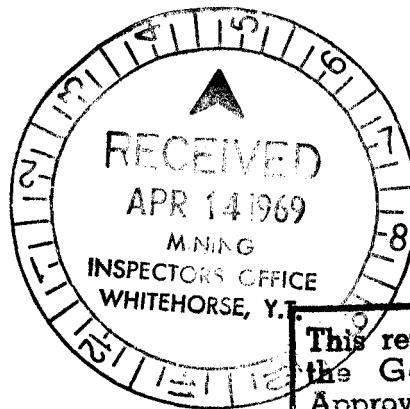


HART RIVER MINES LTD.
Report on a Geochemical Survey and a Magnetometer Survey
on the Mark 1-38 Claims, Linda B Claims 1-9, 17 & 18
and the May Claims 1-6
Hart River Area, Y. T.

ALRAE ENGINEERING LTD.



January 15, 1969

This report has been examined by
the Geological Evaluation Unit.
Approved as to technical worth by:

D. J. Craig
RESIDENT GEOLOGIST

Approved as to cost in the amount
of \$11,597.73

H. E. Hudson
REGISTERED MINING ENGINEER

Approved as representation work
under Section 53(4) Yukon Quartz
Mining Act.

[Signature]
COMMISSIONER OF YUKON

TO PROTECT OUR CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS AND
AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS AND EXTRACTS FROM OUR REPORTS MUST RECEIVE OUR WRITTEN APPROVAL.

ALRAE ENGINEERING LTD.
VANCOUVER, B.C.
ENGINEERS & GEOLOGISTS

TABLE OF CONTENTS

	Page
INTRODUCTION	1
CONCLUSIONS AND RECOMMENDATIONS.	1
LOCATION AND ACCESS.	2
TOPOGRAPHY AND VEGETATION.	2
CLAIM DATA	2
HISTORY...	2
GEOLOGY.	2
GEOCHEMICAL SURVEY	3
INTERPRETATION	4
MAGNETOMETER SURVEY.	5
TIME AND COST DISTRIBUTION	8

MAPS

	Scale
Figure 1 Geochemical Survey - Copper	1" = 500 ft.
Figure 2 Geochemical Survey - Lead	1" = 500 ft.
Figure 3 Geochemical Survey - Zinc	1" = 500 ft.
Figure 4 Magnetometer Survey	1" = 50 feet
Figure 5 Detailed Ground Magnetometer Survey	1" = 50 feet
Figure 6 Surface Geology	1" = 50 feet

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Report on a Geochemical Survey and a Magnetometer Survey
on the Mark Group of Claims 1 through 38,
Linda B 1 through 9, Linda B 17 and 18
and the May 1 through 6
Hart River Area, Y. T.

INTRODUCTION

The group of claims listed above consists of 55 contiguous full sized mineral claims, situated in the Hart River area, 80 miles northwest of Mayo, Y.T. The Mark 1 to 24 mineral claims were staked in 1966, Mark 25 to 38 mineral claims were staked in August and September 1967 and the Linda B and May groups were staked in April and May 1968.

These surveys were conducted at the request of Hart River Mines Ltd., to localize potential sulfide structures giving targets both for surface diamond drilling and underground exploration.

Field work was carried out from June 18 to July 23, 1968 and July 31 to August 13 and August 24 to September 2, 1968.

CONCLUSIONS AND RECOMMENDATIONS

The geochemical soil survey indicated several anomalous areas on the claim group other than the one caused by the main mineral structure which is already under investigation by diamond drilling. These anomalies merit further investigation by other methods, preferably by magnetometer survey, to localize the structure creating the anomaly. The magnetometer anomalies which appear to corroborate the soil anomalies should be investigated by diamond drilling. Due to the topography an underground adit should be driven with diamond drill stations. From these stations the main showing would be outlined, further magnetic anomalies could be tested and the structural control of the mineralized zones determined.

LOCATION AND ACCESS

The claims are located at approximately 64°38'N latitude and 136°50'W longitude on claim sheet 116A-10. This site is 80 air miles northwest and northeast of Mayo and Dawson, respectively.

Access to the property was by Cessna 185 from Dawson, Y.T. to Mark Lake then by helicopter to the property 12 miles southwest of Mark Lake. Chapman Lake and the Dempster Highway lie approximately 50 miles to the west. A winter road has been constructed from the Dempster Highway to the property during December 1968.

TOPOGRAPHY AND VEGETATION

The relief in the area varies from broad 'U' shaped valleys to steep unstable talus slopes. The valleys are mainly swampy and covered by buckbrush and willows. Spruce, the predominant tree type, are sparsely scattered throughout the valleys to an elevation of approximately 3,500 feet.

CLAIM DATA

The block of 55 full size contiguous claims is shown on claim sheet 116A-10. These claims are all held by record by Hart River Mines Ltd.

HISTORY

A limited amount of trenching was carried out within the group during 1966. Electromagnetic and geochemical surveys were carried out over some sections of the group in 1967. This represents the total work performed prior to the 1968 season.

GEOLOGY

The detailed geology of the area was mapped during 1968 and a full report on this will be issued, on completion, by A. MacDonald and J. L. Usher.

Regional geology in the vicinity of the claims is taken from map 116A, the Larsen Creek 4 mile sheet which accompanies G.S.C. paper 62-7 by L.H. Green and J.A. Roddick.

Table of Formations (from sheet 116A)

<u>Cretaceous</u> 20	orange to brown weathering, diorite and gabbro, and altered equivalents.
<u>Cambrian, Ordovician and Silurian</u> 8	Dolomite and limestone, thick bedded, grey-buff weathering.
Unconformity	
<u>Precambrian</u> 2	orange weathering, platy, grey-green dolomite, dark slate, minor phyllite and quartzite.
2d	buff, orange and pink dolomite, black shale, minor black limestone, Red dolomite; green argillite, maroon quartzite and shale, and greenstone.
1	mainly dark grey, grey-green, and black thin bedded argillite, slate and phyllite.

Narrow bands of map units 1, 2 and 2d trending easterly and dipping southerly outcrop in the area. There are surrounded by andesitic flows which, in places, become coarse grained approaching a diorite. In places, these units are capped by limestone and dolomite of unit 8. Small diorite stocks (unit 20) intrude the above units at several locations in the area.

