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MAGGIE 92I/NW-15

92I/14W

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92INW15

GEOLOGY OF THE

MAGGIE DEPOSIT

By,

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Abstract

The Maggie porphyry copper-molybdenum deposit was discovered in 1970 by percussion and diamond drilling of a till and alluvium covered area. Outcrops bordering the covered area contain anomalous copper values associated with strong pyrite mineralization and hydrothermal alteration. Drill holes on a 122 metre grid pattern indicated geological reserves of 181,440,000 tonnes grading 0.28 percent copper and 0.029 percent molybdenum.

The deposit is associated with the Maggie stock, an elongate, northwest trending intrusion of biotite quartz monzonite porphyry of Tertiary age. Economic minerals also occur, to a lesser extent, in adjacent strata of the Cache Creek Group.

Ore minerals are chalcopyrite and molybdenite. Relatively high grade mineralization is found in two core areas in the deposit which are surrounded by lower grade mineralization. Overlapping potassic-phyllic alteration assemblages are associated with higher grade mineralization, whereas phyllic-argillic alteration assemblages are associated with lower grade mineralization.

Pyrite, the most common sulphide present, varies from 1 percent in the central part of the deposit to over 10 percent in a well developed halo surrounding it. Weathering of the pyritic halo has produced striking gossans on the east and west sides of the deposit.

### Location

The deposit is centered in the Bonaparte River valley at Lat.  $50^{\circ}55.4'N$ , Long.  $121^{\circ}25.2'W$ , N.T.S. 92I/14W. It is about 15 km north of the Village of Cache Creek along Highway 97. Colorful gossan areas on both sides of the highway mark the extent of the pyrite halo associated with the deposit.

In the vicinity of the deposit, the Bonaparte River valley floor lies at an elevation of approximately 520 meters and is relatively flat with a width of 0.8 km. To the west, moderately sloped valley walls rise to a maximum height of 1,300 metres. To the east, the valley is flanked by steep rocky slopes which moderate rapidly toward the east and gradually rise to heights between 1,500 and 1,675 metres.

### History

Prospecting in the area dates back to the 1860s when miners travelling to the Cariboo investigated pyritic zones along the old Cariboo highway. This historic route passes over the western edge of the deposit and a number of test pits of unknown age are located in gossan adjacent to the road.

In 1907, underground exploration was undertaken to explore a narrow chalcopyrite-bearing shear zone located about 750 metres north of the porphyry deposit. The shear zone strikes northeast and dips steeply southeast. A shaft was sunk 56 metres

below the adit level and three levels totalling 335 to 365 metres were driven. Some stoping was conducted on the No. 2 level and 45.4 tonnes of selected ore were shipped which yielded 8 percent copper, 62.5 gms. of silver per tonne but no gold. Attempts to reopen the workings in 1915 and 1930 were unsuccessful. These workings were referred to as the Maggie Mine.

In 1952, limited exploration, including some diamond drilling, was conducted in the vicinity of the Maggie Mine by Kennecott Explorations (Canada) Ltd. Results of this work were largely negative and the project was discontinued.

In 1955, claims in the area were acquired by Huestis, Reynolds and Associates. In 1964, Frobex Ltd. drilled four diamond drill holes to test part of a gossan area. Low copper values were intersected in some holes but the programme was discontinued.

In 1966, the claims were acquired by Bethlehem Copper Corporation Ltd. and in 1968 a relatively small area was tested by percussion drilling. Results of this work were negative.

In 1969, Bethlehem conducted limited geological mapping on the property and a single diamond drill hole tested the central part of the gossan. Copper values to a depth of 244 metres were about 0.05 percent copper but values averaging 0.25 percent were intersected in the lower part of the hole to a depth of 453 metres.

Following drilling of this deep hole, additional ground

was acquired and further geological mapping and bedrock sampling were conducted. Copper values from 27 gossan samples ranged from 19 to 1,100 ppm and averaged 210 ppm. Background values beyond the gossan averaged less than 100 ppm copper.

In 1970, further percussion drilling followed by diamond drilling on a 122 metre grid pattern outlined a porphyry type deposit containing geological reserves of 181,440,000 tonnes grading 0.28 percent copper and 0.029 percent molybdenum.

