

Indexed

06/1/72

WHITEHORSE COPPER MINES LTD.

EXPLORATION 1974

*KEEWENAW - COWLEY PARK
105-D-10*

*WAR EAGLE CLAIM GROUP
105-D-14*

D. Tenney,
Chief Geologist.

*Received Ottawa
April 2, 1974
J.H. Plaine*

TABLE OF CONTENTS

SUMMARY OF PROPOSED EXPLORATION 1974

	PAGE
General	1
Estimate of Expenditures	1

KEEWENAW - COWLEY PARK

Introduction	2
Geology	2
Exploration	2
Proposed Exploration	2
Expenditures	3
Fig. 1	Exploration Composite
Annex A	Affidavit of Claim Ownership and Sketch of Claims

WAR EAGLE 19-39

Introduction	4
Geology	4
Work Done	4
Proposed Exploration	4
Expenditures	5
Annex A	Affidavit of Claim Ownership
Annex B	Report of I.P. Survey Kenting Geophysics
Fig. 1	Geology Map
Fig. 2	Magnetic Survey
Fig. 3	Geochemical Survey - Soil Sampling

SUMMARY OF PROPOSED EXPLORATION 1974

General

Whitehorse Copper Mines Ltd., proposes to explore two areas on the Whitehorse Copper Belt under, "The Northern Mineral Exploration Assistance Program" in an attempt to find economic copper mineralization.

Estimated Expenditures

a)	Keeweenaw - Cowley Park		
	I Diamond Drilling 5000' @ 15.00/ft.		\$ 75000
	II I.P. Surveys 6 miles		3000
	III Line Cutting 6 miles		600
	IV Geologist and supervision		4800
	V Core boxes, assaying, pickup and general and administrative expenses		<u>10232</u>
		TOTAL	\$ 93632
b)	WE 19-39		
	I Diamond Drilling 1600' @ 12.00/ft.		\$ 19200
	II Soil Sampling and Analysis 850 Samples @ 2.00/sample		1700
	III Geologist and supervision		1800
	IV Core boxes, assaying, pickup and general and administrative expenses		<u>3513</u>
		TOTAL	\$ 26213
		TOTAL a&b	<u>\$119845</u>

(All as detailed on accompanying estimate sheet)

WHITEHORSE COPPER MINES LTD.

KEEWENAW TO COWLEY PARK

PROPOSED EXPLORATION PROGRAMME.

Introduction

The belt between Keewenaw and Cowley Park extends for a distance of 2.5 miles and is located 7 miles southeast of McCrae (Mile 910, Alaska Highway). The area is accessible by road from McCrae and from Mile 2.5 of the Carcross road.

Geology

Several copper bearing skarn zones exist along this belt (see map Appendix A) of these only the Black Cub South and Keewenaw zones have been mined. All skarn zones are developed along the contact of Cretaceous diorite and granodiorite of the coast range intrusive complex with sedimentary rocks of the Lewes River series.

Exploration

I.P. and magnetometer surveys have been completed over the area, except for the valley east of Cowley Park.

The presence of graphitic limestone near the favorable diorite-sediments contact tends to mask any I.P. anomalies that may result from the presence of copper sulphides. However, I.P. surveys have helped in outlining the diorite sediments contacts.

Magnetic surveys located the Gem and "Cub" orebodies while Keewenaw and Cowley Park are not magnetically anomalous. However, both these produced an anomalous induced polarisation response.

Proposed Exploration

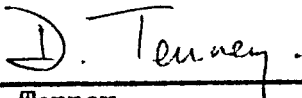
The 1974 program proposes to test by drilling and I.P. a number of locations along the belt.

- a) Complete a hole started in 1973 under the Black Cub South zone. Further drilling would depend on results.
- b) Drill the contact between Black Cub South and Keewenaw Pit in at least three locations.

- c) Test other I.P. anomalies.
- d) Do detailed I.P. in the area 4000' south of Cowley Park. CP67 drilled in this area in 1973 did not adequately explain the source of the anomaly. The anomaly should be drilled again if its presence is confirmed by work during 1974.
- e) Complete I.P. coverage over the Cowley Creek valley east of Cowley Park. Drill anomalies as required.

Expenditures

Diamond Drilling	5000' @ \$ 15.00/ft.	\$75000
I.P. Surveys	6 miles	3000
Line Cutting	6 miles	600
	TOTAL	<u>\$78600</u>



D. Tenney,
Chief Geologist.



V.V. Jutronich,
P. Eng.,
General Manager.

WAR EAGLE CLAIMS 19-39

Introduction

WE 19-39 claims are located west of the Porter Creek subdivision Mile 921 of the Alaska Highway. The area is accessible by a number of roads which provide access to a fire break which runs through the property from North to South.

Geology

The WE 19-39 claims are at the northern extremity of the known Whitehorse Copper Belt. The southern boundary of the claims is approximately 1½ miles north of the War Eagle Pit which produced 900,000 tons @ 1.2% cu. Rock exposure on the claims is poor. Diorite of the Coast Range Intrusive Complex is known to be in contact with rocks of the Lewes River group in the west and southwest part of the area.

Skarn float containing bornite and chalcopyrite has been found in a number of locations on the claims.

Work Done

Geological mapping, a magnetometer survey, and an Induced Polarization Survey were completed in 1973. Part of the grid was covered by Geochemical Sampling.

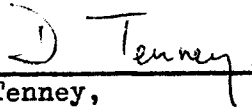
A number of I.P. anomalies were found during the survey near probable diorite sediments contacts with which mineralization in the Copper Belt is associated. None of the anomalies were found to have any magnetic correlation. Weakly anomalous soil samples were found in the area of the I.P. anomaly centered at 192N 29W.

Proposed Exploration

- a) To test by diamond drilling anomalies centered at 192N 29W, and 176N 6W. Testing of other areas would be contingent on results.
- b) To complete the soil sampling of the grid.

Expenditures

1600' Diamond Drilling @ 12.00/ft.	\$ 19200
Soil Sampling and Analysis	
850 Samples @ 2.00/sample	<u>1700</u>
TOTAL	\$ 20900



D. Tenney,
Chief Geologist.



V.V. Jutronich,
P. Eng.,
General Manager.

