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PROJECTS UNIT

MAGNETIC AND ELECTROMAGNETIC SURVEYS

ON 18-CLAIM GROUP PROPERTY

CASAN MINING LIMITED

GAUTHIER TOWNSHIP

EAST KIRKLAND LAKE GOLD AREA

ONTARIO

January 20, 1977

CANA EXPLORATION CONSULTANTS LIMITED

Mr. G. L. Roberts, P. Eng.
President
Burnhamdale Investments Ltd.
Suite 36
1350 Winding Trail
Mississauga, Ontario
L4Y 2T8

Dear Sir:

This report describes the results of a program of geophysical surveys, conducted by Cana Exploration Consultants Limited, covering an 18-claim group property of Casan Mining Limited (346871 Ontario Limited), located in Gauthier Township, East Kirkland Lake gold area, Ontario. The survey data are depicted on two plans accompanying this report, all plotted to a scale 1" = 200'.

PROPERTY:

The 18 claims are contiguous and held in trust under G. L. Roberts, License A-42759. They are identified as follows:

L-482773-8, inclusive, L-440936-45 inclusive, L-440934 and L-440935, Larder Lake Mining Division, Ontario.

The company has also staked an additional block of three claims tying onto the northwest of the surveyed area. The three claims are numbered L-477985 to L-477987; inclusive. Including the three new claims, the property has approximately 840 acres.

LOCATION AND ACCESS:

The property is located at the north central part of Gauthier Township, one mile north of Dobie, tying onto the north of Upper Canada

Mine. It extends northwesterly with its northwest part adjoining to the northeast of Crestland Mines Limited, formerly Northland Mines Limited.

Access was made by motor car from Kirkland Lake via Highway 66 to Northlands Park and by bush road from Northlands Park through the No. 1 shaft area of Northland Mines to the central part of the property.

HISTORY:

The south half of the property was once owned by Northland Gold Mines Limited, a company incorporated in 1922 and was reorganized as Northland Mines Limited in 1940.

During the period between 1922 and 1929, two shafts were sunk by Northland. The No. 1 shaft was sunk to a depth of 1,020 feet, and levels were established at 250, 500, 750 and 1,000 feet. No. 2 shaft was sunk to a depth of 50 feet.

The No. 1 shaft is located about 700 feet to the south of the south boundary of the newly staked three claims of Casan Mining Limited, and the No. 2 shaft is located on now claim L-440934, at the south central part of the property herein concerned.

Most of the drilling done by Northland at the southern part of the property was carried out after 1940. Charter of the company was cancelled in 1975, amalgamated into Crestland Mines Limited. Claims L-440934 and L-440935 were staked when they came open for acreage tax arrears before amalgamation.

Claims 440936-45 were staked to cover a new aeromagnetic anomaly outlined by a high resolution aeromagnetic survey by G. S. C. and O. M. N. R. in 1975.

Claims 482773-8 were staked to cover an airborne electromagnetic conductor zone detected by a program of survey conducted by Upper Canada in 1971. Although Upper Canada had an option on the ground and carried out a successful ground follow-up check survey, the Ministry of Natural Resources of Ontario has no record to show that the conductor zone has been tested by drilling.

GEOLOGY, MINERAL OCCURRENCES AND POSSIBILITIES:

Geology is on Map No. 50c accompanying report Vol. L, Part VIII, 1941, by J. E. Thomson and A. T. Griffis. According to this map, the property area is underlain by a northwest-striking belt of Timiskaming sediments and volcanics overlying Keewatin volcanics and intruded from the west by a large stock of Algomen syenite. However, very little scattered outcrops are located within the claim group.

The No. 2 shaft of Northland is located at the northeast contact zone of the syenite, intruding Timiskaming sediments and acid volcanics. Strong shearing and brecciation along the contact zone were revealed by old drilling. Mineralization was found only at the No. 2 shaft. Samples obtained from here by the staker assayed 0.03 oz/t gold. It should be noted here that the old drilling had tested the northwesterly syenite-

sediments contact but not the syenite-volcanics contact nor the contacts between sediments and volcanics. The ore zones of Upper Canada lie to the immediate south of the same stock of syenite along fault zones near the contacts between sediments and volcanics.

