2.890

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ELECTROMAGNETIC - MAGNETIC SURVEY

on the property of

CALTOR SYNDICATE

Reid - Mcheffy Townships, Ontario

Timmins, Ontario,
March 30, 1972.

R. J. Bradshaw, P. Eng.,
Consulting Geologist.

INTRODUCTION

Magnetic and electromagnetic surveys have been carried out on the Caltor Syndicate property on the Mahaffy-Reid Township boundary north of Timmins, Ontario.

Picket lines were established on the property during the period February 28th to March 10th inclusive, 1972. The geophysical field work was completed during the period March 13th to March 20th inclusive.

A base metal prospect, the property was acquired on the basis of copper, lead, and zinc mineralization in holes drilled in 1964. The object of the geophysical programme was to locate anomalous zones that may be related to the known base metal mineralization and, therefore, lead to a diamond drill investigation.

PROPERTY, LOCATION AND ACCESS

The property consists of 15 unpatented mining claims designated 326514 to 326528 inclusive staked in mid-June, 1971.

Approximately 25 miles north-northwest of Timmins, Ontario, the claim block straddles the west half of the Mahaffy-Reid Township boundary such that claims 326514 to 326523 inclusive are in Mahaffy Township and claims 326524 to 326528 inclusive are in Reid Township.

During the winter the property is accessible by snow vehicle along a four mile trail following the Reid-Mahaffy Township boundary from a winter road on the east side of the Mattagami River. The winter road, maintained by the Ontario Hydro, extends northwards from a concession road a few miles

north of Timmins. During the summer, equipment may be barged up the Mattagami River to a tractor road near the Reid-Mahaffy Township boundary about three miles from the property. Alternatively, tractor roads extend from gravel roads, maintained by lumber companies, to the northeast and southwest of Thorburn Creek on the west boundary of the property.

PREVIOUS WORK

In 1964, a group of three mining companies headed by Black River Mining Limited held that portion of the property located in Mahaffy Township. On their behalf Shield Geophysics completed a Crone JEM in-line survey and a partial magnetic survey along lines established in a northwest direction. As a result of drilling, two small claims were acquired adjacent to the southwest of the main group and Crone JEM and magnetic surveys were conducted along picket lines oriented northwards.

Six holes totalling 2237 feet were drilled to investigate conductive zones detected by the electromagnetic survey.

Four holes were drilled in an area adjacent to the Township boundary (Line 20E on Caltor plans) to investigate the strongest conductor. Although the conductor was caused by pyritized graphite, small amounts of copper, zinc, lead and silver mineralization were encountered in intermediate to felsic pyroclastic rocks forming the footwall of the graphitic zone. In hole 64-3 (see accompanying plans) a section of 2.9 feet assayed 0.15 per cent copper, 0.52 per cent lead, 1.05 per cent zinc and 0.54 oz. of silver. A 2 foot section in hole 64-2 assayed 0.45

per cent copper within a wider section of 13 feet averaging 0.14 per cent copper. Although the values are low, the similarity of metal ratios, rock types, and mineralization to the Texas Gulf orebody is of significance. In 1961, Texas Gulf drilled a hole to a depth of 191 feet to investigate the above described conductor but never reached the wallrock of the conductor.

As indicated on the accompanying plans, conductive zones to the north and northeast of the main zones were the targets of the other two holes. In each case a narrow graphitic zone with heavy marcasite or pyrite mineralization formed the conductive zone within rhyolite agglomerate and tuff.

In 1966, as part of a larger survey, Conwest Exploration completed magnetic and electromagnetic surveys over an area of the property approximately outlined by the three easternmost claims in Reid Township. The McPhar electromagnetic survey indicated a weak east trending conductor in this area of the property.

GEOLOGY

The most recent geological publication of the area is the Pamour Sheet, P698, at a scale of one inch to one mile by the Ontario Department of Mines.

No rock exposures are present in the area. Based on geophysical and drilling data the area is indicated to be underlain by felsic metavolcanics which strike generally east. Narrow, usually pyritized, graphitic zones, probably waterlain tuff, are interphase to wider sections of felsic flows and pyroclastics which

dip steeply north. A north trending diabase dyke, part of a major system, crosses the central portion of the claim group. On the west boundary of the property a gabbro plug a few miles in diameter is reflected by the airborne magnetic susceptibilities.

The east contact of the gabbro is marked by a major north trending structure, termed the Mattagami River fault which apparently crosses the westernmost section of the property. Numerous parallel and subsidiary faults, some filled by diabase, are located particularly to the west of the Mattagami River fault.

Disseminated chalcopyrite mineralization has been noted in drill core from the gabbro. Disseminated sphalerite, galena, chalcopyrite and associated silver values form local zones in the rhyolite agglomerate. Only slight pyrite and pyrrhotite mineralization is associated with the base metal sulphides.

