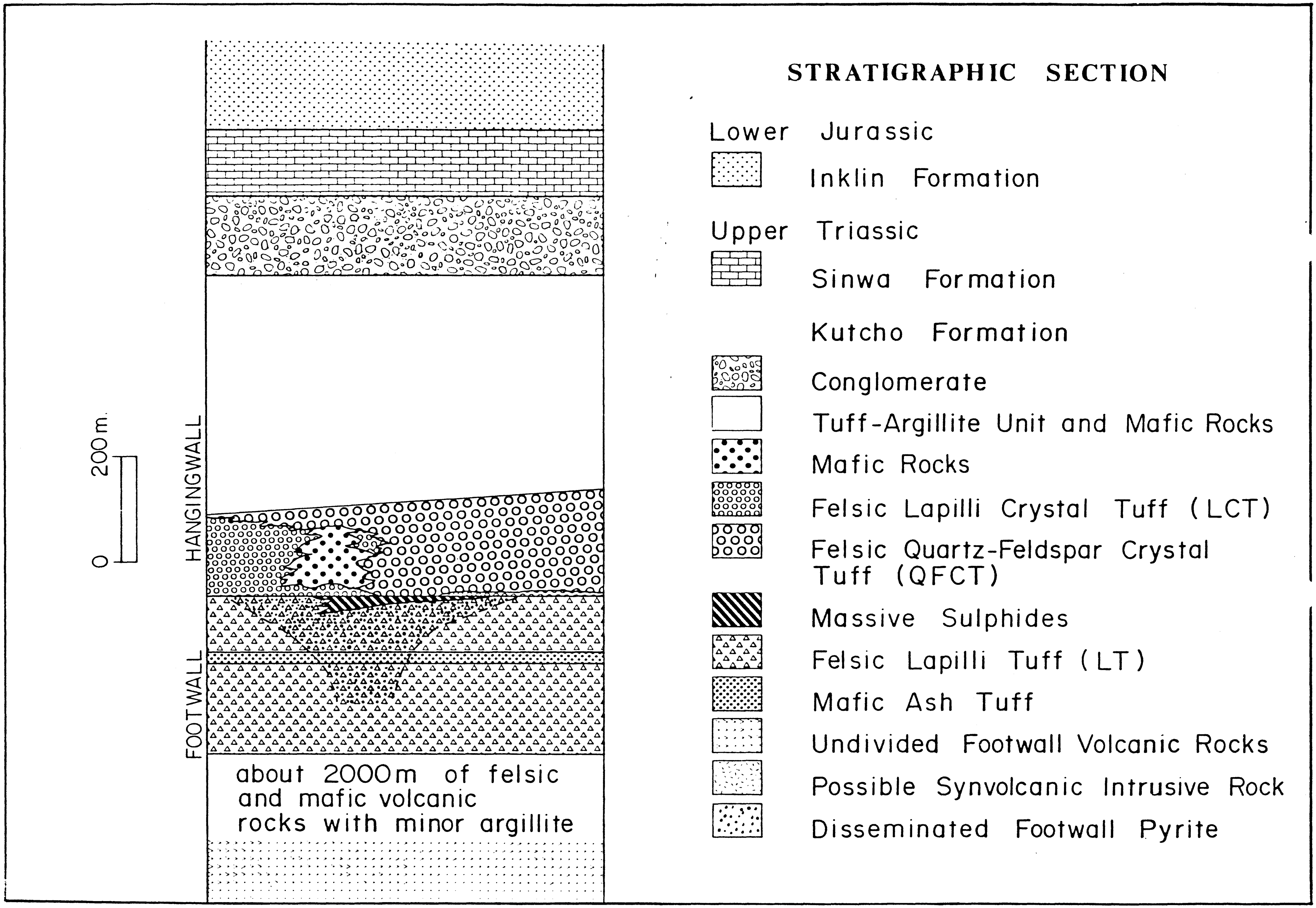
Three massive sulphide concentrations have been discovered at Kutcho Creek. They are collectively known as the "Kutcho Creek Deposits" and are individually called the Kutcho Zone, the Sumac West Zone and the Esso West Zone.

The Kutcho Creek deposits are classed as volcanogenic massive sulphide deposits. They occur over a 3.5 kilometre linear trend near the top of a felsic lapilli tuff unit of the Upper Triassic Kutcho formation. The three known significant concentrations of economic sulphides occur as elongate, ellipsoidal-shaped bodies within an extensive pyrite-rich horizon.

The deposits shown in Figure 2-1 are essentially obscured by nature. One small surface exposure of the Kutcho Zone does exist, but is snow covered for most of the year, while the other two are located 50 to 200 metres below surface. The initial discovery resulted from regional geochemical programs followed by on-site geology, geophysics, detailed geochemistry and ultimately, diamond drilling. The subsequent discovery of the two concealed deposits occurred as a result of utilizing the expanded geological knowledge to guide the search for additional reserves.