The aeromagnetic anomaly noted above is located within an area covered by overburden. An old drill hole located at 1/2 claim to the north indicated that the overburden could be up to 85 feet. The anomalous area apparently has never been drilled.

The E. M. conducting zone noted above is striking east-westerly within the older Keewatin volcanics - mainly rhyolite and associated acidic volcanics. Some drilling was done within these acidic volcanics. Old drill logs showed mineralized rhyolite of considerable widths in places and visible copper at one section; all to the north of the conducting zone. O. D. M. has no record to show that the conducting zone has been drilled.

There is a small stock of syenite located at the northeast boundary area of the claim group. It is not known if any mineralization is associated with this intrusive which cuts into Keewatin acidic volcanics.

In addition to gold and base metal possibilities, one should note the occurrence of low grade uranium in sediments in the neighbouring township to the west (Map P. 971, O. D. M.). It is apparent that no attempt has ever been made to detect radiation on the same sedimentary belt located on the property. Such a deposit, if any, to be found on the

property would likely be associated with structure rather than stratigraphy. However, the occurrence of "basal" conglomerate with some interbanded arkose and greywacke along the northern boundary of the sediments and the occurrence of pebble conglomerate in the sediments are interesting.

SURVEY METHODS:

A line grid spaced at 400 foot intervals was established on the 18 claims for the geophysical surveys. These picket lines, and an additional two detailed lines covering the central part of the aeromagnetic anomaly, were at a northeast-southwest direction, turned off from two base lines established at N45°W. Stations were chained at 100 foot intervals with pickets painted red at the top section.

A Proton Magnetometer on an 8-foot staff was used for the magnetic survey. Base-check method was followed for diurnal variations with the Base Control station located at the Base Line on L24N. Other control stations are located at 800 foot or 1200 foot intervals along the Base Line and one on the bush road at L8S as shown on Plan No. 1 accompanying this report. The diurnal variations were small - 0-25 gammas. All readings were taken at 50 foot intervals except at the end of each picket line where the distances may be longer or shorter.

The total field readings, with diurnal corrections minus base control reading of 59,000 gammas detected at the 3 foot elevation, and

the differentials between these and readings detected at a 12 foot elevation from the same station, are plotted on the plan.

A Ronka EM-16 instrument was used for the electromagnetic survey with operator facing northerly at 90° to the transmitter station NAA or NSS as indicated on Plan No. 2. NAA was used for traverses northwest of and including L12N because the rock formations turned westerly at this part of the property. The same station was used for L32S because station NSS was out of the air when the traverse was made.

All readings, except a 1,000 foot section on L28S, were taken at 50 foot intervals.

MAGNETIC SURVEY RESULTS AND INTERPRETATION:

The magnetic readings were contoured at 200-gamma intervals on Plan No. 1 for better interpretation. The results are described as follows:

- (1) At the southwest part of the property and within the area of syenitic intrusives with minor volcanics, the readings are in general above the base reading 0 (0 = 59,000 gammas total field) and up to about 1,300. Contours showed that there are mainly two magnetic zones within this area. The narrow outer zone runs southeasterly toward the shaft area where drilling cut mostly syenite porphyry. There are sharp drops to the northeast of the sediments with apparent dipole

effects along the contact as shown by moderate negative readings (below minus 200) and weak differentials.

The other magnetic zone is located at several hundred feet to the west. This zone appears to be wider and open to the northwest. The east boundary of this zone runs toward a small outcrop of trachyte which is shown on Map 50c, along the south boundary. One old hole cut syenite at the southwest corner of the property. A close correlation indicates that none of the other old holes had crossed the more interesting grains on this magnetic zone.