MAGNETIC SURVEY RESULTS AND INTERPRETATION

The magnetic survey data is plotted and contoured on a plan at a scale of one inch to two hundred feet accompanying this report. This survey method and instrument is described in the Appendix to this report.

The magnetic background on the property is in the range of 300 to 500 gammas while the isomagnetics trend generally east or north. This area of low magnetic susceptibilities reflects essentially the felsic metavolcanics and graphitic interphase zones.

Striking north-northwest through the centre of the property is a prominent magnetic linear which represents a diabase

dyke. Lower magnetic susceptibilities to the south suggests that the dyke pinches and swells for it is known that the dyke is continuous for several miles to the south.

In the southwest corner of the property is present the strongest magnetic anomaly on the property. This magnetic high represents the northeast sector of a gabbro body two to three miles in diameter. The tendency of the isomagnetics along this feature to trend north and a marked change in direction of the isomagnetics outlining the diabase dyke to the north, indicates the location of the main break forming the Nattagami River fault.

Extending eastwards from L44E is a weak magnetic feature which forms a U shape. Although this feature is thought to represent, in part, mafic volcanics, a north striking fault and perhaps folding may account for the unusual shape.

ELECTROMAGNETIC SURVEY RESULTS AND INTERPRETATION

The electromagnetic survey data is plotted and profiled on two plans at a scale of one inch to two hundred feet. The instrument and survey method is described in the Appendix to this report.

Conductive zones which have been detected by the survey are described as follows:

Conductor A - Of weak to moderate strength, this conductor crosses the north portion of the property for a distance of 4800 feet. The conductivity is discontinuous and variable in strength along strike. The strongest and best defined portion of the conductor crosses Lines 36E to 44E inclusive. In the vicinity of L24E where

there is a moderately strong but isolated crossover, hole 64-4 was drilled approximately as indicated. This hole intersected a 19 foot section of graphite with heavy marcasite within rhyolite agglomerate and tuff. Based on this hole and the character of conductivity, conductor A is interpreted to represent one or more tuff horizons in close proximity, variably graphitic and pyritized, merging and diverging along strike. That section between L36E and 44E which displays stronger conductivity may contain conductive base metal sulphides or simply more graphite and pyrite.

Conductor B - This generally strong conductor, interrupted by faulting and a diabase dyke, trends northeast across the centre of the property a distance of about 4000 feet.

East of the diabase dyke the conductor is of weak to moderate strength. Hole 64-6, located approximately as indicated on the plan, intersected this section of the conductor where it is strongest. A 13 foot section of pyritized graphite with rhyolite tuff and agglomerate accounts for the conductivity. Shallow overburden, less than 20 feet, may account for the apparently stronger conductivity here.

West of the diabase dyke, to L12E, very strong conductivity is displayed over a length of about 1300 feet. Previous drilling, including holes 64-1, 64-2, 64-3, and 64-5, intersected pyritized graphite, about 50 feet wide, and some mafic volcanics within felsic pyroclastic rocks. No base metal values are present in the graphite but disseminated sphalerite, galena, and chalcopyrite occurs locally in the pyroclastic rocks. Here the overburden is

60 to 100 feet deep and the rocks dip steeply north.

Further to the southwest in the vicinity of the Mattagami River fault system are two zones of conductivity of weak to moderate strength, apparently disrupted by faulting. It appears that the conductivity is finally terminated by a gabbro body. Although pyritized graphite is the most likely cause of conductivity here, faulting and perhaps sulphide mineralization related to the gabbro may account for the conductivity.

Conductor C - Striking generally east with a sinuous form in the south portion of the property this weak to moderately strong conductor is almost 9000 feet long. It is interrupted at L28E by a north trending fault intruded by diabase to the north.

West of this fault the conductivity is of weak to moderate strength along an axis striking southwest towards the gabbro body and main break of the Mattagami River fault. The profile shape indicates a source which dips steeply north. Although pyritized graphite is the most likely cause of conductivity, base metal sulphides in felsic pyroclastic rocks immediately north suggest that such sulphides may account for the conductivity.

East of the fault one or more narrow graphitic horizons are thought to account for this weak section of conductivity.

CONCLUSIONS

Complete coverage of the property area by a magnetometer and deep penetrating electromagnetic unit has considerably clarified the geology. The much greater extent of conductive mineralization

indicated on the property by the vertical loop survey as compared to Crone in-line survey is readily apparent. This survey coupled with the magnetic data indicates a complex geological structure.

