

CONFIDENTIAL

REPORT ON  
RESISTIVITY SURVEY ON  
PORTION OF BIG CREEK-BOW CREEK AREA  
CARMACKS DISTRICT, YUKON TERRITORY

Under Option To  
NEWKIRK MINING CORPORATION LTD

Prepared by:

J. D. McCannell, Geologist for

GEO-TECHNICAL DEVELOPMENT COMPANY LTD  
24 WELLINGTON STREET WEST  
TORONTO, ONTARIO



Newkirk Mining Corporation Ltd  
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Gentlemen:

Electrical resistivity surveys were conducted over two groups of claims held by Newkirk Mining Company Limited and located in the Carmacks District, Yukon Territory. These surveys were conducted by Geo-Technical Development Company Limited during the period July 14th to August 16th, 1954, and the results are depicted on Plans No. 1 and 2 accompanying this report. A description of the resistivity survey results obtained over both properties is contained herein.

#### Summary and Recommendations

Exploration activity in the Carmacks area has been somewhat sporadic although it has been known for a number of years that gold, silver, copper, lead, zinc and antimony mineralization occurs in the area. Coal seams are also found in some of the younger formations but apart from production of this material there has been very little mineral production.

Encouraging copper showings about 25 miles west of Yukon Crossing in the Big Creek-Bow Creek area have recently attracted attention to this immediate section. The electrical resistivity surveys conducted over the two claims groups discussed herein were carried out in an effort to locate anomalous conditions which might suggest the presence of appreciable sulphide mineralization on these properties.

The survey over the south or Bow Creek group did not indicate conducting zones which might suggest the presence of sulphide mineralization. The survey over the north group, however, delineated three north-south trending linear conducting zones interpreted as representing shearing. Three conducting zones associated with this interpreted shearing warrant further investigation. Although the readings over these three anomalies are not decidedly low they stand out as fairly good conducting zones relative to the general conductivity of the underlying formations and could indicate the presence of appreciable sulphide mineralization. An east-west fault has been interpreted as extending across the south end of the surveyed area.

#### Property

The ground covered by the electrical resistivity surveys discussed in this report consists of two groups of claims in the Bow Creek-Big Creek area of the Carmacks District, Yukon Territory. The two groups are located about 2 miles apart and both include 30 claims each. Only a portion of both groups was covered by the electrical resistivity survey.

The claims covered by the surveys are further described as follows: Big Creek group - Claims 1 to 8 inclusive; 17 to 24 inclusive (16 claims). Bow Creek group - Mining Claims Mary 3 to 8 inclusive, Ray 1 to 8 inclusive (14 claims).

### Location and Access

The properties covered by the electrical resistivity survey discussed in this report are located 25 miles due west of Yukon Crossing or 35 miles north-west from Carmacks, in the Carmacks District, Yukon Territory. Yukon Crossing and Carmacks are located on the Lewes River, a large northwesterly flowing stream which joins the Pelly River at Selkirk to form the headwaters of the Yukon River. Dawson City is located on the Yukon River about 125 miles northwest of Selkirk.

Access to the area is via the Whitehorse-Mayo highway as far as Carmacks and then westward for a distance of 43 miles along a road suitable for truck travel. From this point the Bow Creek property is reached via a 7-mile trail which has to be traversed on foot or on horse. The Big Creek property is a further 5 miles over fairly rugged terrain.

### Topography

The topography of the general area is quite mountainous and both groups of claims discussed herein are located in the Dawson Range which reaches elevations of somewhat over 4000 feet. The Bow Creek area property is located at an approximate elevation of 2500 feet, but north of the river flat the ground rises to 3500 feet. Water run-off has eroded deep gullies which make traversing on the mountain slopes very difficult.

The Big Creek area claims group, situated 2 miles to the north, is located at an approximate elevation of 2200 feet. To the north, in the vicinity of Line 18, the ground rises to about 4500 feet. The topography of this claims group is also quite rugged as it is crossed in many places by runoff streams which have eroded deep gullies and ravines.

The steep slopes of the mountains are largely grass covered and devoid of any timber. In the gullies there is evidence of perma-frost and the ground is fairly well timbered with scrub trees.

#### General Geology

The general geology of the Carmacks area is shown on map 340A, Carmacks Sheet, published by the Geological Survey of Canada on the scale of one inch to four miles. This Sheet accompanies Memoir 189 "Carmacks District Yukon" by H. S. Bostock and published by the Geological Survey of Canada in 1936.

A summarized description of the geology from the above mentioned report is as follows:

"The rocks of Carmacks district include a basement of old metamorphic rocks, the Yukon group, and early intrusives. This basement is overlain by areas of Mesozoic sediments, the Lewes River, Laberge series, Tantalus formation, and Mount Nansen volcanic group. These Mesozoic strata and older rocks are cut into and separated by great and small bodies of intrusive rocks, largely of granitic composition and mainly of Mesozoic age. Large areas of the Mesozoic intrusives and older rocks are covered by volcanics and sediments of Tertiary to Recent age. In the Pleistocene rather more than half the district was covered by the last glaciation which encroached

upon it from the east and southeast leaving large areas covered by glacial drift. There is some record of earlier glacial advances which were locally more extensive than the last.

The district contains gold placer deposits and lode deposits carrying gold, silver, copper, lead, zinc, antimony, and other metals, as well as large reserves of bituminous coal.

