



42L06NE0034 2.1506 O'SULLIVAN LAKE

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PROJECTS UNIT

REPORT ON THE
GROUND GEOPHYSICAL SURVEYS
LOUMA OPTION, O'SULLIVAN LAKE, ONTARIO
FOR
MATTAGAMI LAKE MINES LIMITED

D. B. Sutherland

June, 1974

1. INTRODUCTION

The Louma Option Group consists of 83 claims located on the north-west portion of O'Sullivan Lake. These claims surround two smaller groups: 4 claims of Consolidated Louanna Gold Mines Limited and 3 claims of Rodney Gold Mines Limited. Boundaries and numbers of all claims are clearly indicated on the maps.

A second group of 136 claims, known as the Odman Lake Group, adjoins the Louma Option Group to the north. Both claim groups, and the internal claims, were covered by a single grid and the surveys, which were carried out by Mattagami Lake Mines own field crews, were continuous across the common boundary. The surveying of both groups was accomplished in the period from Jan. 7 to April 13, 1974. Complete coverage was made with three methods, VLF-EM, horizontal loop electromagnetics, and magnetics along 106.3 miles of picket line grid.

The claims are located on O'Sullivan Lake about 20 miles north-west of Nakina. An all-weather gravel road from Nakina leading to Anaconda's iron deposit 17 miles north of O'Sullivan Lake passes close to the area and a five mile bush road provides access to the property.

The geology of the survey area is covered by "Reconnaissance Geology of the Louma Option, O'Sullivan Lake Ontario" 1974 by Joe Hinzer. According to this report, pillowed andesites, dacite and diorite sills and dikes predominate while acid tuffs and intermediate tuffs and agglomerates are rare. The predominance of intermediate - basic rocks are unfavourable for massive Zn-Cu-Pb sulphides but the prospects for Au in narrow acid

tuff and shear zones and associated porphyries are good. Cu and Cu-Ni associated with basic rocks is also probable.

It is interesting that no strong geophysical anomalies were found over the gold mine of Consolidated Louanna Gold Mines Limited.

Four preliminary DDH's were drilled in the winter of 1974 but nothing of economic interest was encountered.

2. SURVEY INSTRUMENTS

A direct reading McPhar fluxgate instrument was used to measure the vertical field to an accuracy of ± 20 gammas.

The VLF-EM survey was conducted with a Crone RADEM unit. Both the dip angle in degrees, and the horizontal component of the field strength in percent of normal field strength, were recorded with an accuracy of $\pm 1^\circ$ and $\pm 5\%$ respectively. The Seattle, Washington station which operates at 18.6 KHz was used for the survey.

An ABEM Demigun dual-frequency Electromagnetic unit was employed for the horizontal loop survey. Most of the surveying was done using a 300 foot coil separation. The high frequency of 2640 Hz was used for Sheet 2 and the low frequency of 880 Hz for Sheet 1.

3. PRESENTATION OF RESULTS

The claims group has been divided into 2 map areas which are numbered from south to north; 1&2. The results of the three surveys are shown on five separate sheets which have been lettered consecutively making a total of 10 maps.

All of the maps are at a scale of 1" = 400 feet and show claim lines and numbers as well as topography. The alphabetical coding of the map sheets (e. g. - 2B) is as follows.

- A. Magnetic map, values and contours.
- B. Horizontal Loop EM, values and profiles.
- C. VLF Dip Angles values and profiles.
- D. VLF Field Strength values and contours.
- E. Composite.

4. DISCUSSION OF RESULTS

4 a. Magnetics

There are only a few well-closed highs in the survey area.

The most dominant feature is a group of variable magnetic highs that extend from 43 S on 16 W to 25 S on 48 E. These appear to outline a diorite-andesite contact.

Some of the anomalies on the Osulake Peninsula may also indicate a diorite - andesite contact while others (e. g. Line 20 E) appear to be due to later diabase dikes.

4 b. Conductive Methods

The results of the VLF-EM and Horizontal loop surveys will be discussed together in the following.

Experience has shown that strong bedrock conductors give rise to sizable increases in field strength whereas surficial conductivity and minor structural features are evident only in the dip angle profiles.

Consequently the VLF data has been graded on the basis of field strength.

The stronger VLF and Demigun responses have been grouped into zones and lettered alphabetically from south to north. A total of 15 zones, A to O inclusive have been interpreted from the data and are discussed below.

Conductive sediments (eg. lake bottom) are believed to be the cause of many of the anomalies. Consequently a great many cross-overs, not supported by field strength, have not been indicated.

Zone A

Zone A extends from 8 E to 48 E along the north side of the Crydeman Peninsula on the VLF data. It may be largely due to lake shore effects but it crosses land from 12 E to 20 E. It is not supported by Demigun or magnetics and is considered a third priority target. A shear or contact zone are offered as possible causes.

Zone B

Sharp VLF dip angle and field strength profiles characterize this short anomaly. This third priority target may lie on a dacite - diorite contact.

Zone C

The VLF field strength response on Zone C is broad but high valued. It is probably associated with an andesite-diorite contact enhanced by lake bottom conductivity and warrants a low priority rating.

Lake bottom conductivity has a strong influence on the VLF over parts of Sheet 1. At 65 S on 52 E there is a strong reverse cross-over that appears to be caused by the resistive island interrupting the conductive bottom. A similar example occurs near 51 S on 16 E. Lake-shore effects extend from 16 W to 4 E in the vicinity of 65 S and probably represents the edge of a conductive sheet. These effects can mask underlying conductors and distort the appearance of bonafide anomalies.

Zone D

Zone D is an interesting short strike length VLF anomaly with strong dip angles but only moderate field strength. It is weakly supported by quadrature response on the Demigun data (see 60 W) and a nearby single station magnetic high. Although it may be due entirely to conductive lake bottom it warrants a second priority rating.

Zone E

A long zone of moderate VLF response is continuous from 12 W to 36 W. It seems to trace a lake channel and is probably due to conductive sediments.

There is unusual Demigun response associated with parts of Zone E. Most of this appears only as quadrature response and tends to confirm that the source is poorly conductive lake bottom. However, the Demigun response is variable with the better values on Line 16 W, 20 W, 36 W and 40 W which is west of the VLF anomalies.

The 300 gamma magnetic high on 36 W correlates with the VLF and Demigun on Zone E warrants a second priority rating on this line.

VLF dip angle reversals over islands, which often typify conductive lake bottom, may be seen near: 28 S on 44 E, 32 S on 32 E, 32 S on 20 E, 32 S on 8 E, 22 S on 4 W, and 27 S on 12 W. There are also reversals from 4 W to 24 E on the Osulake Peninsula that may be caused by similar effects. On the Demigun data most of the above islands show a positive response, also indicative of the surrounding conductive sediments.

Zone F

Zone F is a single line Demigun response that displays moderate amplitude and moderate conductivity. It is not evident in the VLF or magnetic data. It was tested by preliminary DDH No. 2 which encountered minor sulphides and a sheared mineralized contact. It is not considered worthy of further work.

Zone G

This weak VLF response was selected for the initial preliminary test hole DDH No. 1. Minor sulphides were encountered throughout the hole but there was no economic encouragement.

Zone H

This weak VLF zone lies in the area selected for preliminary DDH's 3 & 4 which were spotted for geologic information. Nothing of economic value was encountered.

Zone I

Zone I strikes E-W and crosses 3 lines on the VLF data. This strong anomaly lies entirely on land and probably represents a shear or contact. It has been assigned a second priority.

Zone J

An unusual single line VLF response lies near 1 S on 100 E. There is no magnetic or Demigun response nearby. However, Zone J occurs near Airborne anomaly 66 and consequently could represent a short or obliquely striking source that may be stronger than indicated by the present traverse direction. Further detailing on E-W traverses and/or 200 foot N-S lines may be warranted if the geology is favourable.

Zone K

Zone K displays good VLF dip angle response but poor field strength. It may indicate an andesite - diorite contact and has been classified as a 3rd priority target.

Zones L, M, N & O

These four zones lie in the northeast portion of the survey area. All of these display moderate to strong VLF dip angles and field strength. They are not associated with either magnetics or Demigun anomalies and are probably due to geologic contacts or shear zones. However, they are strong enough to warrant a second priority classification and should be reassessed on the basis of the initial results obtained on the Odman Lake Group to the north.

5. SUMMARY & RECOMMENDATION

Fifteen anomalous zones, lettered A to O inclusive, have been interpreted from the VLF and Demigun data. In addition weaker VLF

conductors are shown that may be useful in outlining structures and geologic contacts.

The only definite Demigun response encountered in the survey, Zone F, was tested by DDH No. 2 prior to this interpretation. It appears to be caused by a sheared mineralized contact of minor economic importance. Zones G & H are weak VLF zones near DDH's 1, 3 & 4 which were drilled for geologic information.

The remaining twelve zones are based chiefly on VLF data, consequently no diamond drilling has been recommended.

Zones A, B & C are third priority targets that probably represent contacts and/or overburden.

Zone D & E suggest lake bottom as their cause but weak Demigun confirmation enhances their grading to second priority. If their geologic setting is favourable they should be checked with induced polarization to assess their metallic content and eliminate the effects of ionic (e.g. overburden) conduction.

Zone I occurs on land and is a second priority target worthy of further consideration.

Zone J lies in the vicinity of airborne anomaly 66. Additional VLF & EM work on closer spaced and/or perpendicular traverses are definitely warranted on this second priority anomaly.

Zone K is considered third priority and is probably caused by a shear or contact.

Zones L, M, N & O are strong VLF responses that warrant reassessment on the basis of the results obtained on the nearby Odman Lake Group.