Three main conductive zones striking generally east, roughly parallel to one another, are bisected by a north-northwest trending diabase dyke-fault, disrupted to the west by Mattagami River fault system and finally terminated by a gabbro body. To the east the conductors may also be influenced by north or northwest trending faults. The conductive zones were previously drilled in three locations where the conductivity was determined to be caused by a pyritized graphite horizon within felsic pyroclastic rocks. This information coupled with the location and trend of the conductive zones and related to the magnetic susceptibilities suggest that the conductors represent a Z shaped folded horizon. The rocks forming the fold structure appear to dip steeply north.

Base metal sulphide mineralization in the felsic pyroclastics of the footwall of conductor B intersected in previous drilling together with the interpreted geology indicate that certain zones of conductivity merit particular attention for a drill investigation. Conductor C just south of the base metal mineralization intersected in previous drilling is a prime target. The southwest extension of conductor B on either side of the main break of the Mattagami River fault should also be investigated. This conductor is terminated by a gabbro body to the southwest known to contain chalcopyrite mineralization. The only other conductive zone of possible importance is the east portion of conductor A which

exhibits moderately strong conductivity over a length of approximately 1000 feet.

RECOMMENDATIONS

It is recommended that a diamond drill programme be undertaken on the property which is outined as follows:

Hole	Location	Direction	Dip	Depth	Target
72-1	115'W of L20E at 5+00S	S30°E	50°	500'	Conductor C
72-2	L16E 0+50S	S30°E	50°	700'	Conductor B
72-3	120'W of L12E at 6+00S	S30°E	50°	450'	Conductor B
72-4	L40E 18+00N	South	50°	400'	Conductor A
				2050'	

Holes 72-1 and 72-2 are laid out to form a section across conductors C and B. Pyroclastic rocks between these two conductors contain base metal sulphides. The size and strength of conductors B and C may mask a sulphide zone in this intervening area.

Cost of diamond drilling, supervision and assaying is estimated at $20,500.

Respectfully submitted,

SHIELD GEOPHYSICS LIMITED,

R. J. Bradshaw, P. Eng.,

Consulting Geologist.

Timmins, Ontario,

March 30, 1972.

REGISTERED PROFESSIONAL ENGINEER R.J. BRADSHAW PROVINCE OF ONTARIO

APPENDIX

SURVEY METHOD AND INSTRUMENT DATA

Electromagnetic Survey

Any alternating magnetic field will induce an electrical eddy current in the medium through which the magnetic field passes. If a source of an alternating magnetic field is located near a conductive body anomalously strong eddy currents will be induced in the deposit due to its high electrical conductivity. Electrical currents induced in the conductive body will produce a secondary magnetic field proportional to the intensity of current flow.

A receiver coil tuned to the frequency of the transmitting device will pick up both the directly transmitted signal and the eddy current signal.

The electromagnetic unit used in this survey is a McPhar unit and consists of a vertically mounted, motor-generator powered transmitting coil operating at frequencies of 5000 and 1000 cps. and a receiving coil, tuned to the transmitting frequencies, an inclinometer, an amplifier and a headset.

Throughout the survey, the transmitter and receiver were separated by distances of 400, 800 and 1200 feet. The plane of the transmitter coil was oriented so that the transmitter was vertical and pointed towards the receiver. Orientation was obtained using a plate on which predetermined receiver positions were plotted. Stations were read at one hundred foot intervals. At all times, the receiver "faced" the transmitter. The results obtained are dip angles, measured in degrees. The dip angles are obtained by first orienting the receiver coil in the plane of the

magnetic field by rotating the coil about a vertical axis until a null or minimum signal is obtained, and then rotating the coil about a horizontal axis until a null or minimum signal is obtained. The angle which the magnetic field makes with the horizontal is recorded as a "dip" or "tilt" angle. In the absence of a conductor the dip angle will be zero since no secondary field is present. In the presence of a conductor, the axis of the receiver coil points towards the conductor and the plane of the coil away from the conductor. In the presence of a conductor, the secondary magnetic field is usually displaced from the primary in-phase as well as direction so that the total field is elliptically polarized. The receiver cannot then be nulled completely but a minimum signal can be obtained, the width of the minimum being an indication of the phase displacement.

The tilt angles are plotted as profiles, the zero or "cross-over" point indicating the focus of the conductor axis.

Once a conductor axis has been established, the transmitter is set up over the conductor and lines are read on both sides of the transmitter and the conductor axis is traced out by "leap frogging" from "cross-over" to "cross-over".

SPECIFICATIONS

Operating Frequencies: 1000 and 5000 cycles per second

Range: 2000 foot seperation between the transmitter and receiver for a $\pm$ 10 degree null width.

Depth of Exploration: Roughly half the distance between transmitter and receiver.

Transmitter Power Supply: 500 watt alternator driven by a 1½ H.P. gasoline engine.