All of the lode deposits and placers, except those of the bars of Pelly river, have been found southwest of Lewes river, and the more important of these are along the Dawson range where there is the greatest variety of differentiates of intrusives. Gold placers have been found along the range in places in the district and to the northwest where it extends beyond the district. The range has not been subjected to glaciation except at its southeast end and any placers that have formed lie undisturbed. The lode deposits found to date in the range are those of Freegold mountain, and the assemblage of rocks associated with them occur elsewhere along the range and may be expected to produce similar mineralization elsewhere in it."

In the immediate area of the two claims groups discussed herein the underlying formations are shown on map 340A to consist largely of rocks classified as the Yukon group. The rocks of this group are possible Precambrian age and include mica-quartz schist, chlorite, graphitic schist, quartzite, serpentine, gneiss and minor limestone. The entire series has been intruded by numerous bodies of quartz porphyry, granite porphyry and rhyolite, all of possible Tertiary age. In the Big Creek area a mass of late Mesozoic granite has been mapped and a tongue of this formation extends south to the Company's property. Syenite, monzonite and allied rock types, as well as granite and granite-diorite, were observed by the survey crew in the Bow Creek claims group. However, as much of this immediate area is unglaciated it is covered with overburden and rock exposures are quite sparse.

Similar conditions occur in the immediate area of the Big Creek claims group.

### General Discussion

There has been very little mining carried out in the Carmacks area although reports of mineral occurrences date back to the early part of the present century. Coal was reported as early as 1887 and has been mined for several years for local consumption.

The Carmacks area has been the scene of several staking rushes. The first prospecting in the district was for gold when prospectors passing through on the way to the Klondike during the early gold rush are reported to have discovered placer gold in tributaries of the Lewes River. Some placer mining was done following these discoveries.

Lode prospecting was later carried out and several gold occurrences were located, especially in the vicinity of Freegold Mountain. Other minerals discovered in the area include silver, copper, lead, zinc and antimony.

### Explanation of Resistivity Method

The method used by Geo-Technical Development Company Limited is a form of the earlier resistivity methods modified by some eight years' experience in the field.

In short, a known current is put into the ground and readings are taken at 50 foot intervals along picket lines by sensitive vacuum tube voltmeters measuring the voltage drop across this interval. Calculations translate these voltage readings into resistance values in terms of ohm-centimeters. These are plotted on the map.

Due to the inhomogeneity of the medium being examined, i.e., the complexity of the geology and structure, interpretations are based on experience and a knowledge of the geological conditions in the area being tested with this particular method. Where the latter are unknown, the interpretation must, of necessity, be limited or very tentative.

However, without any geological information it is generally possible to differentiate between banded rocks such as volcanics, sediments or gneiss and large bodies of massive intrusives, due to the difference of electrical conductivity between the various flows or beds. Strike trends, folding, etc. are therefore readily picked up. In some cases rock contacts may be inferred.

Shear or fracture zones are relatively better conductors, due to their higher water content. Where extreme low resistivity values are found graphite or sulphide is indicated. Graphite is found in schist or shear zones or sedimentary horizons, which are shown by electrical methods as, generally, narrow low linear trends. Unfortunately, from the point of view of interpretation, sulphides may be present with the graphite or may occur in shear zones giving similar low linears.

### Interpretation of Resistivity Results

The results of the electrical resistivity survey over the Bow Creek claims group are depicted on Plan No. 1 accompanying this report. The resistivity readings were for the most part quite high suggesting poor conductivity of the underlying formations. No anomalous conditions were delineated and no resistivity readings were observed sufficiently low to suggest the presence of sulphide mineralization.

Several small lenticular shaped areas showing relatively higher resistivity have been interpreted as delineating areas underlain by the Tertiary granitic rocks which intrude the Yukon series. The interpreted contacts between the Yukon series and the intrusive rocks are shown on the accompanying plan.

The resistivity results over the north group, or Big Creek property, are more encouraging, and three anomalous zones apparently associated with north-south shearing have been delineated by the survey. The north-south shears are identified on the accompanying plan No. 2 in their relative order of apparent significance as the No. 1, No. 2 and No. 3 shear. These shear zones follow very definite linear trends of lower resistivity which stand out quite sharply with respect to the readings over the immediately adjacent areas.

The resistivity readings over the anomalous areas associated with these three north-south shears are all in the same range and are sufficiently low to suggest fairly good

conductivity mediums. Map 340A shows this area to be underlain by rocks of the Yukon group and includes rocks classified as graphitic schists. These graphitic formations could provide a good conducting medium resulting in the anomalies delineated by the survey. However, the presence of appreciable sulphide mineralization could also result in resistivity readings in this low range.

It is not possible to determine, by geophysical means alone, anomalies caused by the presence of graphitic material and those resulting from the presence of sulphide mineralization.

In addition to the north-south shear zones mentioned above, the resistivity survey has suggested the presence of an east-west fault extending across the south part of the surveyed area and immediately north of Big Creek. The shear zones described above terminate against this interpreted fault.