Technical staff associated with the discovery included H. G. Ewanchuk, R. E. Anderson, D. C. Miller, R. J. Nethery, R. J. Savellieff and consultant, J. D. Lowell.

#### Geological Setting

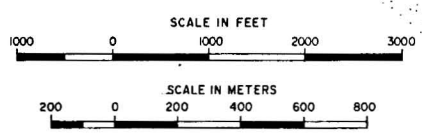
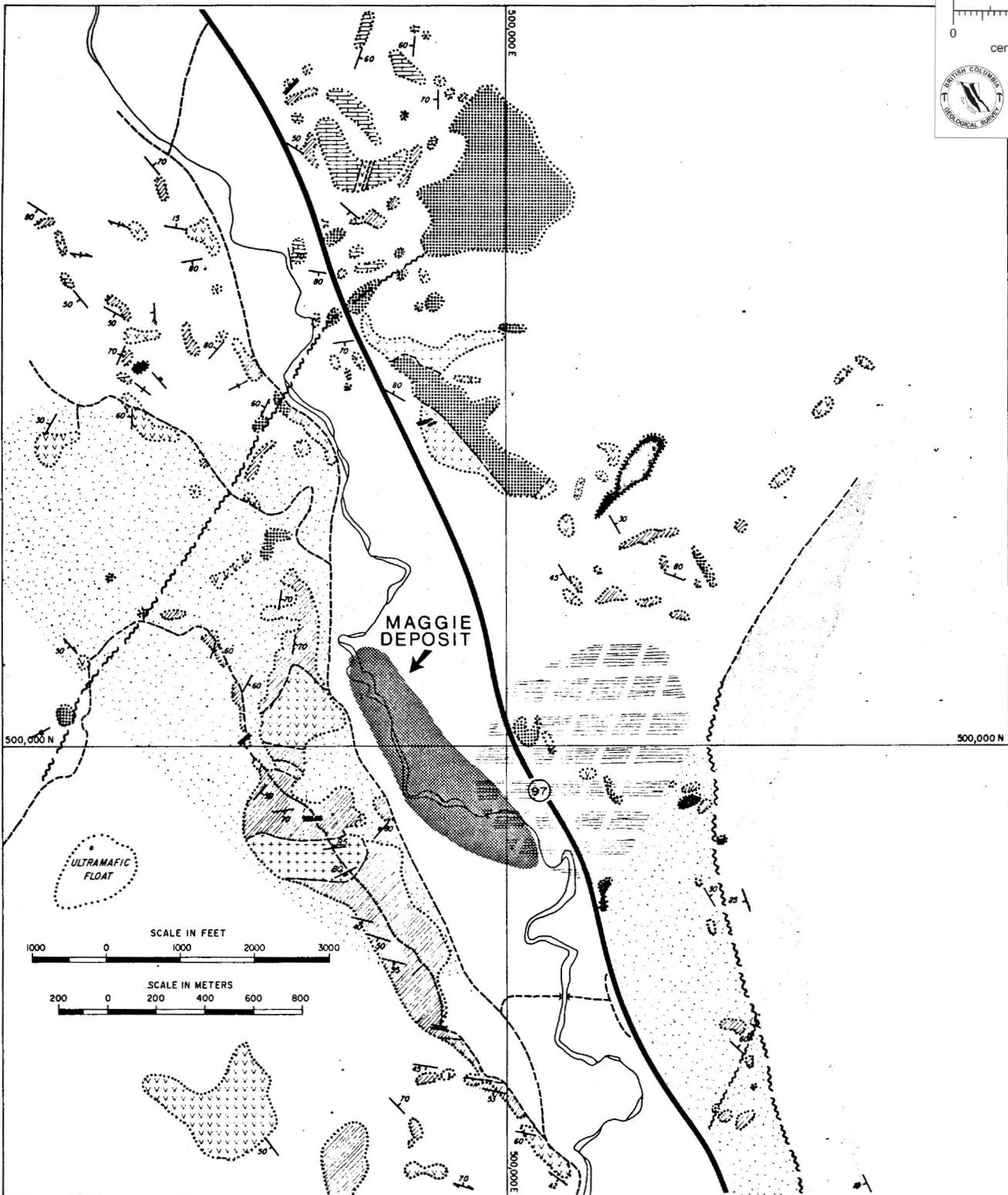
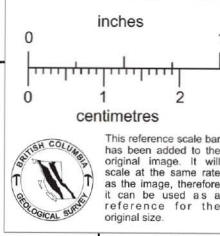
The Maggie deposit comprises low grade chalcopyrite-molybdenite mineralization in an elongate zone trending N37°W and dipping steeply toward the southwest. The long dimension of the deposit is 1,280 metres and its maximum width is 365 metres. The deposit contains two deeply rooted core zones with relatively high grade mineralization which are surrounded by areas of shallower, lower grade mineralization.