Cursory examination indicates that the area is highly faulted in easterly and northerly directions. The easterly faults which appear to follow the bedding strike, predominate.

GEOCHEMICAL SURVEY

(1) Control Grid

Approximately 39 line miles of base and cross lines were marked with flagging as outlined in figs. 1, 2 and 3.

Cross lines were put in using a compass and nylon chain at 400 foot intervals and sampling stations at 200 feet along lines.

(2) Field Procedure

The geochemical survey carried out was a program of soil sampling. Samples were collected along cross lines. They consisted of residual soil immediately underlying the organic layer. A total of 28 line miles of grid lines were sampled.

(3) Laboratory Procedure

All samples were analyzed for copper, lead and zinc. Laboratory work was performed by T.S.L. Laboratories Ltd., Vancouver, B.C. and Whitehorse Assay Office, Whitehorse, Y.T.

After drying and screening to -80 mesh, the metals were extracted by a hot $\text{HNO}_3\text{-HCl}$ solution. The quantities of each metal in the sample were determined by atomic absorption spectrographic analysis. Contoured laboratory results for lead, zinc and copper are shown on figures 1, 2 and 3.

INTERPRETATION

Mark I Group

The main anomalous area revealed by the soil sampling indicate several new areas of interest which required further investigation.

Several hundred feet to the north of the No. 1 showing on the ridge top, a geochemical anomaly was investigated by a detailed magnetometer survey, the results indicated that there was another possible zone which will be investigated.

To the head of Reinke Creek, to the southeast, beyond the No. 2 showing, there is a fairly wide belt of anomalous values trending across the creek. These appear to be due to downslope migrations from diorite outcroppings up the hillside. These areas should be further investigated as the geological setting is similar

to the main showing except the diorite would appear to be in closer association.

To the northeast of the emergence of Reinke Creek onto the flats of Marc Creek valley there are several anomalous areas for lead and zinc with minor copper anomalies.

These areas of interest are in the lower dolomitic formation with andesites, along the contact with the diorite body.

Further north, where the contact with the diorite appears to be sheared, there are some anomalies which would pinpoint this area for further investigation.

Linda B Group

On a creek (no name) flowing into Marc Creek from the west, through the Linda B claim group, there are several anomalous areas, the main anomaly is for lead and the area covers the confluence of four small creeks and would indicate potential zones to the north and to the south - southeast. There is an anomalous zone for copper on the north side of this creek and as there is a diorite body to the north here, it indicates that this whole area should be further investigated.

MAGNETOMETER SURVEY

(1) Instrument and Field Procedure

The Scintex Magnetometer Model MF-1 was used on the magnetic survey of the claim group. Approximately seven line miles of magnetometer readings were obtained on cross lines at 50 feet and readings at 25 foot intervals along the lines. The results are shown on figure 4.

A reference base line was established and the instrument checked after each line was run. Time drift corrections were

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applied to the readings.

(2) Interpretation

From the plotted results (figs. 4 and 5) of the detailed magnetometer survey several anomalous high magnetic areas are indicated. The main showing is shown to be highly anomalous which agrees with both the diamond drilling and the geochemical soil sample analyses.

With the further anomalies adjacent to the main showing, either folding and faulting from the main showing is indicated. Several of these are in agreement with the soil sample anomalies. The strongest of these lie 200 feet and 300 feet directly north of the showing.

Utilizing the geological features in the area (i.e.: the bedding and the cleavage) folding appears to be the controlling feature of the ore deposition as it stands at present.

(3) Conclusions and Recommendations

The ground magnetometer survey conducted on the Mark claims of Hart River Mines Ltd. indicate numerous anomalous areas. The main showing is located by one of these anomalies and this was confirmed by diamond drilling and indicated by soil samples. The anomalies north of the main show appear to indicate folding controlling the location of the mineralized structure.

From this magnetometer survey in conjunction with the soil samples and the mineralized zone indicated by diamond drill, it is recommended that an adit be driven from 1150 South 29 East of the soil sample grid at an azimuth 148°. This would explore the north

anomalies and provide access for diamond drill exploration of the mineralized structures in the area. This diamond drilling should be instituted concurrently with the adit program.

Respectfully submitted:



G. Trowsdale, P. Eng.

TIME AND COST DISTRIBUTION

LABOUR

<u>Name</u>	<u>Days</u>	<u>Position</u>	
Dr. J. L. Usher	10	Supervision	\$ 612.80
A. MacDonald	3	Geophysics	106.02
G. Trowsdale	8	Supervision and Report	640.36
L. Altman	60	Grid lines, Magnetometer Soil Sampling, Plotting	1,489.20
J. S. Bennett	36	Grid lines, soil sampling	840.60
D. K. Reinke	1	Grid lines	33.88
R. A. Bennett	8	Soil Sampling	246.00
R. Cumberbirch	1	Soil Sampling	17.66
R. G. Jury	2	Consulting	200.00
M. Payne	6	Drafting	331.86
D. L. McKelvie	2	Consulting	200.80
G. D. House	5	Interpretation	<u>250.00</u>
			\$ 4,569.18
Camp costs	129 days @ \$12.36		1,594.44
Magnetometer rental			600.00
Laboratory charges			1,557.45
Miscellaneous - Drafting and field supplies			<u>500.00</u>
			\$ 4,251.89
Transportation			
Air Fare	33-1/3% x 230 x 7		536.66
Helicopter	8 hours @ \$150.00		1,200.00
Cessna	16 hours @ \$65.00		<u>1,040.00</u>
			\$ 2,776.66
		TOTAL	\$ <u><u>11,597.73</u></u>

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And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the City
of Vancouver, in the
Province of British Columbia, this 5
day of March 1969, A.D.

G. Trowsdale

[Signature]

A Commissioner for taking Affidavits for British Columbia or
A Notary Public in and for the Province of British Columbia.