KUTCHO CREEK DEPOSITS

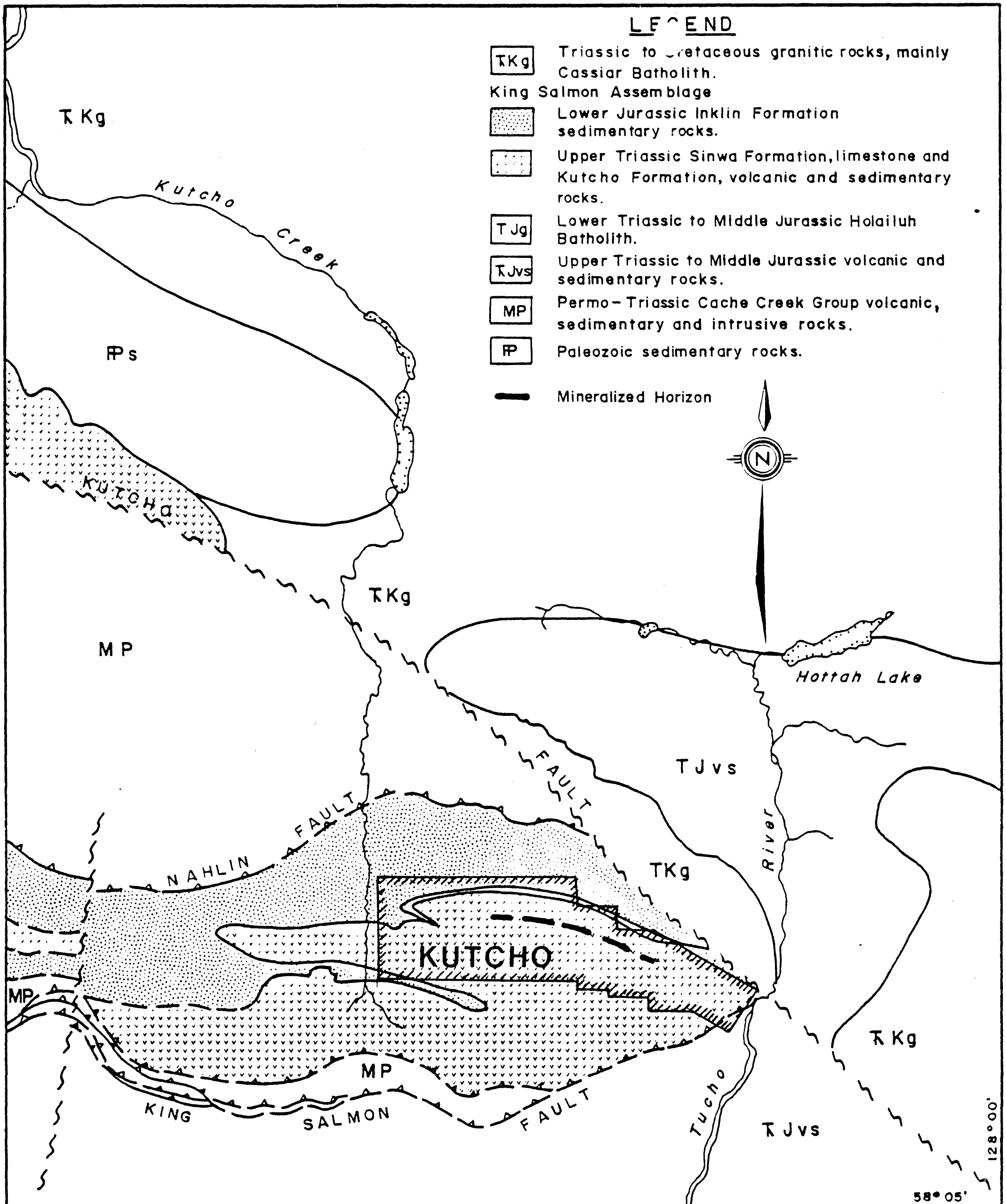

STRATIGRAPHIC SECTION
Lower Jurassic
Inklin Formation
Upper Triassic
Sinwa Formation
Kutcho Formation
Conglomerate
Tuff-Argillite Unit and Mafic Rocks
Mafic Rocks
Felsic Lapilli Crystal Tuff (LCT)
Felsic Quartz-Feldspar Crystal Tuff (QFCT)
Massive Sulphides
Felsic Lapilli Tuff (LT)
Mafic Ash Tuff
Undivided Footwall Volcanic Rocks
Possible Synvolcanic Intrusive Rock
Disseminated Footwall Pyrite
HANGINGWALL
FOOTWALL
200 m
0
about 2000m of felsic and mafic volcanic rocks with minor argillite

The property has been explored by 250 diamond drill holes and an underground adit which crosscuts the Kutcho Zone 60 metres below surface.

The Kutcho formation shown in Figure 2-2 consists of intermediate to dacite breccia and tuff, commonly epidotized, overlain by dacitic to rhyolitic tuffs and flows with minor andesitic tuffs. The sulphide zone overlies these rocks and is, in turn, overlain by sericite schists and rhyolite flows with minor basalt porphyry lenses. A tuff-argillite and upper conglomerate sequence that have gradational contacts and which are in part facies equivalents, cap the volcanic rocks. The predominant lithologies (dacite and rhyolite equivalents) are quartz-eye, feldspar, sericite schists and quart-eye sericite schists. Dolomite is commonly associated with the ore.

In the vicinity of the deposits, the lapilli tuff unit, which hosts the sulphide zone, has been metamorphosed to sericite schists. A relatively large basic to intermediate lens of amphibolite schist occurs in the hanging wall rocks in the general area of the deposits.

The three massive sulphide zones are believed to have formed in a linear fumarole field. They are interpreted to overlie a hydrothermally altered fissure zone and are overlain by barren, disseminated pyrite which is extensive in the lateral dimension and decreases in abundance with depth.



REGIONAL GEOLOGIC PLAN

0 5 10 15 km

Scale in kilometres

Figure 2-2

Sericite and dolomitic alteration envelop the massive sulphide lenses and are readily distinguishable in outcrop and drill core intersections. Other forms of alteration, including silicification, are minor.

Volcanogenic deposits typically occur in clusters around centres of volcanic activity. The potential to discover additional sulphide concentrations within this geologic environment must be considered good.

2.2. SITE GEOLOGY (KUTCHO ZONE)

The Kutcho zone has been explored much more extensively than the other two deposits. Accordingly, the following detailed description is based primarily on data obtained from that source. The other two deposits are part of the same geologic system, however, and are known to have some of the same general characteristics.

Detailed diamond drilling of the Kutcho Zone has indicated that the massive sulphide body is an elongated lens extending approximately 1,220 metres along strike and 240 metres in the down-dip direction. The central area is close to 20 metres thick tapering out laterally into a thin, disseminated, pyritic sequence at the margins of the massive sulphide.

The deposit has a general east-west strike direction and dips approximately 45 degrees to the north which is conformable with local bedding attitudes.

The Kutcho deposit is composed of a main massive sulphide lens, thin, discontinuous hanging wall lenses and disseminated pyrite in the immediate footwall of the main lens. The hanging wall lenses are generally separated from the main zone by several metres of essentially barren waste. The intervening waste interval pinches and swells and in some areas is entirely lacking, producing a single, continuous ore horizon.

The main massive sulphide lens consists primarily of pyrite which varies from very fine grained to coarsely granular, with some occurring as framboidal aggregates. The other sulphides in order of abundance are sphalerite, chalcopyrite, bornite, minor chalcocite, trace tennantite, galena and digenite. The non-sulphide gangue minerals which account for approximately 20% of the zone consist primarily of dolomite, quartz and sericite.

Both copper and zinc are concentrated in the middle to upper portions of the massive sulphide zone. The lower section is typically lacking in economic sulphides and is transitional with the barren disseminated sulphides below.

In the main massive sulphide zone chalcopyrite and bornite occur as fine disseminations or as remobilized patches and veinlets.