- (2) At the central part of the property, the survey outlined an anomalous area with its center located in Claim L-482778 just west of the indicated location of the aeromagnetic anomaly. The highest reading is 1445. The zone tapers out toward northwest and opens into two weaker branches toward southeast with above 0 readings inbetween. The data showed no appreciable dipole effects along the boundaries of this anomalous area. The picture appears to indicate a fold with mostly Timiskaming volcanics and some sediments within this magnetic area.

The northwestern nose of this indicated fold is not only stronger magnetically but also appears to have been cut by several minor cross structures. As the main structure (fold) is only about 1,200 feet from the main stock of syenitic intrusives and parallel to its intrusive contact, it is considered a favourable structure for the introduction of gold-bearing solutions originated from the intrusives. The northwestern nose area of this fold is the choice location for the occurrence of gold mineralization.

- (3) At 300 to 500 feet to the northeast of the above-said indicated fold, the survey outlined a narrow magnetic zone which runs parallel to and in the approximate location of the north boundary of the Timiskaming sediments. The magnetic grains on this zone are from 230 to 490. Readings to the north in the area of known Keewatin volcanics are considerably lower. As the contact between the sediments and the older Keewatin volcanics is marked by a regional unconformity, this magnetic zone is inferred as indicating a narrow magnetic horizon at the base of the sediments. A narrow zone of "basal" conglomerate, with some interbanded arkose and greywacke, corresponds closely in location with

this magnetic zone and thus inferred as the source of this weak magnetic zone.

- (4) Magnetic readings encountered over the large area of known occurrence of Keewatin volcanics located at the north part of the property are ranged from 115 to -155.

The survey encountered no anomalous condition near a small occurrence of syenitic intrusive, assumed to be located near or off the northeast end of L4S. At the assumed location of the airborne electromagnetic anomaly on Claims L-482775 and L-482774, the magnetic readings are also very flat.

ELECTROMAGNETIC SURVEY RESULTS:

The electromagnetic survey encountered many weak to moderate VLF conductors which are grouped into several conductor zones as marked "A" to "M", inclusive, from north to south, on Plan No. 2, and described as follows:

- (1) "A" corresponds approximately with the location of the airborne electromagnetic conductor zone described in the section on the history of the property. It has an indicated length of 1300 feet. It is a very weak VLF conductor zone, striking east-west and has little in and out-of-phase changes. Magnetic data showed less than 25-gamma readings above

background in the vicinity. As the area is covered by a broad and locally wet muskeg, except a small ridge of esker, the overburden is likely heavy and the indications are considered just expressions of a possible conductor detectable by the Ronka EM-16 survey. A more deep penetrating EM equipment is required to check the airborne indication.

- (2) "B", "C" and "D" are short and very weak conductor zones located at the northeast part of the property. They were detected by two traverses. "B" and "C" are associated with very minor magnetic changes to indicate the possible occurrence of minor faults in the Keewatin volcanics. "D" is associated with no magnetic changes and is located within an area of wet alder swamp. It is inferred as a surface VLF conductor zone.
- (3) "E" and "F" are probably indicating the same structure. "E" is a long weak conductor zone detected by five traverses across Claims L-440937 and L-440943. The conductors on this zone are associated with no appreciable changes in magnetic readings and have the characteristics of a fault to be located within Keewatin volcanics. The zone strikes parallel to the general west-northwesterly structural trend of the area to the south as indicated by the magnetic data.

above. One apparent exception is the conductor located at L2S, 1625 feet north. This is a relatively sharp conductor located on a narrow magnetic zone inferred as indicating a band of "basal" conglomerate. As the conductor is from a shallow depth (within 50 feet) and near a bush road, surface examination should be carried out for further evaluation.

SUMMARY AND CONCLUSIONS:

The surveys have successfully depicted an interesting picture which warrants further exploration. The main features are outlined as follows:

- (1) There is a magnetic zone along the contact between syenitic intrusives and sediments. This contact and the associated magnetic zone were drilled by previous owners. However, there is another parallel zone within the intrusives. This zone has a weak VLF conductor zone running alongside which is inferred as indicating a fault or shear through mainly intrusives, with the possibility of gold mineralization.
- (2) The new and untested aeromagnetic anomaly appears to be a fold structure with an anomalous center located on Claim L-482778; it peters out toward northwest and

opens into two weaker branches toward southeast.