Weights:

Packboard-mounted engine generator	48 lbs.
Transmitter coil on packboard	49 lbs.
Coil mounting pole and spreader bar	22 lbs.
Receiver	7 lbs.

Magnetometer Survey

A Sharpe M.F.-1 fluxgate magnetometer was used in the magnetic survey. This instrument measures the vertical component of the earth's magnetic field in gammas. Base stations for determining the magnetic diurnal variations were established along the main base line at 100 foot intervals. Magnetic readings were taken at 50 foot intervals, along the cross lines.

File 2.890

RECEIVED
JUN 6 1972

GEOPHYSICAL – GEOLOGICAL – GEOCHEMICAL TECHNICAL DATA STATEMENT

TO BE ATTACHED AS AN APPENDI
FACTS SHOWN HERE NEED NOT B
TECHNICAL REPORT MUST CONTAIN INTE

900

Type of Survey Magnetic & Electromagnetic

Township or Area Mahaffy & Reid Townships

Claim holder(s) Caltor Syndicate

Author of Report R. J. Bradshaw

Address 26 Pine St. S., Timmins, Ontario

Covering Dates of Survey February 28 - March 20, 1972.
(linecutting to office)

Total Miles of Line cut 12.0

SPECIAL PROVISIONS
CREDITS REQUESTED

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

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
–Electromagnetic	40
–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: March 30, 1972 SIGNATURE: _____
Author of Report

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

326514
326515
326516
326517
326518
326519
326520
326521
326522
326523
326524
326525
326526
326527
326528

TOTAL CLAIMS 15

If space insufficient, attach list

OFFICE USE ONLY

PROJECTS SECTION

Res. Geol. _____ Qualifications Ins. Rpts file

Previous Surveys L D

Checked by _____ date _____

GEOLOGICAL BRANCH

Approved by _____ date _____

GEOLOGICAL BRANCH

Approved by _____ date _____

GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS

1248 - magnetic

Number of Stations 624 Number of Readings about 1000 - EM

Station interval 100'

Line spacing 400'

Profile scale or Contour intervals 1" = 20° EM profile scale; 100 gamma contour interval
(specify for each type of survey)

MAGNETIC

Instrument Sharpe M.F.-1 fluxgate

Accuracy - Scale constant + or - 10 gammas

Diurnal correction method check of base stations at no greater than 1 hour intervals

Base station location on base line at 400' intervals commencing from Line 0

ELECTROMAGNETIC

Instrument McPhar 1000-5000

Coil configuration vertical loop

Coil separation minimum - 400' maximum - 1600'

Accuracy + or - 1 degree

Method: ☒ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency 1000 and 5000 cps
(specify V.L.F. station)