The greatest concentrations of copper minerals are found in 1 to 2 metre thick dolomite lenses or bands which often occur in sharp contact with massive sulphides. Coarse patches and stringer-like chalcopyrite, bornite, chalcocite and minor tennantite characterize the dolomitic lenses. The ratio of chalcopyrite to bornite is in the order of 65:35, while the contained copper ratio is approximately 1:1.

Sphalerite occurs primarily as disseminations and thin crude bands within massive pyrite.

The hanging wall zone is not continuous and can be quite variable in both thickness and metal content. Chalcopyrite, bornite and chalcocite form coarse patches and stringer like masses which occur with massive or disseminated pyrite and dolomite lenses. Sphalerite is common as disseminations while a few nearly massive intersections associated with dolomite lenses have been encountered.

Economic sulphides are essentially lacking in the intervening sericite schists which separate the hanging wall from the main massive sulphide body.

Several geologic characteristics of the deposit that will significantly affect the mining process are:

- Sharp contacts between ore and waste, combined with some relatively narrow ore or waste intervals, dictate the need for selective mining capability.
- The potential unstable sericite schist footwall rocks have initiated the need for geotechnical investigation and proposed corrective measures.
- Footwall waste rocks with high sulphide content will have to be mined in a schedule to match the waste dump design.
- The overall continuity of the main massive sulphide zone, combined with a notable lack of significant

faulting, provides a deposit amenable to medium scale open pit mining methods.

The Kutcho deposit is characterized by sharp contacts between ore and waste. This is particularly true for both sides of the hanging wall zone and the upper contact of the main massive sulphide zone. Any waste which becomes mixed with the ore from these areas will be essentially void of economic sulphides and will significantly reduce the overall grade. Fortunately these ore-waste contacts are visually apparent and reasonably consistent along strike and dip. The contacts coincide with abrupt changes from sericite schist to heavy sulphide ore. Selective mining in these areas is a realistic possibility.

In contrast, the footwall of the main massive sulphide ore interval is often gradational. The ore-waste contact, in this case, is generally an assay cut-off. This often occurs within the massive sulphides with no obvious visual change. Both the ore and waste will be dominated by pyrite. While increased dilution must be expected along this poorly defined contact, the impact of the dilution is not as severe due to the more gradual grade change.

In one area of the deposit the mining process will be complicated by a second ore horizon within the main massive sulphide body. This lower zone has been called the B-3 zone and, where present, is grossly conformable to the main ore horizon. It varies from 1 to 7 metres in width and is separated from the adjacent reserves by gangue consisting primarily of massive pyrite. The B-3 zone is marginal in grade and contributes less than 1% of the reserve tonnage. The zone has been identified in 19 holes, but only 6 encountered reserve grade intersections. They are clustered near the centre of the deposit in a relatively narrow band which extends 140 metres along strike, but only 20 to 40 metres in the down dip direction.

The sericite schist footwall rocks have been the subject of considerable geotechnical investigation. They have well-developed schistocity dipping at 50 to 80 degrees to the north. The high sericite content causes these surfaces to have a low shear strength. The schistosity will have significant influence on both hydrology and slope stability conditions.

2.3. GEOLOGICAL ORE RESERVES

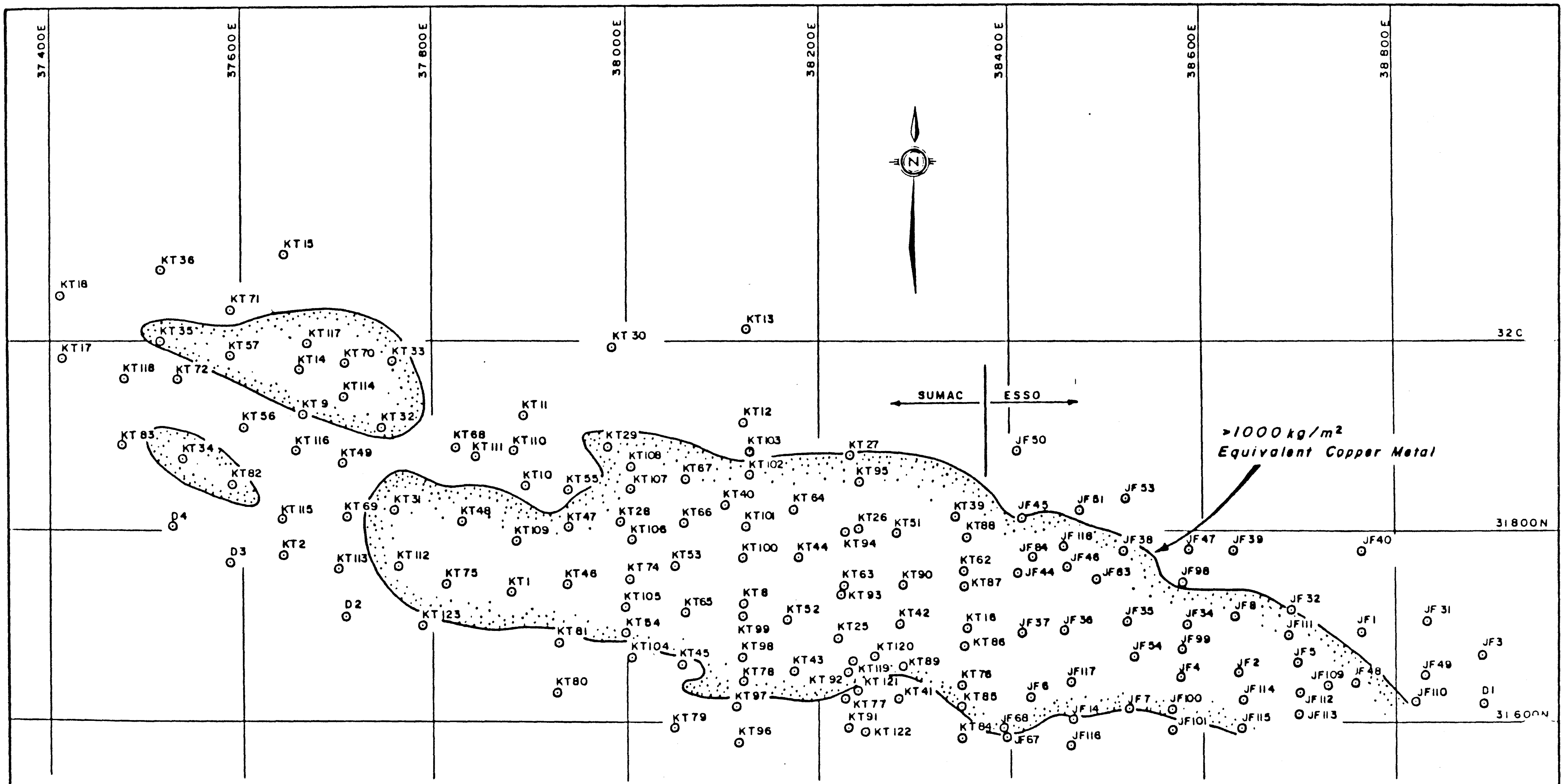
The geological ore reserves are a computer calculated reserve estimate prepared by the Exploration Department of Sumitomo Metal Mining Co. Ltd. (SMMCL) of Japan. The calculation method was designed specifically for the Kutcho Zone by geologists and engineers familiar with the deposit. A summary of the reserve estimates at a range of cut-off grades and variable degrees of dilution is as follows:

TABLE 2-1

GEOLOGICAL ORE RESERVE ESTIMATES

At Various Cut-off Grades and Degrees of Dilution

Case No.	Cut-off % Cu-Eq.	Dilution Hw/Fw (cm)	Ore t x 1,000	Cu %	Zn %	Ag g/t	Au g/t	Cu-Eq. %
1.1	1.0	0 / 0	14,854	1.85	2.62	31.61	0.37	3.43
1.2	1.0	25 / 50	16,090	1.71	2.42	29.29	0.34	3.17
1.3	1.0	50 /100	17,199	1.60	2.27	27.44	0.32	2.97
2.1	0.8	0 / 0	15,697	1.78	2.51	31.71	0.36	3.32
2.2	0.8	25 / 50	17,043	1.65	2.32	29.34	0.33	3.07
2.3	0.8	50 /100	18,273	1.54	2.17	27.44	0.31	2.87
3.1	0.6	0 / 0	17,059	1.67	2.33	29.70	0.34	3.10
3.2	0.6	25 / 50	18,363	1.55	2.17	27.66	0.31	2.89
3.3	0.6	50 /100	19,720	1.45	2.03	25.89	0.29	2.70



KUTCHO ZONE

DRILL HOLE PIERCING POINTS -45°N PLANE

(In the Plane of the Deposit)

0 300

Scale in metres

Figure 2-3

These geological reserve estimates were utilized for pit design, production scheduling and mine planning purposes. The block grade data generated during compilation of the geological reserves has been estimated from 150 diamond drill hole intersections. The Kutcho Zone has also been explored by an underground exploration adit. The drill hole density is illustrated on Figure 2-3.

Drill hole sections were initially spaced at 120 metre intervals along the strike of the deposit. The spacing was subsequently reduced to approximately 60 metres by adding intermediate sections.

In the down dip direction, the grade is not as continuous as along the strike and the hole spacing was accordingly reduced to approximately 30 metre intervals.

Correlation of grade trends and thickness indicated reasonable continuity throughout the deposit including the transition from Esso to Sumac data.

Core recoveries generally exceeded 90% in the ore horizon, but dropped off significantly in the schistose footwall rocks.

The deposit has been explored by an exploration adit which provided the opportunity for visual examination and detailed geological mapping. The underground development work was undertaken primarily to provide a 140 tonne bulk sample for metallurgical testing. The extraction of ore was done on a round-by-round basis and provided an excellent opportunity for sampling comparisons. These comparisons are shown in Table 2-2.

TABLE 2-2

BULK SAMPLING VERSUS ORE RESERVE GRADE COMPARISONS

	Horizontal Width (m)	Cu %	Zn %	Ag g/t
Bulk Sample Results:				
Round-by-round sampling	19.5	1.83	1.97	30.4
Pilot mill feed grade	-	1.91	2.06	31.8
Reserve Estimate	20.5	1.78	2.32	24.8
Adjacent Drill Holes:				
Hole KT-92 (above)	18.0	1.81	2.69	29.6
Hole KT-25 (below)	22.6	1.72	3.19	25.9
Hole KT-119 (east)	15.7	2.72	2.56	27.8
Average	18.8	2.03	2.85	27.6
Dilution (1.5 m x$\sqrt{2}$)	2.1	.04	.07	0.5
Diluted Grades	20.9	1.83	2.56	24.8

It will be noted that both the reserve estimate and the diluted drill hole grades are within acceptable limits of the bulk sampling results. Detailed examination of the adjacent drill holes revealed reasons for the discrepancies. Grade and width fluctuations are a geological characteristic of volcanogenic deposits and some variance between estimated and actual grades for individual reserve blocks is to be expected.

Fill-in drilling programs did not significantly alter overall tonnage and grade estimates. However, they did modify the predicted grade and reserve outline on a local basis. Based, in part, on this factor it is proposed that a high degree of confidence is appropriate for the total predicted tonnage and grade, but that local discrepancies are probable. In this regard there will be discrepancies in the estimates for individual reserve grade blocks. Such discrepancies should, however, be compensating, with the result that confidence in the tonnage and grade estimate increases as the population of mining blocks increases.

The reserves presented in this report are derived from computer calculations by Sumitomo Metal Mining. However, the configuration of the deposit and the correlation of drill hole intersections were subject to manual geological control.

