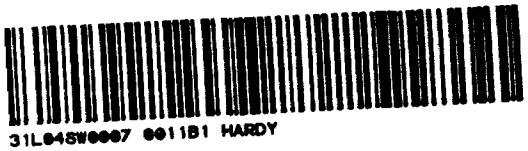

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PLAN NO. 1 - Geophysical Survey over part of property at Memesaganesing Lake (Ref. No. 3-4-55)

MAGNETIC & IN PART ELECTROMAGNETIC SURVEYS

OVER

SUDBURY MIDZONE MINES LIMITED

GROUP OF CLAIMS

HARDY TOWNSHIP, ONTARIO

Prepared by:

E. B. Nicholls, Geophysisist

GEO-TECHNICAL DEVELOPMENT CO.LTD.
24 Wellington St.W.
Toronto, Ont.

Sudbury Midzone Mines Ltd.,
Room 1106, 25 Adelaide St. W.,
Toronto, Ont.

Gentlemen:

A magnetometer survey was conducted over a group of claims held by Sudbury Midzone Mines Limited, and located in Hardy Township, Ontario. This was followed by an electromagnetic survey over the anomalous areas outlined by the magnetometer survey.

The surveys were conducted by Geo-Technical Development Co. Limited during the period from March 17th to April 5th, 1955. Mr. A.B.Fleming supervised the field work and the results are depicted on Plan No. 1 accompanying this report.

Summary & Recommendations

The magnetometer survey indicated two anomalies of high magnetic intensity on the property. They are identified on the accompanying map by the letters 'A' and 'B'. Of these anomalies 'B' appears to be caused by a dyke. The readings and contour pattern are similar to those expected of a diabase dyke. Anomaly 'A', which gives the highest readings on the property, is probably due to a norite plug, quantities of magnetite and pyrrhotite.

An electromagnetic survey was conducted over these anomalies, and across the Kelcey showing. The results over the 'A' and 'B' anomalies indicated no conducting zones. Over the Kelcey showing a slight inflexion is found, which indicated a zone of weak conductivity. It is possible that this showing is very narrow and localised.

The area covered by the surveys did not show any extension

to the Kelsey showing, nor did it reveal any other zone that may warrant further investigation.

Property

The property of Sudbury Midsons Mines Limited, described in this report, comprises a group of 36 claims located in Hardy township, Ontario. These claims are numbered as follows:

3798 to 3833 inclusive

The area surveyed was that portion of the claims group covered by Lake Memesagamesing. The claims covered by the surveys are further described as follows:

Concession IX (South ½) Lots 25, 28 and 29, part of claims 3824,3831 and 3832

Concession VIII - Lots 24 to 28 inclusive, Claim Nos. 3818, 3819, 3820, 3821, 3812, 3814, 3813, and part of claims 3811, 3815, 3816, 3817, 3826.

Concession VII (North ½) - Lots 24 to 27 inclusive, Claim Nos. 3802, 3807, 3809, 3810

Location & Access

The property can be reached by taking Highway No. 11 to Trout Creek and then turning west to Loring. The claims group is located six miles north of Loring on the southeast part of Lake Memesagamesing.

Topography

The major part of the property is covered by the Memesagamesing Lake. Along the lakeshore the ground in many places shows scarp faces. However, the general topography is undulating with the hills reaching a maximum height of approximately 100 feet in the area covered by the property.

General Geology

The general geology of the area is shown on Map 51A accompanying the Ontario Department of Mines Report Volume LI, Part II, 1942. Seven copper-nickel occurrences scattered over the area, were examined by J.Satterley, geologist for the Ontario Department of Mines. The mineralization was found to be pyrrhotite and chalcopyrite as disseminations or solid sulphide lenses

in amphibolite or norite.

Two showings are located on the shore of Memesagamesing Lake. One, called the Kelcey showing, is located on Lot 23, Concession VII, Hardy Township. Here a shaft is reported to have been sunk to a depth of 30 feet. The open cut exposed rusty weathering norite, with a little disseminated sulphides. Pyrrhotite and magnetite were also present. The second showing on lot 25, Concession VII, also had rusty weathered norite exposed, which was sparsely mineralized with pyrrhotite and pyrite.