REPORT ON
AN INDUCED POLARIZATION SURVEY
IN THE
WHITEHORSE AREA, YUKON TERRITORY
FOR
WHITEHORSE COPPER MINES LTD.
BY
T.R.B. Dundas, M.Sc., D.I.C.
J.E. Wyder, Ph.D., P.Eng.

REPORT ON
AN INDUCED POLARIZATION SURVEY

IN THE
WHITEHORSE AREA, YUKON TERRITORY

FOR

WHITEHORSE COPPER MINES LTD.

BY

KENTING EXPLORATION SERVICES LIMITED

CALGARY, ALBERTA

OCT. 1973

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	
General	1
SURVEY SPECIFICATIONS	
Instrumentation	2
Calculations	2
Electrode Arrays	2
RESULTS	4
GEOLOGY	5
INTERPRETATION	6
CONCLUSIONS AND RECOMMENDATIONS	8
<u>ACCOMPANYING MAPS</u>	<u>LOCATED</u>
Figure 1 - Location Map	In Report
Figure 2 - Detail Line 6W	"
Figure 3 - Detail Line 192N	"
Figure 4 - Apparent Chargeability $a=200$ feet	In Pocket
Figure 5 - Apparent Resistivity $a=200$ feet	"
Figure 6 - Apparent Chargeability $a=400$ feet	"
Figure 7 - Apparent Resistivity $a=400$ feet	"
Figure 8 - Interpretation Map	"

INTRODUCTION

General

This report describes the results of an Induced Polarization (I.P.) Survey carried out by Kenting Exploration Services Limited, Whitehorse Area, Yukon Territory for Whitehorse Copper Mines Ltd.

The field work was carried out in the period October 3rd - October 29th, 1973 by T.R.B. Dundas, Senior Geophysicist with a crew provided by Whitehorse Copper Mines Ltd.

The area is located approximately 5 miles to the Northwest of Whitehorse Townsite and on the west side of the Alaska Highway (Figure 1).

The property forms part of the general Whitehorse Copper Belt and the purpose of the survey was to continue previous Induced Polarization work northwards in an attempt to locate copper deposits similar to those of the copper Belt to the south of the survey grid.

SURVEY SPECIFICATIONS

Instrumentation

The equipment used for the Induced Polarization survey consisted of a pulse-type system using a Huntec 2.5 kilowatt transmitting system combined with a Newmont Type Receiver.

The following specifications apply:-

Current - D.C.	-	2.0 seconds "current on" 2.0 seconds "current off" Alternate pulses have reversed polarity
Transmitter Power Available	-	2.5 k Watt
Integrating Time	-	650 Milliseconds
Delay Time From "current off" to start of integration	-	450 Milliseconds

Calculations

The apparent resistivity is calculated by dividing the primary voltage, V_p , by the current, I_g , flowing between the current electrodes, C_1 and C_2 , and multiplying by a geometrical factor appropriate to the electrode array being used. The apparent resistivity is expressed in ohm-meters.

Electrode Arrays

The electrode array used was the pole dipole array.

In this system one current electrode, C_1 , is put a large distance from the stations surveyed so that the other electrode, C_2 , can be considered as a single electrical pole unaffected by the potential from the C_1 electrode. The potential electrodes ($P_1 - P_2$) are maintained at a fixed distance from the moving current electrode C_2 .

Electrode Arrays (continued)

Distances of 200 feet and 400 feet were used for $C_2 - P_1$, combined with a $P_1 - P_2$ distance of 200 feet.

Detail work on the two anomalies was carried out using a gradient arrangement in which the two current electrodes, $C_1 - C_2$, are maintained a large distance apart compared to the potential electrodes $P_1 - P_2$ which are moved along the line between the current electrodes.

RESULTS

The results are presented in the form of contoured plan maps of both apparent resistivity and chargeability at a scale of 1 inch = 400 feet for both electrode separations (Figures 4 - 7).

The detail work over two of the anomalies is presented as profiles (Figures 2 - 3).

GEOLOGY

The property is located at the northern end of the "Whitehorse Copper Belt" which is approximately 17 miles long and varying from 1 mile to 3 miles in width.

The Copper Belt strikes approximately north - south, and lies directly west of Whitehorse.

The general geology of the area consists of a series of sedimentary rocks of Upper Triassic age - grey wacke, arkose, limestone, quartzite, argillite and slates, which have been intruded and metamorphosed by an acid intrusive, varying in composition from a granite - granodiorite, forming part of the main Coast Range Intrusives.

The copper deposits are mainly classed as contact metamorphic skarn type with the limestone/intrusive contact being the favoured location for the formation of this type of ore.

INTERPRETATION

An interpretation of the results is presented in Figure 8 but certain qualifications as described later should be considered in conjunction with this map.

A number of factors have made it very difficult to be definite regarding the distribution of the various rock types, establishing the background values locally and thus the amplitude and extent of "anomalous" areas. Normally a particular rock type would be expected to give a characteristic resistivity and chargeability response making it possible, provided there is enough contrast between adjoining rock units, to make the contact with reasonable accuracy. It is apparent from the geophysical results and what geology is known of the survey area that a particular rock type shows considerable variation in both resistivity and chargeability response. The changes in resistivity response are probably due to a combination of variation in the degree of metamorphism and local faulting. Changes in chargeability response are probably caused by local metamorphism combined with the introduction of secondary minerals in some local areas.

The only rock unit in the survey area which could be recognized with any degree of certainty is the quartzite which has an apparent east-west strike and located near the north end of the grid. An interpretation of the resistivity results which are high over the quartzite suggests that the quartzite strike is in fact west north west - east south east with the apparent east - west strike due to a number of cross faults normal to the strike. Other quartzites are known to occur within the survey area but do not show a similar high resistivity response and cannot be distinguished from the sediments. The extent of the quartzite suggests that it is cut off by the major faults both at the east and west ends with no direction or amount of displacement obvious from the results.

The response of the diorite intrusive and the sediments in the area are very similar

and the proposed intrusive/sediment contacts as shown on the map is questionable in some places.

A major "contact" trend in a northwest - southeast direction (from Line 176N, 25E) is obvious from the chargeability response and is different from the strike of the sediments just to the north. This could be the location of the intrusive/sediments contact making a large area of proposed sediments, centered at the baseline - Lines 164-180, a pendant or faulted inlier within the main mass of the intrusive. This change in response could also be a feature within the sedimentary rocks, possibly caused by faulting or could indicate limits of a metamorphosed zone.