The resistivity results also suggest the area immediately north of Big Creek and between the No. 1 and No. 3 interpreted shears to be underlain by granitic or rhyolite rocks intruding the Yukon group. The possible contact between these formations is shown on the accompanying plan. A similar condition is suggested in the extreme southwest corner of the surveyed area south of the interpreted fault. A broad north-south band of high resistivity readings between the No. 2 and No. 3 interpreted shear zones suggests a dyke or bed of dense impervious rock to extend

through this section of the property.

It is recommended that surface work be carried out to determine the economic merits of the anomalous areas associated with the No. 1, No. 2 and No. 3 shear zones. The encouragement obtained from the electrical resistivity survey is somewhat marginal but it is felt that these three anomalies should be further investigated and can possibly be examined by surface trenching. The survey crew reported a fair amount of rock exposure on the property and it is known that outcrops occur immediately south of the anomalous area associated with the interpreted No. 3 shear.

#### Survey Data

An electrical resistivity survey was conducted over two groups of claims held by Newkirk Mining Company Limited and located in the Carmacks District, Yukon Territory.

The survey was conducted by Geo-Technical Development Company Limited during the period from July 14th to August 16th, 1954, and the results are shown on Plans No. 1 and No. 2 accompanying this report. Plan No. 1 covers the survey over the Bow Creek group and Plan No. 2 the Big Creek group. The former comprises approximately 775 acres and the latter 900 acres.

North-south base lines were established on both properties and east-west traverse lines turned off at 400 foot intervals. Resistivity readings were taken at 50 foot

intervals along the east-west traverse lines, and are shown on the accompanying plans in ohm-centimeters x  $10^3$ , plotted to the east of the picket lines and depicted by contour lines.

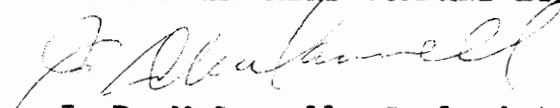
On the Bow Creek group a total of 14.1 miles of electrical resistivity surveying was conducted requiring 1,490 station readings. 17 miles of line were surveyed on the Big Creek group requiring 1,792 station readings.

The number of eight-hour man-days required to complete this work is as follows:

	<u>BOW CREEK</u>	<u>BIG CREEK</u>
	(8-hour)	(8-hour)
	<u>Man Days</u>	<u>Man Days</u>
Laying spread wire	5	5
Operating resistivity survey	17	23
Calculation & Interpretation	5	5
Drafting	11	15
Office typing & supervision	<u>4</u>	<u>4</u>
Total .....	42 days	52 days

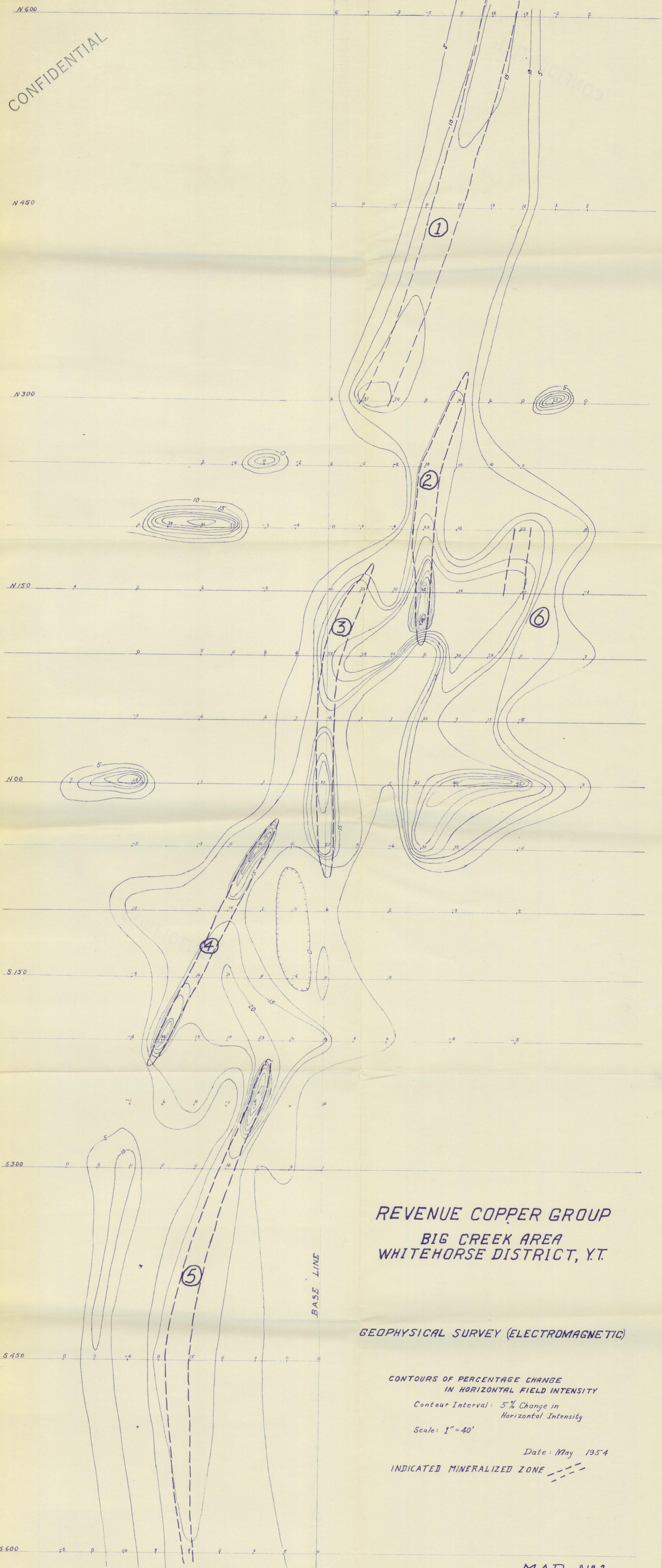
Respectfully submitted,

GEO-TECHNICAL DEVELOPMENT COMPANY LTD

  
J. D. McCannell, Geologist

Toronto, Ontario  
September 14, 1954

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REVENUE COPPER GROUP  
BIG CREEK AREA  
WHITEHORSE DISTRICT, Y.T.

