

MATTAGAMI LAKE MINES LIMITED

FOR

KAPUSKASING PROJECT

GROUP I

ELECTROMAGNETIC & MAGNETIC SURVEY

PROJECTS UNIT

REPORT ON THE

JUN 28 1977

RECEIVED

010

426015W0002 2.2435 CASSELMAN



INTRODUCTION

Group I consists of 6 claims and was staked to cover 12 airborne responses, of which 75S, 76B and 78A are six channel anomalies. A grid of NW-SE picket lines, spaced at 400 foot intervals, and consisting of 6.0 line miles of picket line was cut to cover most of the claims. Magnetic and electromagnetic surveying was carried out over a total of 6.0 miles of line.

The surveying was completed by the crews of Mattagami Lake Mines Limited in two periods: June 22 and 23, 1976 and February 27 and 28, 1977.

LOCATION AND ACCESS

The Kapuskasing Project area lies between latitude $48^{\circ}51'N.$ and $49^{\circ}11'N.$, longitude $82^{\circ}06'W.$ and $82^{\circ}39'W.$ and is situated about 16 miles due south of Kapuskasing, Ontario.

The area can be reached from Kapuskasing by either of two good gravel roads maintained by Spruce Falls Power and Paper Company. Winter cut haul roads provide good control for ground work but are not driveable. Rivers and lakes provide additional access to areas of outcrop.

GEOLOGY

The Kapuskasing Project area is a meta-volcanic-meta-sedimentary sequence of upper to mid-amphibolite metamorphic grade greenstones. It is bounded on the east by an abrupt transition to high-grade gneisses and migmatites and on the west by granitic plutonic rocks. Original volcanic structures are visible in some of the greenstones. Mineralization occurs as iron-formation in the greenstones and as disseminated sulphides throughout the survey area with concentrations predominantly occurring in the metasedimentary, low grade gneiss terrain.

SURVEY INSTRUMENTS

A direct reading Scintrex MF-2 fluxgate instrument was used to measure the vertical field to an accuracy of 10 gammas.

A Geonics EM-17 electromagnetic was employed for the horizontal loop survey. A frequency of 1,600 Hz and a coil separation of 300 feet was used. The in-phase and quadrature components were measured to an accuracy of $\pm 1\%$ of the primary field.

PRESENTATION OF RESULTS

The accompanying maps, showing the results of the surveys, are at a scale of 1" - 200 feet.

EM-17 Horizontal Loop	Map 1
Magnetics	Map 2

DISCUSSION OF RESULTS

Five conductive zones, Zones A, B, C, D and E have been interpreted from the electromagnetic data. These will be discussed separately below.

There is up to 14,000 gammas magnetic relief in the form of several, narrow, linear highs that have an E-W trend.

ZONE A

An isolated anomaly occurs on the west end of 8S and correlates with a 600 gamma magnetic high that continues to the south. Zone A could continue farther north and south and lines 4N and 4S could be extended to check its length.

ZONE A - cont. . . .

It appears as a narrow source, about 40 feet deep with a conductivity-thickness of 3 mhos. Zone A corresponds to airborne anomaly 77P which displays a conductivity-thickness of 5 mhos.

It has been assigned a second priority classification due to its low conductivity and apparent short strike length.

ZONE B

Zone B is a strong conductor on 0 and 4S but changes direction and weakens on 8S and 12S. On line 0, it appears 75 feet deep, has a width of 40 feet and displays a conductivity-thickness of 13 mhos. It correlates with airborne anomalies 77R and 78B with conductivity-thicknesses of 7 and 4 mhos respectively.

Its magnetic association is unusual. The conductor on 0 and 4S follows the southern flank of a strong (i.e. up to 3000 gammas), E-W trending, magnetic linear that extends from 12S, eastward off the grid. The magnetics suggest a geologic unit or dike 300 feet wide.

Zone B is a first priority target and a drill hole has been spotted to test it on line 0.

ZONE C

Zone C has a strike length of at least 2000 feet and appears to correlate with airborne anomalies 75S, 76B, 76S, 77A and 78L which display conductivity-thicknesses from 2 to 17 mhos. The best response on the ground data occurs on 8S and indicates a depth of 75 feet, a conductivity-thickness of 8 mhos and a width of 300 feet.

The conductor is partly magnetic with 200 gamma highs near the west edge on 12S and 8S and 300 to 400 gammas near the centre on 4S. The zone shows variation in width (i.e. 40 to 300 feet) that is typical of many sulphide deposits and is a first priority target on 8S.

ZONE D

Zone D is a three line conductor with an E-W strike that is essentially sub-parallel to Zone C (i.e. ENE). The best response, on 12S, indicates a narrow source, 120 feet deep with a conductivity-thickness of 15 mhos. Magnetic coincidence is not exact on 12S but it is closely associated with a 24,000 gamma low. On 8S, Zone D is coincident with a 14,000 gamma high. It should be noted that the strong magnetic high extends for at least 1600 feet and Zone D covers the western 800 feet of this feature.

ZONE D - cont.

Zone D is a highly conductive feature that correlates with the western half of a strong magnetic linear and may be due to conductive iron formation. It has been awarded a second priority classification but should be reviewed when the first priority holes have been completed.

Airborne anomaly 76A with a conductivity-thickness of 2 mhos appears to correlate with Zone D.

ZONE E

Zone E is a strong anomaly on 8N and appears to be the ground expression of airborne anomaly 79M which displays a conductivity-thickness of 1 mho. There is a weaker response on 12N and the conductor is open to the north.

Zone E shows a depth of 75 feet, a high conductivity-thickness of 20 mhos and a width of about 40 feet on 8N. The zone appears to be associated with a magnetic trend and a 3,000 gamma peak is coincident with the conductor on 8N.

Zone E is a highly conductive zone definitely worthy of a first priority rating and a drill test on 8N.

SUMMARY AND RECOMMENDATIONS

Five conductive zones, Zone A, B, C, D and E have been interpreted from the ground electromagnetic data. These

SUMMARY AND RECOMMENDATIONS - cont. . . .

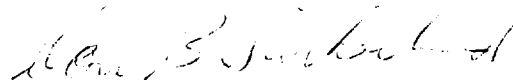
correspond closely with the 12 airborne responses covered by the 6 claim grid. The strike of the zones is EW to ENE and correlates closely with the strike of a series of narrow magnetic highs.