Two weak VLF conductor zones inferred as indicating faults or shears, are located within this structure but to the east of the anomalous center. The northwestern nose area of this inferred fold is considered as the choice location for the occurrence of gold mineralization.

- (3) There are several weak conductor zones without indications of appreciable concentrations of conductive minerals located within the sediments between the syenitic intrusives and the indicated fold. These are inferred as faults or shears located within sediments though two of these (Zones "H" and "J") are located along the south boundary areas of the above-said inferred fold and are therefore more interesting.
- (4) A narrow weak magnetic zone located 300 to 500 feet to the northeast of the said fold is inferred as indicating a band of "basal" conglomerate with some interbanded arkose and greywacke along the boundary between Timiskaming sediments and Keewatin acidic volcanics. There is a conductor associated with this magnetic zone.
- (5) There are several very weak to moderate conductors located within the area of known Keewatin volcanics.

None appeared to indicate appreciable concentrations of conductive minerals. Conductor zone "A" corresponds approximately in location with the airborne EM conductor encountered by Upper Canada. The weak indications encountered by the present survey could be due to heavy overburden in the area and deep penetrating EM equipment is required to check the airborne indication.

Considering the fact that a gold-bearing zone may or may not carry appreciable concentrations of conductive minerals, one may conclude that all the structures indicated to the south of the Keewatin volcanics have possibilities for gold. However, the writer feels that the nose area of the inferred fold and the indicated fault or shear within the syenitic intrusives with minor sediments and volcanics are the two choice structures for gold deposits. The band of "basal" conglomerate should be checked for radiation and the area of conducting zone "A" should be checked by a deep penetrating method.

RECOMMENDATIONS:

The writer recommends:

- (1) To carry out a program of geological survey to check the interpretations, examine the geophysical indications, surface workings, and to locate old drill holes for further evaluation.

- (2) To prospect along the interesting structures and check the band of "basal" conglomerate and perhaps also the limited outcrop areas near the inferred fold with a radiation survey.
- (3) To carry out a limited program of geochemical soil sample survey at the conductor zone "A" area for possible indications of base metals to justify the application of an E. M. or an I. P. check survey.

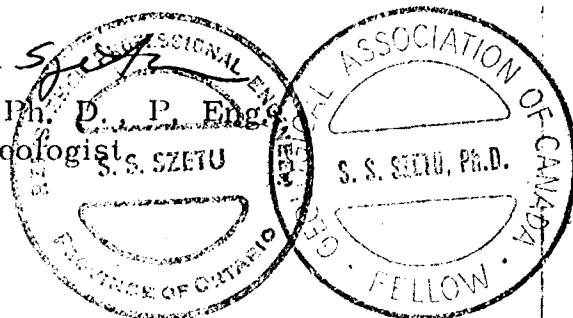
It is estimated that a program of 1,000 feet or more of preliminary diamond drilling is required to follow up the findings obtained to date, subject to changes which may be made by findings to be obtained by the recommended additional work.

Respectfully submitted,

CANA EXPLORATION CONSULTANTS LIMITED

SSS:rk
Encl.

S. S. Szetu
S. S. Szetu, Ph. D., P. Eng.
Consulting Geologist
S. S. SZETU



Toronto, Ontario
January 20, 1977

CANA EXPLORATION CONSULTANTS LIMITED

"F" is a short zone. It has stronger in-phase changes - from as high as 30% to minus 21% - but has no corresponding out-of-phase changes at the conductors. Very weak magnetic decrements were encountered at the conductors to support the interpretation of a fault in Keewatin volcanics.

- (4) "G" and "I" are located within the fold structure inferred from magnetic data. "G" is a weak 800 foot long conductor zone encountered by four traverses which showed corresponding out-of-phase changes at each conductor and magnetic increments to the north. It follows a creek bed and the characteristics had apparently been affected to a certain degree by this surface feature. However, while the creek bed continues to the southeast, the indications for a conductor zone shifted south to "I" to follow the south magnetic band of the said inferred fold for better than 2500 feet.