Respectfully submitted,

A handwritten signature in cursive script, reading "Don B. Sutherland". The signature is written in dark ink and is positioned above the printed name.

Don B. Sutherland,
Consulting Geophysicist.

Ground Zone	Airborne Anomalies No.	Demigun Amp. Cond.	VLF EM F.S. Dip	Mag.	Priority	Drill Holes
A	-	-	500 50	-	3	L-2-74/1 completed L-2-74/2 completed L-2-74/3 completed & L-2-74/4 completed
B	-	-	300 40	-	3	
C	-	-	400 55	-	3	
D	-	Weak Very	450 50	2700?	2	
E	-	Poor	350 55	300	2	
F	-	Mod. Very	-	-	-	
G	-	Poor	250 15	-	-	
H	-	Mod. Mod.	150 45	-	-	
I	-	-	450 80	-	2	
J	66	-	450 45	-	2	
K	-	-	200 55	-	3	
L	-	-	450 70	-	2	
M	-	-	450 70	-	2	
N	-	-	425 70	-	2	
O	-	-	325 40	-	2	



42L06NE0034 2.1506 0'SULLIVAN LAKE

900

GEOPHYSICAL - GEOLC
TECHNICAL DATA STATEMENT

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 ELECTROMAGNETIC (RADEM)
Township or Area O'SULLIVAN LAKE AREA
Claim holder(s) LOUMA MINES LTD.
BOX 45, COMMERCE COURT W., TORONTO
Author of Report D. B. SUTHERLAND
Address 2136 Pineneedle Grove, Mississauga
Covering Dates of Survey JAN. 7 TO JUNE. 26... 1974
(linecutting to office)
Total Miles of Line cut 47.3

SPECIAL PROVISIONS
CREDITS REQUESTED

ENTER 40 days (includes
line cutting) for first
survey.

ENTER 20 days for each
additional survey using
same grid.

Geophysical
Radem-Electromagnetic

-Magnetometer

-Radiometric

-Other

Geological

Geochemical

DAYS
per claim

20

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

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

DATE: June 18/74 SIGNATURE: [Signature]
Author of Report

PROJECTS SECTION

Res. Geol. _____ Qualifications 63.1168
ON THIS FILE

Previous Surveys _____

Checked by _____ date _____

GEOLOGICAL BRANCH _____

Approved by _____ date _____

GEOLOGICAL BRANCH _____

Approved by _____ date _____

MINING CLAIMS TRAVERSED
List numerically

T.B. 350038, 350039, 350040,
(prefix) (number)
350041, 350042, 350043, 350044
350045, 350046, 350047, 350048,
350049, 350050, 350051, 350052,
350053, 350054, 350055, 370301,
370302, 370303, 370304, 370305,
370306, 370307, 370308, 370309,
370310, 370311, 370312, 370313,
370317, 370318, 370319, 370320,
370321, 370322, 370323, 370324,
370325, 370326, 370327, 370328,
370329, 370330, 370331, 370332,
370333, 370334, 370335, 370336.

If space insufficient, attach list

TOTAL CLAIMS 51

OFFICE USE ONLY

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS

Number of Stations 2670 Number of Readings 5380
Station interval 100'
Line spacing 400'
Profile scale or Contour intervals Profile 1"=40', Contour Interval = 50%
(specify for each type of survey)

MAGNETIC

Instrument _____
Accuracy - Scale constant _____
Diurnal correction method _____
Base station location _____

ELECTROMAGNETIC

Instrument CRONE RADEM UNIT
Coil configuration _____
Coil separation _____
Accuracy + 20 Gammas
Method: ☒ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line
Frequency 18.6 KHz Seattle
(specify V.L.F. station)
Parameters measured Dip Angle; Field Strength.

GRAVITY

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

Elevation accuracy _____

INDUCED POLARIZATION -- RESISTIVITY

Instrument _____
Time domain _____ Frequency domain _____
Frequency _____ Range _____
Power _____
Electrode array _____
Electrode spacing _____
Type of electrode _____

**GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL
TECHNICAL DATA STATEMENT**

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 GEOPHYSICAL
Township or Area O'SULLIVAN LAKE AREA
Claim holder(s) LOUMA MINES LIMITED
BOX 45, COMMERCE COURT W., TORONTO
Author of Report D. B. SUTHERLAND
Address 2136 Pineneedle Grove, Mississauga
Covering Dates of Survey JAN. 7 - JUNE. 24 1974
(linecutting to office)
Total Miles of Line cut 47.3

SPECIAL PROVISIONS
CREDITS REQUESTED

Hor. Loop
ENTER 40 days (includes
line cutting) for first
survey.

ENTER 20 days for each
additional survey using
same grid.

Geophysical

–Electromagnetic

–Magnetometer

–Radiometric

–Other

Geological

Geochemical

DAYS
per claim

20

40

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

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

DATE: June 18/74

SIGNATURE: D. B. Sutherland

Author of Report

MINING CLAIMS TRAVERSED
List numerically

TB.350038, 350039, 350040,
(prefix) (number)
350041, 350042, 350043, 350044,
350045, 350046, 350047, 350048,
350049, 350050, 350051, 350052,
350053, 350054, 350055, 370301,
370302, 370303, 370304, 370305,
370306, 370307, 370308, 370309,
370310, 370311, 370312, 370313,
370317, 370318, 370319, 370320,
370321, 370322, 370323, 370324,
370325, 370326, 370327, 370328,
370329, 370330, 370331, 370332,
370333, 370334, 370335, 370336.

If space insufficient, attach list

PROJECTS SECTION

Res. Geol. _____ Qualifications also 63.11.68
ON THIS FILE

Previous Surveys L.D. 63.3024 not for
assessment credits

Checked by _____ date _____

GEOLOGICAL BRANCH _____

Approved by _____ date _____

GEOLOGICAL BRANCH _____

Approved by _____ date _____

TOTAL CLAIMS 51

OFFICE USE ONLY

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS

Number of Stations 2670 Number of Readings 8055
Station interval 100'
Line spacing 400'
Profile scale or Contour intervals Mag Contours 200 gammas Radem 50%, profiles 1"=40'
(specify for each type of survey)

MAGNETIC

Instrument McPhar Fluxgate
Accuracy - Scale constant ± .5 gammas
Diurnal correction method XXXXX Readings tied in to predetermined Base Stations within 1 hour
Base station location 0+00 E, 0+00 N & Points every 400' along 0 Baseline

ELECTROMAGNETIC

Instrument ABEM DEMIGUN
Coil configuration Coplaner
Coil separation 300' & 200'
Accuracy .5%
Method: ☐ Fixed transmitter ☐ Shoot back ☒ In line ☐ Parallel line
Frequency 880' Hz 2640 Hz
(specify V.L.F. station)
Parameters measured In Phase & Out of Phase

GRAVITY

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

Elevation accuracy _____

INDUCED POLARIZATION – RESISTIVITY

Instrument _____
Time domain _____ Frequency domain _____
Frequency _____ Range _____
Power _____
Electrode array _____
Electrode spacing _____
Type of electrode _____

AREA OF

2.1506

O'SULLIVAN LAKE

DISTRICT OF
THUNDER BAY

THUNDER BAY
MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	Ⓟ
CROWN LAND SALE	Ⓢ
LEASES	Ⓛ
LOCATED LAND	Ⓛ
LICENSE OF OCCUPATION	Ⓛ
MINING RIGHTS ONLY	Ⓛ
SURFACE RIGHTS ONLY	Ⓛ
ROADS	—
IMPROVED ROADS	—
KING'S HIGHWAYS	—
RAILWAYS	—
POWER LINES	—
MARSH OR MUSKEG	—
MINES	—
CANCELLED	—

NOTES

400' surface rights reservation around
all lakes and rivers.