Zones B, C and E are first priority conductors which display good conductivity-thicknesses and warrant immediate test drilling. Zone B has a flanking magnetic feature while Zone C shows moderate highs on three lines. Zone E is associated with a magnetic feature and has a strong coincident high on one line.

Zone A is a second priority target with low conductivity, short strike length, and a coincident 600 gamma high.

Zone D is a good conductor that correlates with the western half of a strong magnetic linear and could be due to iron formation. It is also a second priority anomaly.

Respectfully submitted



Don B. Sutherland
Consulting Geophysicist

May, 1977.

ANOMALY TABLE

A I R		G R O U N D							P R I O R - I T Y	D I A M O N D D R I L L H O L E S				
ZONE	C ^o t	ZONE	DEPTH	C ^o t	W	σ	MAG	LINE		STA.	DIP	DIRECTION	LENGTH	
77P	5	A	40	3	1		600	8S	-	-	-	-		
77R, 78C	7, 4	B	75	13	40		3000 ^F	0	7.5W	-50	E along traverse	400'		
75S to 78C	2-17	C	75	8	300		-	8S	0	-50	E along traverse	800'		
76A	2	D	120	15	1		-24,000	12S	-	-	-	-		
79M	1	E	75	20	40		3000 ^F	8N	5.5E	-50	E along traverse	400'		

F - denotes flanking anomaly.



LEGEND

- 6 Channel Anomaly
- 5 " "
- ⊕ 4 " "
- ⊕ 3 " "
- ⊕ 2 " "

60 Magnetic Correlation
 Anomaly Letter / B5 Apparent Conductivity-Width
 800 Ch.2 Amplitude ppm.

INDEX MAP
QUESTOR INPUT SURVEY
KAPUSKASING PROJECT
GROUP I

SCALE : 1" = 1320'

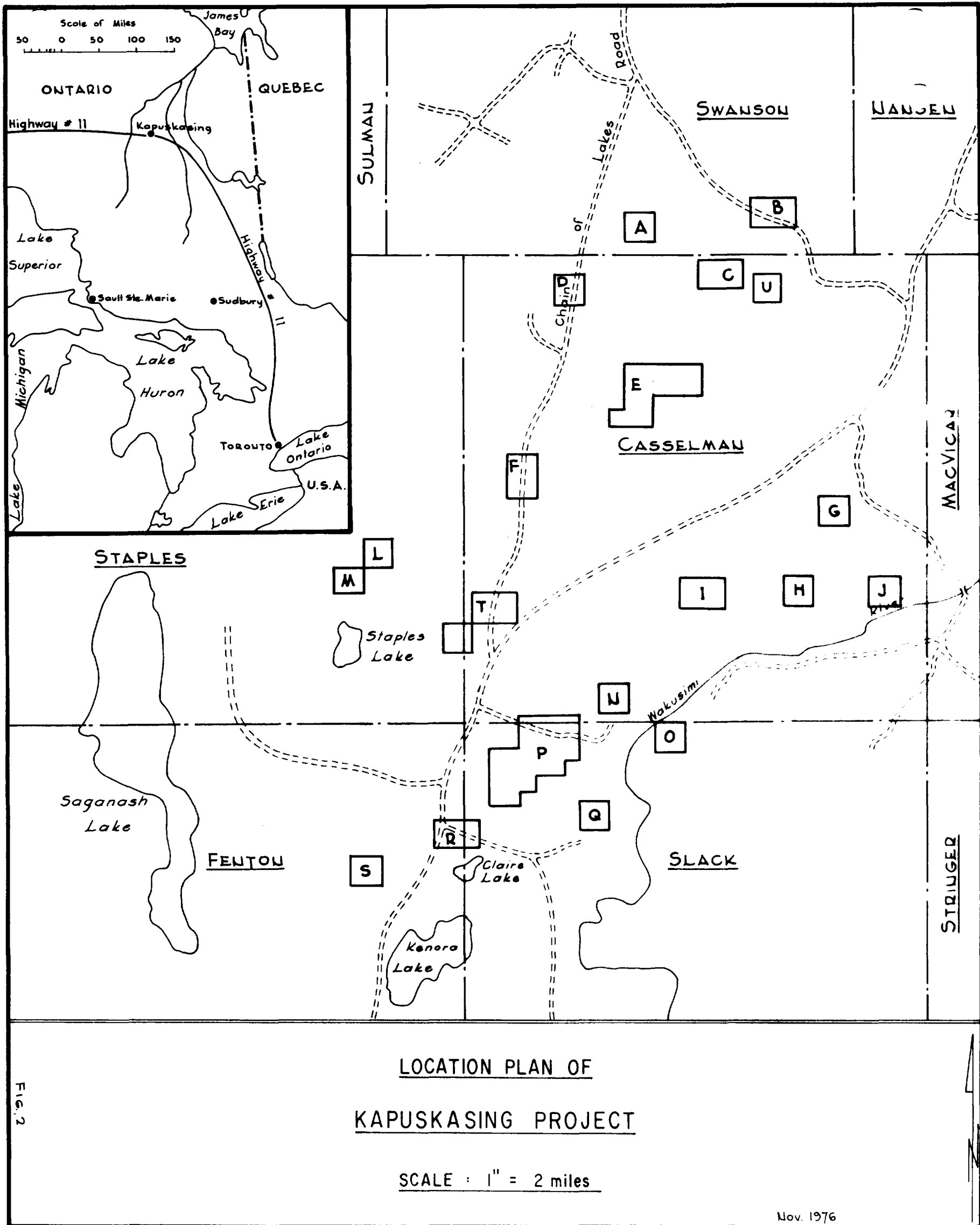
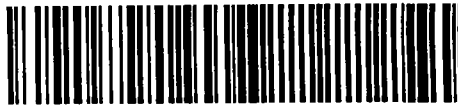


FIG. 2

LOCATION PLAN OF
KAPUSKASING PROJECT

SCALE : 1" = 2 miles

Nov. 1976



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PROJECTS UNIT

REPORT ON THE

ELECTROMAGNETIC & MAGNETIC SURVEY

GROUP G

KAPUSKASING PROJECT

FOR

MATTAGAMI LAKE MINES LIMITED

INTRODUCTION

Group G consists of 4 claims and was staked to cover 3 airborne responses, 96A, 97M and 98A. A grid of NW-SE picket lines, spaced at 400 foot intervals, and consisting of 2.0 line miles of picket line was cut to cover most of the claims. Magnetic and electromagnetic surveying was carried out over a total of 2.0 miles of line.