The deposit is associated with a Tertiary biotite quartz monzonite porphyry stock that intrudes weakly metamorphosed sedimentary and volcanic rocks of the Upper Paleozoic Cache Creek Group. Economic minerals are largely confined to the stock but also extend

into bordering Cache Creek rocks. The stock is approximately 1,500 metres long and 425 metres wide, but does not crop out. It is covered by 45 to 120 metres of till and alluvium. The stock is cut by a number of pre-mineral latite porphyry dykes. Some distance from the stock, several light colored, porphyritic dykes and small intrusions varying in composition from quartz latite to diorite intrude Cache Creek rocks (Figure 1). A satellite intrusion immediately west of the stock is comprised of quartz diorite. The contact zone between this intrusive and the stock is not exposed; however, it is interpreted that the quartz diorite intrusion is cut by the stock (Figure 2).

The Cache Creek Group in this area comprises chert, argillite, limestone and intermediate to basic volcanic rocks. Because of poor exposure and deformation, the stratigraphy of the Cache Creek Group is not yet fully understood (Duffell and McTaggart, 1951). The Cache Creek rocks are cut by a number of small ultramafic intrusions which are thought to have been emplaced during Permian or Triassic time. The ultramafic bodies are cut by the Maggie stock or occur as large inclusions within it.

Tertiary volcanic rocks, which are younger than the Maggie stock, crop out east of the Maggie deposit where they are in fault contact with rocks of the Cache Creek Group and down dropped with respect to the block containing the Maggie. Tertiary volcanic rocks comprise basaltic to andesitic flows and breccias.