The north shore of the lake appeared to be granite and granite gneiss. Along the southeast outcrops of norite were observed.

Explanation of the Electromagnetic Method

The electromagnetic method of geophysical exploration is based on the use of two fundamental physical phenomena, electricity and magnetism. An alternating current flowing in a loop of wire suspended above the earth's surface will cause current to flow within sub-surface conductors. The process by which this takes place is called "induction". The steps in the process are as follows:

(1) The alternating current flowing in the loop creates an alternating magnetic field (Primary magnetic field) which can be measured at the surface of the earth.

(2) Primary alternating magnetic field will induce an alternating current in any sub-surface conductor. This current will in turn create an alternating magnetic field (Secondary magnetic field). The secondary magnetic field is absent unless an excellent conductor of electricity exists beneath the surface of the earth. The indicating device used to

measure the magnetic fields in the electromagnetic method consists of a search coil connected to a pair of ear phones. The intensity of the magnetic field cutting the search coil is indicated by loudness of signal in the ear phones.

In the technique employed on your property a coil of wire of several turns was suspended in a vertical plane on a tripod and frame. A strong alternating current was passed through this coil which created an alternating magnetic field (Primary) in the vicinity of the coil over an area of 1000' square. If a highly conductive mass, such as a massive sulphide body, is near this coil (within 1000' area), currents are induced in this mass. Induced currents flowing in the conductor will in turn create another alternating magnetic field (Secondary). The Secondary magnetic field distorts the Primary magnetic field. This distortion can be measured in terms of "dip angles". An understanding of these measurements may be obtained from the following paragraphs:

The magnetic field caused by a current flowing in a long wire spreads out from the wire concentrically. At any point in the field a search coil will have a voltage induced in it which is dependent upon the frequency of the alternating current in the transmitting coil, number of turns of wire in the search coil, area of search coil and the angle the search coil makes with the lines of force.

In a traverse taken along the ground above and at right angles to such a conductor, the directions of Primary and Secondary fields may be shown by lines whose lengths are proportional to their respective fields' strengths.

The direction and intensity of the resultant or distorted field

are found by using the so-called "parallelogram of forces". The resultant line is parallel to plane of the search coil when it is rotated into a position where it is not cut by any of the lines of force of the resulting field. In this position no voltage is induced in the search coil so that if a pair of ear phones is connected across the search coil no signal is heard. When the search coil is tilted in either direction away from the position of minimum voltage, a signal is heard in the ear phones. The angle between resultant and the horizontal at any point is termed the dip angle and its determination is the fundamental measurement in the search for conductors.

Over barren ground the dip angles are practically zero. The approach to a conductor is marked by increasing dip angles which in turn decrease to zero directly over the conductor, then increase in opposite sense beyond the conductor until far enough away from it they reduce to zero again.

To overcome distortion of dip angles arising from topography and elevation effects, the plane of the transmitting coil is oriented for each reading so as to point toward the station occupied by the search coil. If location of transmitter coil relative to the search coil is known accurately, the transmitter coil can be oriented so as to make errors negligible; hence dip angle profiles are directly interpretable and require no topography or elevation correction. In the case of your survey, the search coil was visible from the transmitter loop and direct orientation was positive.

It must be pointed out that the electromagnetic method gives very little response from swamps or topographic features when the survey is conducted with a frequency of 1000 cycles per second. Graphitic shears and sedimentary horizons are frequently the cause of electromagnetic anomalies. The 1000 cps does not map contacts between two rock types unless one or the

other of the two is an excellent conductor, or unless an excellent conductor such as sulphide, magnetite or graphite lies along the contact. Thus, the 1000 cps. method does not map structure in the manner of a resistivity method unless these good conductors follow structural trends. Occasionally 1000 cps detects faults.

Interpretation of Geophysical Survey

The results of the surveys conducted over the group of claims held by Sudbury Midzone Mines Limited and located in Hardy township, Ontario, are depicted on Plan No. 1 accompanying thisreport.