GEOPHYSICAL SURVEY (ELECTROMAGNETIC)

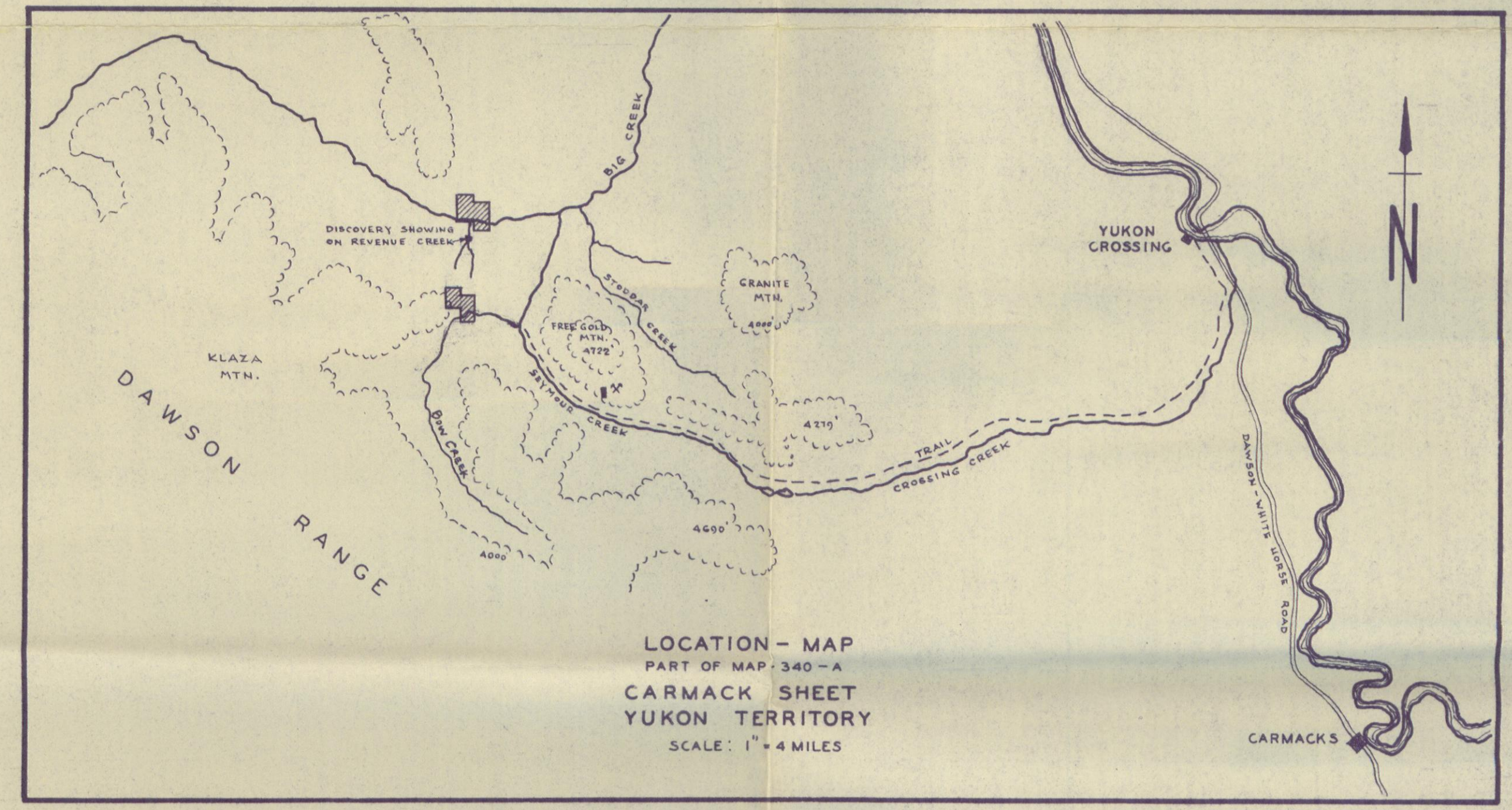
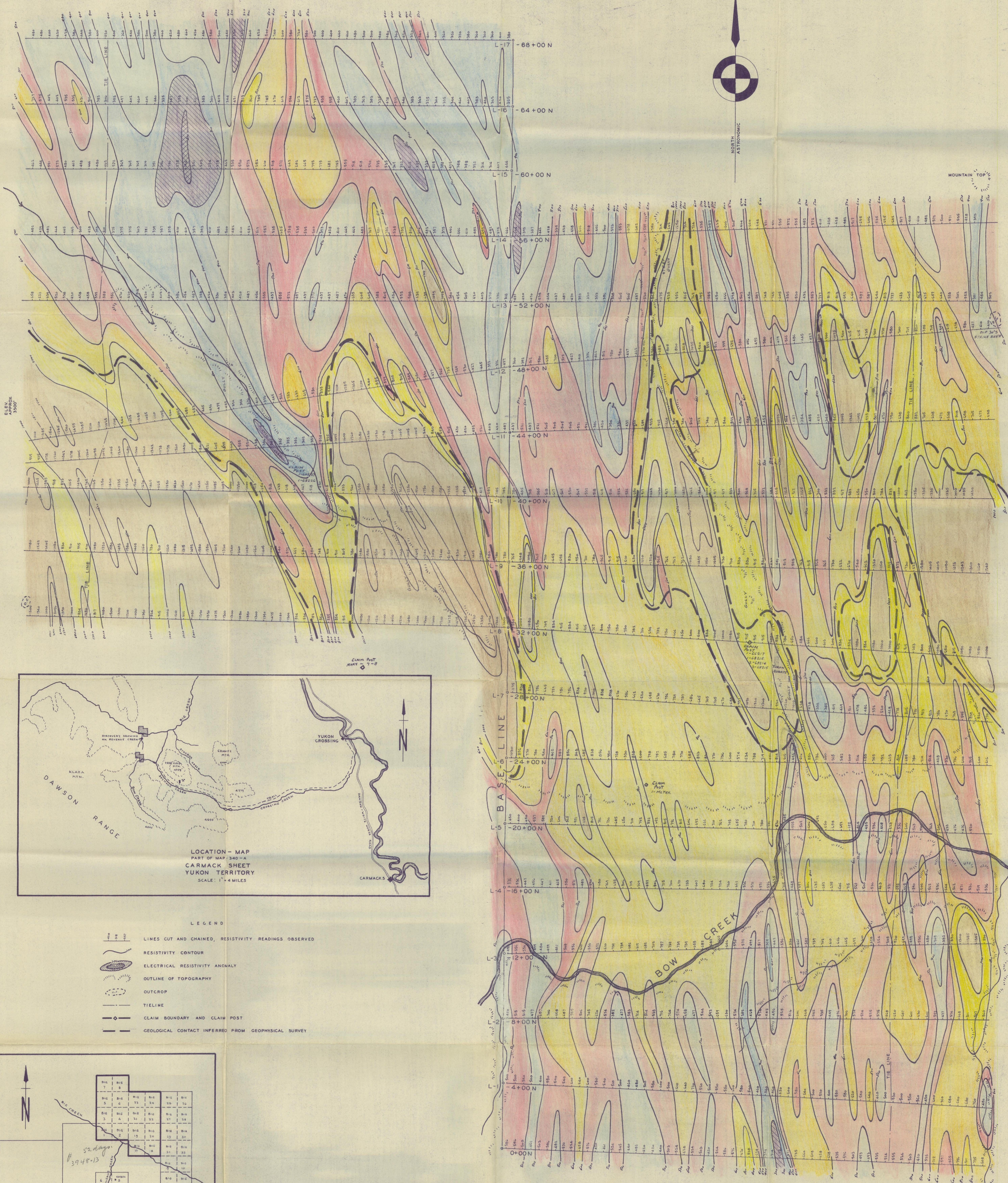
CONTOURS OF PERCENTAGE CHANGE  
IN HORIZONTAL FIELD INTENSITY