Conductor zone "I" is also a weak zone and has corresponding out-of-phase changes and characteristics of a weakly conductive fault or shear. It follows that "G" is inferred as indicating the same and perhaps separated by a cross fault.

- (5) "H", "J", "K" and "L" are located within a zone of sediments with low magnetic readings between the inferred fold to the northeast and the syenitic intrusives to the southwest, with "H" and "J" following closely the south boundary of the said indicated fold.

They are weak to moderate conductor zones with no appreciable out-of-phase changes associated with the in-phase indications. They have, as a rule, the characteristics of a deep seated origin. Where shallow depths are indicated, surface topographic effects are apparent.

They are inferred as indicating geological structures without appreciable concentration of conductive minerals.

- (6) "M" is a weak conductor zone located within the known syenite area with minor volcanics. The conductors of this zone appeared to be from relatively shallow depths (within 75 feet on L4S) as indicated by their profiles. Higher readings obtained on L12S could be due to some surface conduction related to a beaver pond. In-phase indications are associated with very little out-of-phase changes all through and the topography on L20S suggested the occurrence of a fault or shear.

The conductor zone is on a relatively low magnetic area along the northeast side of the south magnetic zone encountered within the syenitic intrusives, open at both ends.

At L4S, the conductor zone appeared to have shifted to the south for about 150 feet following the south magnetic zone, and has a magnetic anomaly to its northeast. Using the long trench located further to the northeast as a tying point, old drill holes shown here on Map No. 50c apparently did not cross this conductor zone. The choice location to test the possibility of gold mineralization on this zone appears to be located on 1825 feet west, L4S. A correlation with known geology and topography shown outside of the property on Map No. 50c indicated the possibility of having a fault zone extending from this conductor zone through an isolated occurrence of sediments which strikes northwest-southeasterly toward a swampy area located to the northwest of the "Q" ore zone of Upper Canada.

- (7) The survey has encountered several isolated conductors which could be related to a nearby structure described

Show instrument technical data in each space for
type of survey submitted or indicate "not applicable"

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS

Number of Stations 1712 Number of Readings 3424 each
Station interval 50 ft (see report)
Line spacing 400ft and 200 ft
Profile scale or Contour intervals 200-gamma for magnetic survey; 1"=50% for EM profile
(specify for each type of survey)

MAGNETIC

Instrument Geometrics G 816 magnetometer
Accuracy - Scale constant 1 gamma
Diurnal correction method Time check at control stations
Base station location L24N on base line No. 1

ELECTROMAGNETIC

Instrument Geonics Ronka EM-16
Coil configuration Operator facing northerly at 90° to transmitter stations
Coil separation Transmitter stations NAA or NSS as indicated on traverses
Accuracy + 1%
Method: Fixed transmitter Shoot back In line Parallel line
Frequency 17.8 kHz for NAA, Cutler, Maine; 19.0 kHz for NSS, Annapolis, Md., U. S. A.
(specify V.L.F. station)
Parameters measured _____