The surveying was carried out by the crews of Mattagami Lake Mines Limited in the period from March 2 to March 3, 1977.

LOCATION AND ACCESS

The Kapuskasing Project area lies between latitude $48^{\circ}51'N.$ and $49^{\circ}11'N.$, longitude $82^{\circ}06'W.$ and $82^{\circ}39'W.$ and is situated about 16 miles due south of Kapuskasing, Ontario.

The area can be reached from Kapuskasing by either of two good gravel roads maintained by Spruce Falls Power and Paper Company. Winter cut haul roads provide good control for ground work but are not driveable. Rivers and lakes provide additional access to areas of outcrop.

GEOLOGY

The Kapuskasing Project area is meta-volcanic-meta-sedimentary sequence of upper to mid-amphibolite metamorphic grade greenstones. It is bounded on the east by an abrupt trans-

Geology - cont.

ition to high-grade gneisses and migmatities and on the west by granitic plutonic rocks. Original volcanic structures are visible in some of the greenstones. Mineralization occurs as iron-formation in the greenstones and as disseminated sulphides throughout the survey area with concentrations predominantly occurring in the metasedimentary, low grade gneiss terrain.

SURVEY INSTRUMENTS

A direct reading Scintrex MF-2 Fluxgate instrument was used to measure the vertical field to an accuracy of 10 gammas.

A Geonics EM-17 electromagnetic was employed for the horizontal loop survey. A frequency of 1,600 Hz and a coil separation of 300 feet was used. The in-phase and quadrature components were measured to an accuracy of $\pm 1\%$ of the primary field.

PRESENTATION OF RESULTS

The accompanying maps, showing the results of the surveys, are at a scale of 1" = 200 feet.

EM-17 Horizontal Loop	Map 1
Magnetics	Map 2

DISCUSSION OF RESULTS

Three conductors, Zones A, B and C have been interpreted from the electromagnetic data. The magnetics show a series of linear highs that support an NE-SW trend.

ZONE A

Zone A is a strong conductor on 28S that indicates a depth of 75 feet, and an unusually high conductivity-thickness of 50 mhos. It may continue south to 32S but appears to weaken rapidly in this direction. It is shown as a narrow conductor but there could be some width on 28S.

Zone A appears to be the ground expression of airborne anomaly 96A, a six channel response, with a conductivity-thickness of 4 mhos. It has no direct magnetic expression but lies on the south flank of a 500 gamma magnetic high.

Zone A is definitely a first priority target and a drill hole has been spotted to test it on 28S.

ZONE B

A poorly formed response occurs on the west end of 20S and indicates a conductor 100 feet deep with a conductivity thickness of 60 mhos. However, there is lack of definition on the quadrature curve and the adjacent lines are not surveyed far enough west to provide support for the anomaly. Zone B has magnetic expression with a coincident 250 gamma high at 16W on 20S.

ZONE B - cont.

Zone B appears to correspond with airborne anomaly 98B, a six channel response, that is part of a strong through-going airborne feature.

Zone B is a strong conductor but is regarded as a third priority target since it appears to be part of a long formational zone.

ZONE C

A low amplitude isolated response on 16S indicates a conductor 150 feet deep, near the detection limit of the system. However, it appears to correlate with airborne anomaly 98A. Present data indicates a width of 100 feet and a conductivity thickness of 25 mhos. Zone C is a second priority target at present but should be resurveyed with a 500 foot separation.

Zone C could be the strike extension of Zone A and resurveying of lines 12S to 28S is recommended for this area of indicated deep overburden.

DISCUSSION OF RESULTS

The conductors, lettered Zones A, B and C have been interpreted from the data.

DISCUSSION OF RESULTS - cont.

Zone A is a strong conductor which displays high conductivity and correlates with airborne anomaly 96A. It lies on the flank of a 500 gamma high and is definitely a first priority target, worthy of immediate drilling.

Zone B correlates with airborne anomaly 98B and a long throughgoing airborne zone that indicates a formational feature. Consequently, it is considered a third priority target.

Zone C is a deep source with a high conductivity. It may be the strike extension of Zone A in an area of deep overburden, but is regarded as a second priority target at present. Resurveying of lines 12S to 28S with 500 foot separations is recommended to check this possibility.

Respectfully submitted,



Don B. Sutherland
Consulting Geophysicist

May 1977.

ANOMALY TABLE

A I R		G R O U N D							PRIOR- ITY	D I A M O N D D R I L L H O L E S				
ZONE	CT	ZONE	DEPTH	CT	W	σ	MAG		LINE	STA.	DIP	DIRECTION	LENGTH	
96A	4	A	75	50	1		500 ^F		28S	0	-50	N along traverse	400'	
98B	17	B	100	60	1		250		-	-	-	-	-	
98A?	1	C	150	25	100		100		-	-	-	-	-	