A number of anomalous areas have been indicated in the map and are believed to be caused by the introduction of secondary rocks. High values occur in other parts of the area but are considered to be caused by different lithological units within the sedimentary series. All of the anomalous areas occur within the sedimentary rocks but close to the intrusive contact with the exception of the area near Line 188 at 31W which apparently extends into the main mass of the intrusive rock.

It would not be prudent to give a relative degree of importance to the various anomalous areas based on the present results and if required this may be accomplished on the basis of other work e.g. geochemistry.

Detail work on two of the anomalies (Figures 2 and 3) show that the anomalous areas have considerable depth extent and width from a chargeable source in contrast to the resistivity which shows considerable variation.

CONCLUSIONS AND RECOMMENDATIONS

The results show considerable variation in the chargeability response throughout the survey. The response of many of the rock units in the area is quite similar making it difficult to define geological contacts with any accuracy.

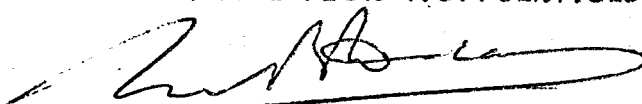
There is strong evidence for a number of faults striking in a north north east - south south west direction.

A number of anomalous areas have been defined and it is recommended that each of these be drilled to check the source of the anomaly in each case. The anomalies have considerable width and vertical drill holes at the peak response should be sufficient to indicate the materials producing the anomalies.

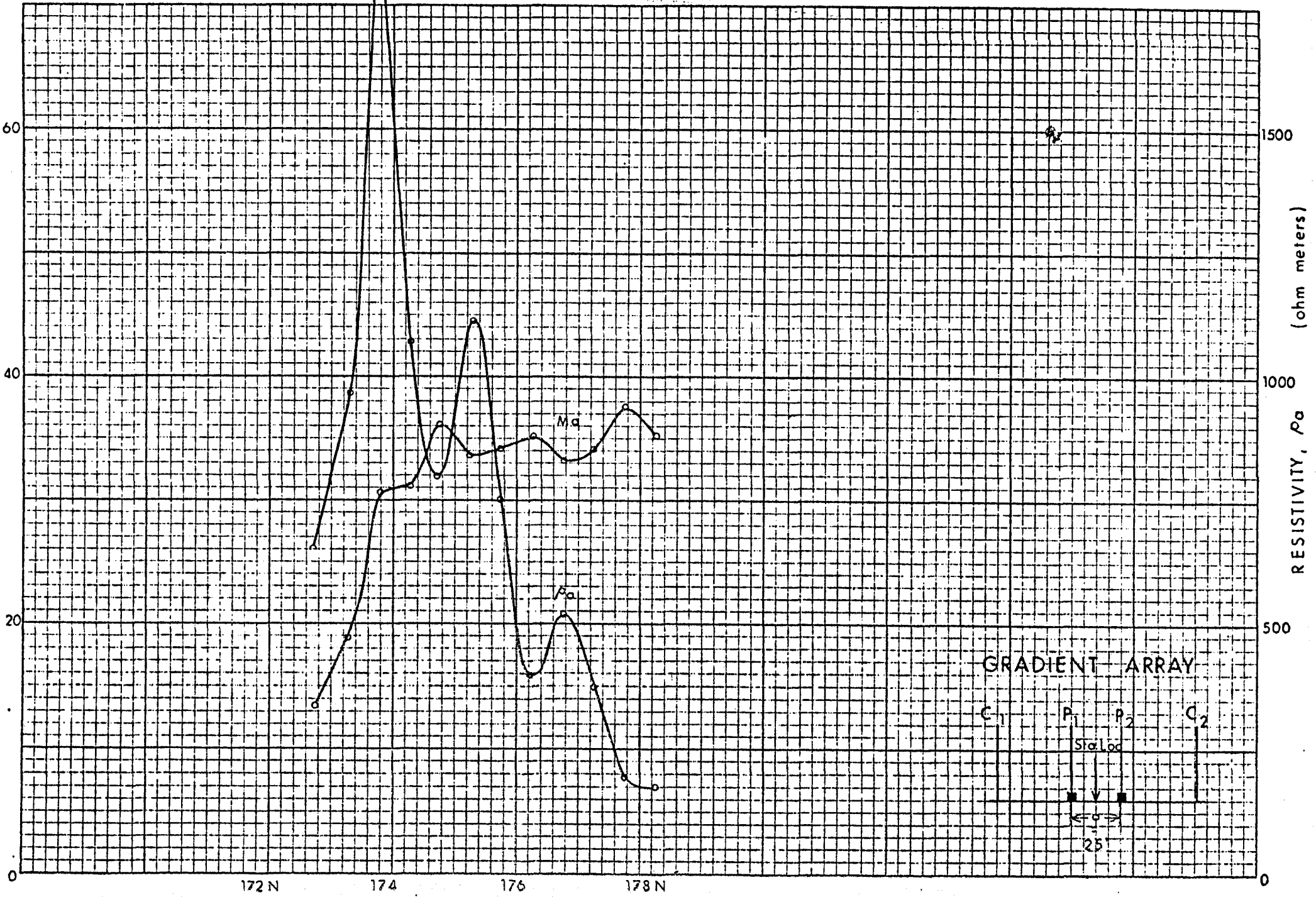
On the basis of the geological information obtained from a drilling programme, a re-interpretation of the present survey might prove valuable.