Contour Interval: 5% Change in  
Horizontal Intensity

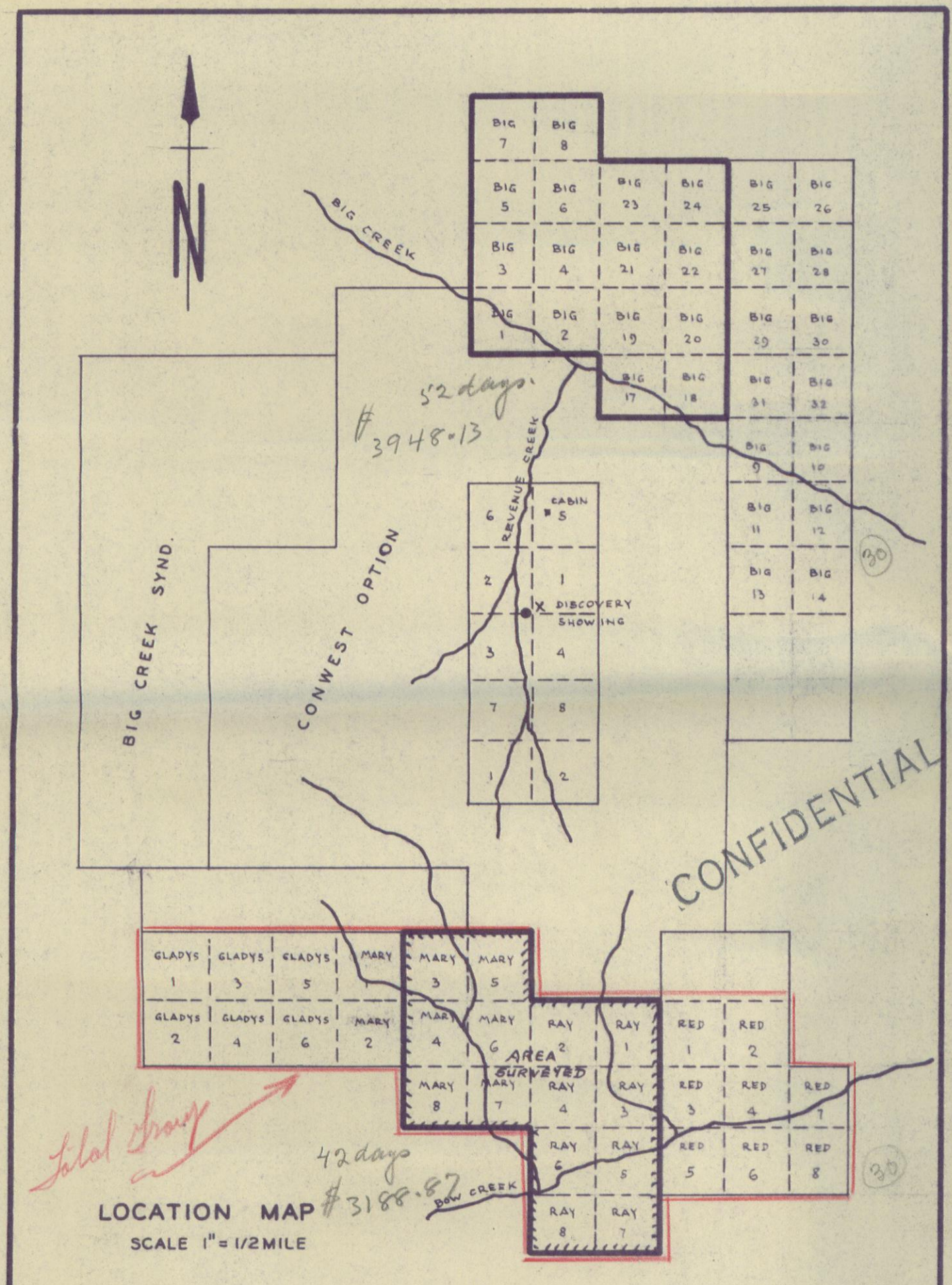
Scale: 1" = 40'