F denotes flanking anomaly



LEGEND

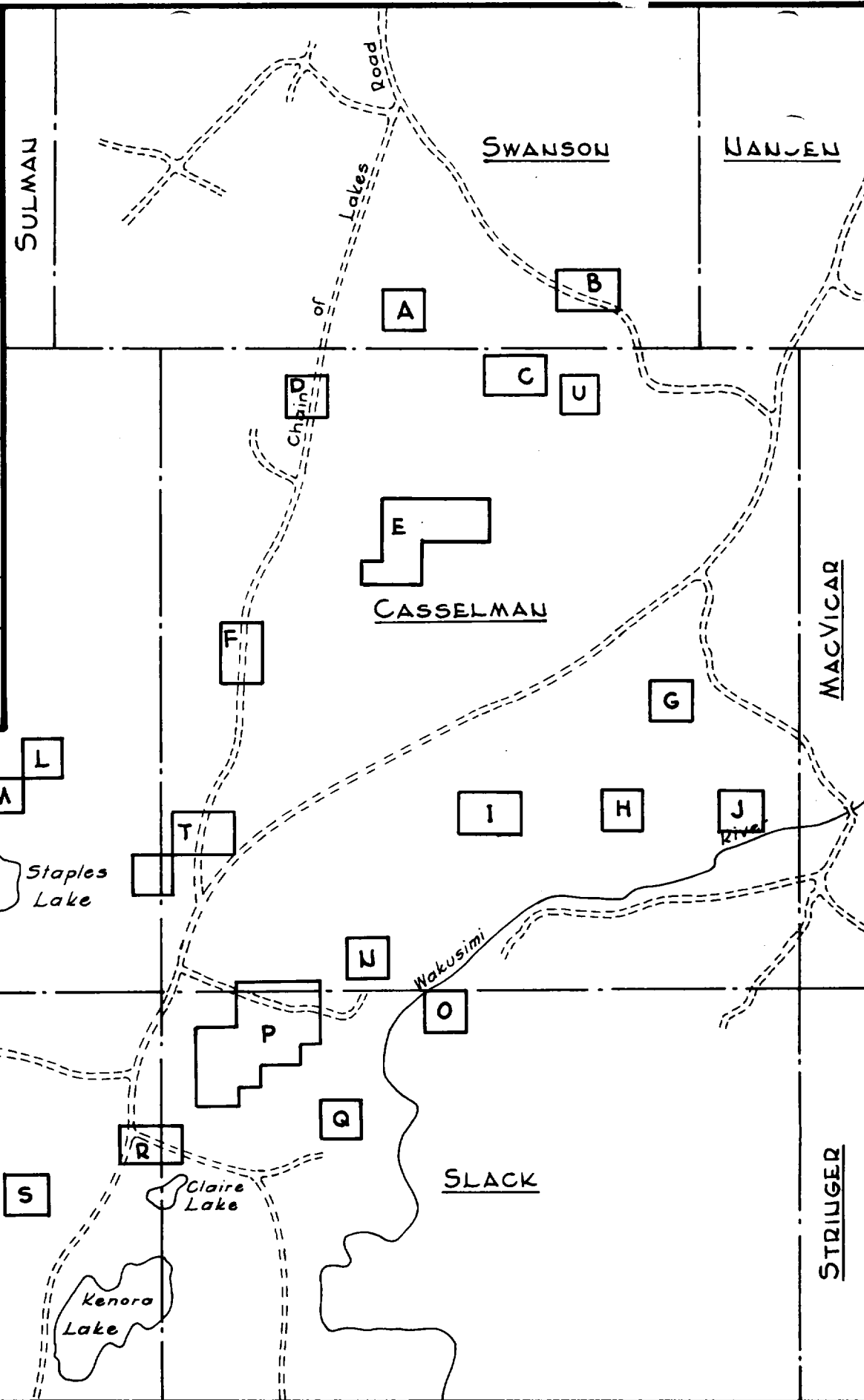
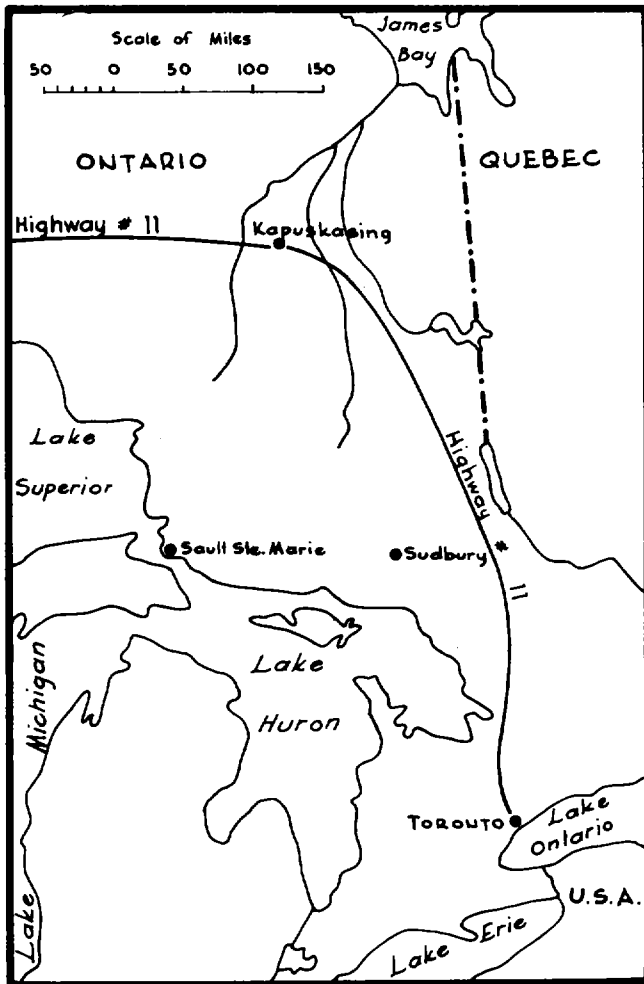
- ◆ 6 Channel Anomaly
- 5 " "
- ⊕ 4 " "
- ⊕ 3 " "
- ⊕ 2 " "
- 60 Magnetic Correlation Anomaly Letter
- 85 Apparent Conductivity - Width
- 800 Ch. 2 Amplitude ppm.

INDEX MAP

QUESTOR INPUT SURVEY
KAPUSKASING PROJECT

GROUP G

SCALE : 1" = 1320'



LOCATION PLAN OF
KAPUSKASING PROJECT

SCALE : 1" = 2 miles

FIG. 2

Nov. 1976



GEOPHYS
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PROJECTS UNIT

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Geophysical
Township or Area Casselman
Claim Holder(s) Mattagami Lake Mines Limited
1110 - 8 King St. East, Toronto
Survey Company Mattagami Lake Mines Limited
Author of Report D.B. Sutherland
Address of Author 68 Cheltenham Ave., Toronto
Covering Dates of Survey March 2 to May 1977
(linecutting to office)
Total Miles of Line Cut 2.8

MINING CLAIMS TRAVERSED
List numerically

EM mag

✓ P. 451344 1/4
(prefix) (number)
 ✓ P. 451345 1/3
 P. 451346
 1/2 P. 451347 2/3

*Credited claim N.C.
451347 1/2 credits
technical allow
full credits*

TOTAL CLAIMS 4

<u>SPECIAL PROVISIONS</u> <u>CREDITS REQUESTED</u>	Geophysical	DAYS per claim
ENTER 40 days (includes line cutting) for first survey.	-Electromagnetic	40
ENTER 20 days for each additional survey using same grid.	-Magnetometer	20
	-Radiometric	
	-Other	
	Geological	
	Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____
(enter days per claim)

DATE: June 5/77 SIGNATURE: D.B. Sutherland
Author of Report or Agent

Res. Geol. _____ Qualifications 63.1168

Previous Surveys

File No.	Type	Date	Claim Holder

If space insufficient, attach list

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations 117 Number of Readings Mag 174 & EM202
Station interval 100' Line spacing 400'
Profile scale 1" = 20%
Contour interval 500 gammas