Parameters measured dip angles in degrees

GRAVITY

Instrument

Scale constant

Corrections made

Base station value and location

Elevation accuracy

INDUCED POLARIZATION -- RESISTIVITY

Instrument

Time domain Frequency domain

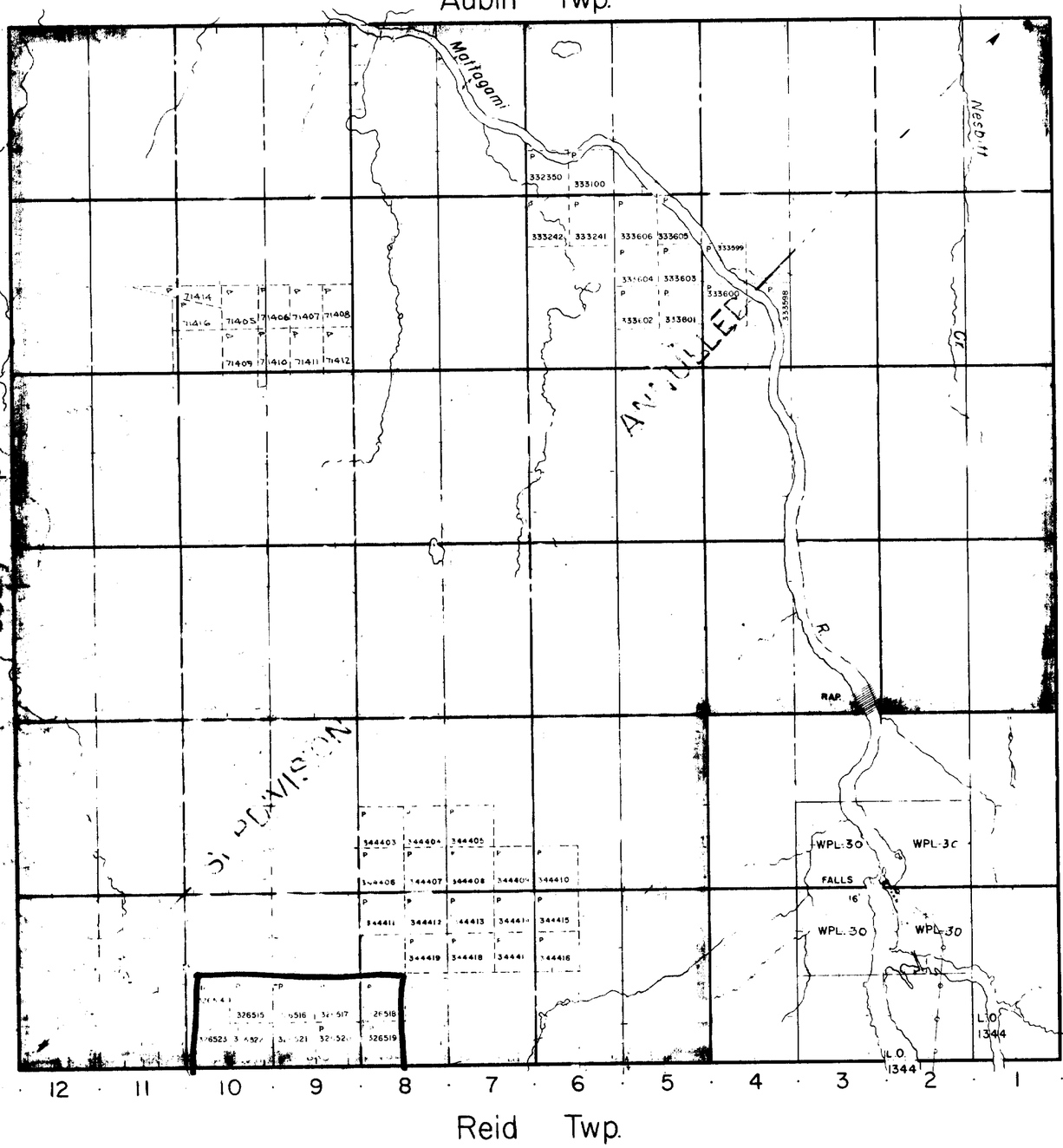
Frequency Range

Power

Electrode array

Electrode spacing

Type of electrode



THE TOWNSHIP OF

MAHAFFY

DISTRICT OF COCHRANE

PORCUPINE MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	P
CROWN LAND SALE	CS
LEASES	D
LOCATED LAND	Loc
LICENSE OF OCCUPATION	L.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAY	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	

NOTES

W.P.L. 92 H.E.P.C. of Ont. 7 Mar. 1945.

L.O. 981 H.E.P.C. of Ont. 7 Mar. 1945.

L.O. 1344 H.E.P.C. of Ont. 7 Mar. 1945 covers flooding in lots 1, 2 & 3 in con. I

Surface rights Reservation around Lakes and Rivers.

2.890

PLAN NO. – M-540

ONTARIO
DEPARTMENT OF MINES
AND NORTHERN AFFAIRS

MAHAFFY TWP. - M.540

THORBURN TWP - M.601

CARNEGIE TWP. - M.441

MACDIARMID TWP - M. 294

THE TOWNSHIP
OF

REID

DISTRICT OF
COCHRANE

PORCUPINE
MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	(P)
CROWN LAND SALE	C.S.
LEASES	(L)
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C.

NOTES

400' surface rights reservation around all lakes and rivers.

Subdivision of this twp. into lots and concessions annulled Aug. 19, 1953.