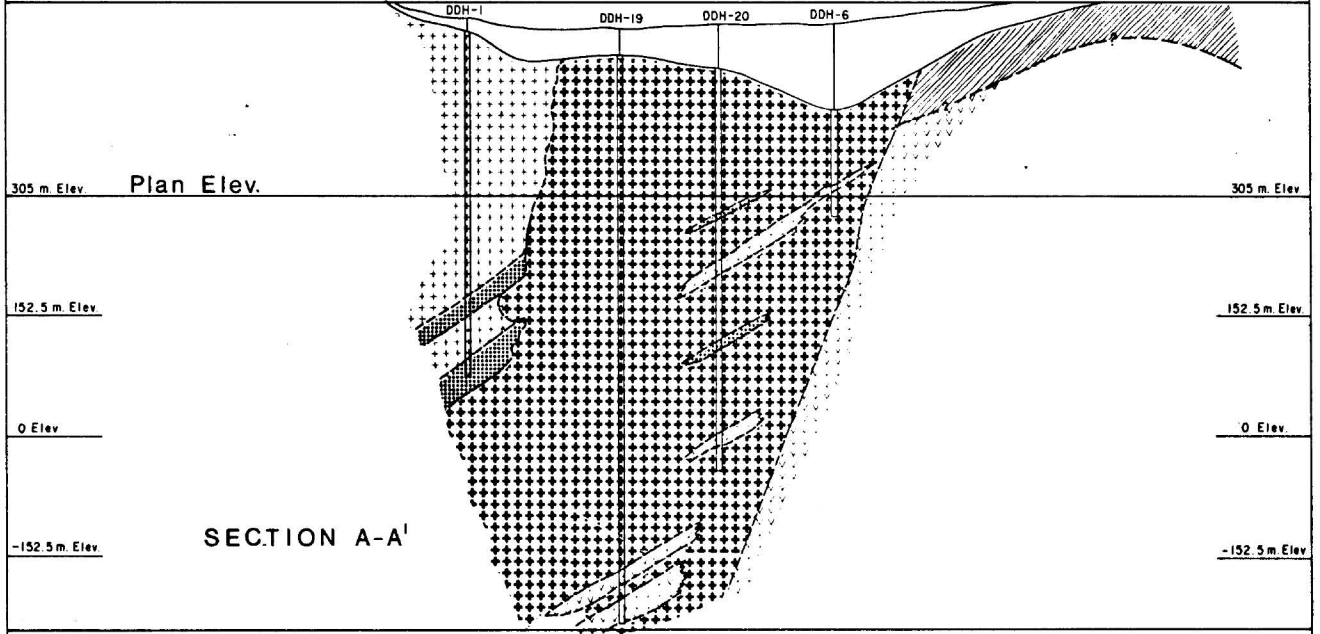
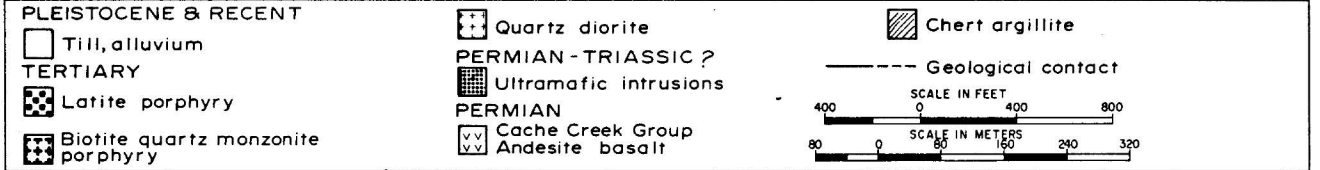