The magnetometer readings are expressed in gamma and are plotted to the east of the traverse line. The electromagnetic survey indicates conducting zones where the "angles of dip" change from a north dip through to a south dip. These "angles of dip" are plotted as profiles on the accompanying map.

The magnetometer survey indicated an area of fairly uniform magnetic intensity with two magnetic anomalies designated by 'A' and 'B' on the accompanying plan. Anomaly 'A' is located on Lines 4+00E, 8+00E and L-12+00E north of base line 'A'. The 'B' zone cuts across the property in a northwest direction from the north half of Lot 24 in Concession VII to the south half of Lot 28 in Concession IX.

The highest readings associated with the 'A' anomaly are located 700 feet and 800 feet north of base line 'A' on Line 12+00E. These readings of 5000 gamma are in the centre of the strongest magnetic zone located on the property. This zone runs approximately N-40-50 degrees east and turns more to the north in the north part of Claim E.O. 3820. Although the west part of the anomaly was not completed, as this lies on the island, it appears that this anomaly corresponds with a mineral occurrence that

occurs on the tip of the island where the highest magnetic readings were taken. This showing was found to be weathered norite, with sparse pyrrhotite and pyrite mineralization. Magnetite may also be present. The nature of the 'A' anomaly suggests that the high magnetic readings are due to a norite plug which contains magnetite and pyrrhotite. The contour pattern of this anomaly suggests that the rocks are dipping to the northwest.

The second anomalous condition, called the 'B' anomaly, as indicated by the magnetometer survey, runs northwestward across the property. This anomaly varies in width from 300 feet to 700 feet and stands out as a strong linear trend. The readings taken over this anomaly are not as high as those taken over the 'A' anomaly. The linear trend and the varying magnetic intensities inside the anomaly are indicative of a dyke.

To aid the interpretation the anomalies were investigated by the electromagnetic method. Profiles were run across the 'A', 'B' anomalies and across the Kelcey showing. No cross-overs were located on either the 'A' or 'B' anomalies, indicating the absence of any conducting zone. Over the Kelcey showing a small inflexion was obtained that indicates the presence of a weakly conducting zone. It is possible that the Kelcey showing is composed of minor dissemination sulphides.

Survey data

A total of 18.41 miles of traverse lines at 400 foot intervals was chained and surveyed with the magnetometer. Readings were taken every 100 feet along the traverse lines, and 1015 station readings were taken. The station at 0+00 on Line 24+00E was established as the base control station for the survey and all readings were taken with reference to this point.

To aid the interpretation, 2.27 miles of traverse lines were surveyed with the electromagnetic method. Readings were taken every

100 feet along the lines. This method required 121 readings with five transmitter setups.

The magnetometer survey covered an area of approximately 820 acres.

The total number of eight-hour man-days required to complete the above-mentioned survey is as follows:

	8-hour Man-days	Attributable to Assessment Work
Establishing picket lines	20 x 4	80
Operating Magnetometer Survey	40 x 4	160
Operating Electromagnetic Survey	10 x 4	40
Calculations & Interpretation	7 x 4	28
Drafting	14 x 4	56
Office Typing & Supervision	6 x 4	24
	97	388

Respectfully submitted

GEO-TECHNICAL DEVELOPMENT CO. LIMITED

E B Nicholls

Toronto, Ont.
April 22, 1955

E. B. Nicholls, B.Sc. A. Inst.P.
Geophysicist

APPENDIX

Subsequent to the geophysical survey Mr. W. Hammerstrom of Haileybury examined the property. Additional structural and geological information was obtained. The following is based on this information.

Geology

The inset on the map accompanying the report shows the distribution of rock formations and a structural interpretation as determined by Mr. Hammerstrom.

The norite which underlies most of the property is described by Satterly.[1] It has a maximum width of 1½ miles and a length in excess of 2 miles. It is somewhat ovoid in shape and the long axis is oriented 30° west of north.