Date: May 1954

INDICATED MINERALIZED ZONE

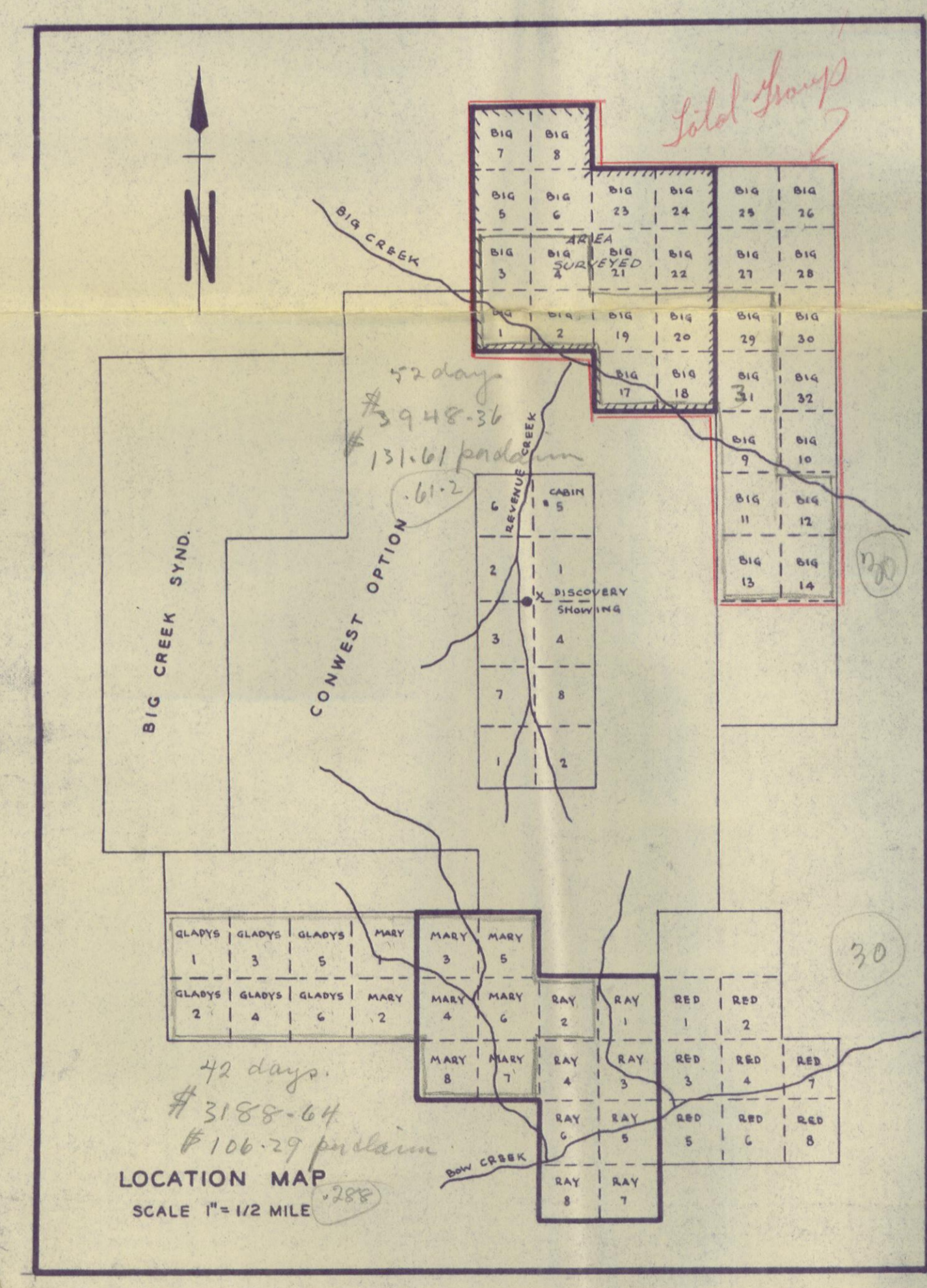