HISTORY OF EXPLORATION AND DEVELOPMENT

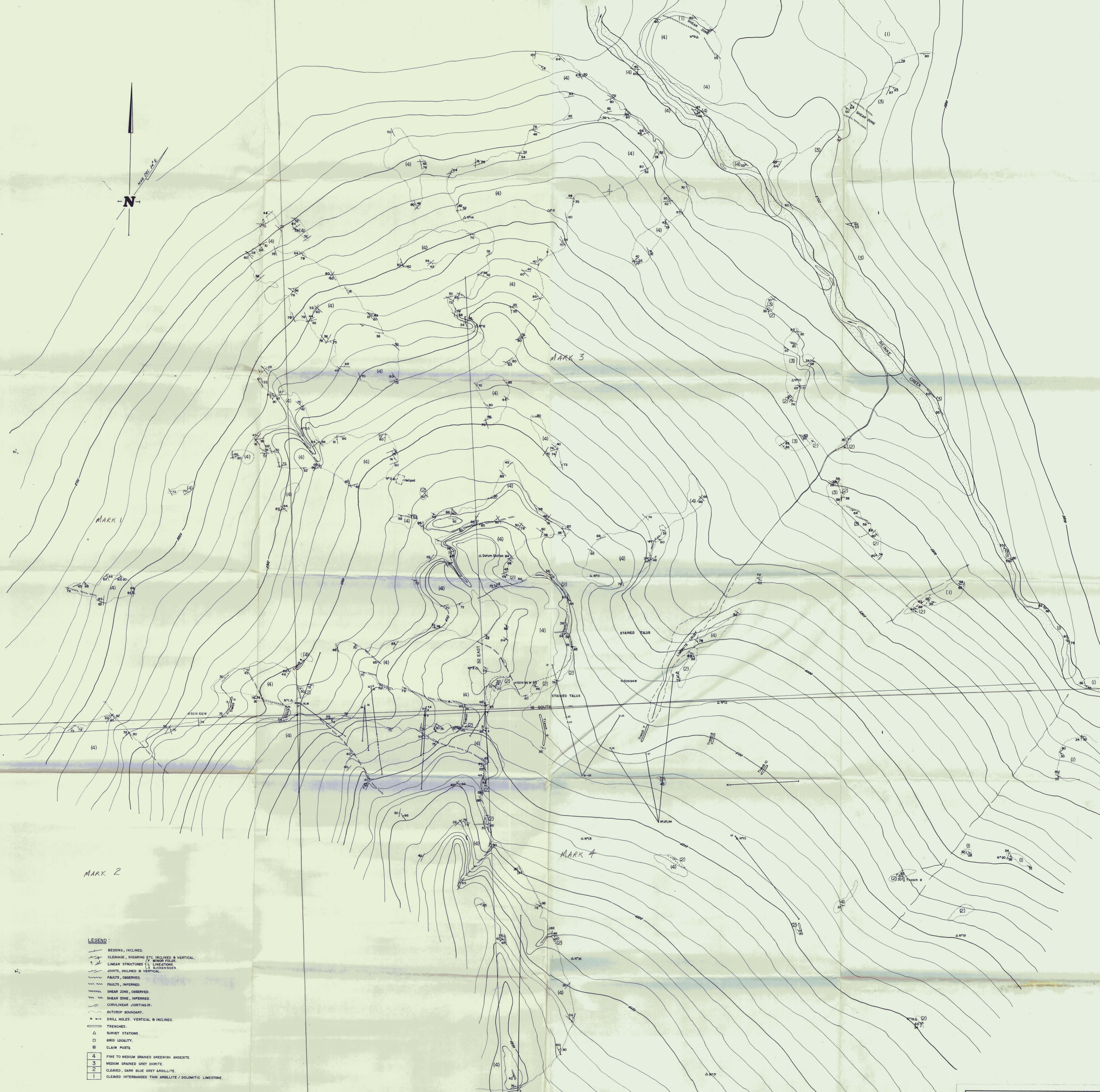
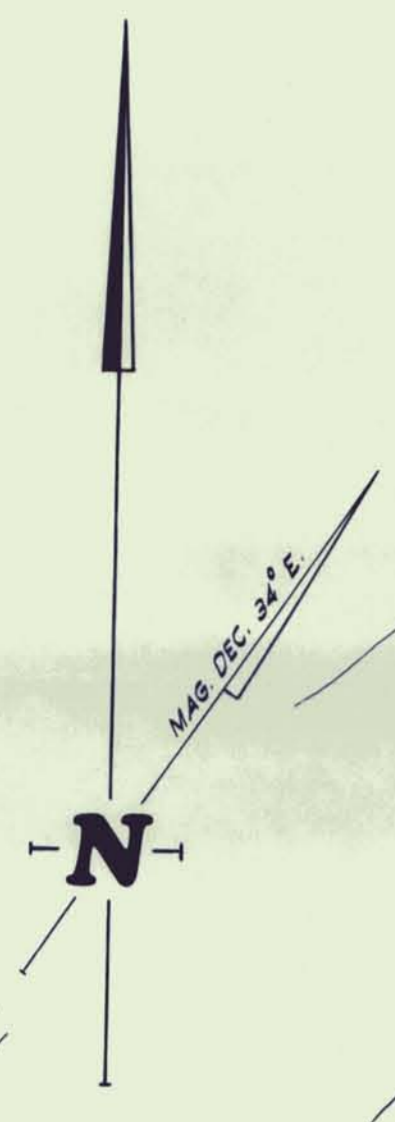
In 1967 Ventures Mining Ltd., in partnership with Anglo Western Minerals, held an option on a group of 38 claims located south of Hart River, about 80 miles northeast of Dawson. Trenching uncovered a mineralized zone reported to be at least 35 feet wide and over 900 feet long. Geochemical and geophysical surveys were carried out also. Late in the year 2 short holes were diamond drilled. One of these reportedly (Northern Miner, May 23, 1968) averaged 1.58% copper, 2.29% zinc, and 1.58 oz./ton silver over 24 feet; and the other 1.94% copper, 1.8% zinc, and 1.61 oz./ton silver over 28 feet. A second showing 3,000 feet away returned an assay of 19.9% lead; 6.95% zinc; and 3.10 oz./ton silver over 5 feet.

On December 1, 1967, Hart River Mines Ltd. was incorporated to acquire and further develop the prospect. Results of the first diamond drill hole put down in 1968 were reported as 0.106 oz./ton gold; 1.96 oz./ton silver; 1.3% copper; 0.78% lead; and 6.39% zinc over 212 feet. (Whitehorse Star, June 13, 1968). In all 31 diamond drill holes totalling 7,266 feet were completed during the season. In the 1968-69 winter months, a 64-mile winter road was built from a point on the Dempster Highway. Equipment was brought in in March 1969, an adit was collared on the 3,880-foot level and driven to intersect the Mark zone. Some drifting was carried out along the zone, and later in the year a second adit was collared on the 3,680 foot level.