Respectfully submitted,

KENTING EXPLORATION SERVICES LIMITED


T.R. B. Dundas, M.Sc., D.I.C.
Sr. Geophysicist

DETAIL PROFILE LINE : 6W

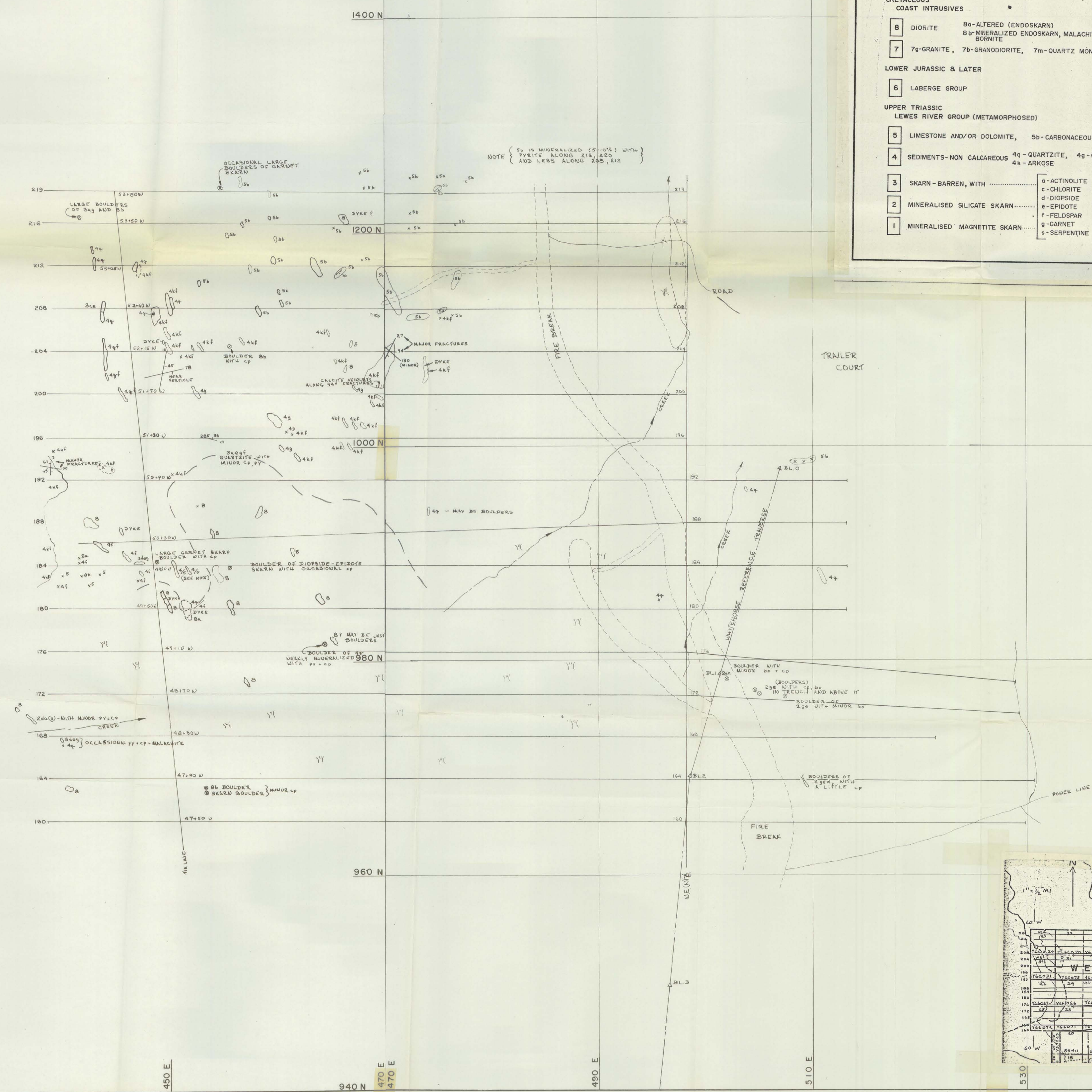


DETAIL PROFILE LINE : 192 N



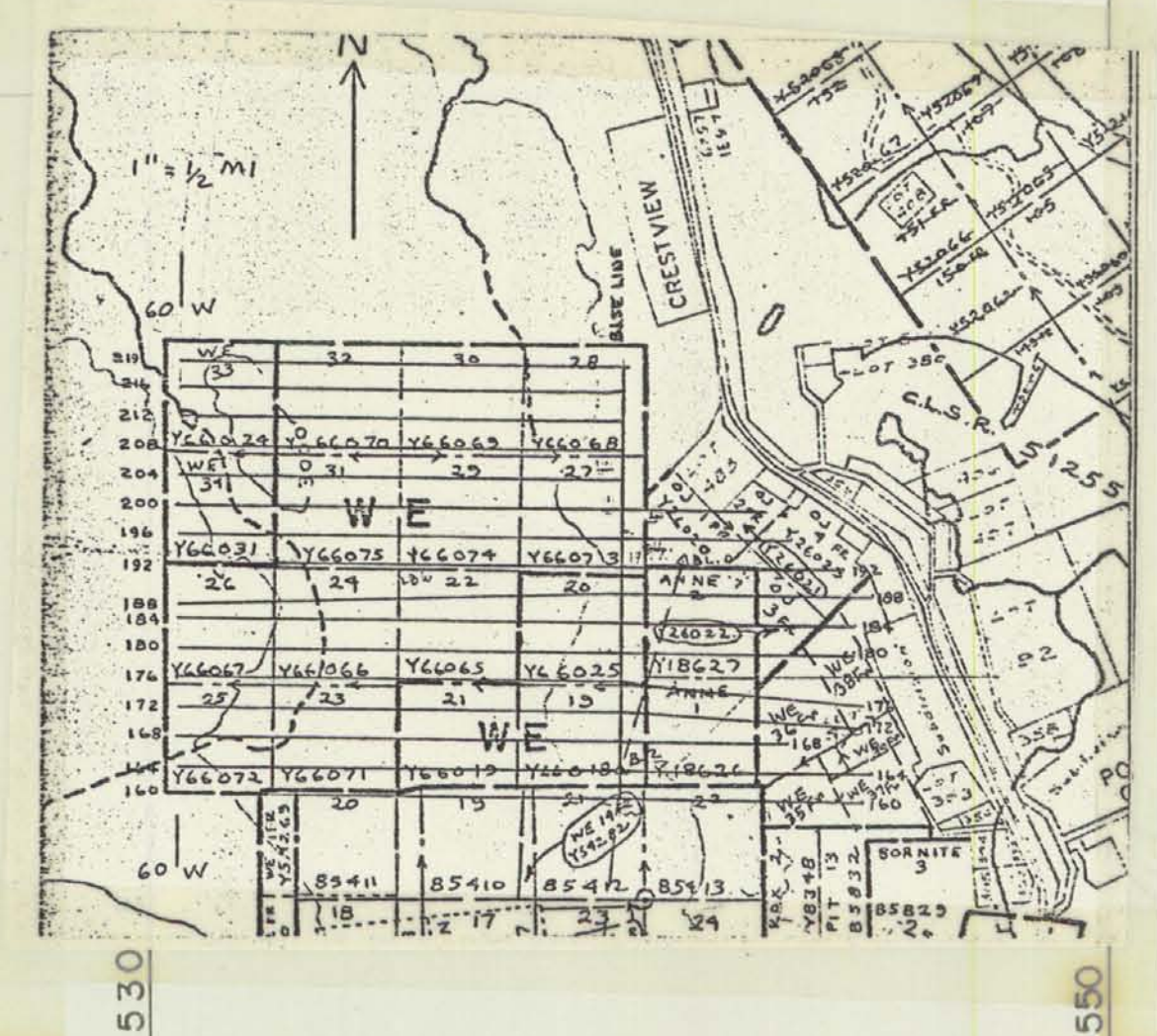
GEOLOGICAL LEGEND

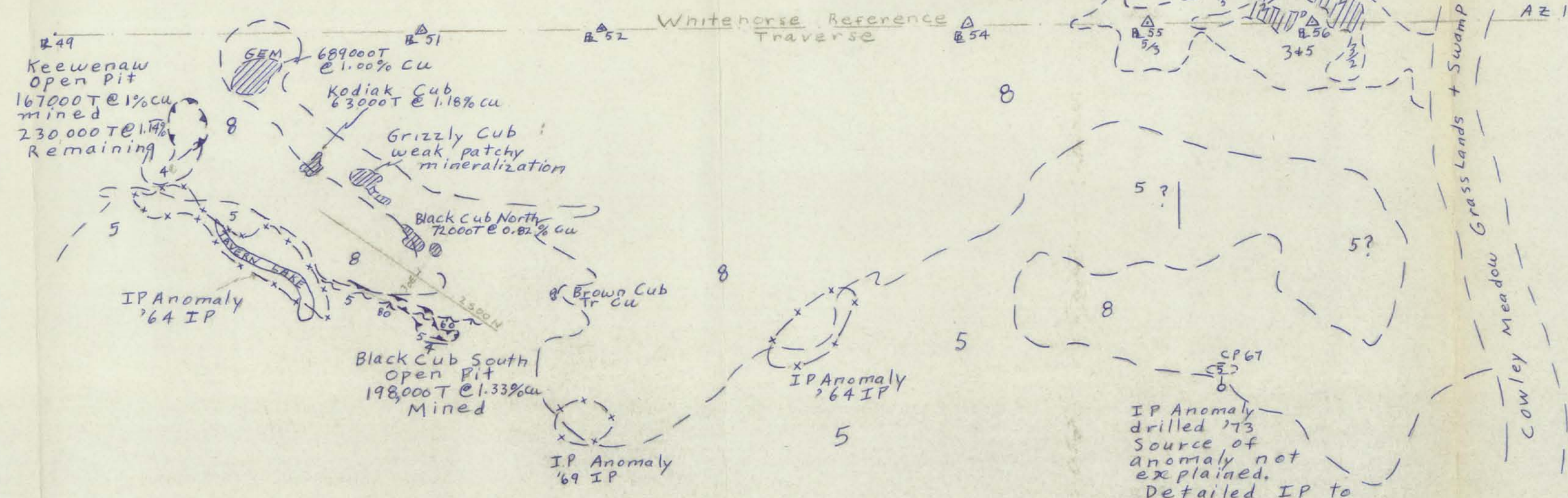
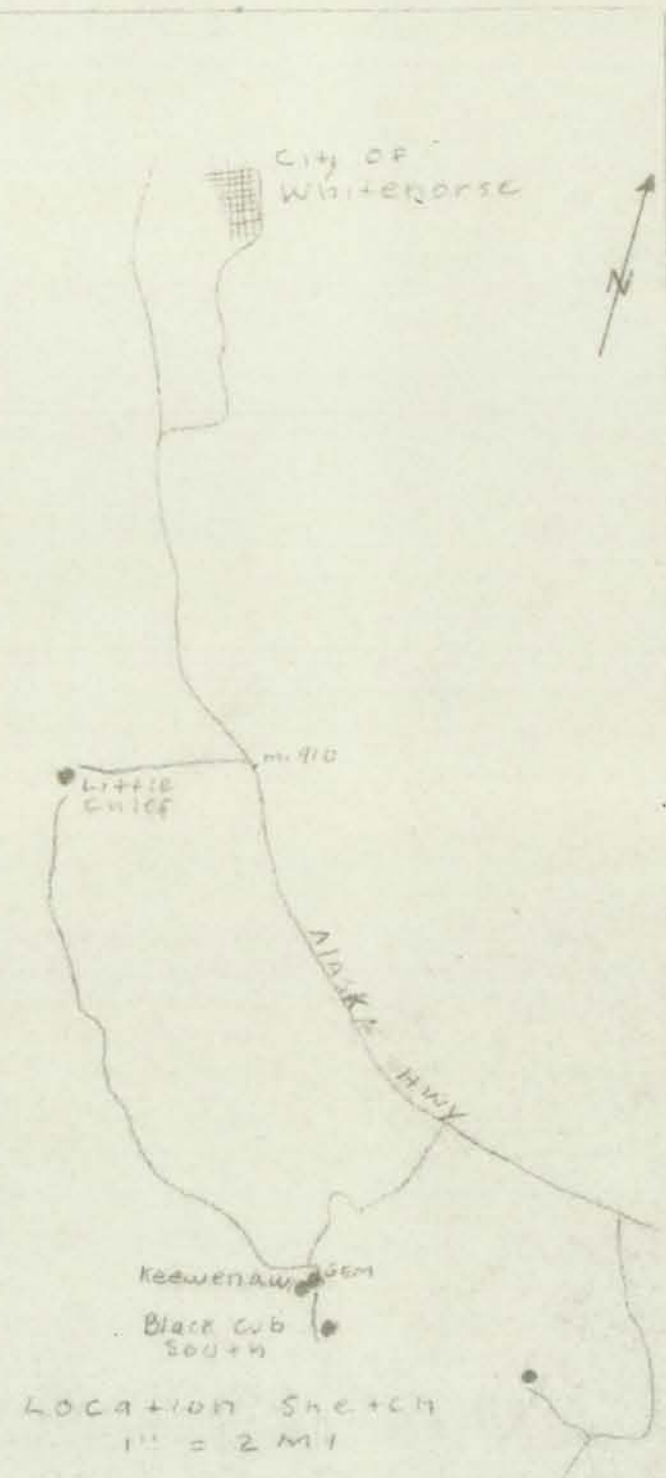
CENOZOIC			
QUATERNARY			
PLEISTOCENE & RECENT			