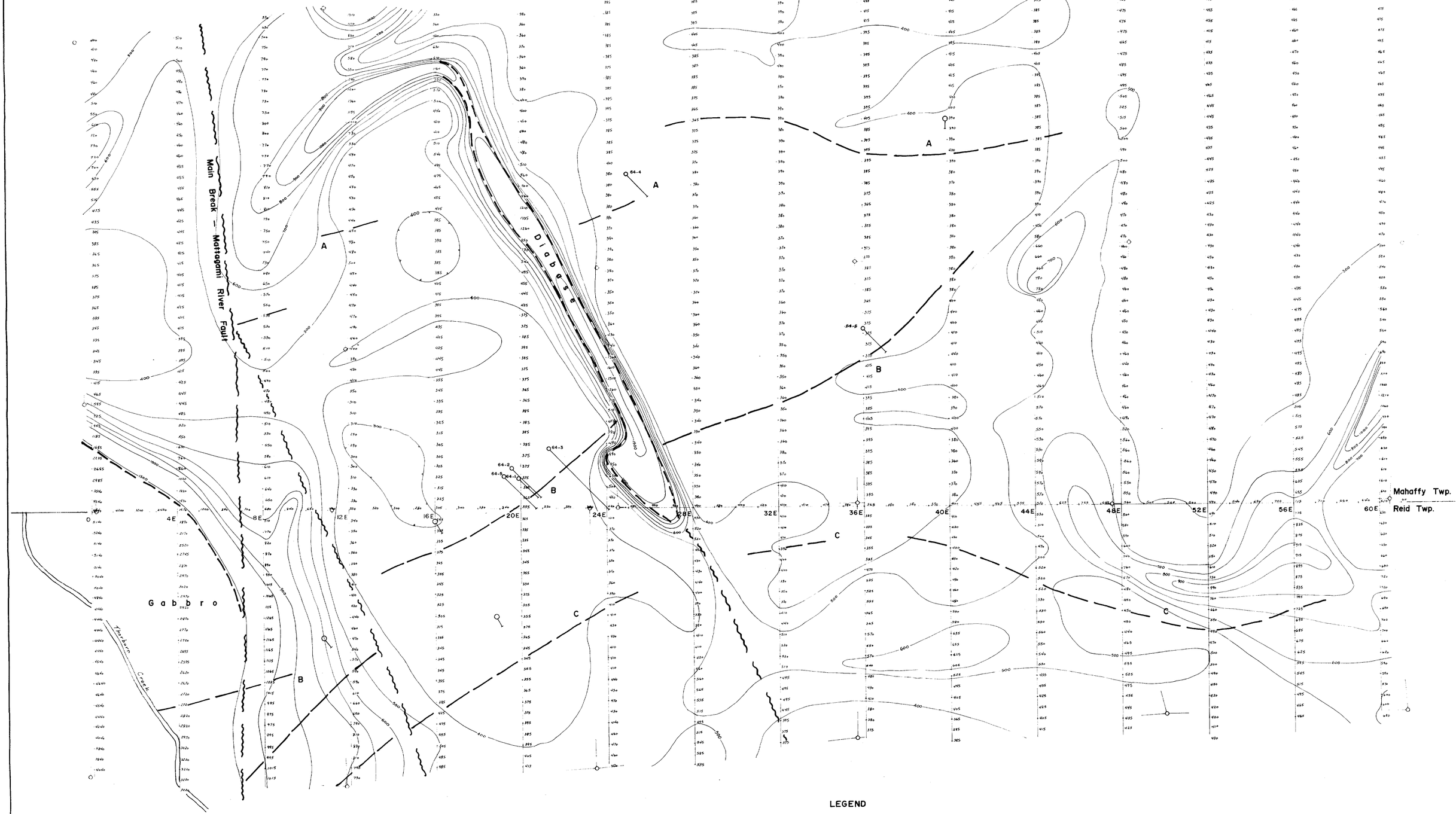
Flooding rights to areas along Mattagami River reserved to H.E.P.C. - L.O. 7085

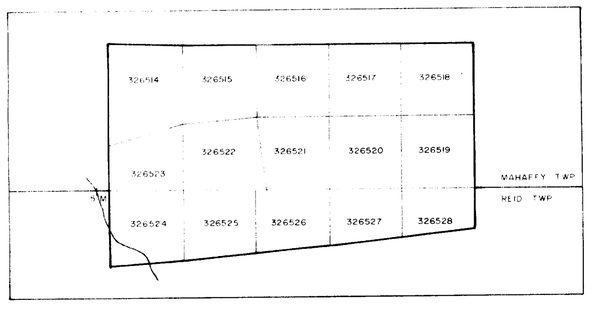
2.890

DATE OF ISSUE
JUN 1 1972
ONT. DEPT. OF MINES
AND NORTHERN AFFAIRS

PLAN NO. M.575

**ONTARIO
DEPARTMENT OF MINES
AND NORTHERN AFFAIRS**





KEY MAP
1" = 1320'

LEGEND

- Measurement station along picket line
- 315 — Relative value of the vertical component of the earth's magnetic field in gammas
- 400 — Magnetic contour
- 64-1 — Horizontal projection of drill hole
- Proposed drill hole