MINING LANDS
DATE OF ISSUE
JUN 28 1974
MINISTRY
OF NATURAL RESOURCES

NATIONAL TOPOGRAPHIC SERIES 42

PLAN NO. M1415

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

Abamasagi

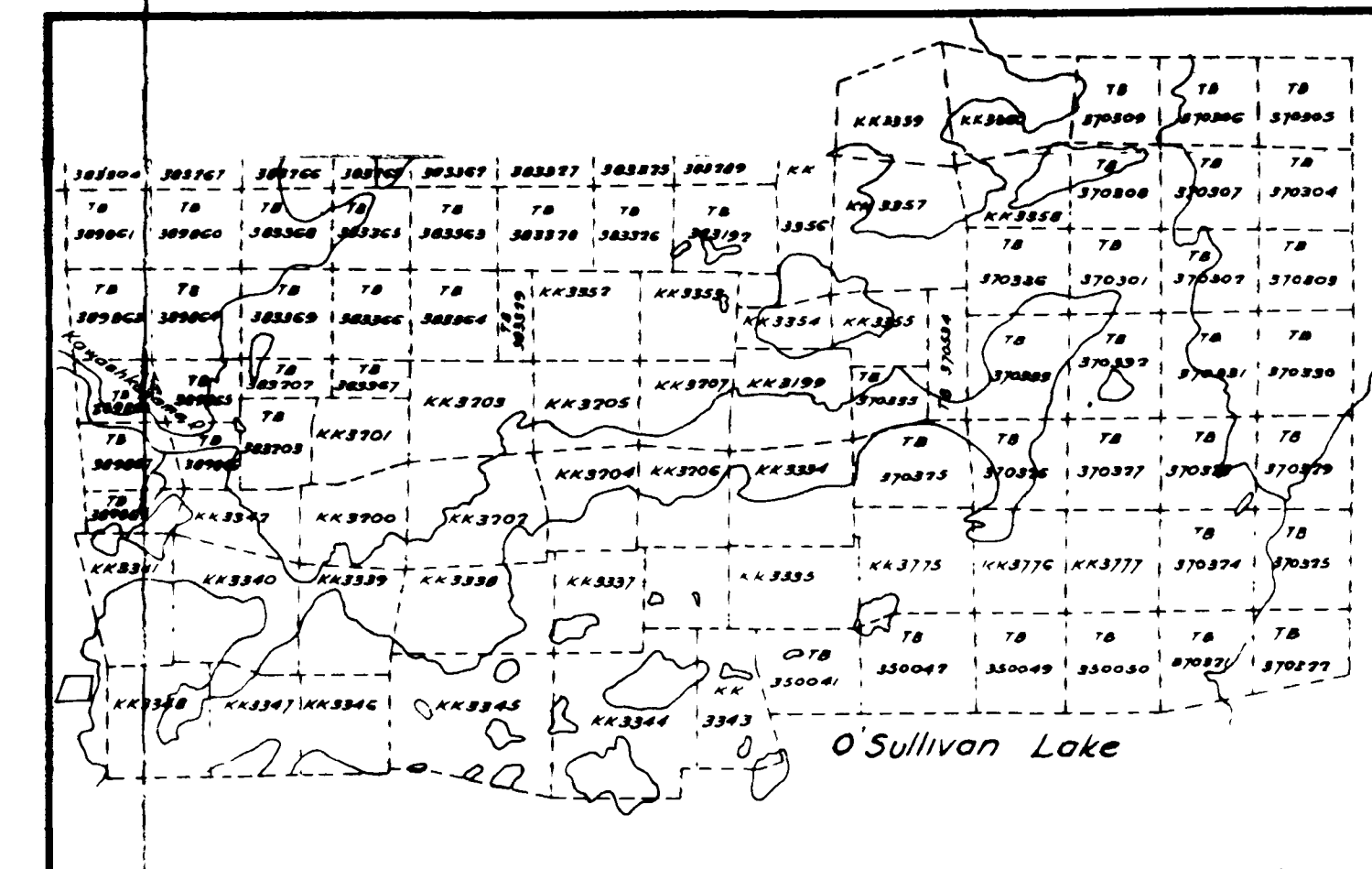
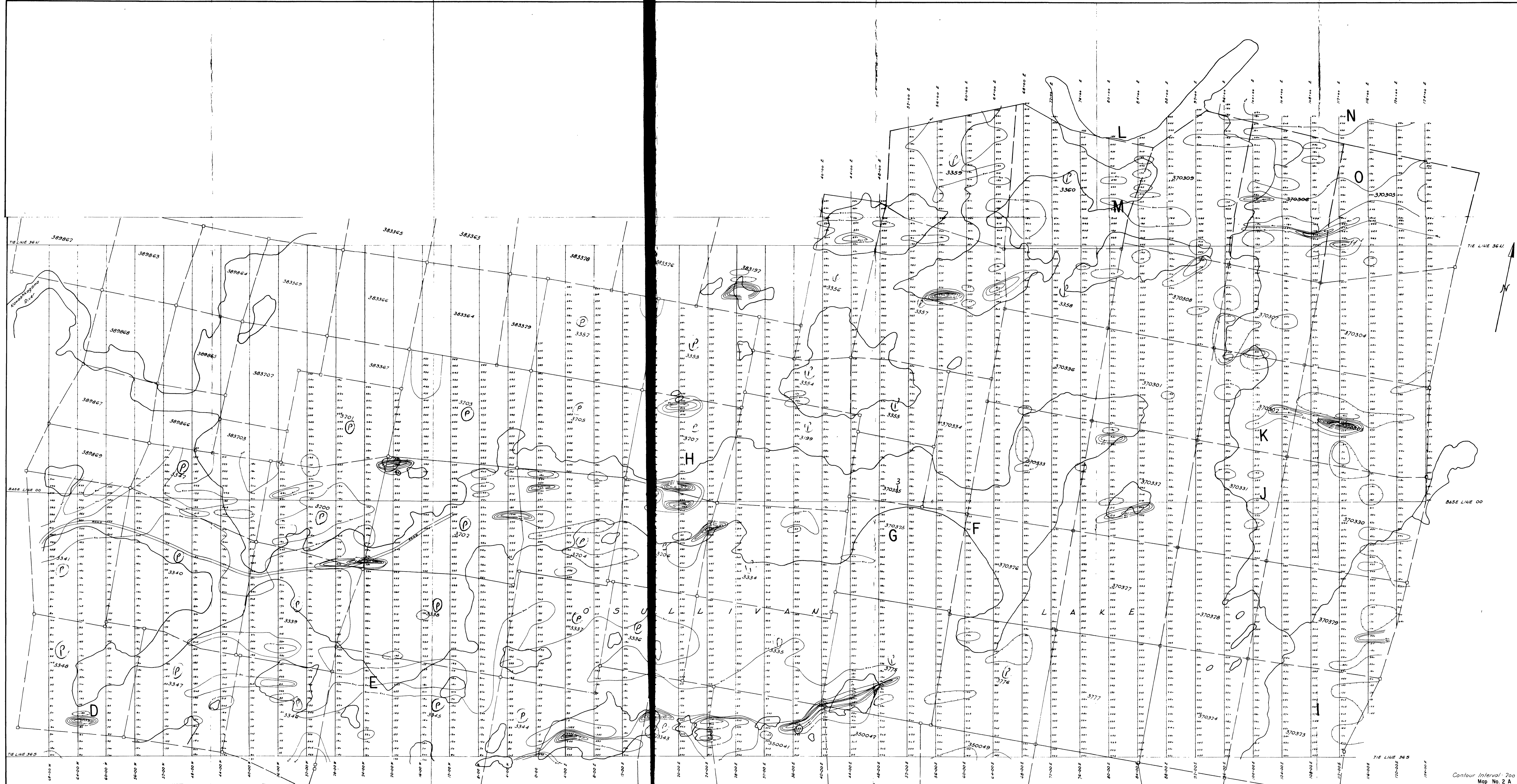
Lake

Hanover

Lake



200



INDEX PLAN
LOUMA OPTION
SCALE 1"=2640'