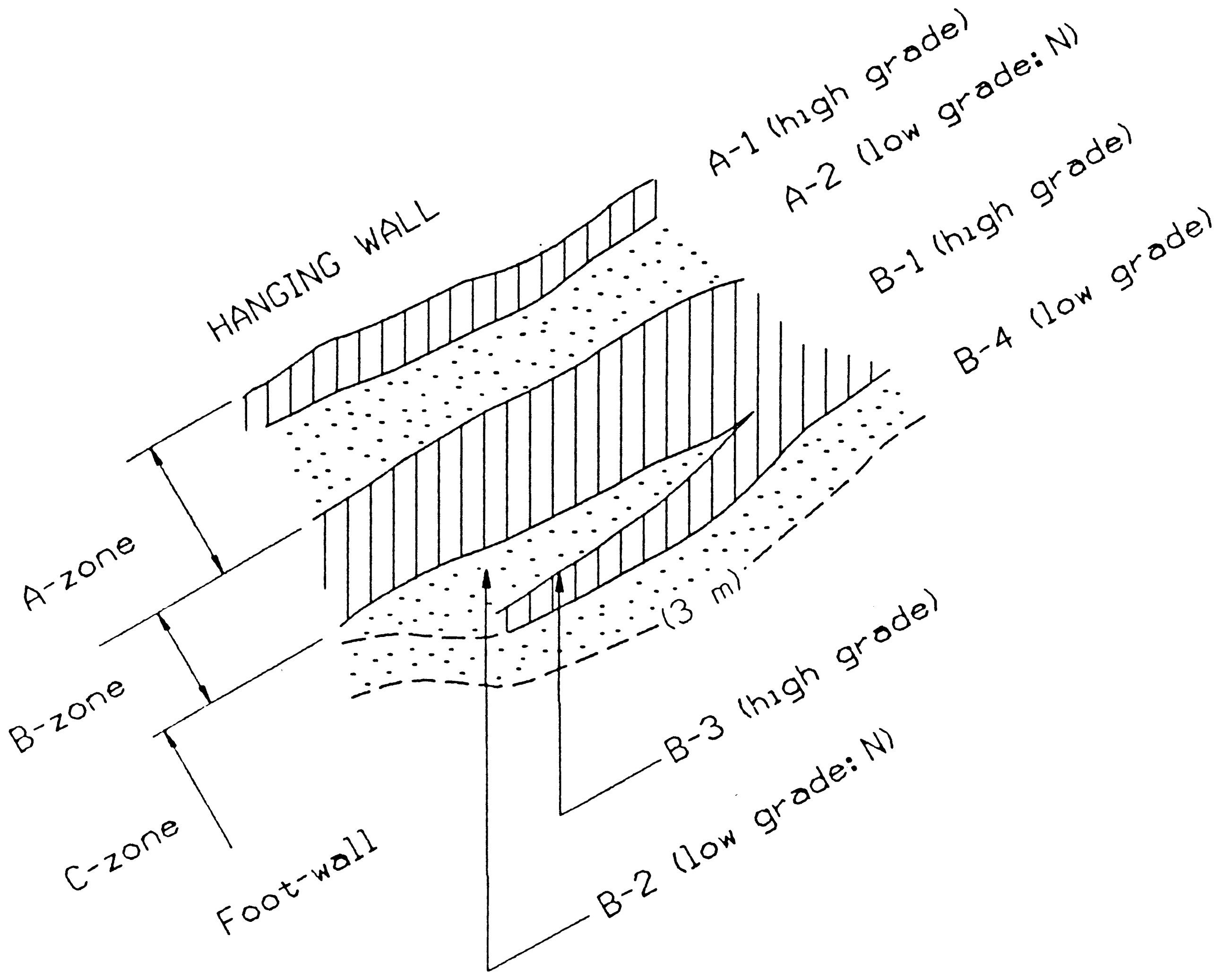
The deposit has been divided into layers defined as follows and shown diagramatically on Figure 2-4.

Stratagraphic Units	Ore-Waste Subdivisions
A-Zone	A-1 (high grade hanging wall lenses)
	A-2 (internal waste between A-1 and B-1
B-Zone	B-1 high grade massive sulphides
	B-2 intercalated iron sulphides (waste)
	B-3 marginal grade footwall zone
C-Zone	B-4 footwall waste (pyrite and schist)

The B-1 zone contributes the bulk of the reserves and is persistent both along strike and down dip. The A-1 zone pinches and swells while the third ore horizon, the B-3 zone, is restricted to the central portion of the deposit.

Grade distribution and thickness of the zones were determined by Kriging on each individual layer. In this manner the location of the ore zones, together with their predicted metal content, could be established for any desired point. Figure 2-5 shows a copper equivalent grade distribution of the combined metal values in the Kutcho Zone.

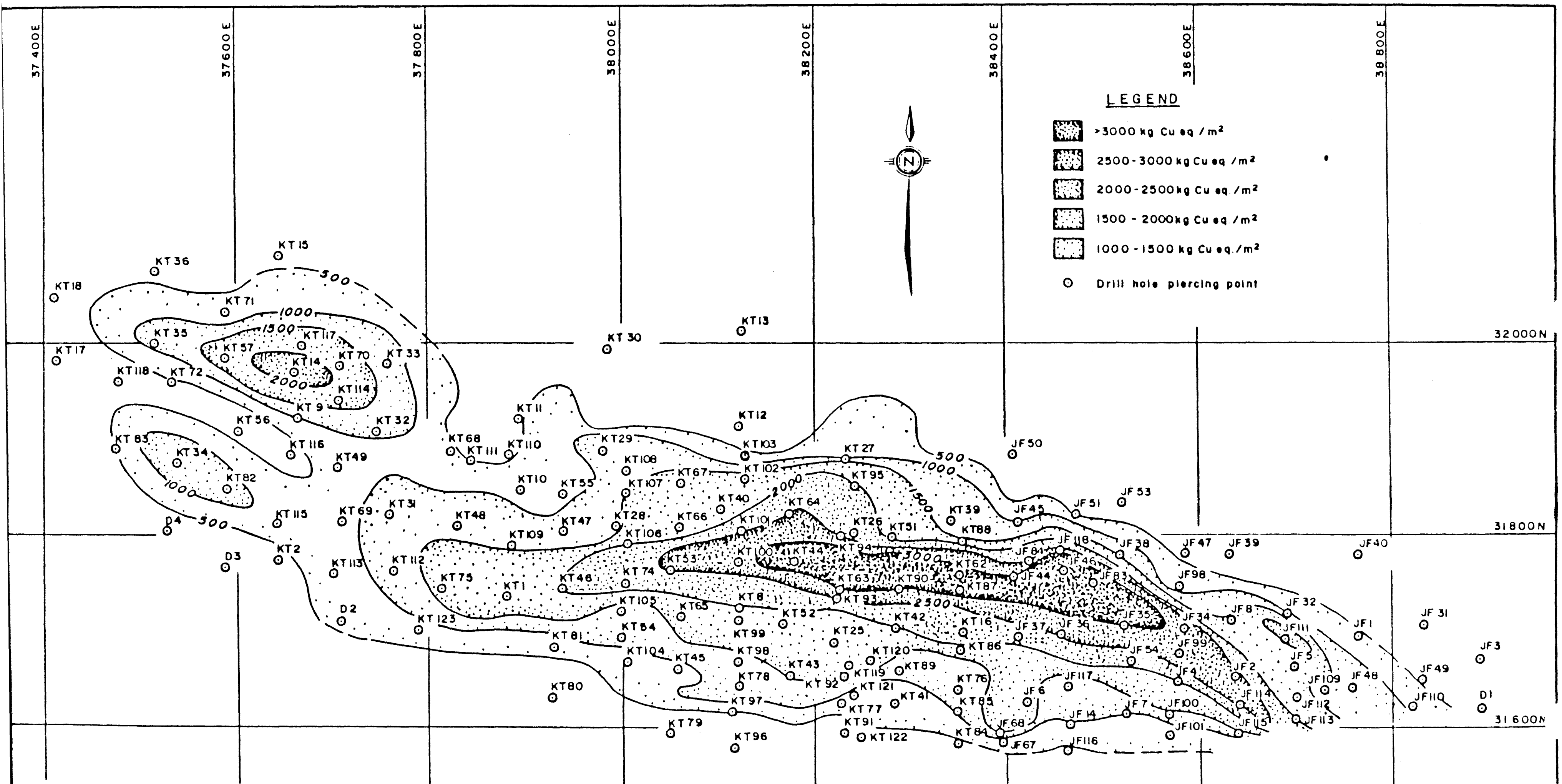
In order to more accurately depict the ore outline, a method of calculation was developed which provided the capability to assign appropriate ratios of ore and waste to individual blocks.