INSTRUMENT: Sharpe M.F.-1 fluxgate magnetometer

MAGNETOMETER SURVEY

FOR

CALTOR SYNDICATE

REID & MAHAFFY TOWNSHIPS

BY

SHIELD GEOPHYSICS LIMITED

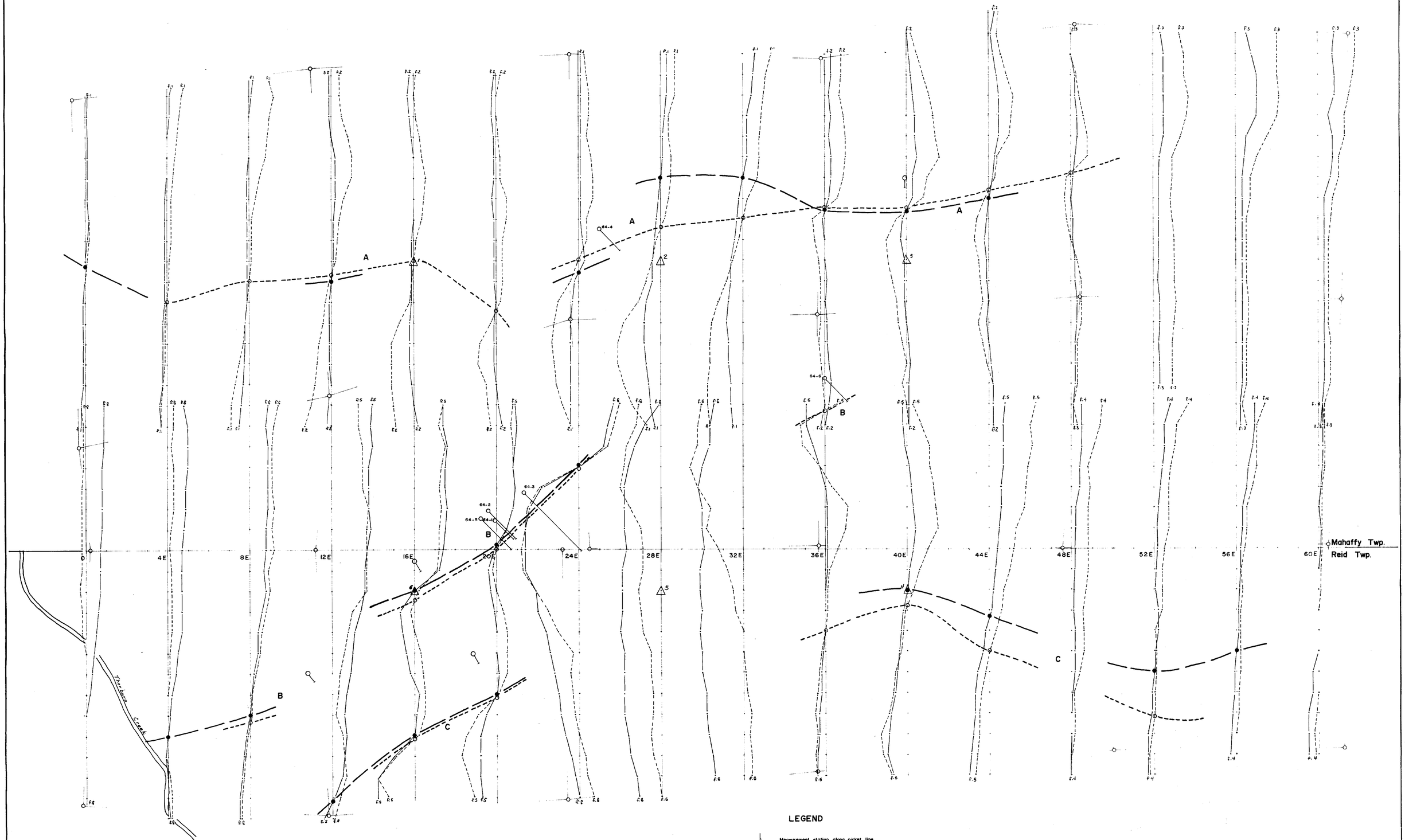
SCALE

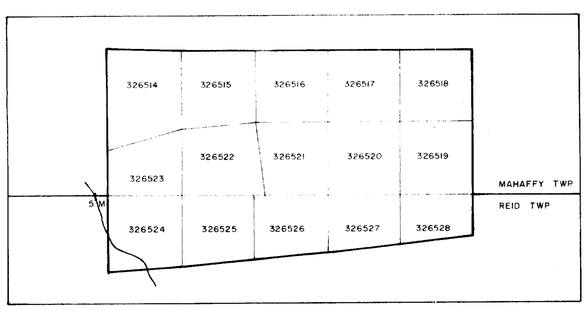
0 200 400 600 800

FEET

MARCH 1972

2.890





KEY MAP
1" = 1320'

LEGEND

- Measurement station along picket line
- North dip angles to left of line
  South dip angles to right of line
- 1000 cps
- 5000 cps
- Transmitter location
- Conductor axis - 1000 cps
  - 5000 cps
- Profile scale: 1" = 20°
- Horizontal projection of drill hole
- Proposed drill hole

INSTRUMENT: McPhar 1000/5000 E.M.