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 _____

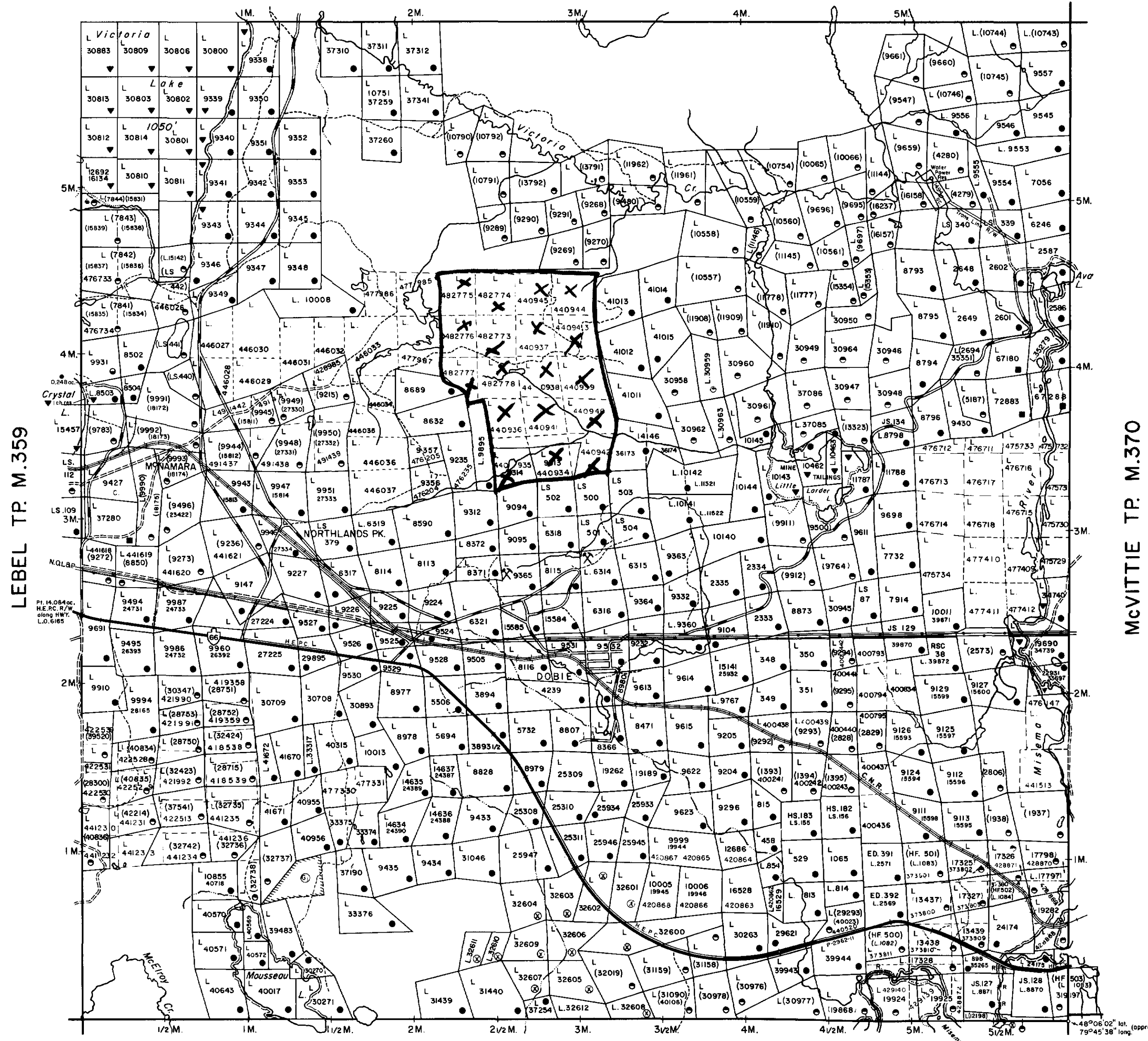
NOTES

400' surface rights reservation along the shores of all lakes and rivers.

M.T.C. File 101421 Pit No.1666

DATE OF ISSUE
FEB - 2 1977
SURVEYS AND MAPPING
BRANCH

ARNOLD TP. M.321



McELROY TP. M.366

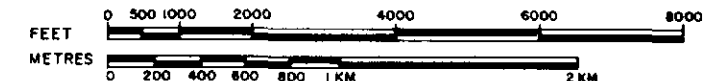
LEGEND

- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES:
 - TOWNSHIPS, BASE LINES, ETC.
 - LOTS, MINING CLAIMS, PARCELS, ETC.
- UNSURVEYED LINES:
 - LOT LINES
 - PARCEL BOUNDARY
 - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION
- ORIGINAL SHORELINE
- MARCH OR MUSKEG
- MINES