Q	ALLUVIUM, GLACIAL DRIFT		
IO	MILLS CANYON BASALT		
POST CRETACEOUS			
INTRUSIVE DYKES OR SILLS			
9a	ACIDIC GRANITIC, APLITE, FELSITE,		
9b	BASIC ANDESITE, DIORITE, POST-ORE,		
9a	MAY PREDATE SKARN		
9b	PORPHYRY		
MESOZOIC			
CRETACEOUS			
COAST INTRUSIVES			
8	DIORITE		
7	7g-GRANITE, 7b-GRANODIORITE, 7m-QUARTZ MONZONITE		
LOWER JURASSIC & LATER			
6	LABERGE GROUP		
UPPER TRIASSIC			
LEWES RIVER GROUP (METAMORPHOSED)			
5	LIMESTONE AND/OR DOLOMITE, 5b-CARBONACEOUS LIMESTONE		
4	SEDIMENTS-NON CALCAREOUS 4q-QUARTZITE, 4g-GREYWACKE, 4k-ARKOSE		
3	SKARN-BARREN, WITH	g-ACTINOLITE	t-TREMOLITE
2	MINERALISED SILICATE SKARN	c-CHLORITE	w-WOLLASTONITE
1	MINERALISED MAGNETITE SKARN	d-DIOPSIDE	z-ZOISITE
		e-EPIDOTE	m-MAGNETITE
		f-FELDSPAR	h-HEMATITE
		g-GARNET	c-CHALCOPYRITE
		s-SERPENTINE	b-BORNITE
			v-VALERIITE