ELECTROMAGNETIC SURVEY

FOR

CALTOR SYNDICATE

REID & MAHAFFY TOWNSHIPS

BY

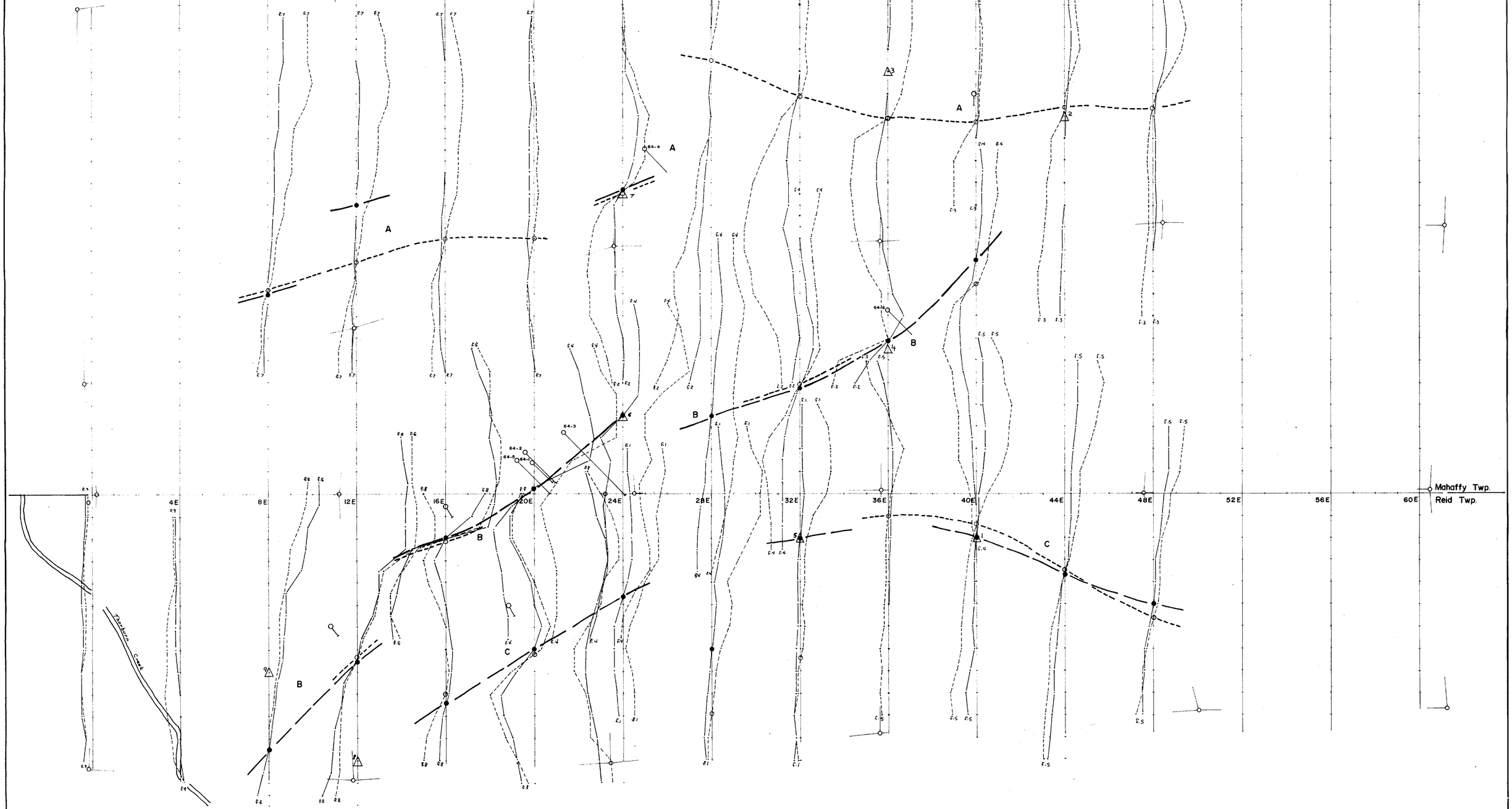
SHIELD GEOPHYSICS LIMITED

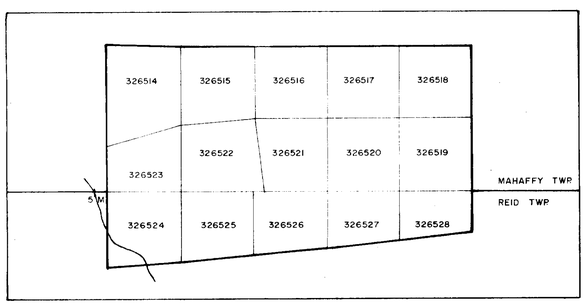
SCALE

0 200 400 600 800

FEET

MARCH 1972





KEY MAP
1" = 1320'

See Electromagnetic Survey for LEGEND.

DETAILED

ELECTROMAGNETIC SURVEY

FOR

CALTOR SYNDICATE

REID & MAHAFFY TOWNSHIPS

BY

SHIELD GEOPHYSICS LIMITED

SCALE

0 200 400 600 800

FEET

MARCH 1972

240

2890

375