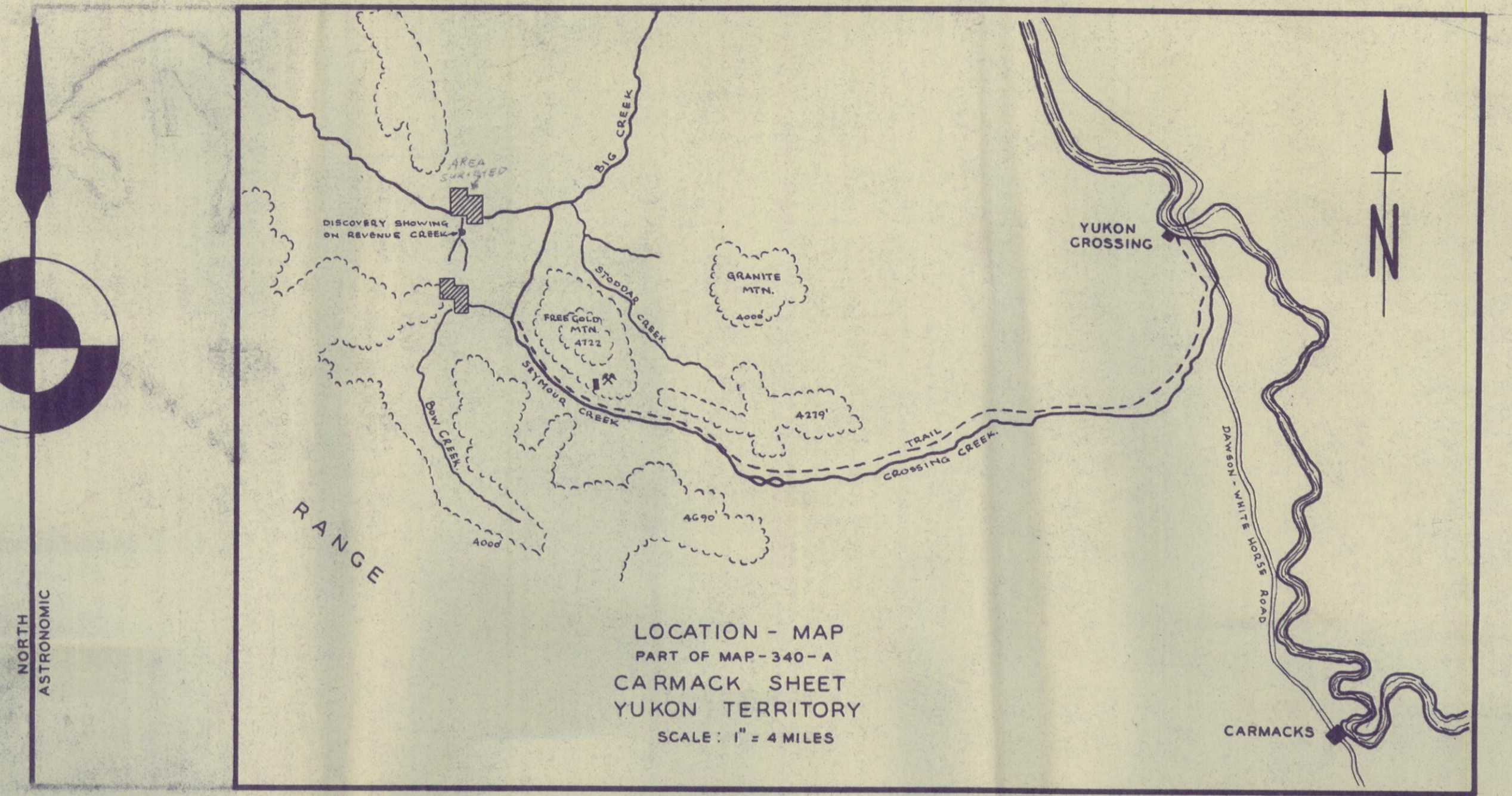
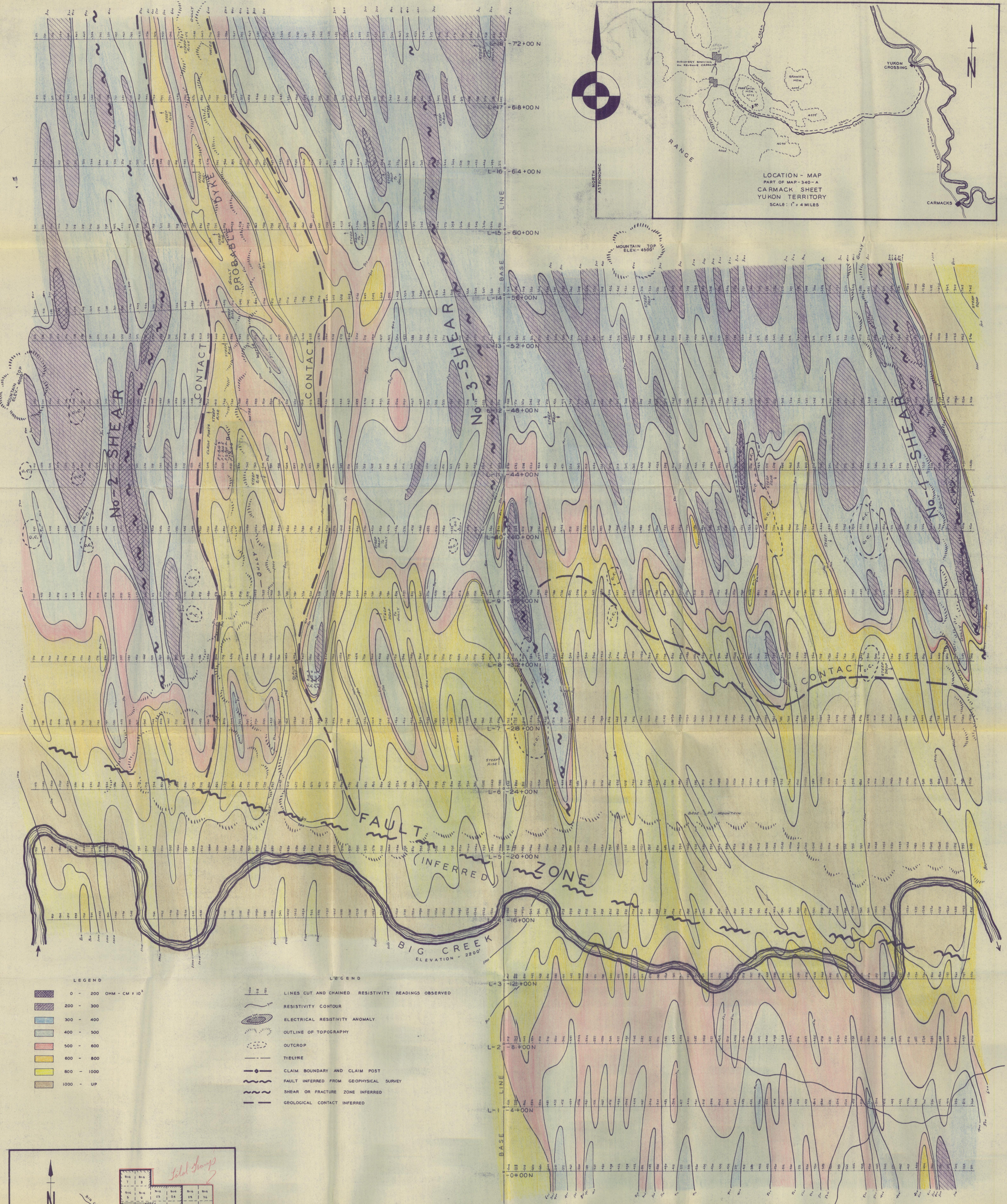