4/5 REFERS TO A BED OF SEDIMENTARY ROCKS COMPOSED OF A FELSPATHIC ARKOSE AND LIMESTONE "MODULES" (BOULDER) IN A "MATRIX" OF CARBONACEOUS LIMESTONE

NOTE { 5b IS MINERALIZED (5-10%) WITH PYRITE ALONG 216, 220 AND LESS ALONG 208, 212 }

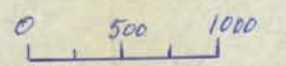


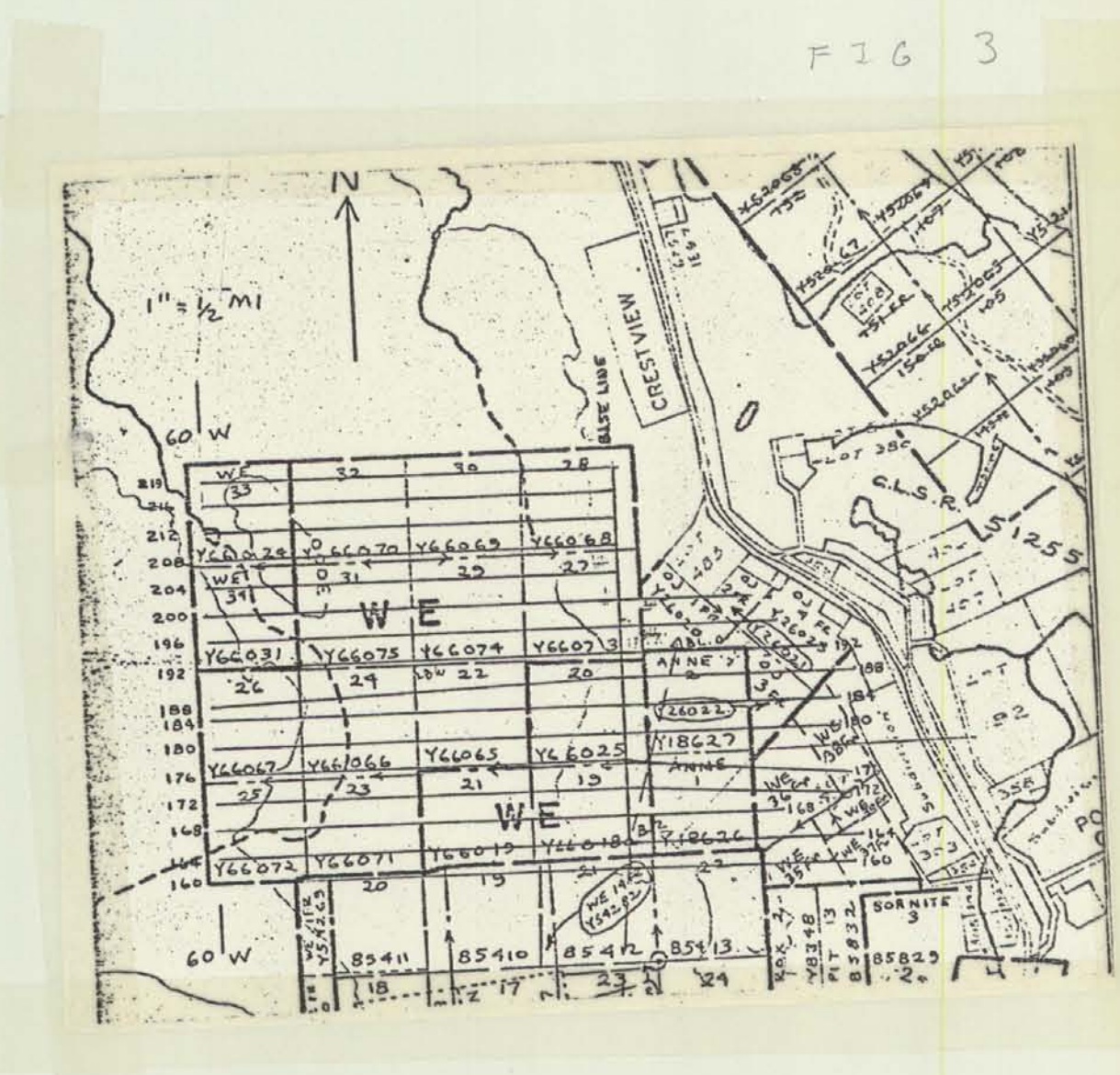
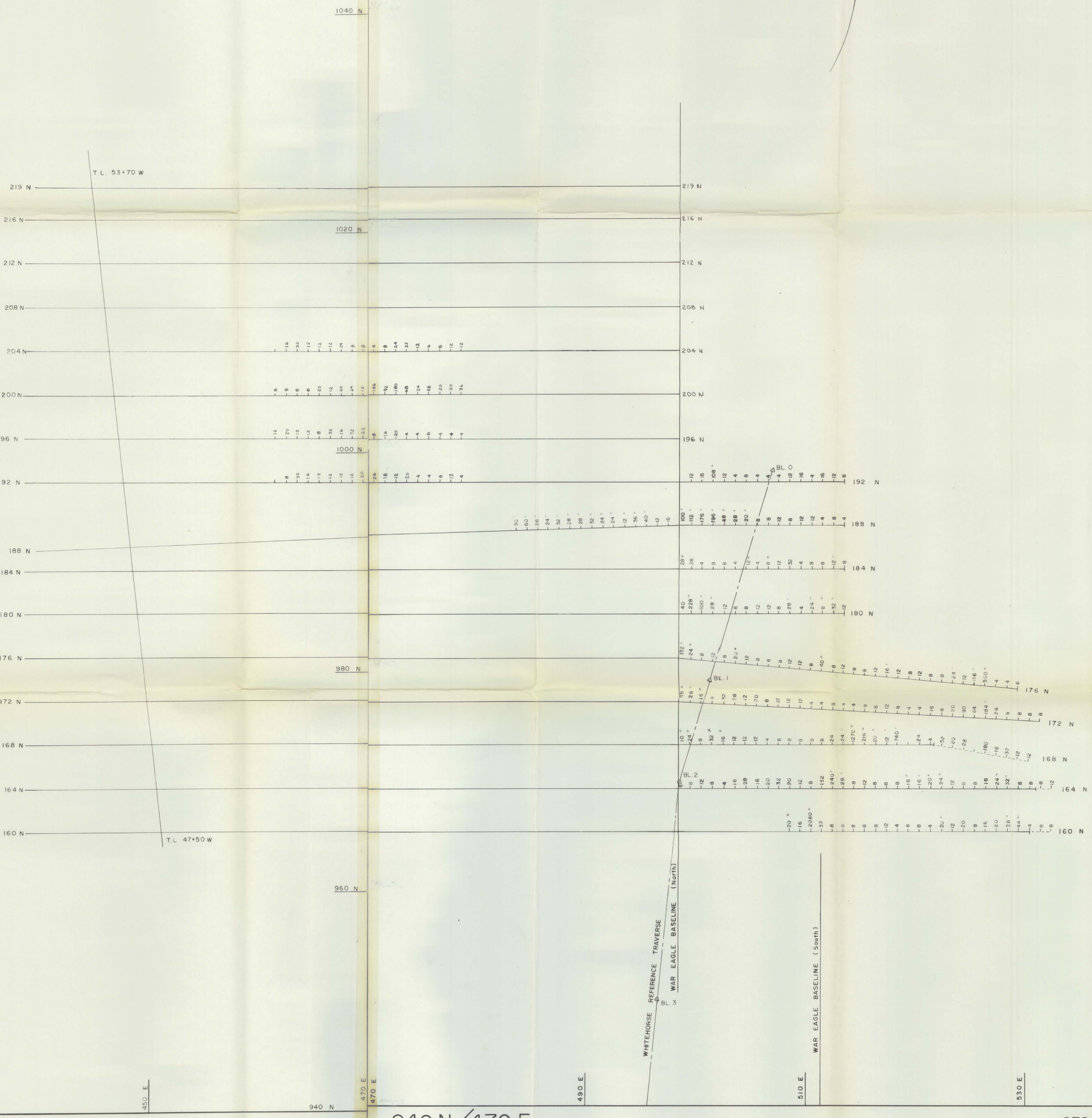