DISPOSITION OF CROWN LANDS

- | TYPE OF DOCUMENT | SYMBOL |
|---------------------------------|--------|
| PATENT, SURFACE & MINING RIGHTS | |
| " SURFACE RIGHTS ONLY | |
| " MINING RIGHTS ONLY | |
| LEASE, SURFACE & MINING RIGHTS | |
| " SURFACE RIGHTS ONLY | |
| " MINING RIGHTS ONLY | |
| LICENCE OF OCCUPATION | |
| CROWN LAND SALE | C.S. |
| ORDER-IN-COUNCIL | OC |
| RESERVATION | |
| CANCELLED | |
| SAND & GRAVEL | |

SCALE : 1 INCH = 40 CHAINS



ACRES HECTARES

40	16
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TOWNSHIP 2.2298

GAUTHIER

DISTRICT TIMISKAMING

MINING DIVISION LARDER LAKE

Ministry of Natural Resources

Ontario Surveys and Mapping Branch

Date JAN. 1973

Plan No.

Whitney Block Queen's Park, Toronto

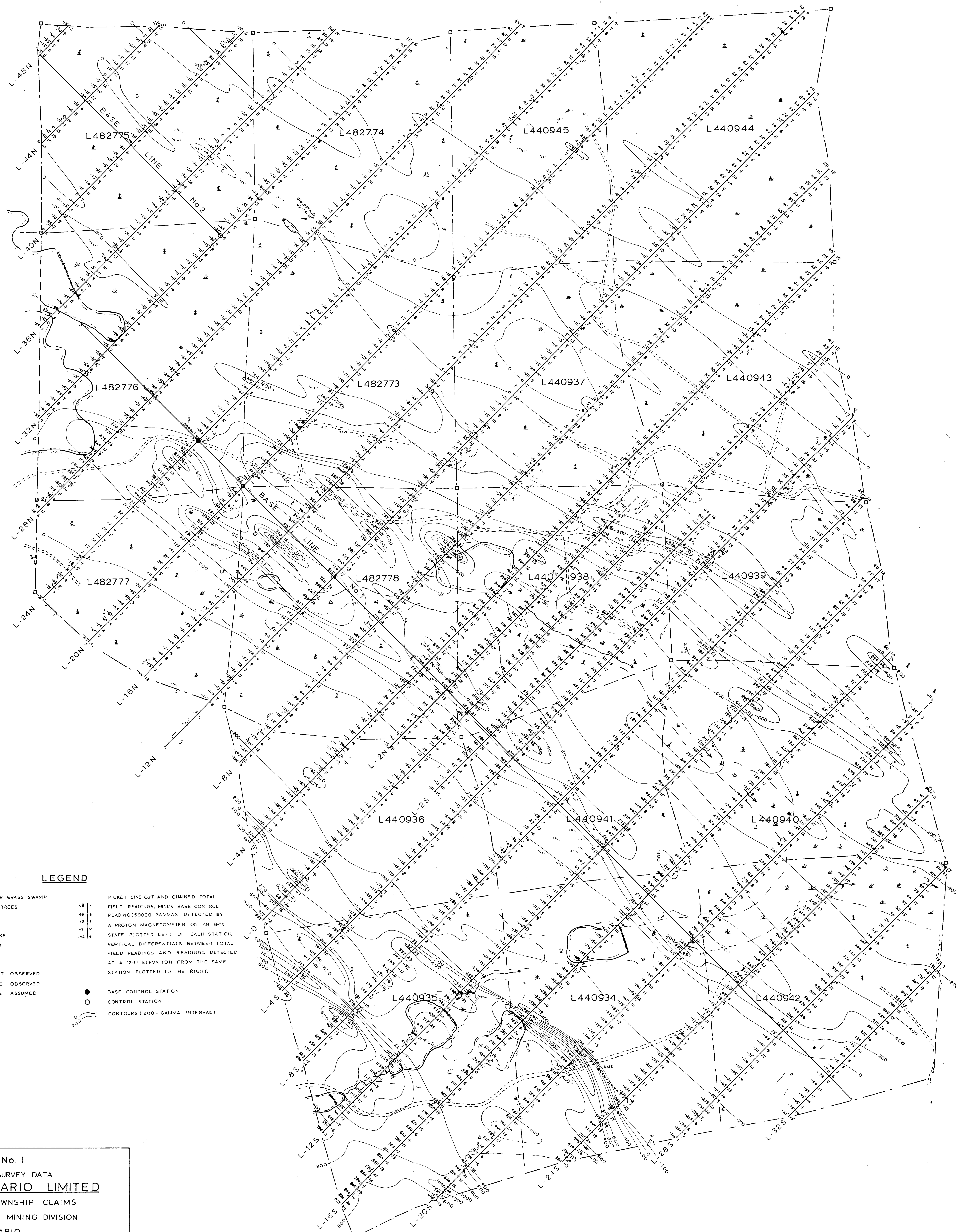
M.350



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P. 2298

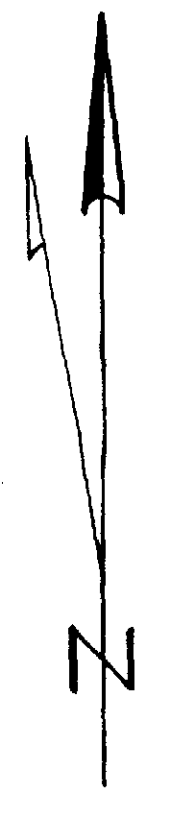


LEGEND

- ALDER AND/OR GRASS SWAMP
- SWAMP WITH TREES
- HIGH GROUND
- CREEK
- POND OR LAKE
- BEAVER DAM
- BUSH ROAD
- TRENCH
- CLAIM POST OBSERVED
- CLAIM LINE OBSERVED
- CLAIM LINE ASSUMED
- BASE CONTROL STATION
- CONTROL STATION
- CONTOURS (200 - GAMMA INTERVAL)