Based on the results of work to August 31, 1969, the company estimates proven tonnage at 577,445 tons grading 1.45 oz./ton silver, 0.041 oz./ton gold, 1.45% copper, 0.87% lead, and 3.65% zinc. Probable tonnage is placed at 600,000 tons of similar grade.

Pre-

s with-
d.



- LEGEND:**
- BEDDING, INCLINED.
 - CLEAVAGE, SHEARING ETC. INCLINED & VERTICAL.
 - LINEAR STRUCTURES (L) MINOR FOLDS.
 - LINEAR STRUCTURES (L) SLICKENSIDES.
 - JOINTS, INCLINED & VERTICAL.
 - FAULTS, OBSERVED.
 - FAULTS, INFERRED.
 - SHEAR ZONE, OBSERVED.
 - SHEAR ZONE, INFERRED.
 - CURVILINEAR JOINTING (C).
 - OUTCROP BOUNDARY.
 - DRILL HOLES, VERTICAL & INCLINED.
 - TRENCHES.
 - SURVEY STATIONS.
 - GRID LOCALITY.
 - CLAIM POSTS.
- 4 FINE TO MEDIUM GRAINED GREENISH ANDESITE.
 3 MEDIUM GRAINED GREY DIORITE.
 2 CLEAVED, DARK BLUE GREY ARGILLITE.
 1 CLEAVED INTERBANDED THIN ARGILLITE / DOLOMITIC LIMESTONE.

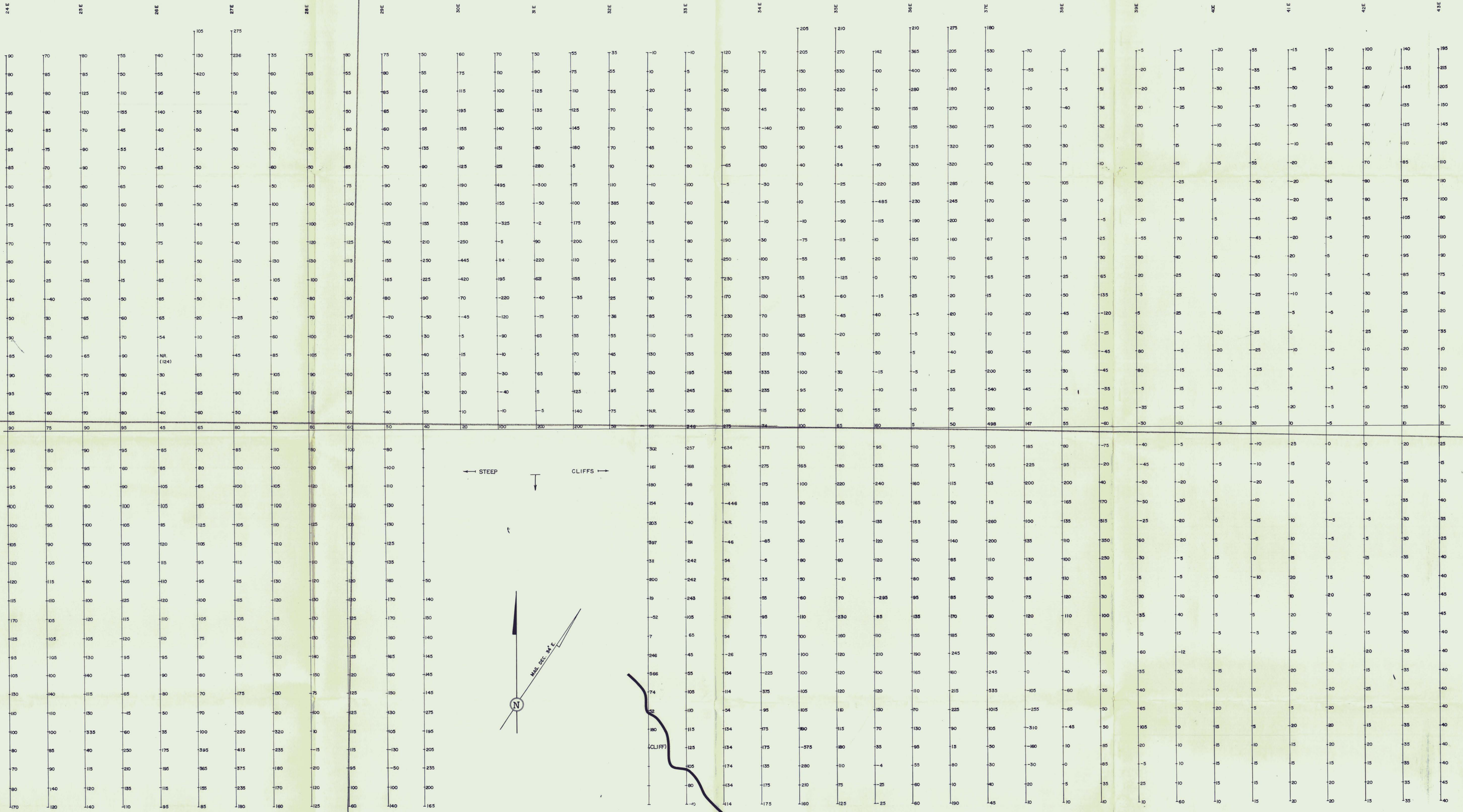
*To accompany Geological - Geophysical
 Report on Mark 1-4, 1955; Scales 1:25,000;
 May 1-6 claims West River area '57*

G. F. Rossdale

HART RIVER MINES LTD.	
MARK	CLAIMS
SURFACE GEOLOGY BY PLANE TABLE SURVEY	
ALBAE ENGINEERING LTD. GEOLOGISTS AND ENGINEERS VANCOUVER, B.C.	
DESIGNED: A. M.	SCALE: HOR. 1" = 50'
DRAWN: M. P.	VERT. 1" = 50'
CHECKED: D. L. M.	
DATE: OCT. 28, 1955	DWG. No. 701-55

MARK 1

MARK 3



MARK 2

MARK 4

To accompany Geological-Geophysical
 Report on Mark 1-38. Lines B 1-9, 17-18;
 May 1-6 claims Hart River Area V.T.