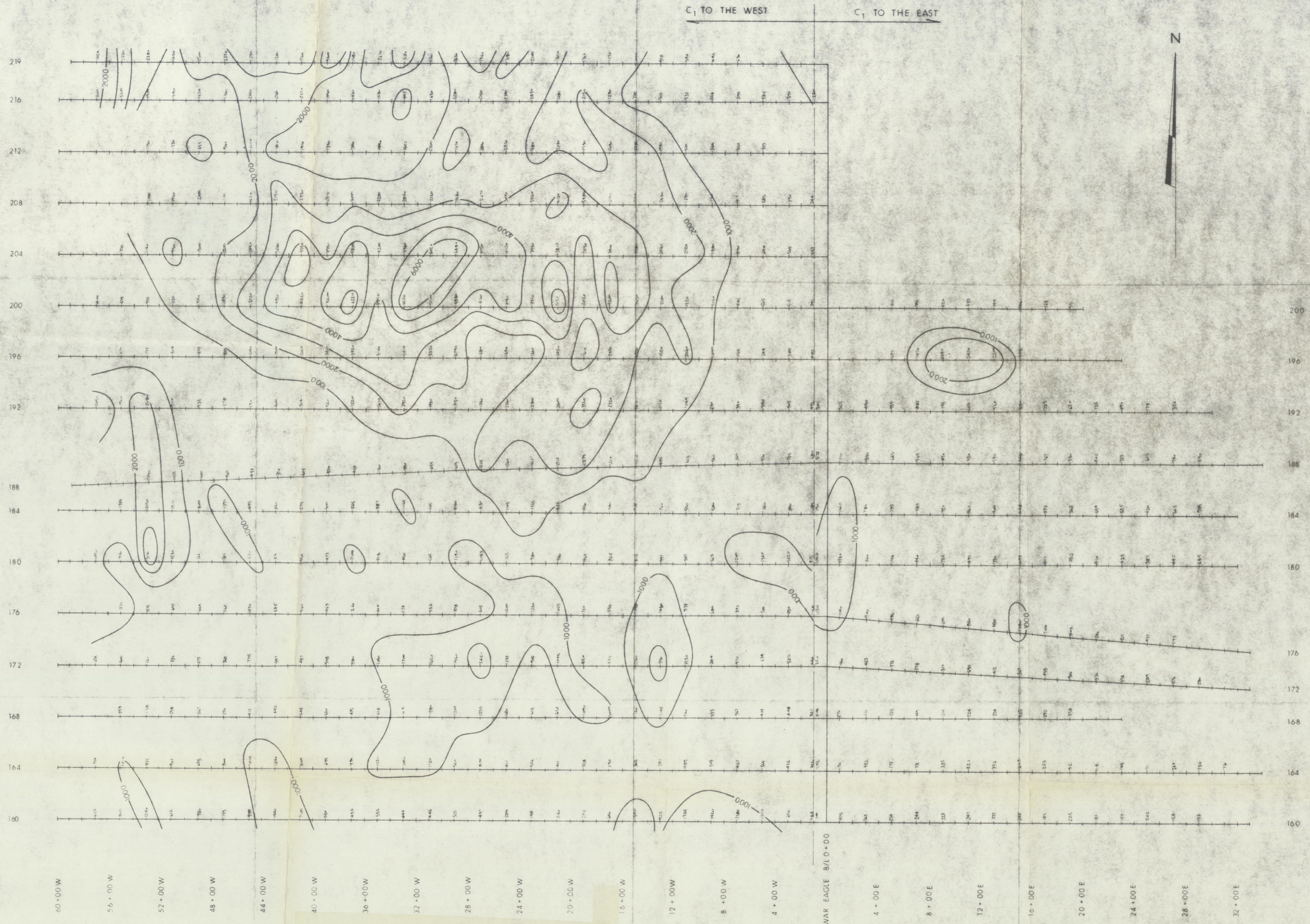
Legend

Cretaceous	
8	Diorite Granodiorite
Upper Triassic	
5	Limestone
4	Quartzite, Greywacke
3	Skarn, Unmineralized
2	Skarn, Copper bearing
- - -	Interpreted Contact
▨	Mineralized Zone
○	Outline of Open Pit
⊗	I.P. Anomaly

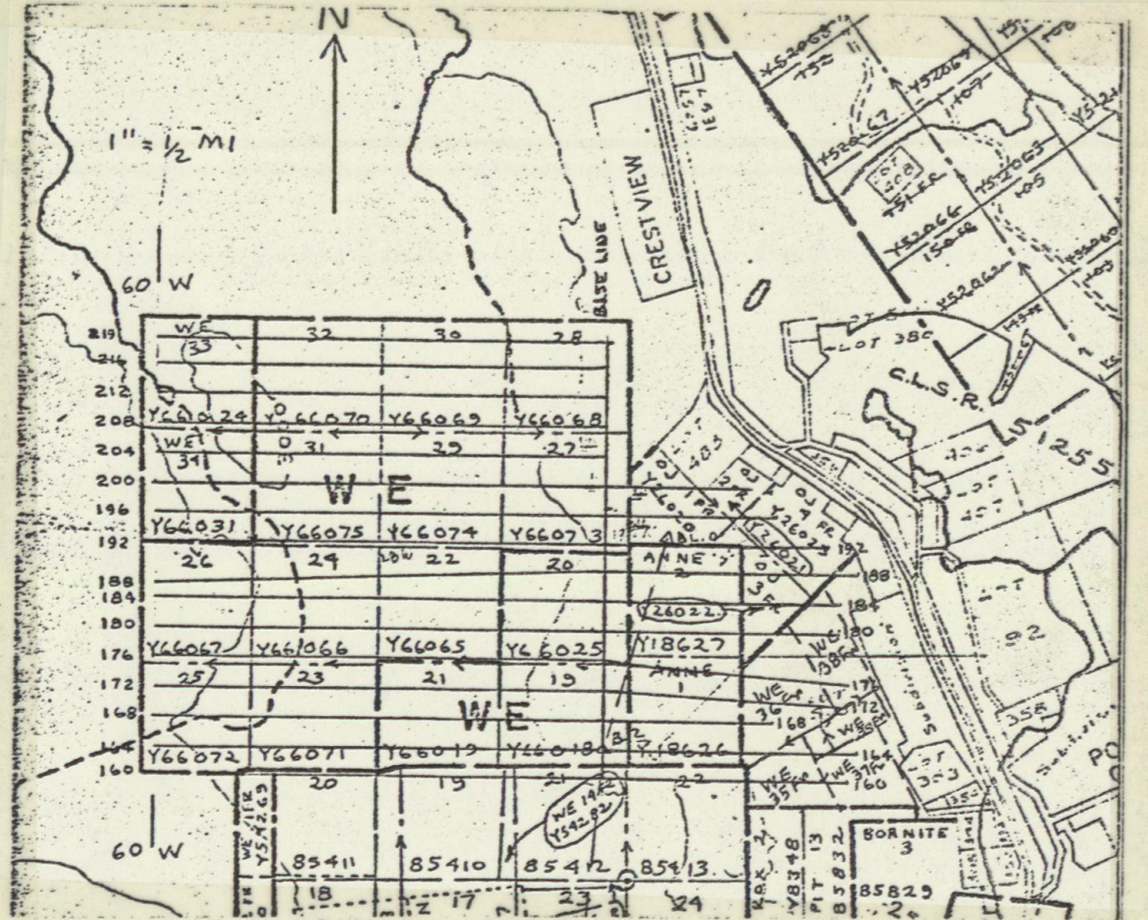
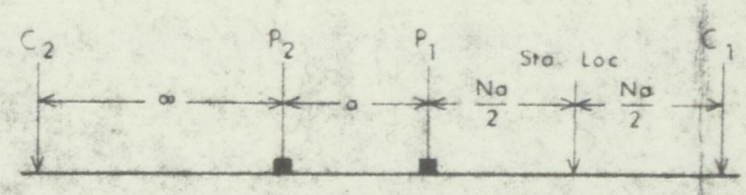
FIG 1
WHITEHORSE COPPER MINES LTD
EXPLORATION COMPOSITE
KEEWENAW TO COWLEY PARK
1" = 1000' A.H. FEB '74







POLE-DIPOLE ARRAY
M1 $a = 200'$



WHITEHORSE COPPER MINES LTD.		
INDUCED POLARIZATION SURVEY		
$a = 200'$ RESISTIVITY CONTOUR MAP		
WAR EAGLE GRID, WHITEHORSE, YUKON TERRITORIES		
		CALGARY, ALBERTA
To accompany report by:		
T. R. B. DUNDAS	M. Sc. D.I.C.	Scale: 1" = 400 feet Job No: 2095 Date: November, 1973
		Fig No: 5 Date: M.C.