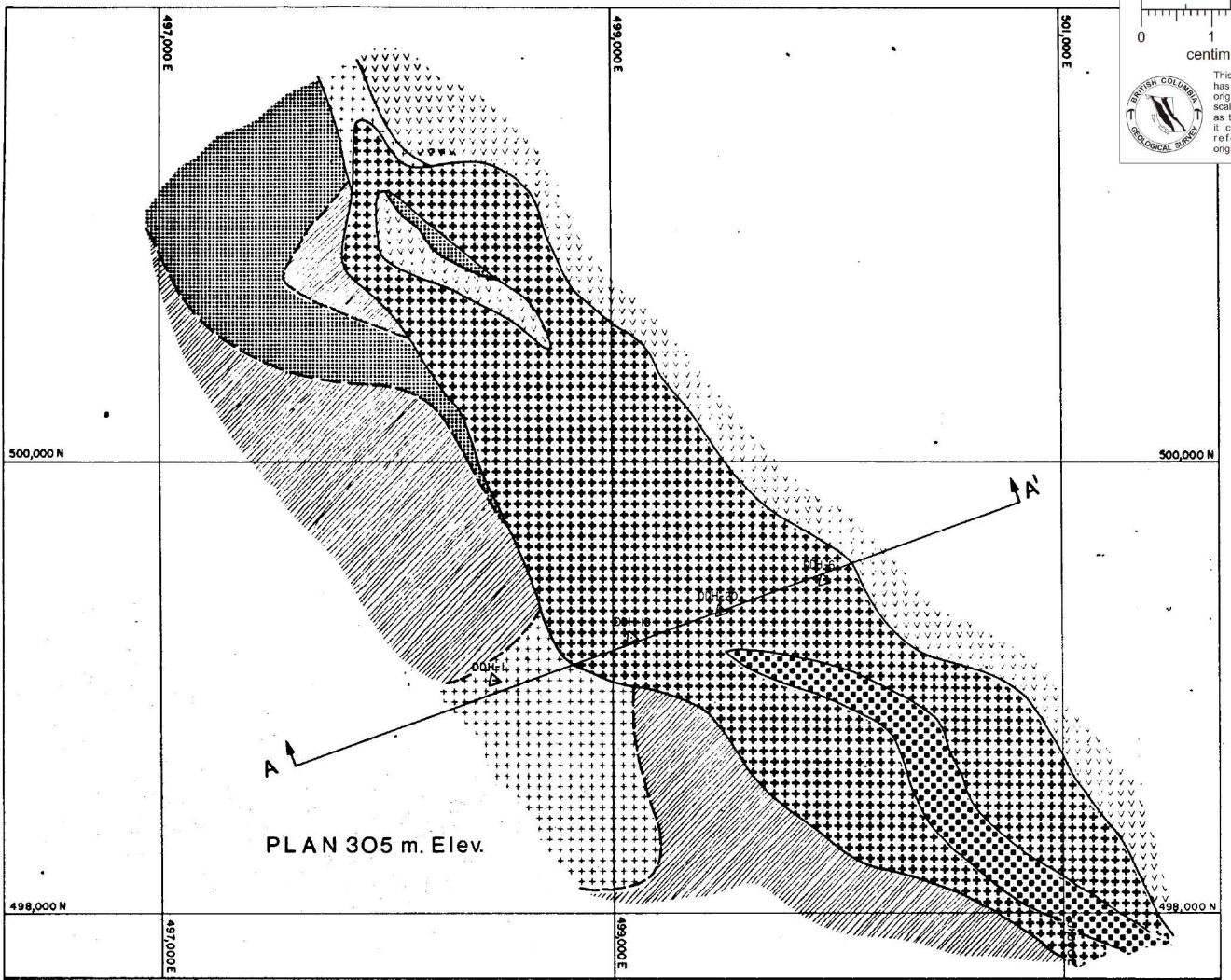
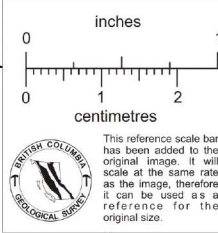