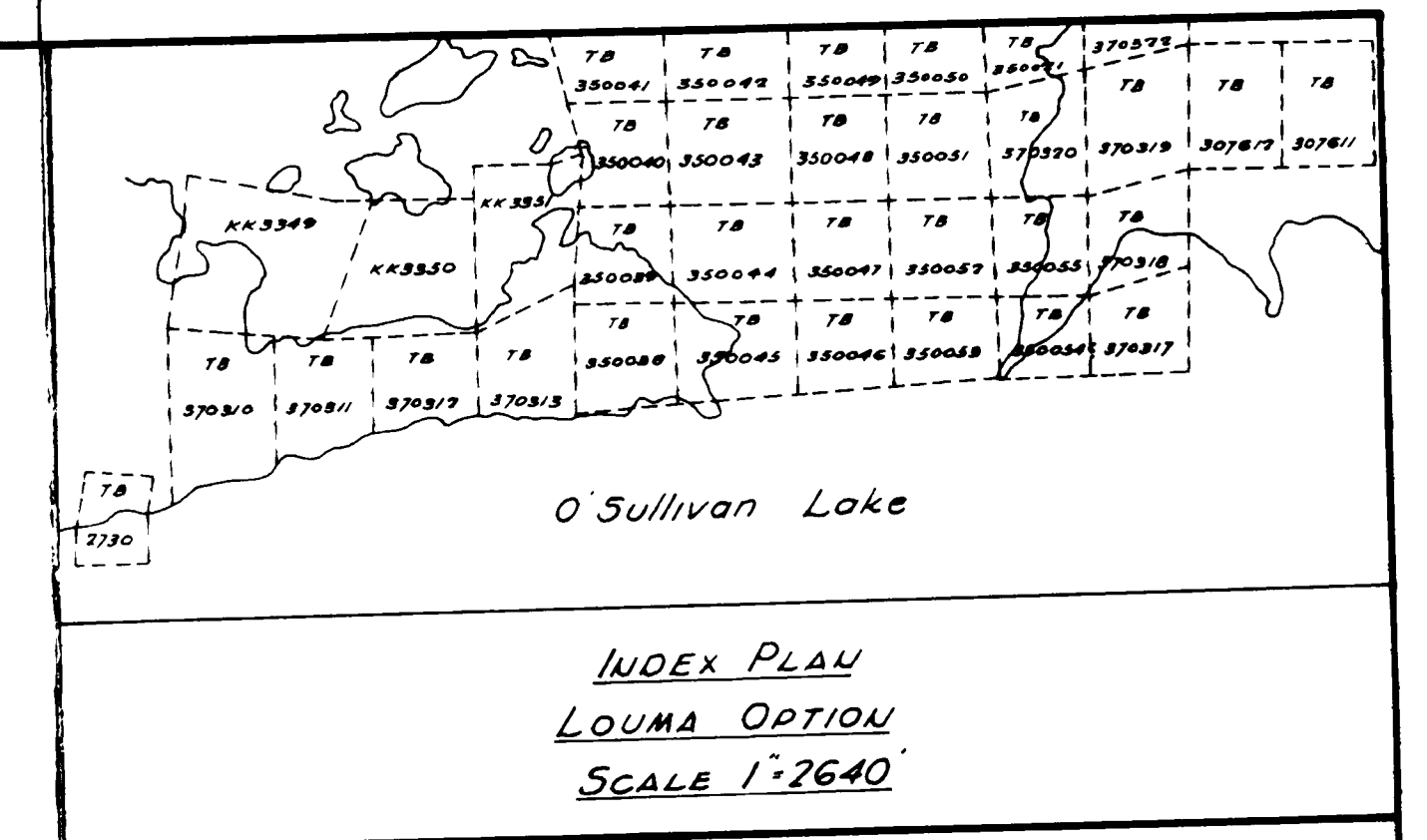
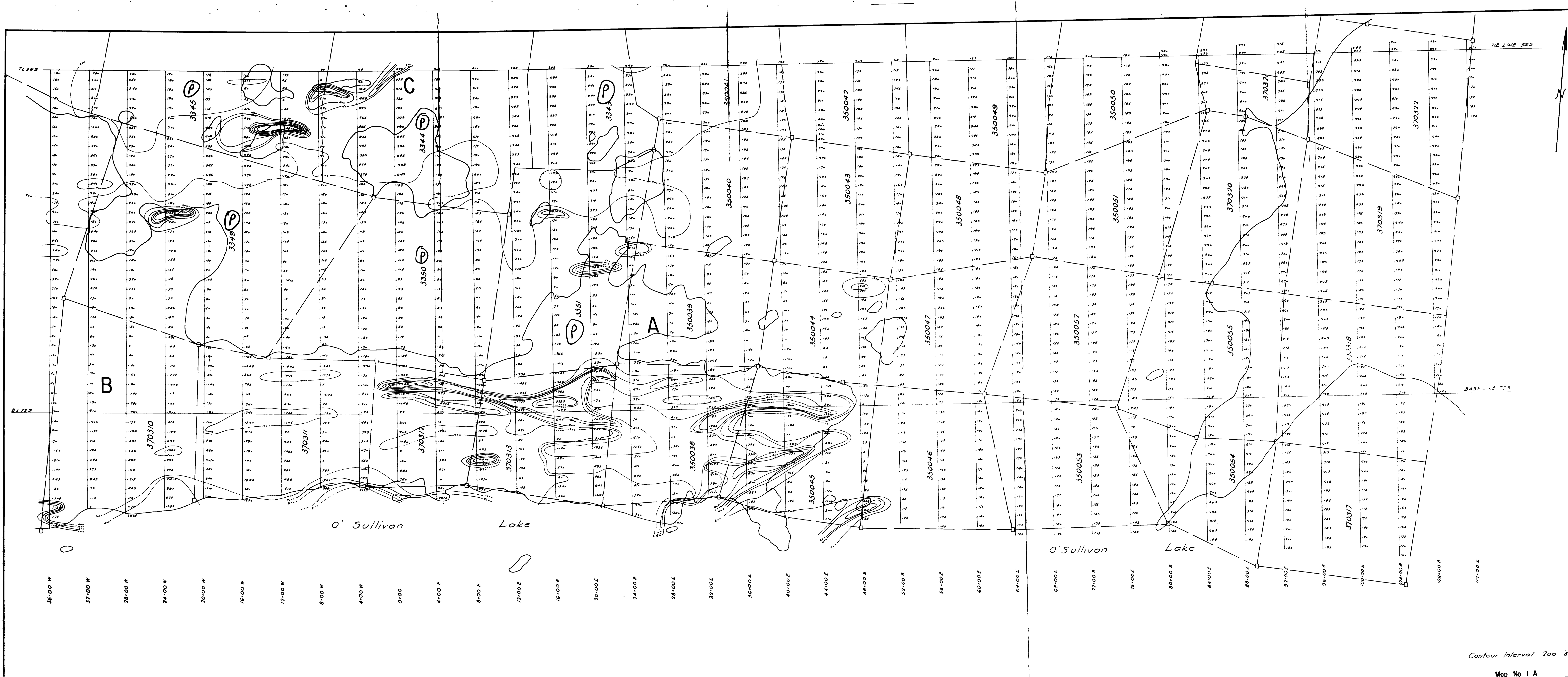
210

PROFESSIONAL
D. B. SUTHERLAND
ENGINEER

MATTAGAMI LAKE MINES LTD.
EXPLORATION DIVISION

MAGNETOMETER SURVEY
LOUMA OPTION
O'SULLIVAN LAKE AREA
ONTARIO

SCALE 1"=400'
DATE MARCH 1974
TWP
DRAWN BY

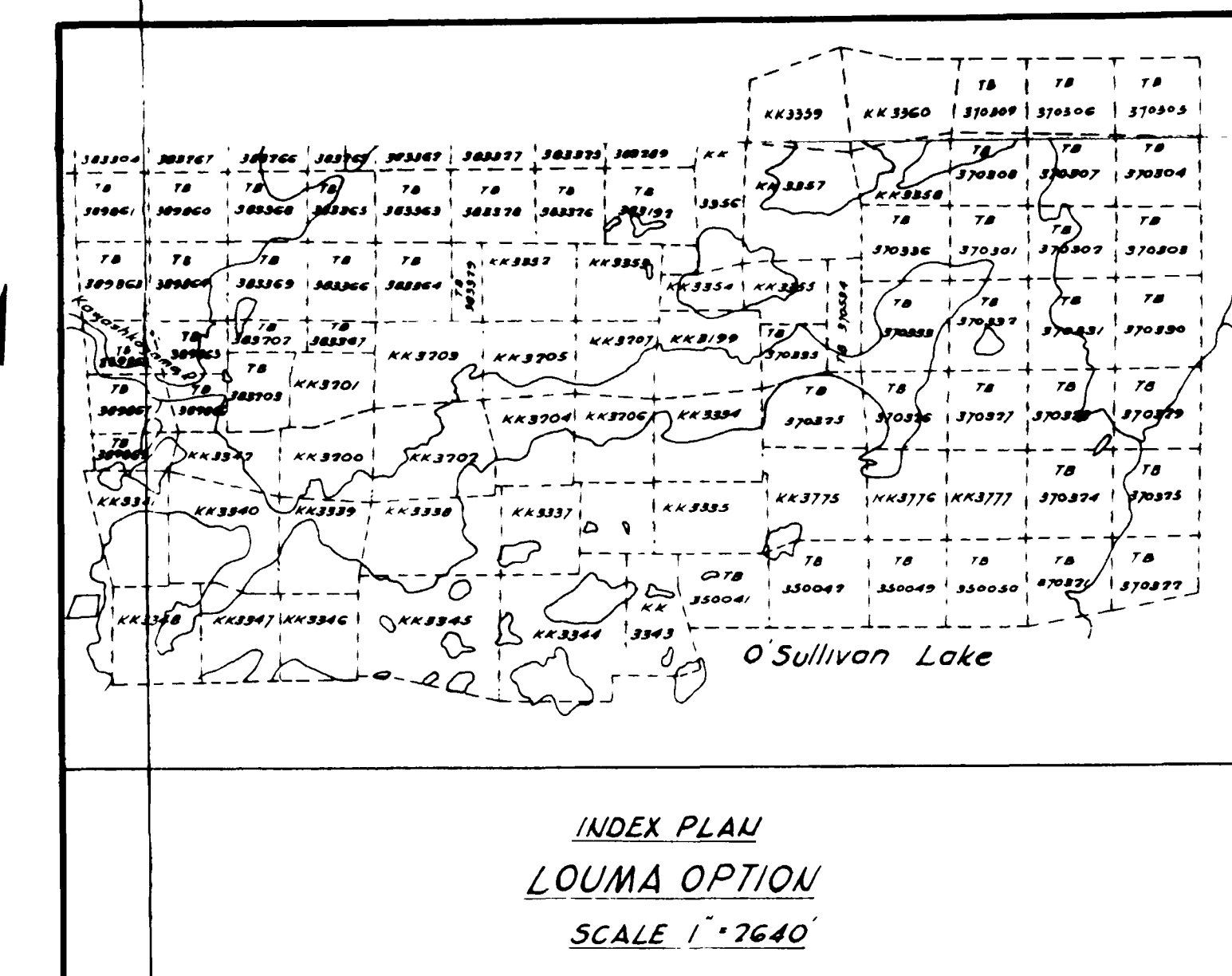
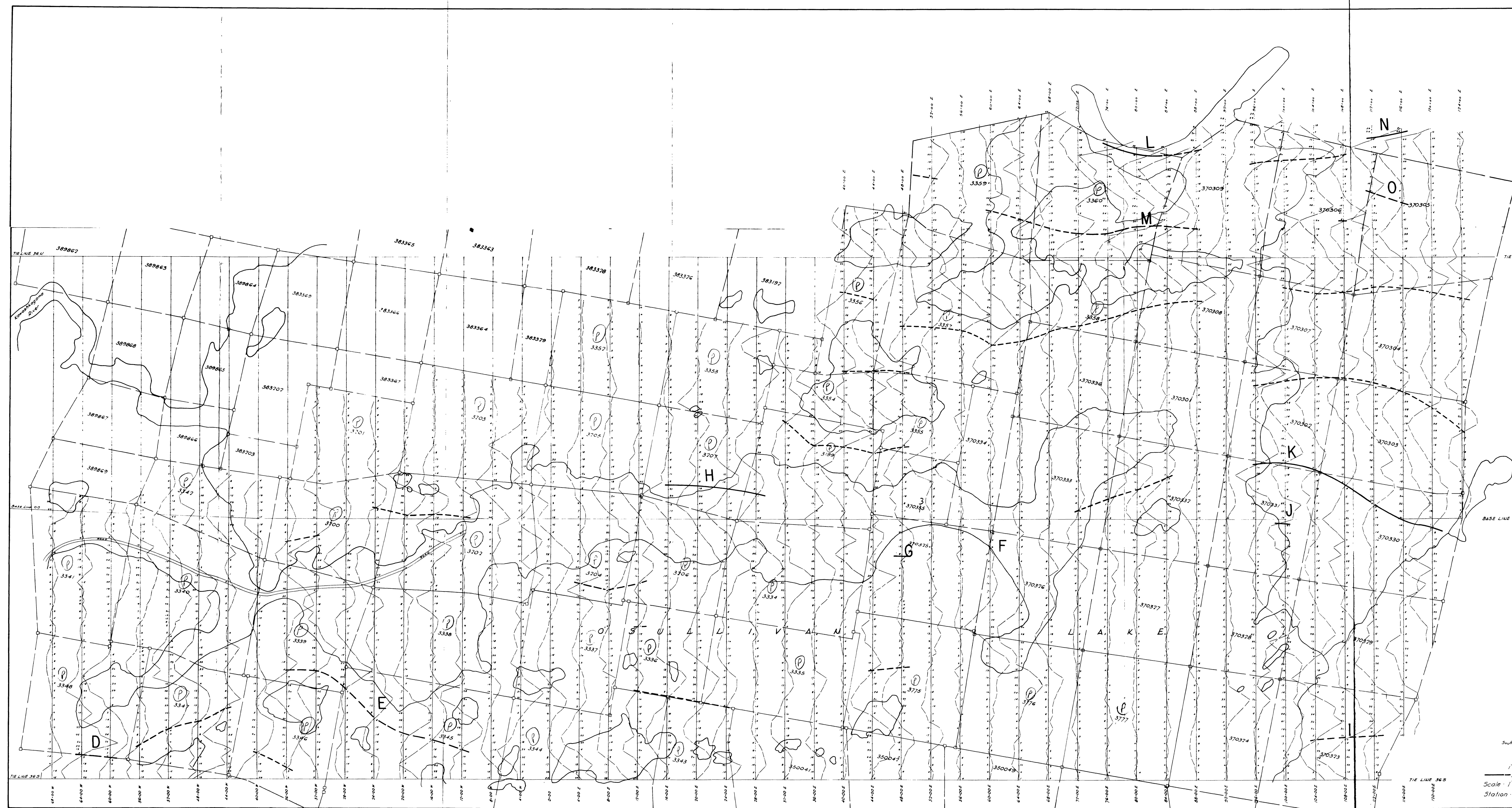