MAGNETIC

Instrument Scintrex MF-2 Fluxgate
Accuracy – Scale constant 10 gammas
Diurnal correction method Graphical
Base Station check-in interval (hours) 2
Base Station location and value Baseline at 4+00S, 490 gammas

ELECTROMAGNETIC

Instrument Geonics EM-17
Coil configuration Horizontal Loop
Coil separation 300'
Accuracy ± 1% of the primary field
Method: Fixed transmitter Shoot back In line Parallel line
Frequency 1600 Hz (specify V.L.F. station)
Parameters measured In-phase & quadrature

GRAVITY

Instrument _____
Scale constant _____
Corrections made _____
Base station value and location _____
Elevation accuracy _____

**INDUCED POLARIZATION
RESISTIVITY**

Instrument _____
Method Time Domain Frequency Domain
Parameters – On time _____ Frequency _____
– Off time _____ Range _____
– Delay time _____
– Integration time _____
Power _____
Electrode array _____
Electrode spacing _____
Type of electrode _____

CASSELMAN

M 708
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

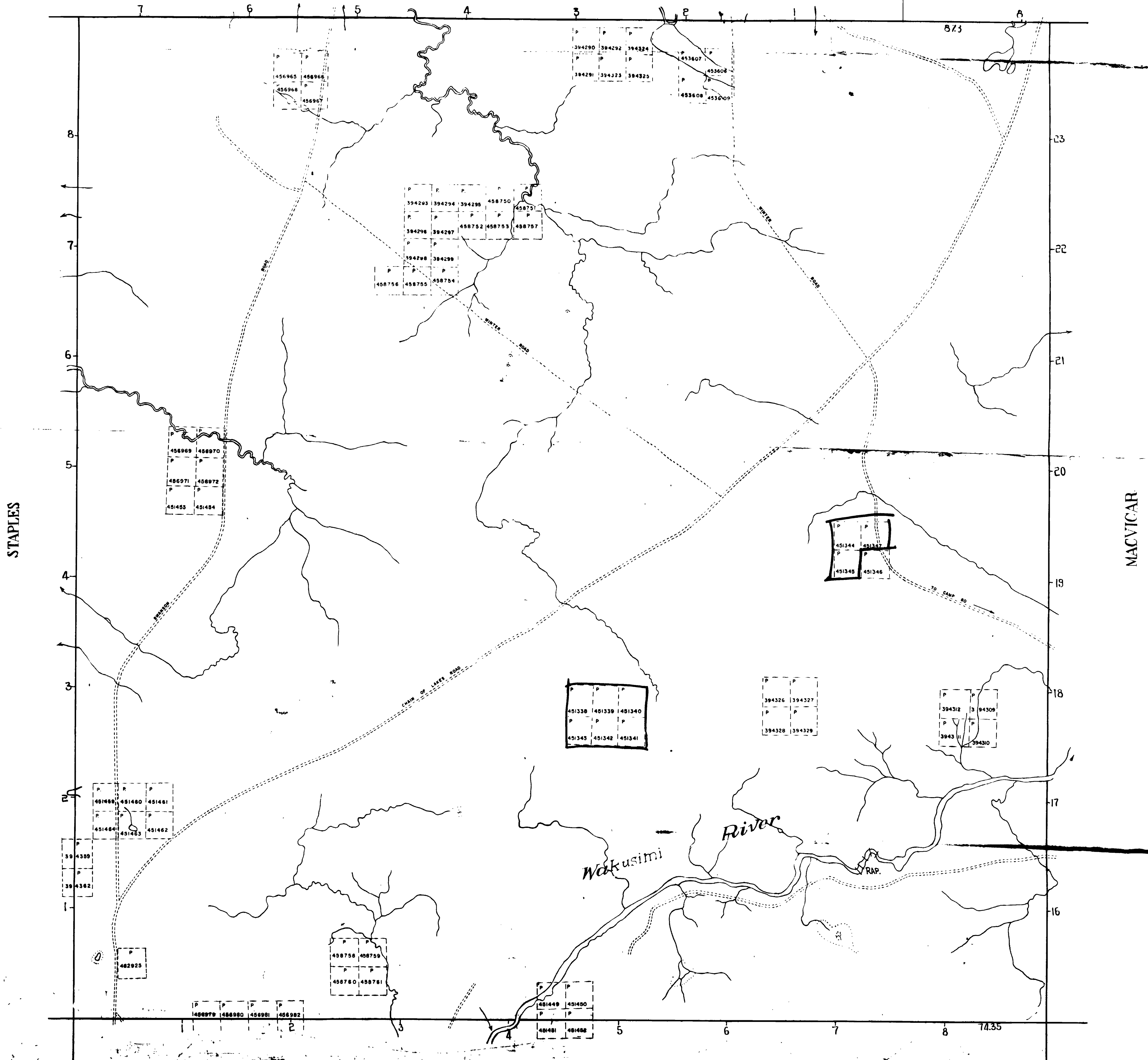
PORCUPINE MINING DIVISION

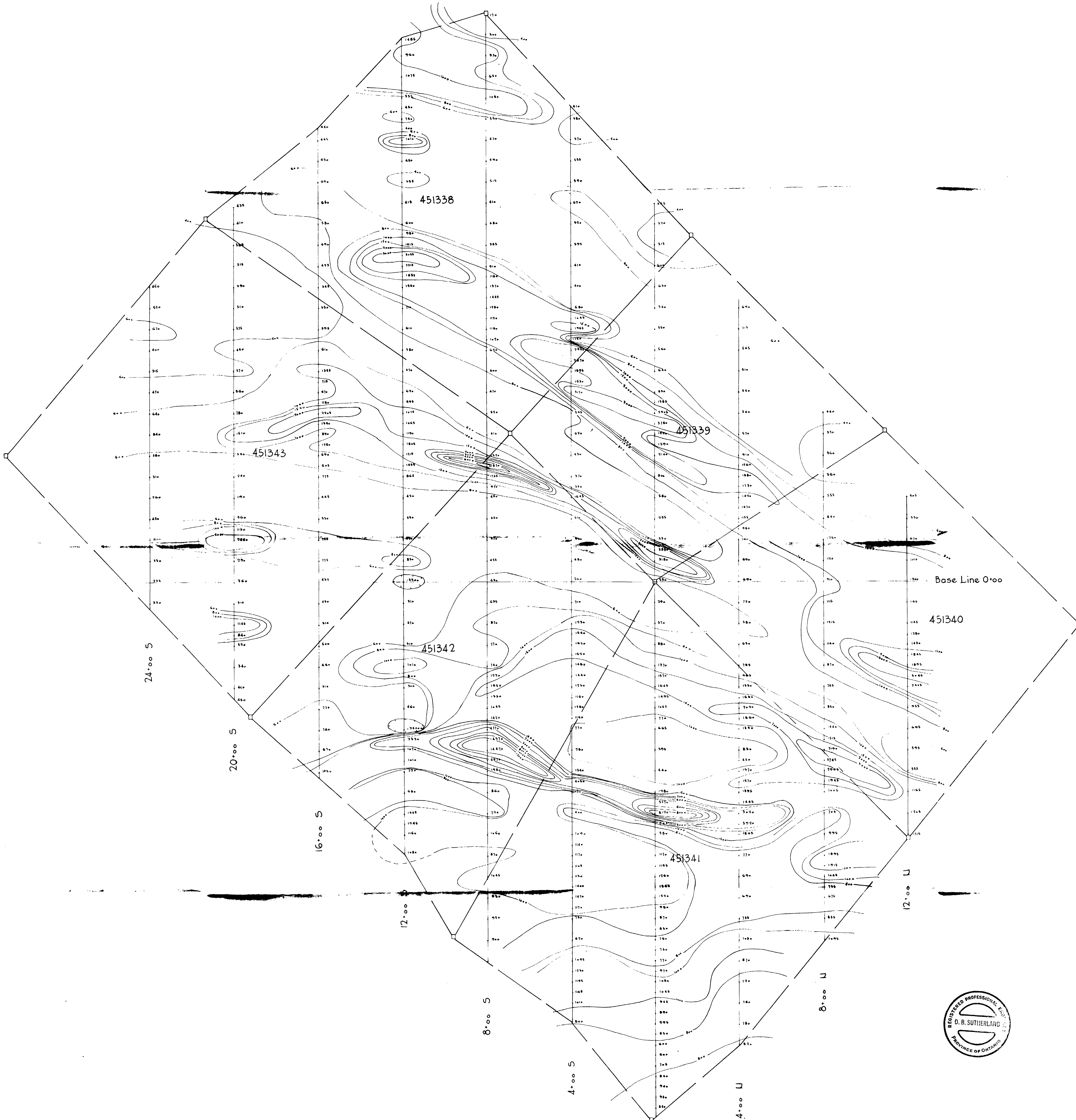
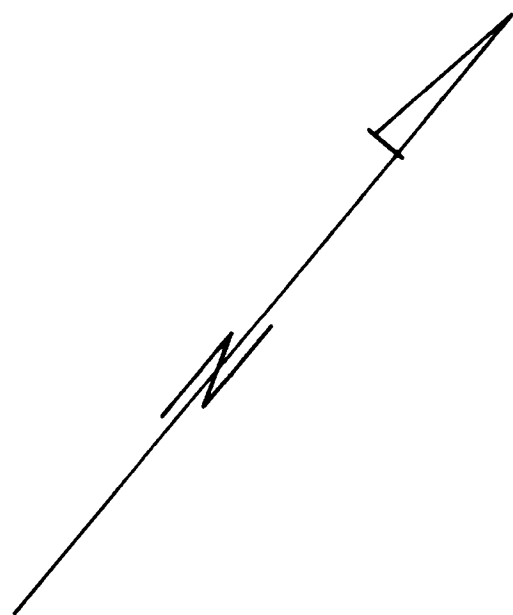
Scale 40 Chains = 1 inch.

SWANSON

DATE OF ISSUE
JUL - 6 1977
SURVEYS AND MAPPING
BRANCH

NOTE
400' Surface Rights Reservation
around all Lakes and Rivers.