- PICKET LINE CUT AND CHAINED. TOTAL FIELD READINGS, MINUS BASE CONTROL READING (59000 GAMMAS) DETECTED BY A PROTON MAGNETOMETER ON AN 8-FT STAFF, PLOTTED LEFT OF EACH STATION. VERTICAL DIFFERENTIALS BETWEEN TOTAL FIELD READINGS AND READINGS DETECTED AT A 12-FT ELEVATION FROM THE SAME STATION PLOTTED TO THE RIGHT.

PLAN No 1
 MAGNETIC SURVEY DATA
346871 ONTARIO LIMITED
 GAUTHIER TOWNSHIP CLAIMS
 LARDER LAKE MINING DIVISION
 ONTARIO
 SCALE: 1"=200' DEC. 1976





LEGEND

- | | | | |
|--|--------------------------|--|---|
| | ALDER AND/OR GRASS SWAMP | | RONPA EM-16 SURVEY DATA |
| | SWAMP WITH TREES | | IN-PHASE READINGS PLOTTED TO THE LEFT, OUT-OF-PHASE READINGS TO THE RIGHT OF STATIONS ON PICKET LINE |
| | HIGH GROUND | | OPERATOR FACING NORTHERLY AT 90° TO THE TRANSMITTER STATION NAA OR NSS AS INDICATED AT THE END OF EACH TRAVERSE |
| | CREEK | | IN-PHASE PROFILE |
| | POND OR LAKE | | OUT-OF-PHASE PROFILE |
| | BEAVER DAM | | SCALE OF PROFILE: 1"=50% PHASE CHANGE |
| | BUSH ROAD | | INDICATED CONDUCTOR AND INFERRED AXIS |
| | TRENCH | | |
| | CLAIM POST OBSERVED | | |
| | CLAIM LINE OBSERVED | | |
| | CLAIM LINE ASSUMED | | |

PLAN No. 2
ELECTROMAGNETIC SURVEY DATA
346871 ONTARIO LIMITED
GAUTHIER TOWNSHIP CLAIMS
LARDER LAKE MINING DIVISION
ONTARIO
SCALE: 1"=200' DEC. 1976