B. B. Sutherland

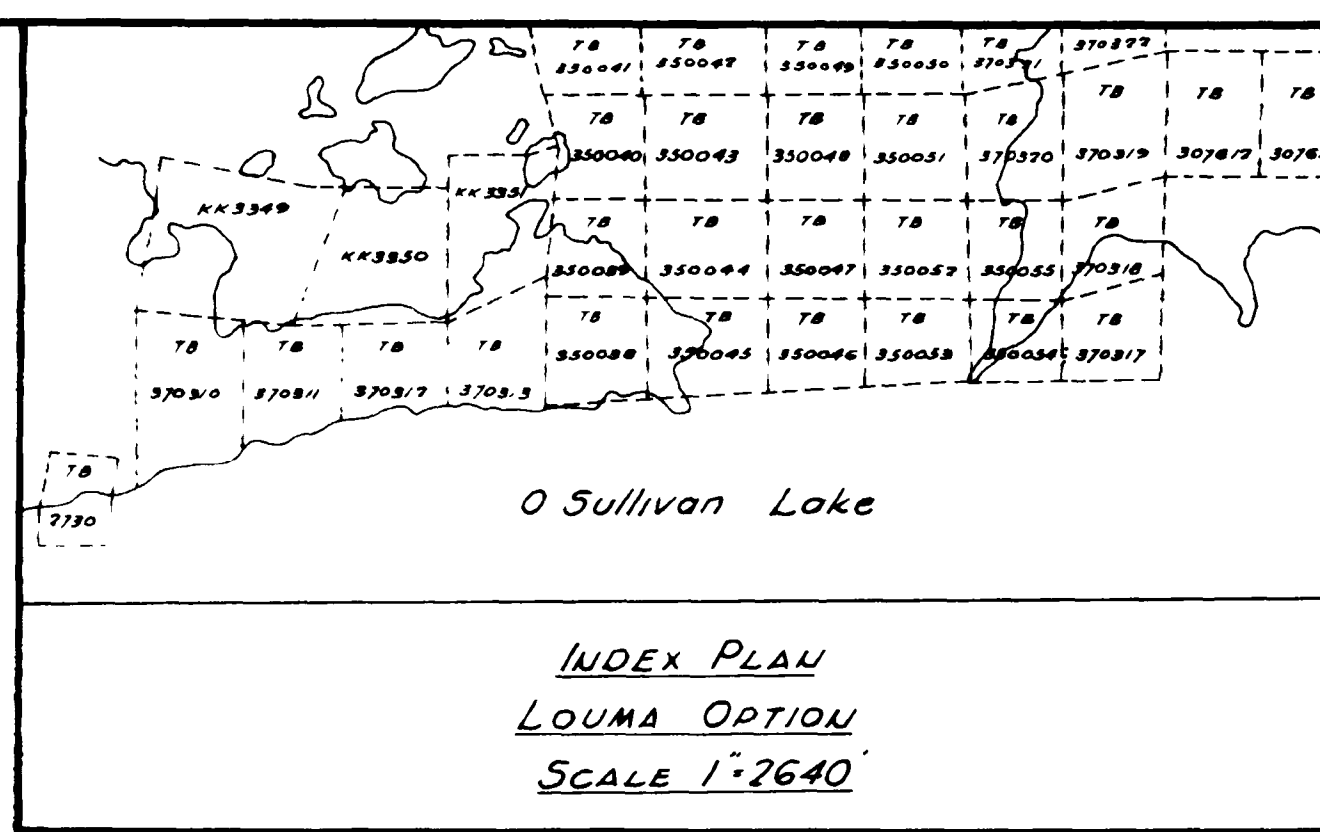
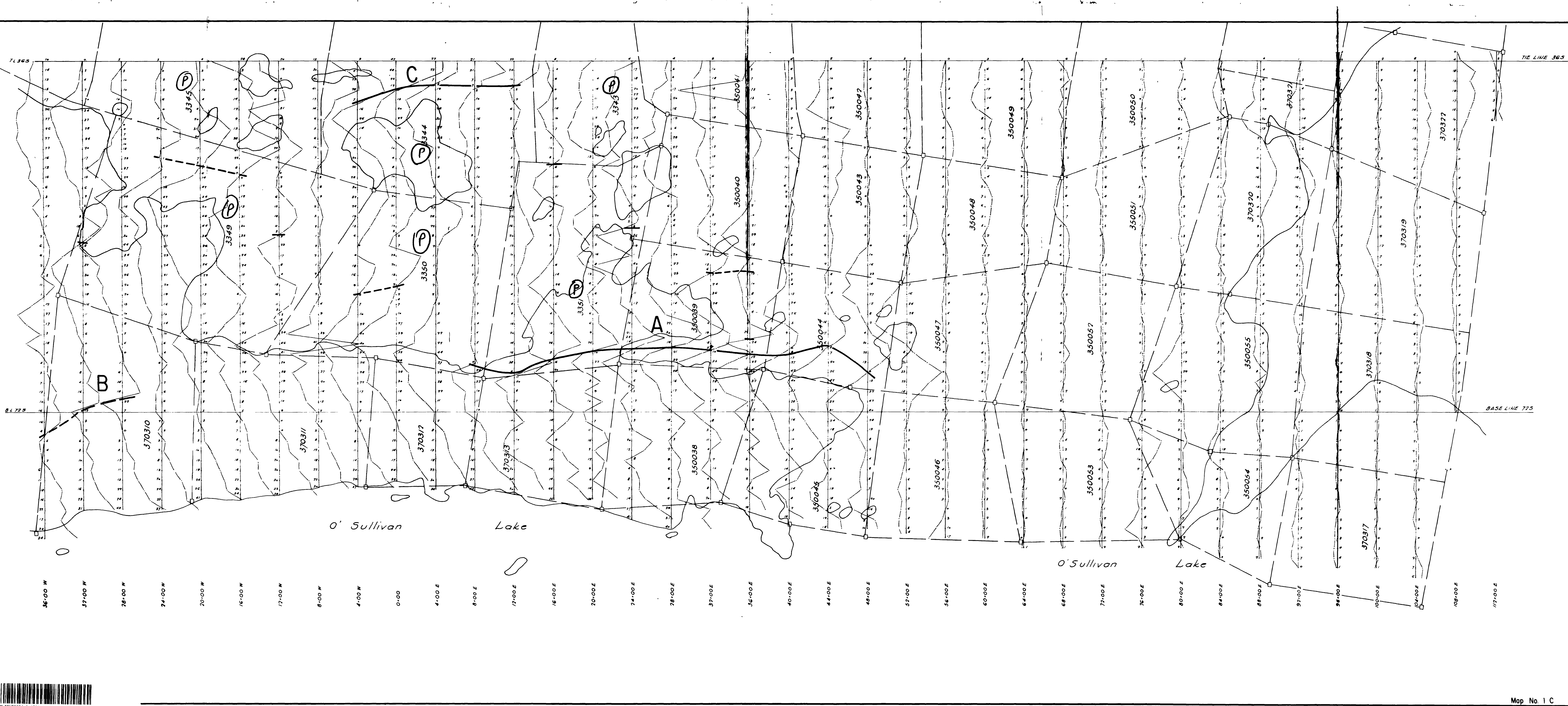
MATTAGAMI LAKE MINES LTD EXPLORATION DIVISION	
MAGNETOMETER SURVEY LOUMA OPTION South O'SULLIVAN LAKE AREA ONTARIO	
SCALE 1" = 400'	TWP:
DATE: MARCH 1974	DRAWN BY:

Contour Interval 200 γ

Map No. 1 A



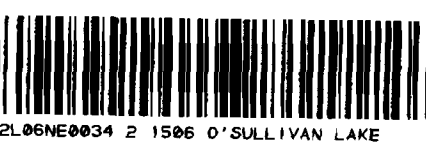
MATTAGAMI LAKE MINES LTD EXPLORATION DIVISION	
RADEM DIP ANGLE SURVEY LOUMA OPTION O'SULLIVAN LAKE AREA ONTARIO	
SCALE 1" = 400'	TWP
DATE MARCH 1974	DRAWN BY

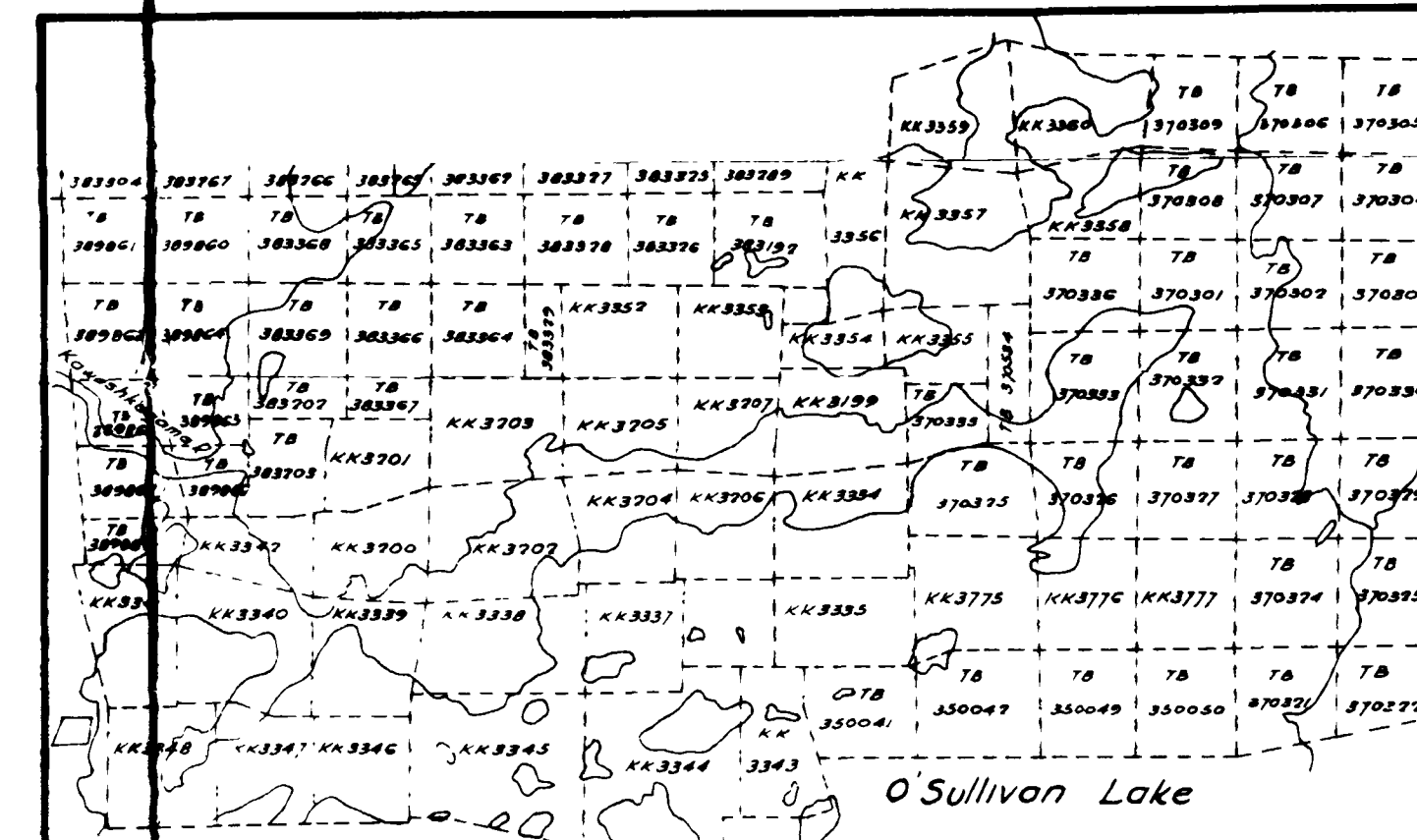


North dip left of line
South dip right of line
Scale: 1" = 40'
Station Seattle, Washington



MATTAGAMI LAKE MINES LTD EXPLORATION DIVISION	
RADEM DIP ANGLE SURVEY	
LOUMA OPTION	
O'SULLIVAN LAKE AREA	
ONTARIO	
SCALE 1" = 400'	TWP. 1
DATE: MARCH 1974	DRAWN BY:





INDEX PLAN
LOUMA OPTION
SCALE 1" = 7640



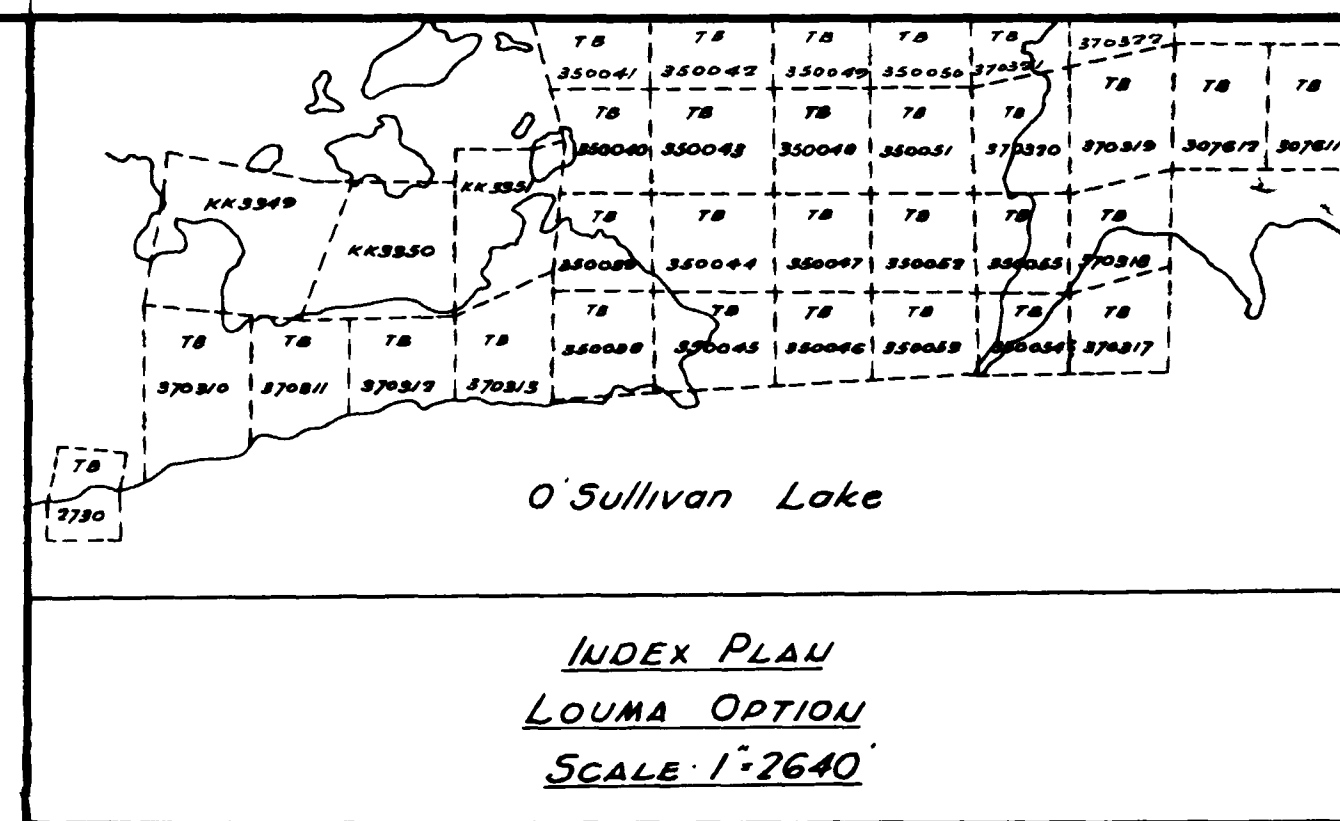
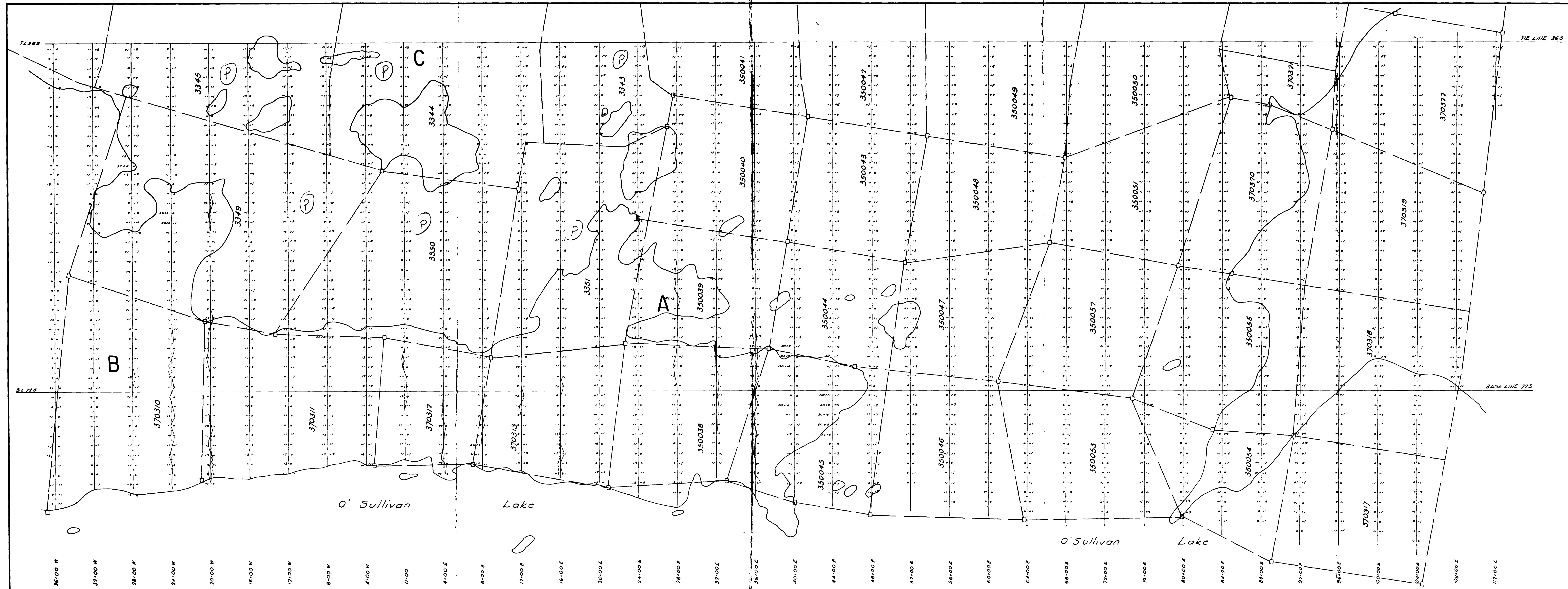
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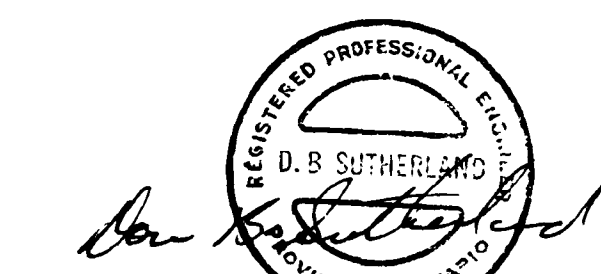
MATTAGAMI LAKE MINES LTD
EXPLORATION DIVISION
DEMIGUN SURVEY
LOUMA OPTION No. 1
O'SULLIVAN LAKE AREA
ONTARIO
SCALE 1" = 400' TWP.
DATE MARCH 1974 DRAWN BY