Geological Sub-divisions

Of The Kutcho Ore Zones

Figure 2-4



KUTCHO ZONE

COPPER EQUIVALENT METAL ABUNDANCE CONTOURS (kg/m²)

Combined Hanging Wall & Massive Ore Zones

0 300

Scale in metres

Figure 2-5

Whenever an ore-waste contact passed through a block, separate ore and waste tonnages on either side of the contact were calculated based on the volumes and specific gravities involved. An illustration of the geological block model used in calculating the ore reserves is shown in Figure 2-6.

In order to coincide with open pit mining constraints, minimum grade-width controls were applied. Layers of ore less than two metres wide were excluded unless the grade was sufficient to carry the added dilution. Similarly, internal waste less than three metres in width was included as dilution, based on the assumption that it was unsortable.

Varying degrees of hanging wall and footwall waste dilution were allowed for in the different models. One model added 25 cm of waste on the hanging wall and 50 cm on the footwall, while another increased the widths to 50 and 100 cm respectively. As mentioned previously, ore-waste contacts of the Kutcho deposit are generally sharp, resulting in very low grade dilution. The grade of the material added as dilution varied slightly depending on the width and cut-off grade involved.

The geological ore reserves dramatically illustrate the detrimental effect of dilution on the predicted mill feed grade.

4

ORE PROCESSING

4.1 METALLURGICAL CHARACTERISTICS

The Kutcho ore is characterized as follows:

- The principal sulphides are chalcopyrite, bornite, sphalerite and pyrite.
- Minor sulphides include chalcocite, galena, tennanite, covellite and tetrahedrite.
- Coarse association occurs between copper minerals and gangue and zinc minerals and gangue.
- Finer association occurs between copper minerals and pyrite, sphalerite and pyrite, copper minerals and sphalerite.

From the early exploration stage, the effort has been concentrated on how to segregate copper and zinc minerals without significant sacrifice of recoveries to each other.

A number of metallurgical tests have been conducted with results as shown in the Table 4-1.

(2)

2.0 DEVELOPMENT PLAN

This chapter describes the development plan for the Kutcho Creek project. The chapter is a summary of the detailed mine plan information which is presented as an appendix to Volume I. The mine plan is based on the pre-feasibility study by Wright Engineers (1985) and other technical studies done for the project which are referenced where appropriate. Large scale map drawings can be found in the appendix to Volume I.

2.1 Key Data

The key project development data are:

Approximate Location:	100 km east of Dease Lake, 390 km north of Smithers
Open Pit Reserves:	14 000 000 tonnes grading 1.75% Cu 2.97% Zn, 28.11 grams per tonne Ag, and 0.39 grams/tonne Au.
Principal Economic Minerals:	Chalcopyrite ($CuFeS_2$), Bornite (Cu_5FeS_4) and Sphalerite (ZnS).
Strip Ratio:	6.6 tonnes of waste per tonne of ore.
Proposed Milling Process:	conventional crushing-grinding-flotation
Production Rate:	4 000 tonnes of ore per day.
Concentrate Produced:	approximately 360 tonnes per day (9 truck loads per day).
Supplies Required:	30 000 litres of fuel per day 20 tonnes of grinding media per day 25 tonnes of lime per day 15 tonnes of other consumables per day

Shipping Facility:	Esso's facilities at Stewart, deep water dock plus storage of concentrate and bulk fuel
Road Access:	new road access required to Highway 37 near Dease Lake
Airstrip:	existing airstrip at Kutcho Creek to be upgraded
Employee Accommodation:	at mine site; to be brought in by fly-in, fly-out rotation
Employment:	Mine construction, peak 400 persons, Mine operation, 294 direct employees
Land Required:	500 hectares

2.2 Exploration Activities

During the early 1970's, Sumac sponsored a regional prospecting and geochemical silt sampling program in northern British Columbia which led to the discovery of a mineralized showing on Sumac Creek and the staking of the SMRB claims during 1972. During this same period Esso, initially under the parent company name of Imperial Oil Limited, was carrying out follow-up exploration work resulting from a helicopter-supported regional geochemical survey. During 1970, Esso's prospecting crews staked claims in the area and collected silt samples from streams along the south side of Andrea Creek. However, the key claims were not staked until 1972, shortly after Sumac took up its original land position.

During 1973, both companies began extensive exploration programs which ultimately resulted in the discovery of three deposits: the Kutcho Zone, the Sumac West Zone and the EMC West Zone. The deposits straddle the property boundaries and were explored separately but in a spirit of overall cooperation.

The project is currently at an advanced stage of development. Metallurgical research is continuing and could refine the proposed process flow sheet while exploration work designed to seek new discoveries is an on-going activity. A final feasibility with related detailed engineering studies and permit applications remains to be completed to bring the project to the point of a production decision.

2.3 Development Schedule

Based on the assumption that improved metal market conditions would permit the project to move forward on an uninterrupted basis, the approximate sequence of events leading to production would be:

1984-1985	Complete Stage II environmental study
1986-1987	Complete final feasibility study
1986-1987	Obtain permits and licenses
1988-1989	Construction and pre-production stripping
1989-2000	Production from Kutcho Zone open pit
1995-1998	Intensified exploration of underground deposits
1998-2000	Possible underground development
2000 Onward	Production from inferred underground reserves or new discoveries, contingent on viability of the operation.

Maintaining the schedule outlined above is contingent on a number of factors which could result in significant delays. Some of the more critical ones include:

- the need for improved metal market conditions,
- unforeseen engineering or environmental complications,
- timing of permit applications and approvals,
- finalizing an operating agreement between Sumac Mines Ltd. and Esso Minerals Canada,
- access road construction, and
- finalizing financial arrangements.