- LEGEND**
- LINES CUT AND CHAINED, RESISTIVITY READINGS OBSERVED
  - RESISTIVITY CONTOUR
  - ELECTRICAL RESISTIVITY ANOMALY
  - OUTLINE OF TOPOGRAPHY
  - OUTCROP
  - TIELINE
  - CLAIM BOUNDARY AND CLAIM POST
  - GEOLOGICAL CONTACT INFERRED FROM GEOPHYSICAL SURVEY



ELECTRICAL RESISTIVITY SURVEY OVER PART OF BOW CREEK AREA PROPERTY  
 OPTIONED BY  
**NEWKIRK MINING CORPORATION LIMITED**  
 ELECTRICAL RESISTIVITY CONTOURS & GEOLOGICAL INTERPRETATION  
 CARMACKS-BIG CREEK AREA  
 WHITEHORSE DISTRICT  
 YUKON TERRITORY  
 GEOPHYSICAL SURVEY BY:  
**GEO-TECHNICAL DEVELOPMENT COMPANY LIMITED**

- LEGEND**
- 0 - 200 OHM - CM x 10<sup>3</sup>
  - 200 - 300
  - 300 - 400
  - 400 - 500
  - 500 - 600
  - 600 - 800
  - 800 - 1000
  - 1000 - UP



ELECTRICAL RESISTIVITY SURVEY OVER PART OF BIG CREEK AREA PROPERTY  
OPTIONED BY

# NEWKIRK MINING CORPORATION LIMITED

ELECTRICAL RESISTIVITY CONTOURS & GEOLOGICAL INTERPRETATION

CARMACKS - BIG CREEK AREA

WHITEHORSE DISTRICT

YUKON TERRITORY

GEOPHYSICAL SURVEY BY:

## GEO - TECHNICAL DEVELOPMENT COMPANY LIMITED

PLAN NO. 2

AUG - 1954

SCALE 1" = 200'

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