Metamorphosed sediments outcrop along the eastern side of the norite. The sediments dip from 10° to 40° in a southerly direction. Their strike is variable, indicating complex folding. Granite occurs within the sediments. Two pegmatite dykes were noted on the east shore of Memesagamising lake, 1000 to 1300 feet southeast of the Kelcey showing.

The metamorphosed sediments consist of coarse grit or fine quartz pebble conglomerate grading upwards into greywacke and quartzite. The granite may be very highly metamorphosed arkose occupying a horizon above the greywacke and quartzite.

To the west of the norite the bed rock is granite.

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[1] Satterly J., Mineral Occurences in Parry Sound District; Ont. Dept. Mines, Vol. 11, pt. 11, 1942 pp. 13, 14.

Satterly believes that the norite intrudes the metamorphosed sediments while the granite intrudes both the sediments and the norite.

Structure

No faults have been located in the general area. However a set of numerous well developed topographic lineaments striking east-west and northeast might represent extensive small scale faulting.

Two such lineaments occur in the area surveyed. One follows anomaly "B" in a direction slightly south of east and extends for a further 10 miles east of the property. The possibility of a diabase dyke lying along this lineament has been discussed in the body of the report. The second extends from the southwest through the north-east corners of the property.

Economic Aspects

Two sulphide showings are present. They have been briefly described in the report. Satterly took 3 grab samples from the Kelsey showing:

	Cu%	Ni%
3 lb. sample of dissem. sulphides	0.17	0.22
5 lb. " " " "	0.05	nil
12 lb. " " massive "	0.68	0.71

A grab sample from the second showing on the southeast point of the island gave negative results for copper and nickel.

Commercial values in copper and nickel are not indicated. The best assay is classed as sub-marginal. However, the following points merit consideration:

(1) All major nickel deposits occur in norite. Hence the importance of the norite on this property must be emphasized.

(2) Nickel deposits in norite characteristically occur distributed around the margin. In rare instances they are centrally located.

(3) The concentration ratio of the nickel content is important and varies for different localities but is generally uniform for any one intrusive. A good concentration ratio makes economic treatment of low grade deposits possible. An indication of the concentration ratio can be obtained from the nickel-sulphur ratio. A nickel-sulphur ratio of 1:4 is favorable.

(4) The fine quarts pebble conglomerate should be checked for radioactivity.

From paragraphs 1 to 3 it follows that the nickel sulphur ratio should be determined for samples from the Kelcey showing.

If a favorable result is obtained the magnetic work should be completed to cover the norite contact zone in order to locate sulphide deposits. Special attention should be given to the east and southeast side of the norite.