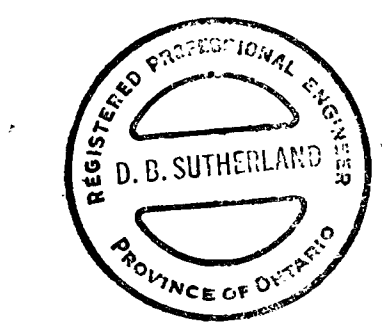
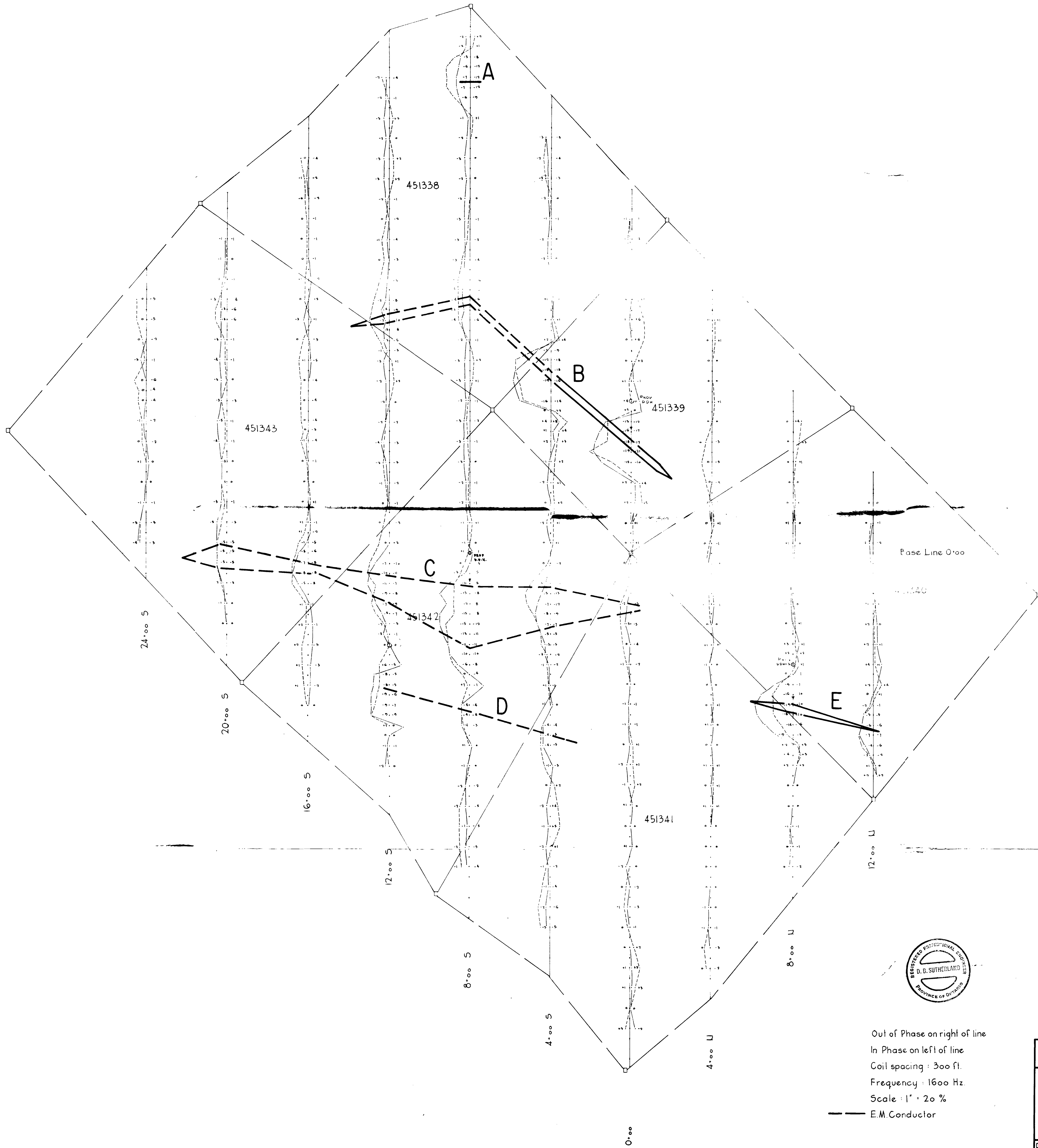
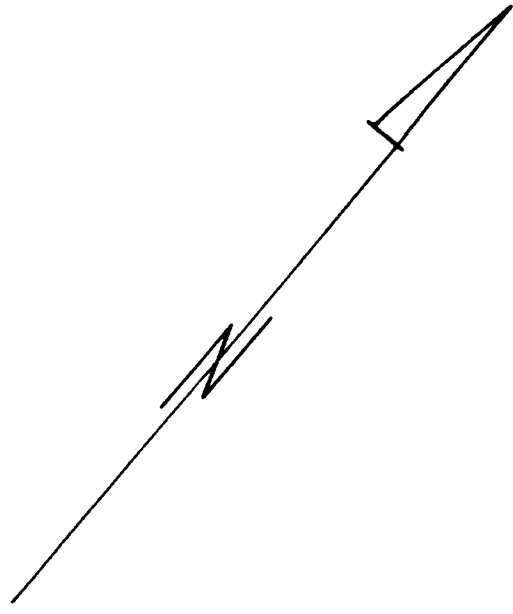


22435

MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION		
MAGNETOMETER SURVEY		
KAPUSKASING PROJECT		
GROUP :		
ONTARIO		
DATE :	SCALE : 1" = 50'	TWP: CASSELMAN
DRAWN BY :		MAP No. :

Instrument - Fluxgate MF-2
Contour Interval - 100 γ



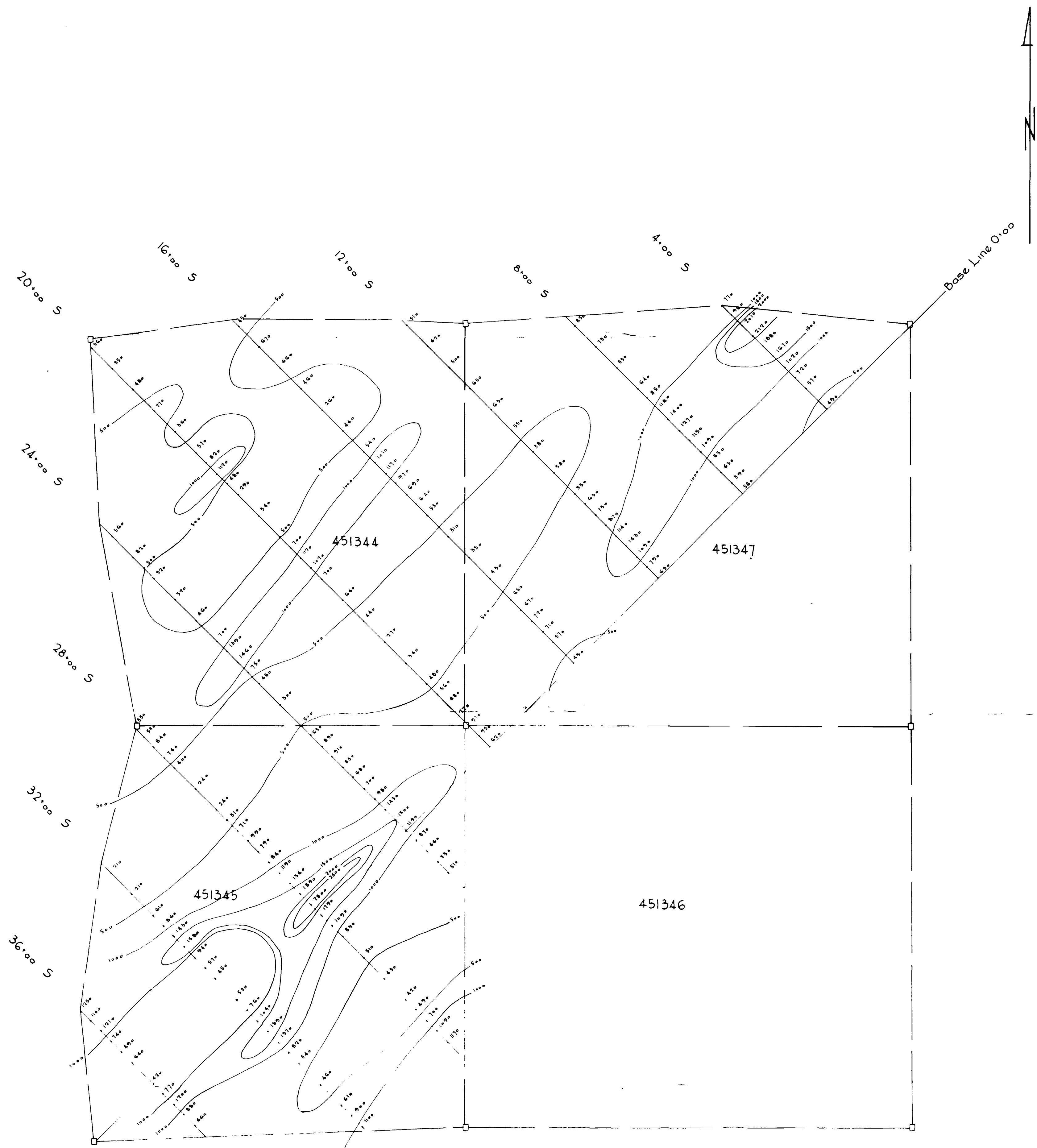


Out of Phase on right of line
 In Phase on left of line
 Coil spacing : 300 ft.
 Frequency : 1600 Hz
 Scale : 1" = 20'
 ——— E.M. Conductor