While most of the potential delays should not prolong the schedule unduly, unfavourable metal market conditions could postpone construction indefinitely.

It is the operators intent to move the project forward to the point of a production decision. That is, to complete the final feasibility study and obtain the necessary licenses and permits so that the project is on a "ready-to-go" basis. On-going activity beyond 1987 is entirely contingent on a favourable feasibility study with the possible exception of continued exploration.

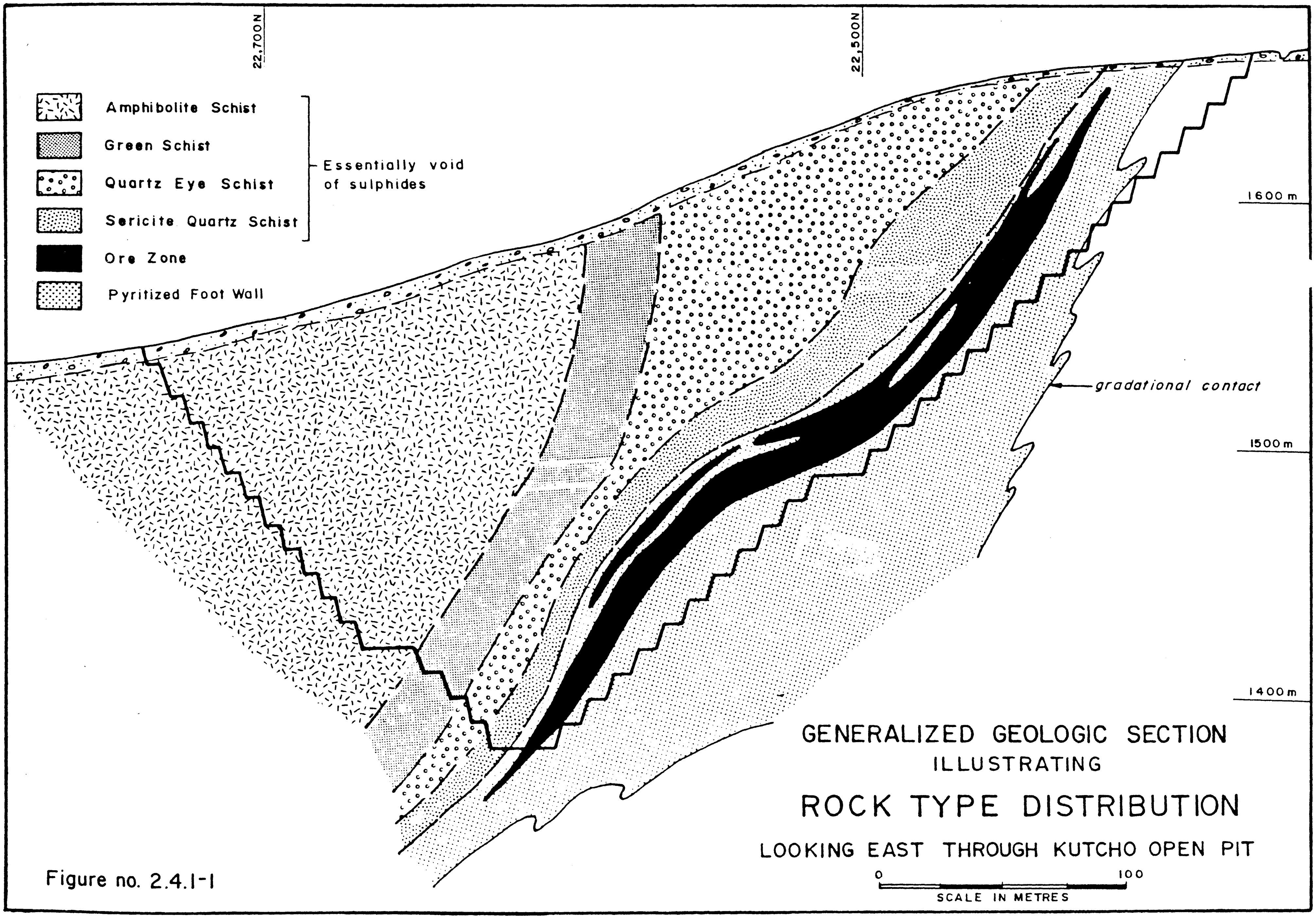
2.4 Geology and Reserves

To date, three mineralized deposits have been discovered at Kutcho Creek: the Kutcho Zone, the Sumac West Zone and the EMC West Zone. The Kutcho Zone, which is near surface, was the first discovered and is mineable by open pit methods. The other two are buried by 50 to 200 m of cover rocks and could be extracted by underground methods.

2.4.1 General geologic setting

The Kutcho Creek deposits are classed as volcanogenic, massive sulphide deposits (Figure 2.4.1-1). They occur intermittently along a favourable geologic horizon which conforms to the general stratigraphic trend. The three known concentrations of economic sulphides occur as elongate, ellipsoidal-shaped bodies within an extensive pyrite rich unit which has been traced for several kilometres. The host horizon strikes in a general east-west direction and dips to the north.

The deposits consist primarily of massive pyrite with varying amounts of copper, zinc, silver and gold. They are grossly conformable to the regional trend, occurring near the top of a lapilli tuff which formed as a result of local volcanism.



GENERALIZED GEOLOGIC SECTION
ILLUSTRATING
ROCK TYPE DISTRIBUTION
LOOKING EAST THROUGH KUTCHO OPEN PIT

Figure no. 2.4.1-1

To date, the Kutcho Zone is the only deposit that has been explored extensively. The EMC West Zone appears to be small, relatively deep and high grade, while the Sumac West Zone is large, but low grade with local high grade concentrations.

2.4.2 Kutcho Zone

The Kutcho Zone is slated for initial production and has been extensively explored. It has been penetrated by more than 150 diamond drill holes and crosscut by an exploration adit.

The Kutcho Zone is tabular to lenticular in shape with minor pinching and swelling along its length. It is conformable with regional layering and dips about 45 degrees to the north. The body is elongated, extending 1 500 m along the strike and 300 m down dip. It has a maximum thickness of 26 m along the central part of the lens and tapers laterally into a thin, disseminated pyrite sequence at the margins. In some areas, the entire zone makes ore while in most areas a layer of waste several metres thick separates hanging wall lenses from the main, massive sulphide zone.

The main mineralized zone consists of 80 to 85% sulphides. The sulphides are predominantly pyrite with lesser amounts of sphalerite, chalcopyrite and bornite, minor chalcocite and trace amounts of tetrahedrite- tennantite, digenite and galena. Gangue associated with the sulphides is predominantly carbonate, sericite and quartz.