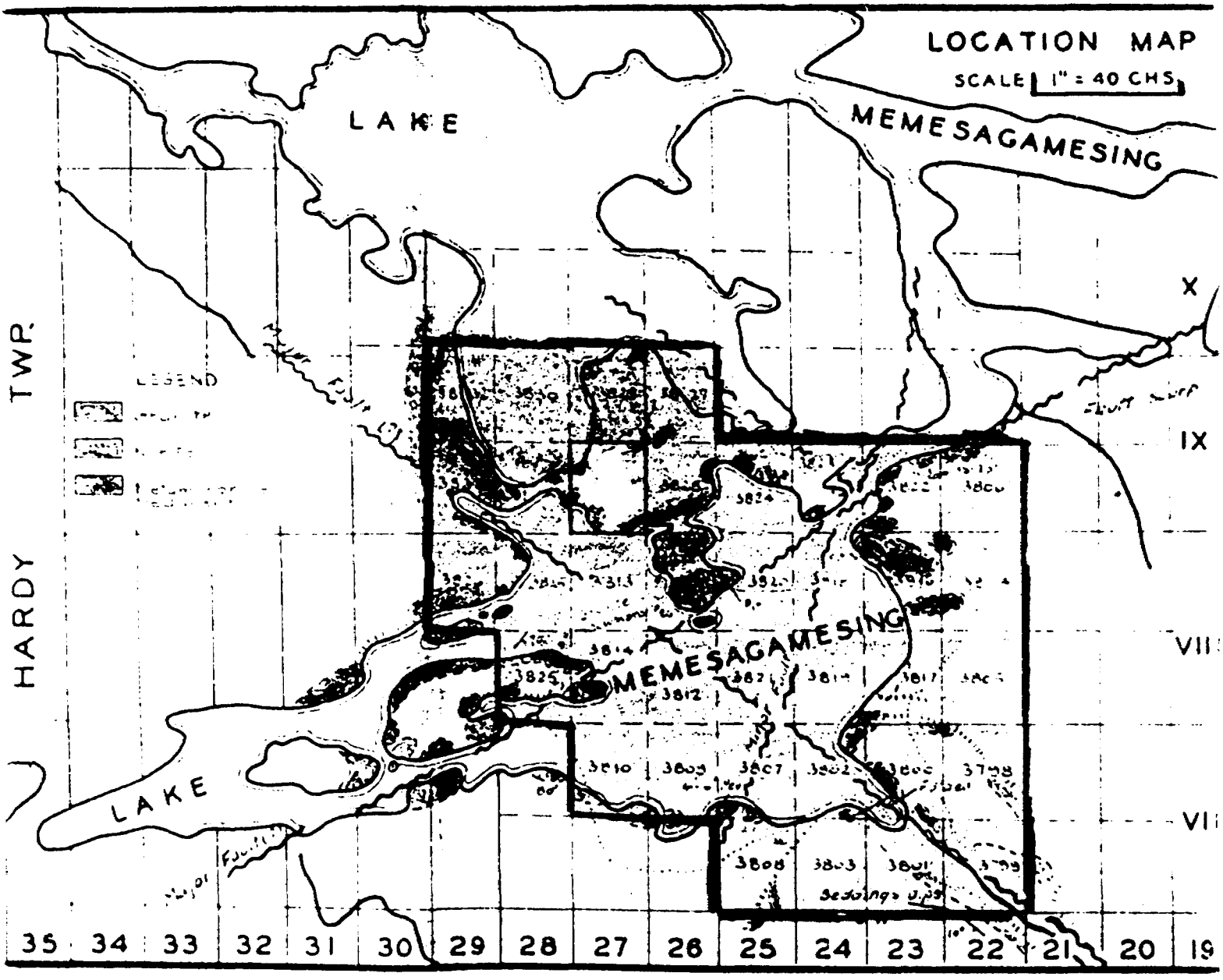
The magnetic anomaly of 4,000 gammas in the granite adjacent to the norite-granite contact at the south end of line 4N could be part of a sulphide zone. This should be checked.