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MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION		
EM - 17 SURVEY KAPUSKASING PROJECT GROUP I ONTARIO		
DATE :	SCALE : 1" = 200'	TWP: CASSELMAN
DRAWN BY :		MAP No.:

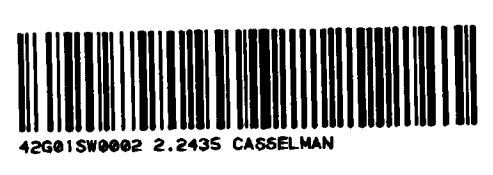


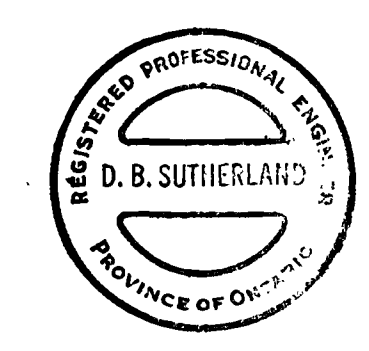
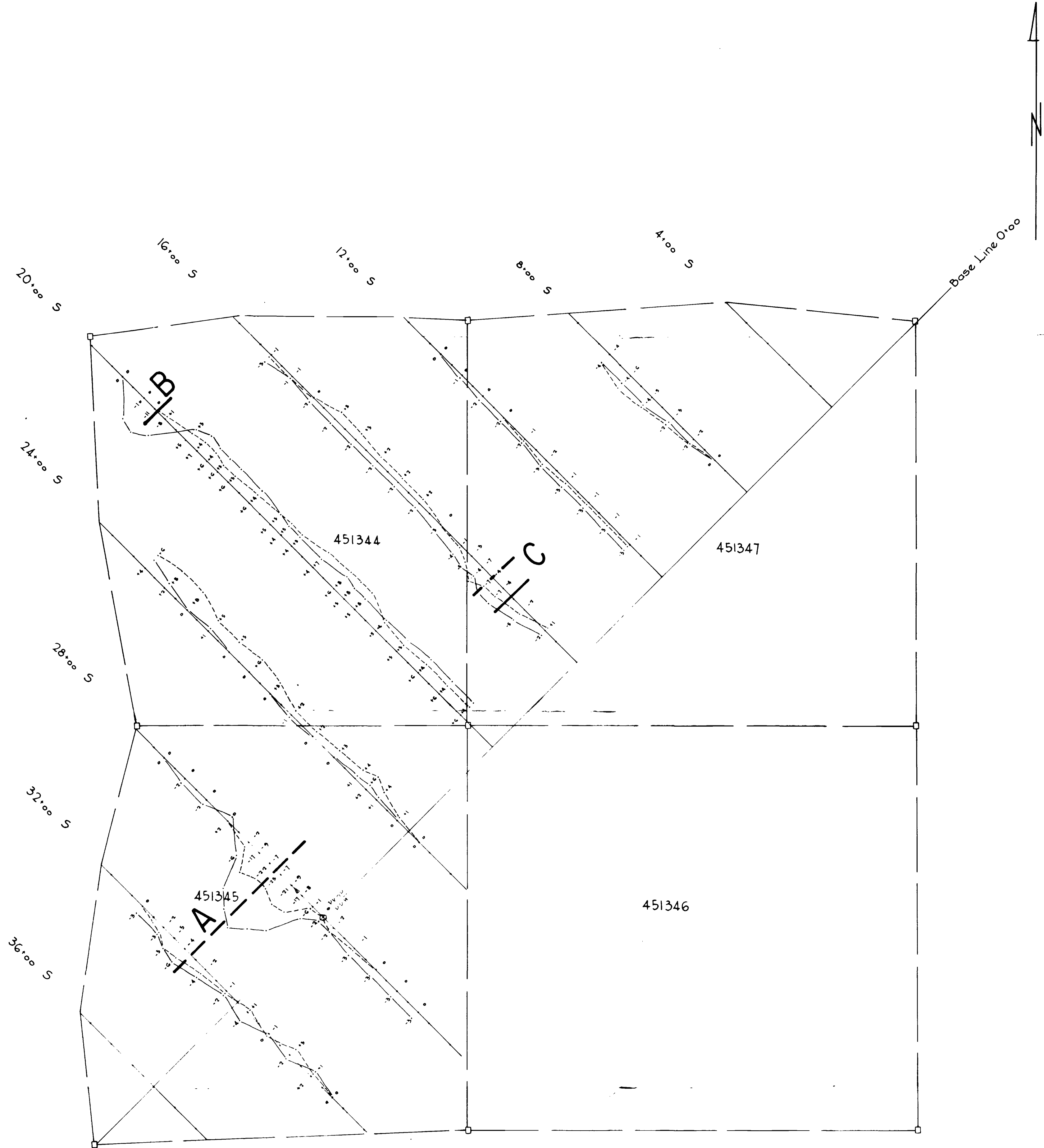


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MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION		
MAGNETOMETER SURVEY		
KAPUSKASING PROJECT		
GROUP G		
ONTARIO		
DATE: MARCH 1977	SCALE: 1" = 200'	TWP CASSELMAN
DRAWN BY:		MAP No.

Contour Interval: 500 X
Instrument Fluxgate MF-2





Out of Phase on right of line
 In Phase on left of line
 Coil spacing : 300 ft.
 Frequency : 1600 Hz
 Scale : 1" = 200'
 --- E.M. Conductor

22435

MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION		
EM - 17 SURVEY KAPUSKASING PROJECT GROUP G ONTARIO		
DATE : MARCH 1977	SCALE : 1" = 200'	TWP. CASSELMAN
DRAWN BY:		MAP No.