<p><b>PLEISTOCENE &amp; RECENT</b></p> <ul style="list-style-type: none"> <li> Landslide</li> <li> Till, alluvium</li> </ul> <p><b>TERTIARY</b></p> <ul style="list-style-type: none"> <li> Kamloops Group Basalt, andesite flows &amp; breccia</li> <li> Felsic to intermediate dykes &amp; small intrusives, commonly porphyritic</li> <li> Quartz diorite</li> </ul>	<p><b>PERMIAN-TRIASSIC ?</b></p> <ul style="list-style-type: none"> <li> Ultramafic intrusions</li> </ul> <p><b>PERMIAN</b></p> <ul style="list-style-type: none"> <li> Cache Creek Group Andesite basalt flows, tuff &amp; breccia, locally foliated may include minor intrusions</li> <li> Chert &amp; argillite</li> <li> Limestone</li> <li> Gossan or strong pyrite mineralization</li> </ul>	<ul style="list-style-type: none"> <li> Bedding Foliation Jointing</li> <li> Outcrop location</li> <li> Fault</li> <li> Geologic boundary</li> <li> Road</li> <li> Ore Zone Under Overburden</li> </ul>
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**GEOLOGICAL PLAN OF THE MAGGIE DEPOSIT**

FIGURE 1

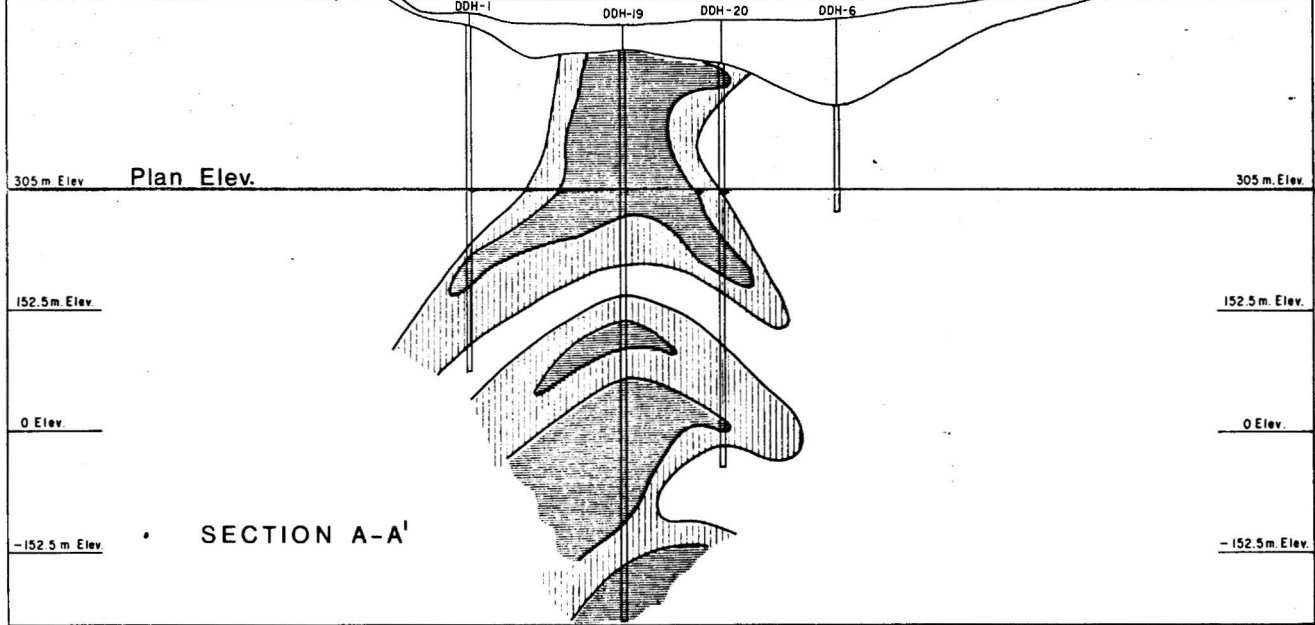
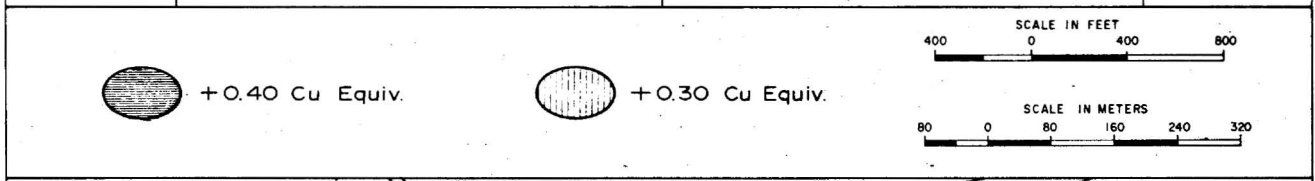
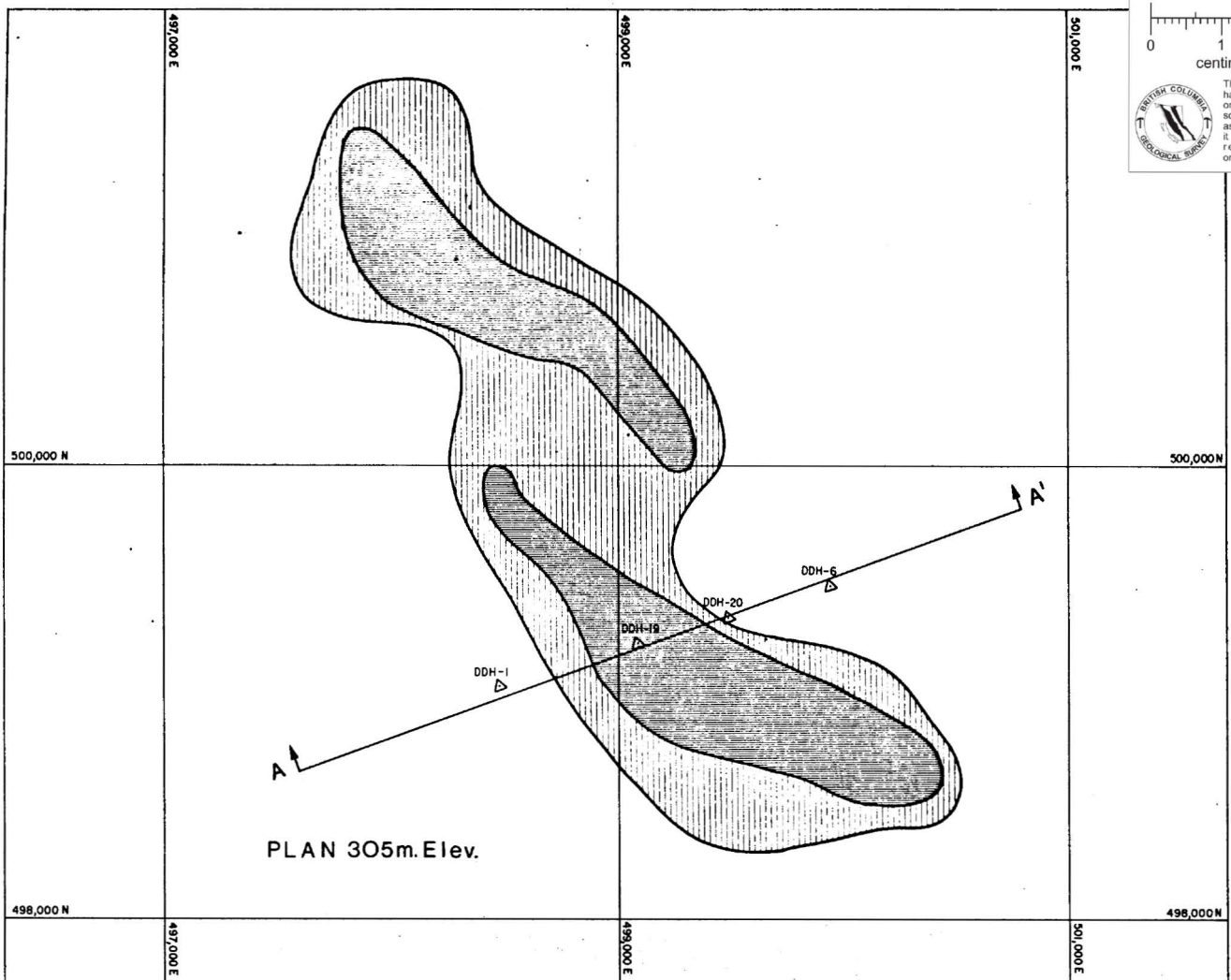
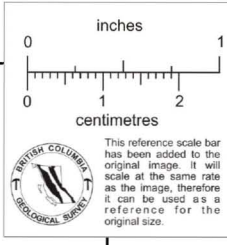