The dip of the deposit at 45 degrees, the relatively consistent ore zones and the apparent lack of faulting are all favourable aspects for open pit mining. Of some concern, however, are such geologic features as the schistose nature of the footwall and the pyrite content of some of the waste rocks. The footwall stability and acid generating potential of the waste rocks are discussed separately under sections 2.6.1, 2.6.2 and 5.1.

2.4.3 Ore reserves

Based on an assumed mining dilution of 25 cm on the hanging wall and 50 cm on the footwall, the Kutcho Zone geological reserve estimates at various cutoff grades are as follows:

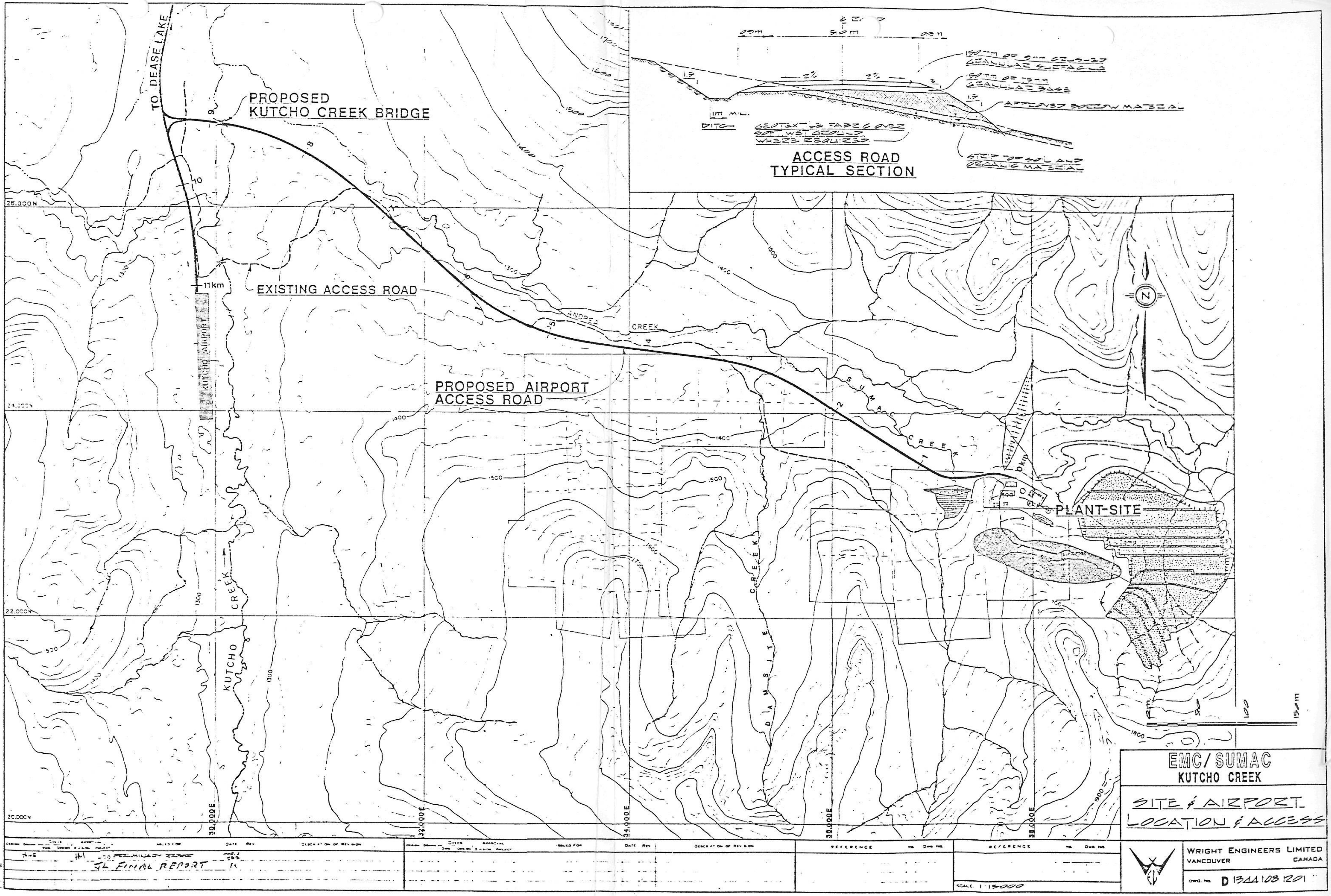
Case	Cut-Off %Cu-Eq.	Tonnes Ore	% Cu	% Zn	g/t Ag	g/t Au
1	1.0	16,090,000	1.71	2.42	29.29	0.34
2	0.8	17,043,000	1.65	2.32	29.34	0.33
3	0.6	18,363,000	1.55	2.17	27.66	0.31

Case 1 was selected for detailed analysis during a recently completed preliminary feasibility study. Following pit design analysis, 14 million tonnes were scheduled for production at an overall stripping ratio of 6.6 to 1.

As previously mentioned, two of the deposits are located well below surface. They are not amenable to open pit mining and, therefore, would require the development of an underground mining system in order to extract any proven ore reserves. While the drilling to date has demonstrated underground potential, the tonnage, grade and configuration of the deposits are not sufficiently defined to permit meaningful reserve calculations or planning of underground mine development.

The currently outlined open pit reserves will meet production requirements until the year 2000. Consequently, planning for the possible exploitation of underground reserves is at a very preliminary stage. Approximately two years of lead time would be required to sink a shaft and prepare an underground mine for production.

The potential for finding additional ore in the Kutcho Creek geological environment is considered good.



ACCESS ROAD
TYPICAL SECTION
5.0 m
1m MIN.
DITCH
TO DEASE LAKE
PROPOSED
KUTCHO CREEK BRIDGE
11km
EXISTING ACCESS ROAD
KUTCHO AIRPORT
PROPOSED AIRPORT
ACCESS ROAD
ANDREA CREEK
SUMAC CREEK
DAMSITE CREEK
KUTCHO CREEK
PLANT-SITE
0km
25,000N
24,000N
22,000N
20,000N
30,000E
32,000E
34,000E
36,000E
38,000E
N
EMC/SUMAC
KUTCHO CREEK
SITE & AIRPORT
LOCATION & ACCESS
WRIGHT ENGINEERS LIMITED
VANCOUVER
CANADA
DWG. NO. D 1344 108 1201
SCALE 1:15000
FINAL REPORT