GEO-TECHNICAL DEVELOPMENT CO. LIMITED

R. Bruce Graham

Toronto, Ont.
June 13, 1955

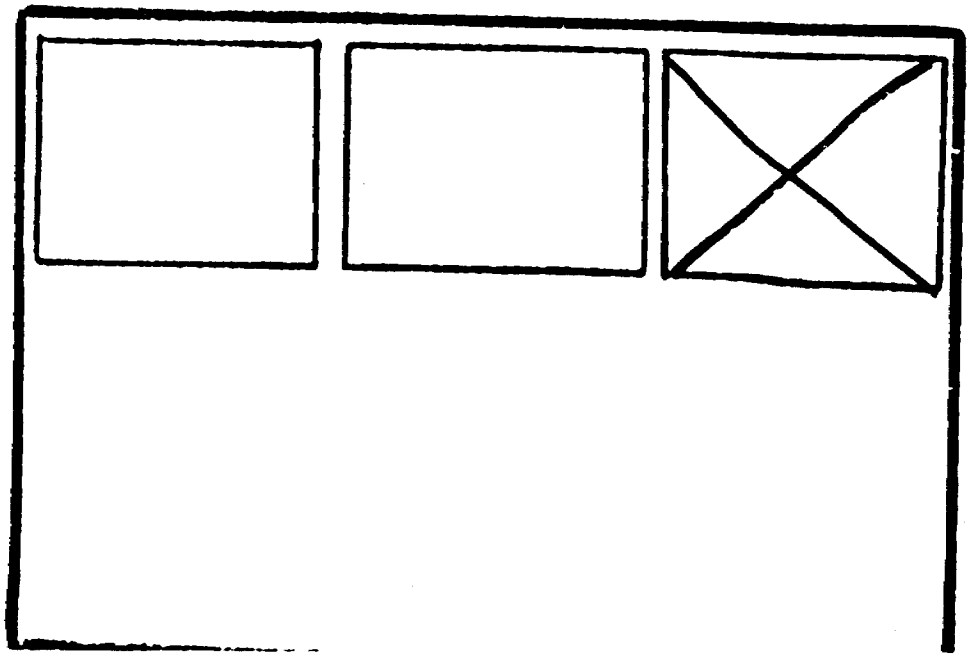
R. Bruce Graham, PhD
Geologist


LOCATION MAP
SCALE 1" = 40 CHS
LAKE
MEMESAGAMESING
X
IX
VII
VI
HARDY TWP.
LEGEND
MEMESAGAMESING
LAKE
35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19

SEE ACCOMPANYING MAP(S) IDENTIFIED AS

HARDY-0011-B1 #1

LOCATED IN THE MAP CHANNEL IN THE FOLLOWING SEQUENCE (X)



GEOPHYSICAL SURVEY DATA OVER PART OF
PROPERTY AT MEMESAGAMESING LAKE

MIDRIM MINING COMPANY

ISO-DYNAMIC CONTOURS OF MAGNETIC INTENSITIES
AND IN PART
E-M CHECK SURVEY DATA

HARDY TOWNSHIP
DISTRICT OF PARRY SOUND
ONTARIO

GEOPHYSICAL SURVEY BY

GEO-TECHNICAL DEVELOPMENT COMPANY LIMITED

PLAN NO-1 SCALE 1" = 200 MAY - 1955

63.641

3828 3824 3681 3831 3833 3811 3820 3813 3815 3826 3812 3814 3825 3809 3810

ISLAND

LINE "A" BASE LINE 0+00 N

LINE "B" BASE LINE 4 S

STA 1 STA 2 STA 3 STA 4

Approximate location of Survey post and iron pin

Blazed line

Survey Post

Gr

Nor.

LEGEND

- 0 - 500 GAMMA
- 500 - 1000
- 1000 - 1500
- 1500 - 2000
- 2000 - 2500
- 2500 - 3000
- 3000 - UP

- LINES CUT AND CHAINED, MAGNETIC READINGS OBSERVED
- MAGNETIC CONTOUR
- MAGNETIC BASE CONTROL STATION
- OUTCROP
- SHOWING
- CLAIM LINE AND CLAIM POST LOCATION
- ELECTROMAGNETIC DATA SHOWN WITH READINGS REFERRED TO TRANSMITTER STATION SCALE: 1" = 10° DIP READ ON E-M RECEIVER
- ▲ STA. 2 TRANSMITTER STATION

NOTE: NORTH DIPS PLOTTED ON EAST SIDE OF PICKET LINE
SOUTH DIPS PLOTTED ON WEST SIDE OF PICKET LINE

1/200

location
post and iron pin

3822 3823 3824 3806 3804 3805 3816 3818 3820 3817 3819 3821 3800 3812 3807 3809 3801 3803 3808 3802

PATENTED
KELCEY
FRACTION

MEMESAGAMESING
LAKE

Post 1, N½ Lot 23 Con VIII

Post 2 part Lot 22 Con IV
WP 3 12 ch N
P2 3816
WP3 3816

Post 1, S½ Lot 25, Con. 7

L - 12 N
L - 8 N
L - 4 N
L - 0+00
L - 4 S
L - 8 S
L - 12 S
L - 16 S
L - 20 S
L - 24 S
L - 28 S

STA 1
STA 2
STA 3
STA 4

NORTH
(ASTRONOMIC)

FILE 63-641

LOCATION MAP
SCALE 1" = 40 CHS.

LEGEND
Granite
Norite
Metamorphosed Sediments

MC CONKEY TWP.
HARDY TWP.

LAKE MEMESAGAMESING

35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19
IX VIII VII

HARDY-0011-B1 #1