SUBSURFACE GEOLOGY OF THE MAGGIE DEPOSIT

FIGURE 2






Cu-Mo DISTRIBUTION OF THE MAGGIE DEPOSIT

FIGURE 3



inches  
0 1 2 3 4 5

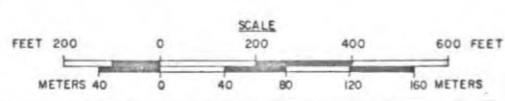
centimetres  
0 1 2 3 4 5



This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.



△ - DIAMOND DRILL HOLE LOCATION  
 ○4955 - SURVEY STATIONS



SHEET INDEX -

10	11	12	13	14
1				
2				
3				
4				
5				

DATE	REVISED	BY	DEPT - EXPLORATION
			DRAWN BY - AJH/11/72
			CHECKED - E.A.
			APPROVED -
			DATE - JULY 1975
			SCALE - 1:2400 or 1" = 200'



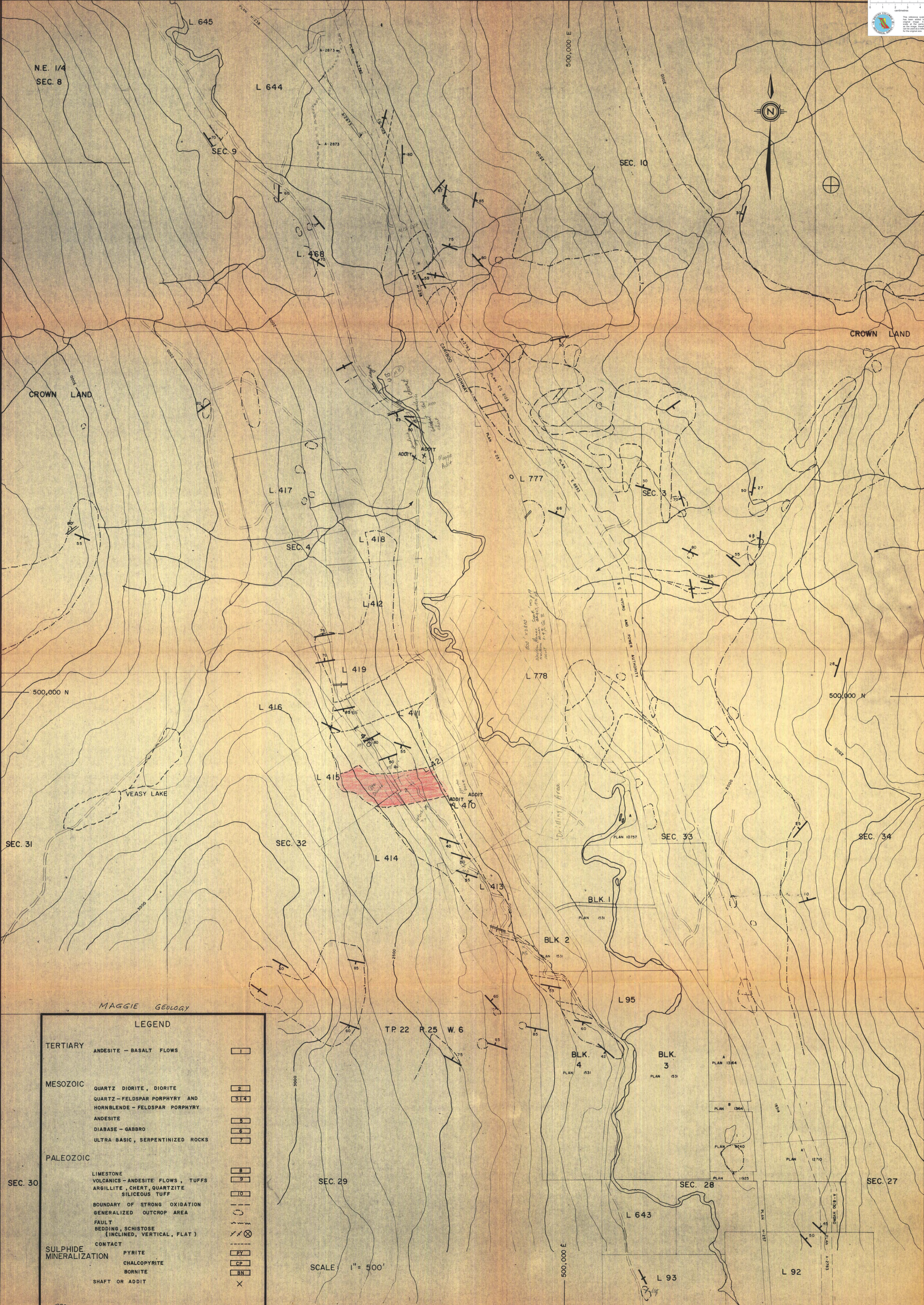
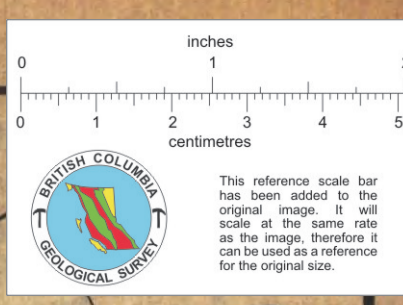
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 DRILL HOLE PLAN

FILE NUMBER - TOPOGRAPHIC SHEET NO. N-13

DRAWING NUMBER - 75-4

Lockwood Survey Corporation Limited  
 DATE OF PHOTOGRAPHY, 19 JUNE 1972





MAGGIE GEOLOGY

LEGEND

TERTIARY	ANDESITE - BASALT FLOWS	1
MESOZOIC	QUARTZ DIORITE, DIORITE	2
	QUARTZ - FELDSPAR PORPHYRY AND HORNBLende - FELDSPAR PORPHYRY	3, 4
	ANDESITE	5
	DIABASE - GABBRO	6
	ULTRA BASIC, SERPENTINIZED ROCKS	7
PALEOZOIC	LIMESTONE	8
	VOLCANICS - ANDESITE FLOWS, TUFFS	9
	ARGILLITE, CHERT, QUARTZITE	10
	SILICEOUS TUFF	10
	BOUNDARY OF STRONG OXIDATION GENERALIZED OUTCROP AREA	(Symbol)
FAULT	BEDDING, SCHISTOSE (INCLINED, VERTICAL, FLAT)	(Symbol)
	CONTACT	(Symbol)
SULPHIDE MINERALIZATION	PYRITE	BY
	CHALCOPYRITE	CP
	BORNITE	BN
	SHAFT OR ADDIT	X

SCALE: 1" = 500'