In-Phase on left of line
Out-of-Phase on right of line
Coil spacing 300 ft.
Frequency 2640 Hz

Map No. 2 B



In-phase on left of line
Out-of-phase on right of line
Coil spacing 300 ft
Frequency 880 Hz



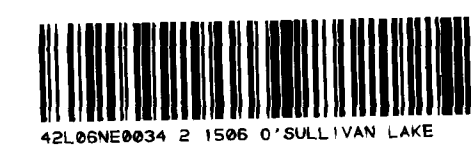
MATTAGAMI LAKE MINES LTD
EXPLORATION DIVISION

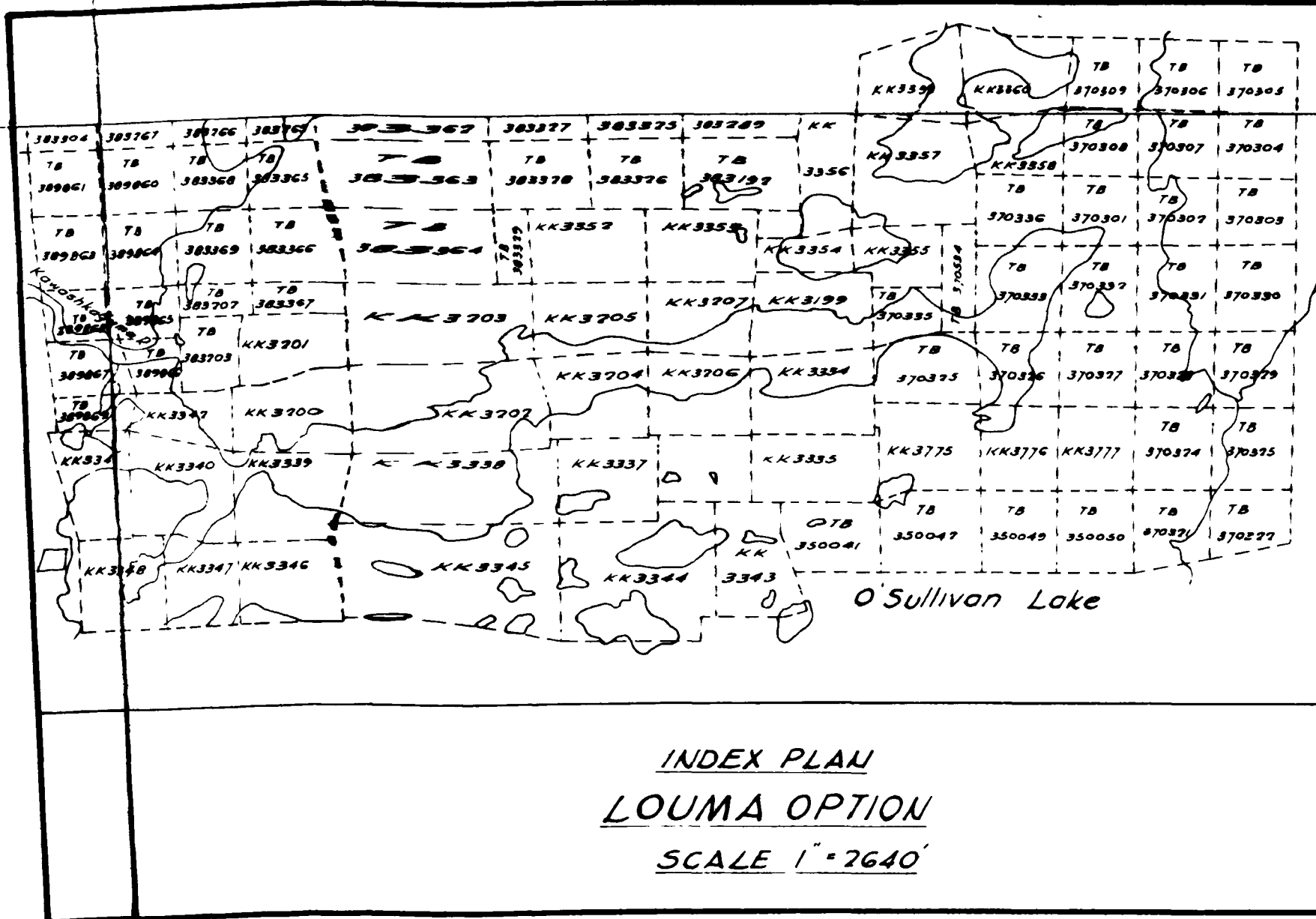
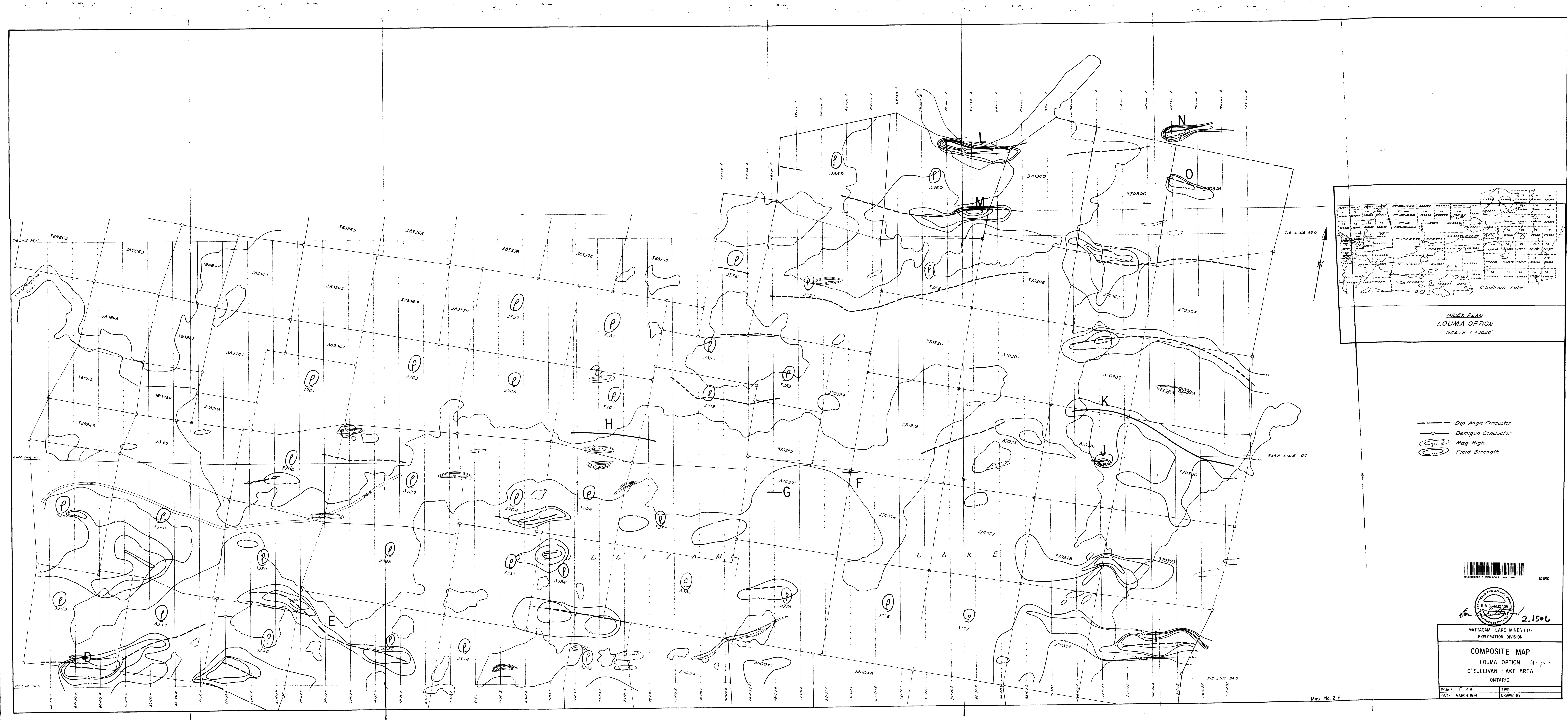
DEMIGUN SURVEY
LOUMA OPTION
O'SULLIVAN LAKE AREA
ONTARIO