C. Howsdale

HART RIVER MINES LTD.	
MAGNETOMETER SURVEY	
ALRAE ENGINEERING LTD. GEOLOGISTS AND ENGINEERS VANCOUVER, B. C.	
DESIGNED: L. A.	SCALE: HOR. 1" = 50'
DRAWN: M. P.	VERT.
CHECKED: D. L. M.	DWG. No. 701-62
DATE: OCT. 68	

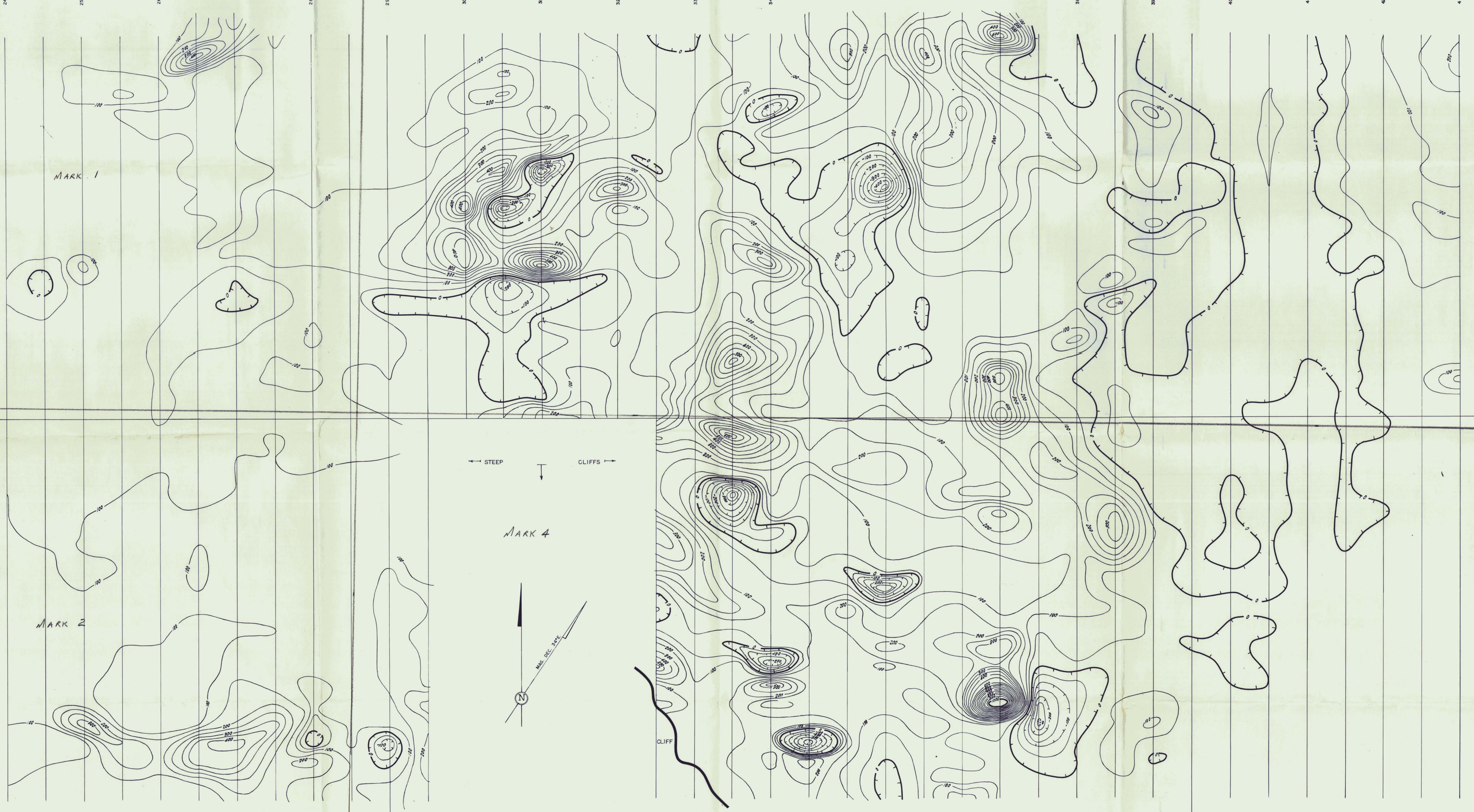
24E 25E 26E 27E 28E 29E 30E 31E 32E 33E 34E 35E 36E 37E 38E 39E 40E 41E 42E 43E

MARK 3

MARK 1

MARK 4

MARK 2

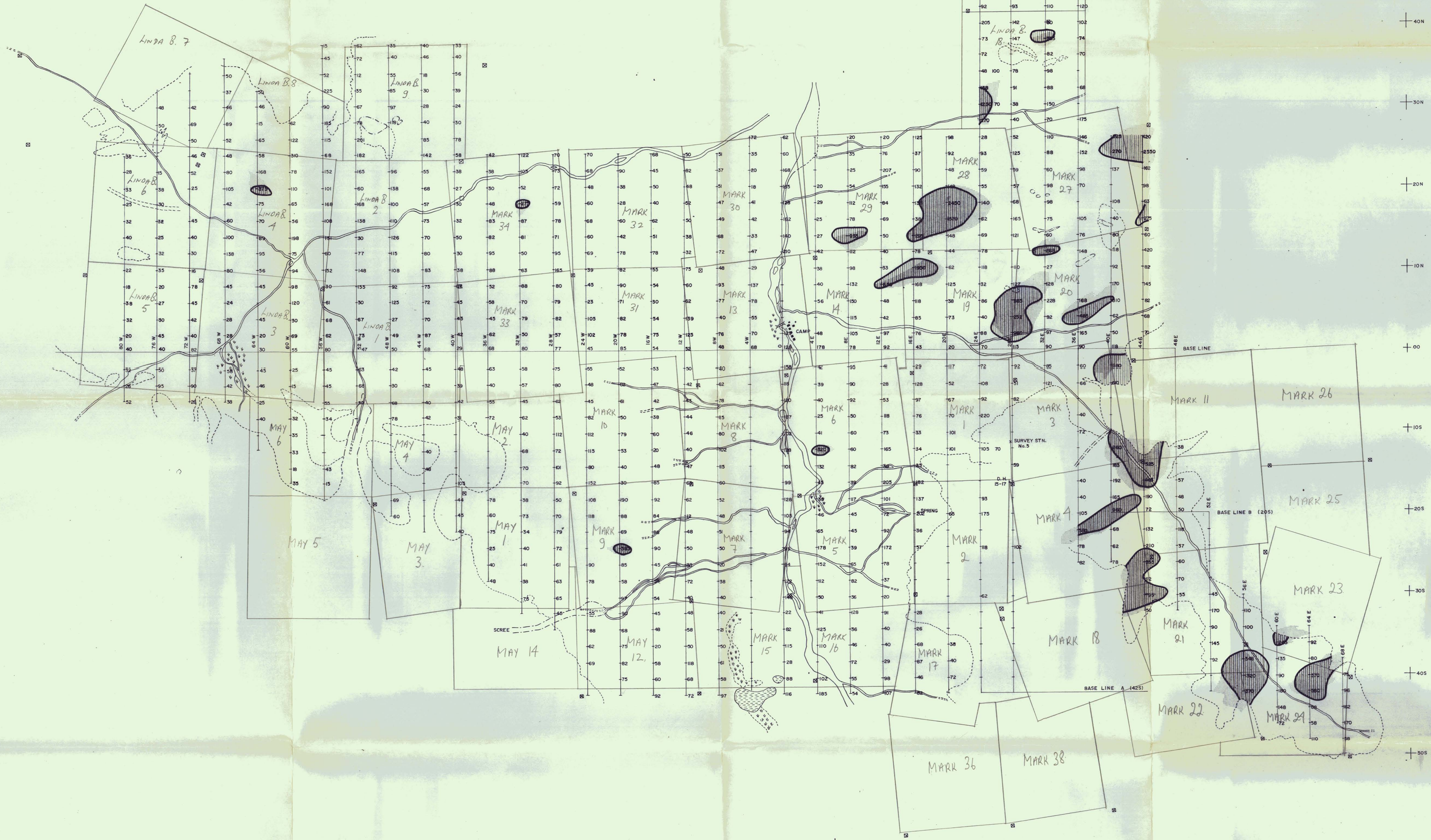
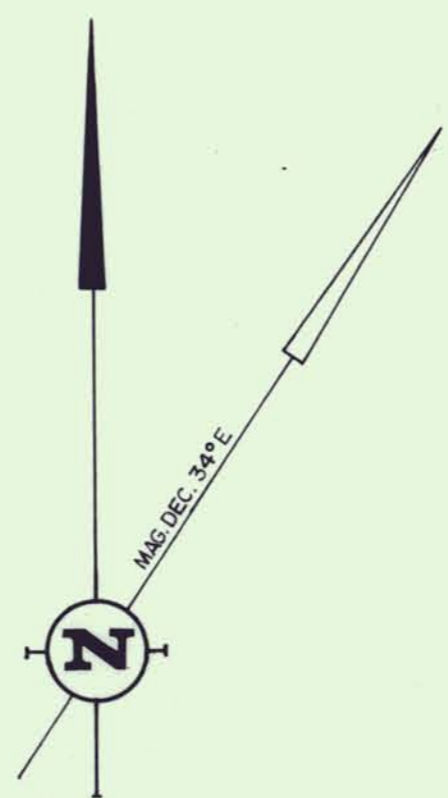


NOTE: CONTOUR INTERVAL 50 GAMMA.

To accompany Geotechnical-Geophysical
Report on Mark 1-38; Sinds B 1-9, 17+18;
May 1-6 Claims Hart River area Y.T.

G. J. Howsdale

HART RIVER MINES LTD.	
DETAILED GROUND SURVEY	MAGNETOMETER SURVEY
INSTRUMENT SHARPE	MFI FLUXGATE
ALRAE ENGINEERING LTD. GEOLOGISTS AND ENGINEERS VANCOUVER, B. C.	
DESIGNED L. A.	SCALE HOR. 1" = 50'
DRAWN M. P.	VERT. 1" = 50'
CHECKED D. L. M.	
DATE OCT. 68	DWG. No. 701-G3

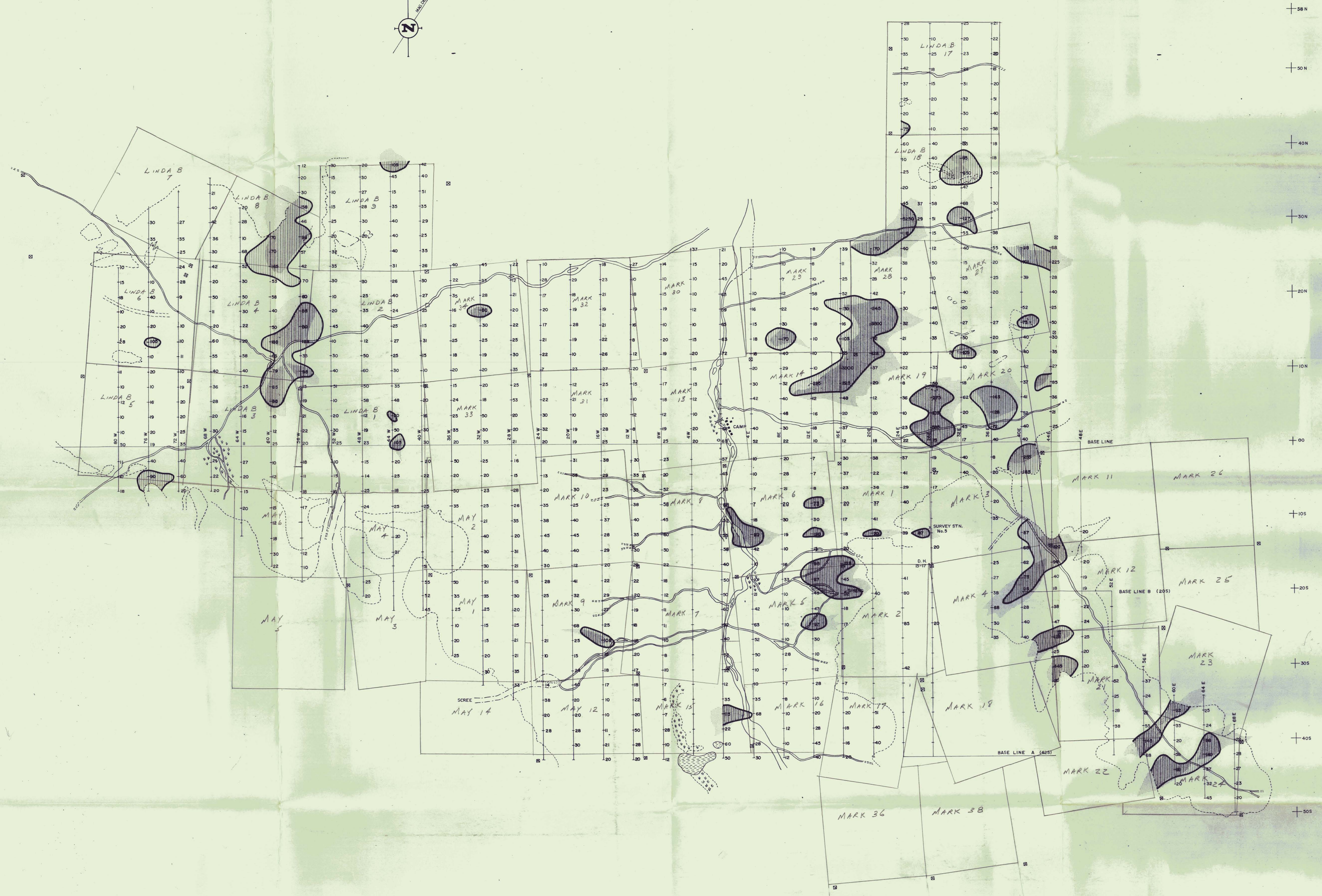
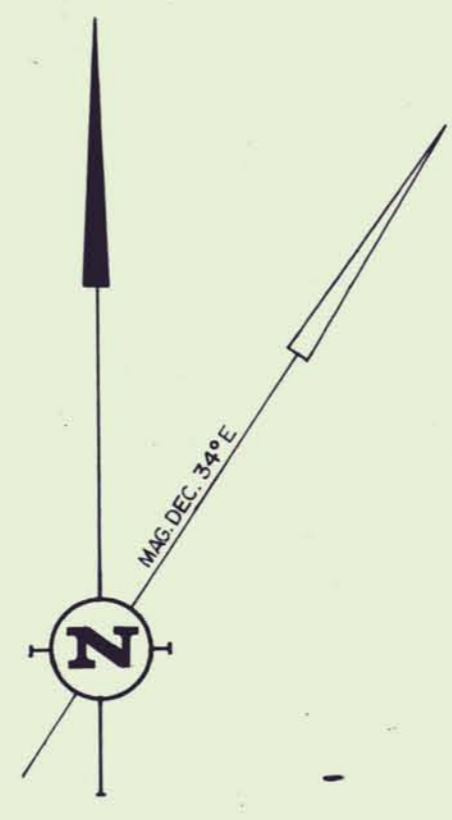


LEGEND :
 - - - - - BOUNDARY OF TALUS & ROCK OUTCROPS.
 [Symbol] CLAIM POSTS.
 [Symbol] ANOMALOUS READINGS @ 230 P.P.M.
 [Symbol] POSSIBLE SOURCE AREAS OF ZINC.

To accompany Geochemical-Geophysical
 Report on mark 1-34; Linda B 1-9, 17, 18,
 May 1-6 claims Northshore area Y.T.

G. Trowsdale

HART RIVER MINES LTD.			
GEOCHEMICAL "ZINC" SURVEY			
ALRAE ENGINEERING LTD. GEOLOGISTS AND ENGINEERS VANCOUVER, B.C.			
DESIGNED: L. A.	SCALE HOR: 1" = 500'		
DRAWN: M. P.	VERT:		
CHECKED: R. G. J.			
DATE: AUG. 68	DWG No. 701-64		

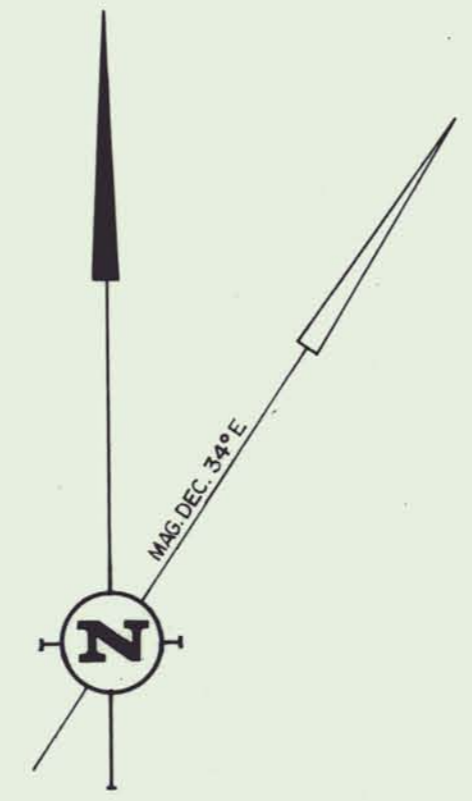




LEGEND:
 - - - - - BOUNDARY OF TALUS & ROCK OUTCROPS.
 □ CLAIM POSTS.
 (Shaded area) ANOMALOUS READINGS # TO P.P.M.
 (Dotted area) POSSIBLE SOURCE AREAS OF LEAD.

To accompany Geophysical Report on Mark 1-38; Linda B 1-9, 17/18; May 1-6 Claims Hartman Area Y.T.

G. Trowsdale

HART RIVER MINES LTD.	
GEOCHEMICAL "LEAD" SURVEY	
ALRAE ENGINEERING LTD. GEOLOGISTS AND ENGINEERS VANCOUVER, B.C.	
DESIGNED: L. A.	SCALE HOR. 1" = 500'
DRAWN: M. P.	VERT. 1" = 500'
CHECKED: R. G. J.	
DATE: AUG. 68	DWG. No. 701-55

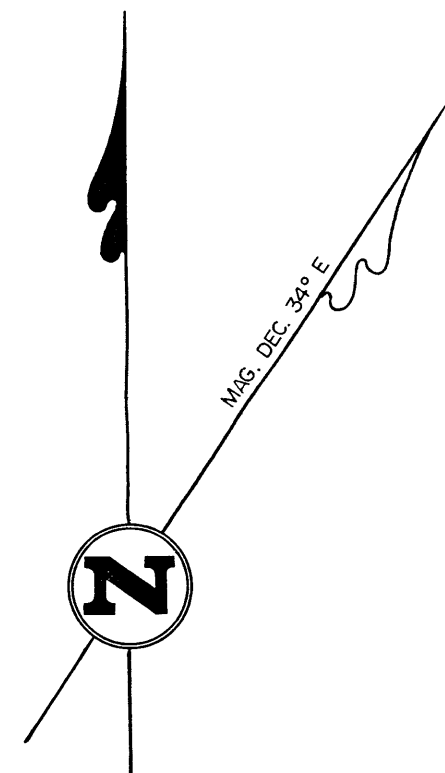


LEGEND:
 - - - - - BOUNDARY OF TALUS & ROCK OUTCROPS.
 □ CLAIM POSTS.
 ANOMALOUS READINGS & HOPPM.
 POSSIBLE SOURCE AREAS OF COPPER.

To accompany Geological-Geophysical
 Report on Mark 1-38; Linda B. 1-9, 17A, B,
 May 1-6 claims, Yukon Area, Y.T.

G. Trowsdale

HART RIVER MINES LTD.	
GEOCHEMICAL "COPPER" SURVEY	
ALRAE ENGINEERING LTD. GEOLOGISTS AND ENGINEERS VANCOUVER, B.C.	
DESIGNED: L. A.	SCALE: HOR. 1" = 500'
DRAWN: M. R.	VERT.
CHECKED: R. G. J.	DWG. No. 701-66
DATE: AUG. 68	



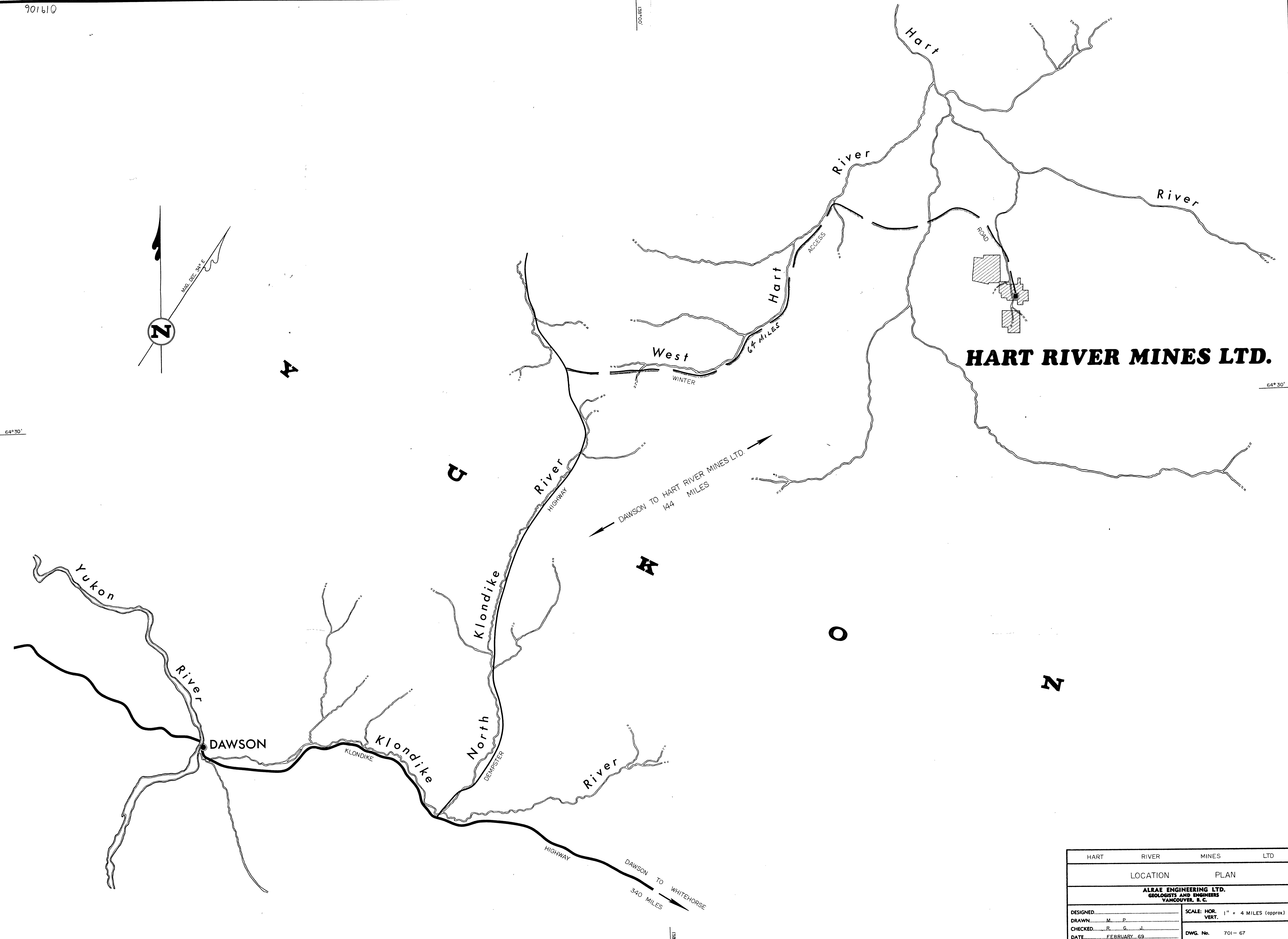
A

B

A

O

N



HART RIVER MINES LTD.

64° 30'

64° 30'

HART RIVER MINES LTD.	
LOCATION PLAN	
ALRAE ENGINEERING LTD. GEOLOGISTS AND ENGINEERS VANCOUVER, B. C.	
DESIGNED.....	SCALE: HOR. 1" = 4 MILES (approx)
DRAWN.....M. F.....	VERT. VERT.
CHECKED.....R. G. J.....	DWG. No. 701-67
DATE.....FEBRUARY, 63.....	