SCALE 1" = 400'
DATE: MARCH 1974

TWP:
DRAWN BY:

Map No. 1 B





- Dip Angle Conductor
- - - Demigun Conductor
- Mag High
- Field Strength

280

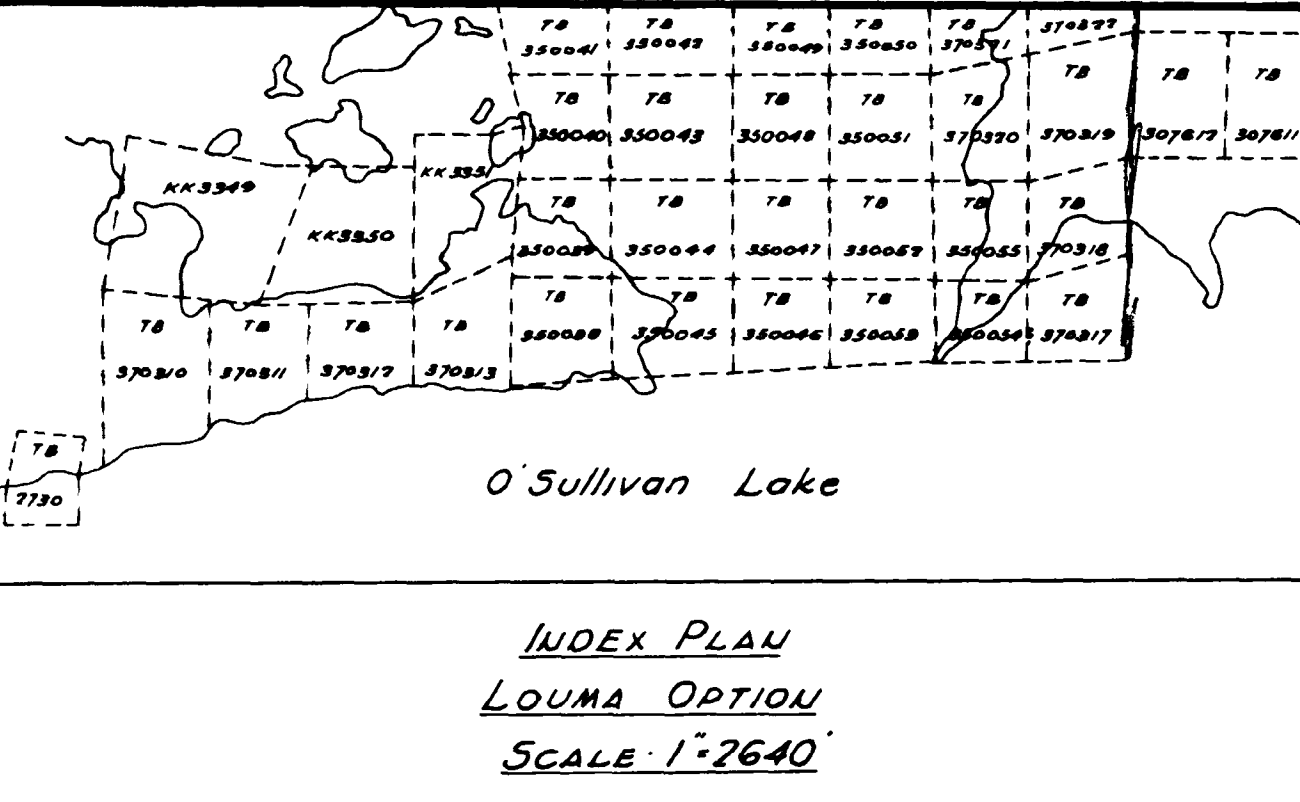
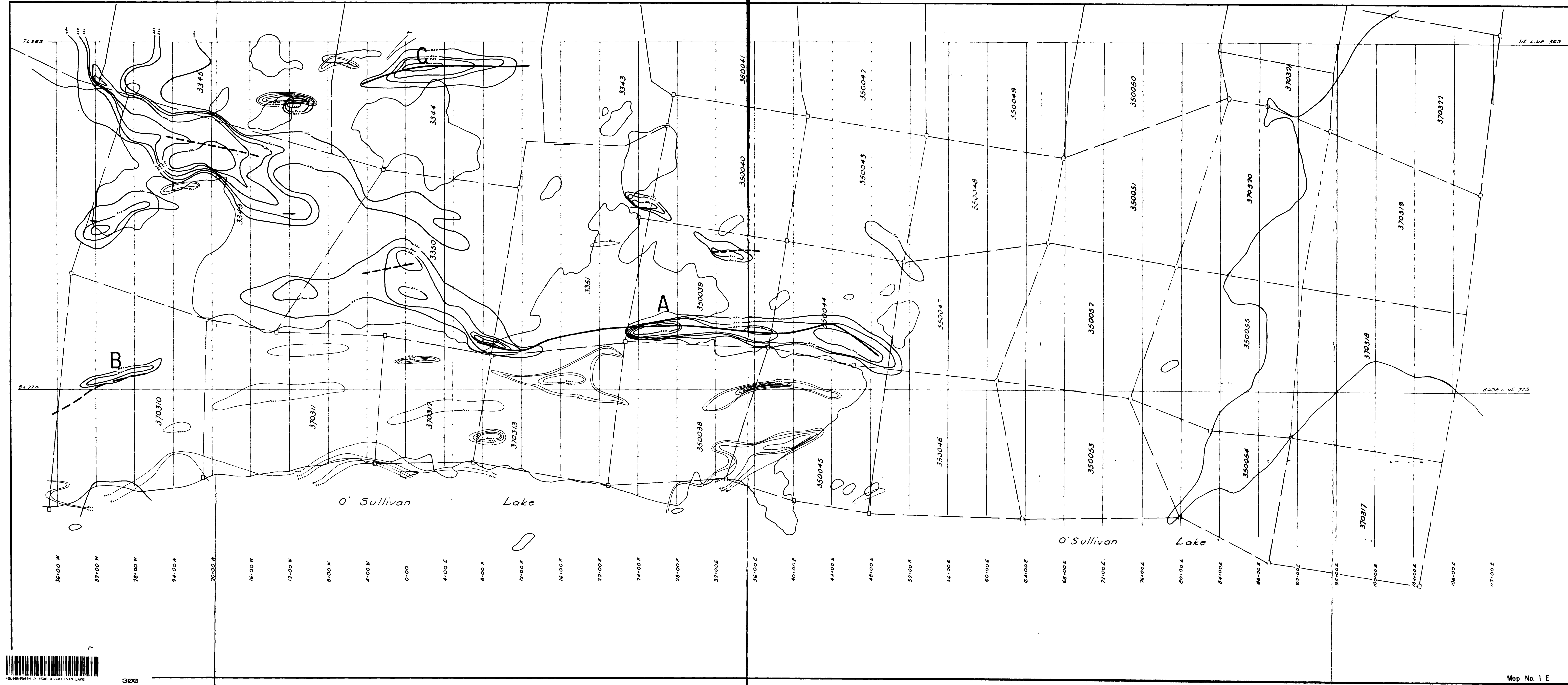
2.1506

MATTAGAMI LAKE MINES LTD
EXPLORATION DIVISION

COMPOSITE MAP
LOUMA OPTION
O'SULLIVAN LAKE AREA
ONTARIO

SCALE: 1" = 400'
DATE: MARCH 1974

TWP:
DRAWN BY:



INDEX PLAN
LOUMA OPTION
SCALE 1"=2640'

- Dip Angle Conductor
- Demigun Conductor
- Mag High
- Field Strength

REGISTERED PROFESSIONAL ENGINEER
D. B. SUTHERLAND
2.1506

MATTAGAMI LAKE MINES LTD. EXPLORATION DIVISION	
COMPOSITE MAP LOUMA OPTION S-part O'SULLIVAN LAKE AREA ONTARIO	
SCALE 1"=400'	TWP:
DATE: MARCH 1974	DRAWN BY: