Suite 905, 121 Richmond Street West, Toronto, Canada, M5H 2K1, Telephone (416) 869-0010

REPORT ON AN AIRBORNE MAGNETIC AND VLF-EM SURVEY BENNEWEISS TOWNSHIP PORCUPINE MINING DIVISION, ONTARIO

for

633881 ONTARIO LTD.

by

TERRAQUEST LTD.
Toronto, Canada

September 29, 1986

Suite 905, 121 Richmond Street West, Toronto, Canada, M5H 2K1. Telephone (416) 869-0010

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LIST OF MAPS IN JACKET

No. A-639-1, Total Magnetic Field
No. A-639-2, Vertical Magnetic Gradient
No. A-639-3, VLF-EM Survey
No. A-639-4, Interpretation

1. INTRODUCTION

This report describes the specifications and results of a geophysical survey carried out for 633861 Ontario Ltd. of 20 Advance Road, Brampton, Ontario L6T 4R7 by Terraquest Ltd., 905 - 121 Richmond St. W., Toronto, Canada. The field work was performed on June 8, 1985 and the data processing, interpretation and reporting from June 9, 1985 to September 29, 1986.

The purpose of a survey of this type is two-fold. One is to prospect directly for anomalously conductive and magnetic areas in the earth's crust which may be caused by, or at least related to, mineral deposits. A second is to use the magnetic and conductivity patterns derived from the survey results to assist in mapping geology, and to indicate the presence of faults, shear zones, folding, alteration zones and other structures potentially favourable to the presence of gold and base-metal concentration. To achieve this purpose the survey area was systematically traversed by an aircraft carrying geophysical instruments along parallel flight lines spaced at even intervals, 100 meters above the terrain surface, and aligned so as to intersect the regional geology in a way to provide the optimum contour patterns of geophysical data.

2. THE PROPERTY

The property is located in Benneweiss township, in the Porcupine Mining Division of Ontario about 20 kilometres south of the town of Gogama. The claims lie in the centre of the township and can be reached by logging roads.

The latitude and longitude are 47 degrees 32 minutes, and 81 degrees 47 minutes respectively, and the N.T.S. reference is 41P/12.

The claim numbers are shown in figure 2 and listed below:

P 849865-849924 (60)
834112-834115 (4)
.....total claims 64

3. GEOLOGY

Map References

1. Map 41d: Three Duck Lakes Area. scale 1:47,520. O.D.M. 1932
2. Map 2205: Timmins - Kirkland Lake. scale 1:253,440. O.D.M. 1973
3. Map p.2534: Pensyl Lake Area. scale 1:15,840. O.G.S. 1982

The property is underlain by medium to coarse grained sodic granitic rocks to the southeast and potassic granitic rocks to the

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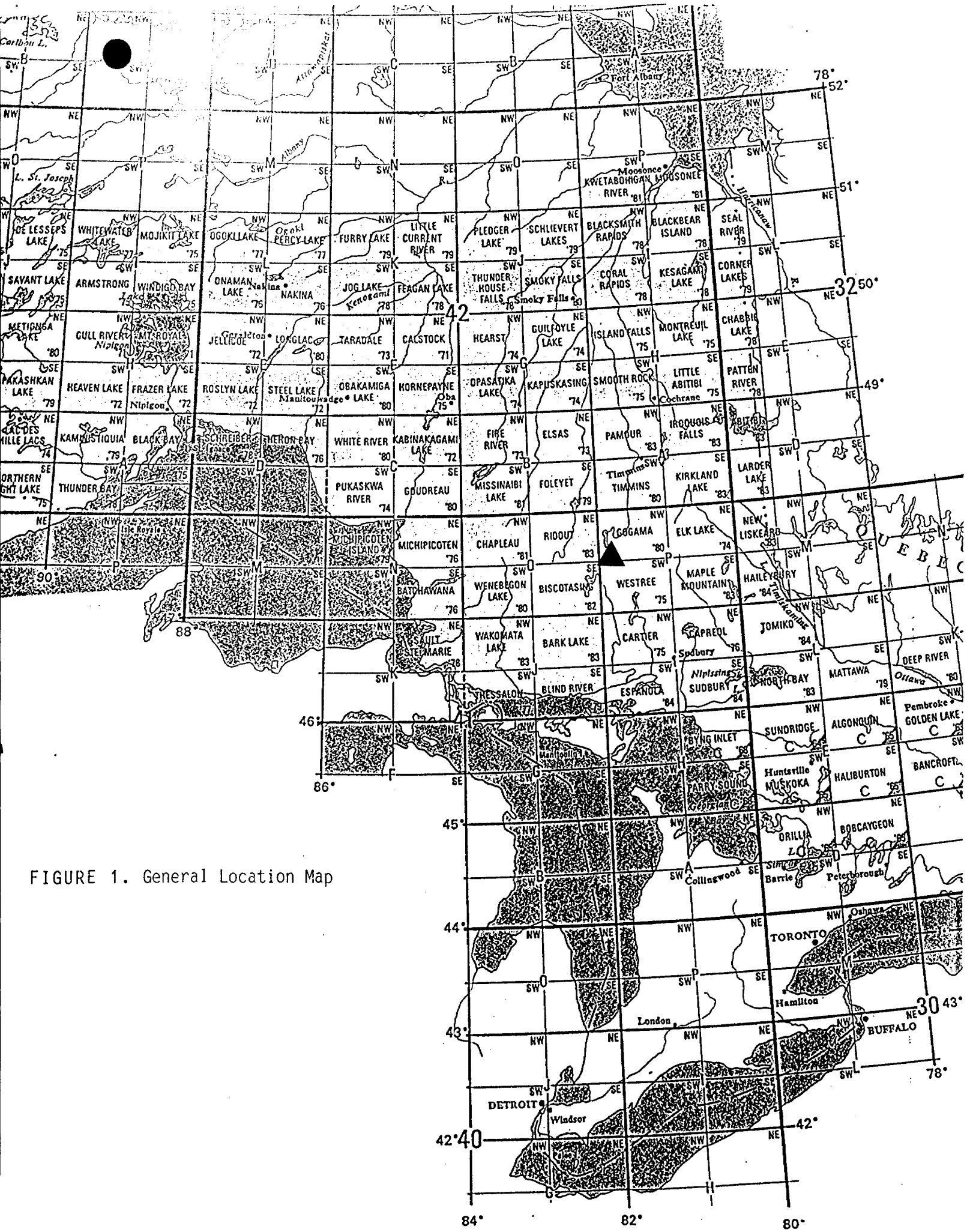

FIGURE 1. General Location Map

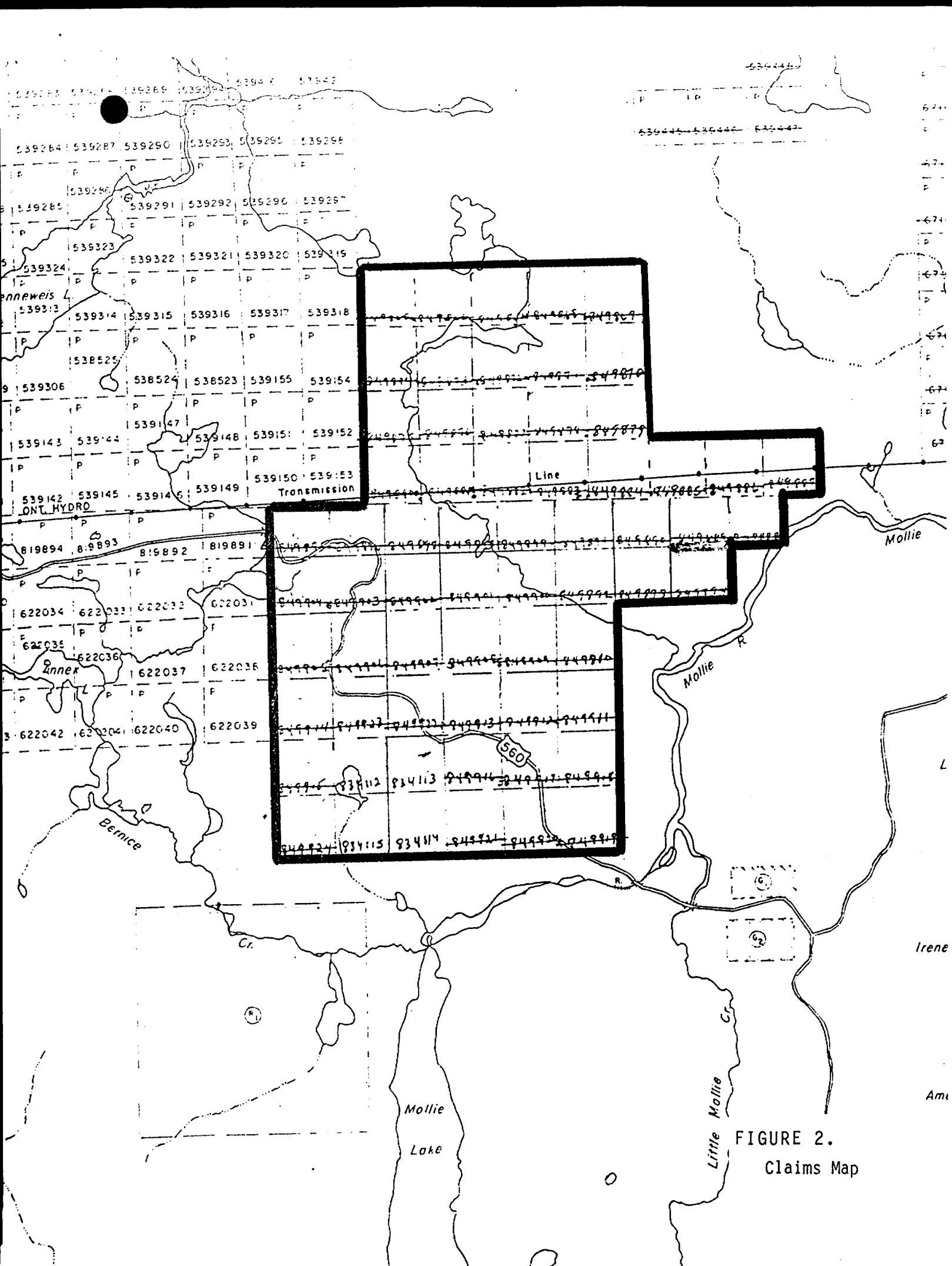

FIGURE 2.
Claims Map

northwest. They are separated by a northeast trending belt of migmatitic rocks varying in composition from diorite to gabbro. Diabase dykes strike to the north northwest. Minor mafic to intermediate volcanics occur to the north.

4. SURVEY SPECIFICATIONS

4.1 Instruments

The survey was carried out using a Cessna 182 aircraft, registration C-FAKK, which carries a magnetometer and a VLF electromagnetic detector.

The magnetometer is a proton precession type with the sensor element mounted in an extension of the right wing tip. It's specifications are as follows:

Resolution:	0.5 gamma
Accuracy:	One gamma
Cycle time:	One second
Range:	20000 - 100000 gammas in 23 overlapping steps
Gradient tolerance:	Up to 5000 gammas per meter
Model:	GSM-8BA
Manufacturer:	GEM Systems Inc., 105 Scarsdale Rd., Don Mills, Ontario, M3B 2R5

The VLF-EM unit uses three orthoganol detector coils to measure (a) the total field strength of the time-varying EM field and (b) the phase relationship between the vertical coil and both the "along line" coil (LINE) and the "cross-line" coil (ORTHO). The LINE coil is tuned to a transmitter station that is ideally positioned at right angles to the flight lines, while the ORTHO coil transmitter should be in line with the flight lines. It's specifications are:

Accuracy:	1%
Reading interval:	1/2 second
Model:	TOTEM 2A
Manufacturer:	Herz Industries, Toronto

The VLF sensor is mounted in the left wing tip extension.

Other instruments are:

- King KRA-10A Radar altimeter
- UDAS-100 data processor with Digidata nine track tape recorder, manufactured by Urtec Ltd., Markham, Ontario.
- Geocam video camera and recorder for flight path recovery, manufactured by Geotech Ltd., Markham, Ontario.

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4.2 Lines and Data

a) Line spacing: 100 meters
b) Line direction: 090 degrees
c) Terrain clearance: 100 meters
d) Average ground speed: 156 km/hr.
e) Data point interval:
Magnetic: 42 meters
VLF-EM: 21 meters
f) Tie Line interval: 2 kilometers
g) Channel 1 (LINE): NSS Annapolis, 24.4 kHz
h) Channel 2 (ORTHO): NAA Cutler, 21.0 kHz
i) Line km over total survey area: 126
j) Line km over claim groups: 110

4.3 Tolerances

a) Line spacing: Any gaps wider than twice the line spacing and longer than 10 times the line spacing were filled in by a new line.
b) Terrain clearance: Portions of line which were flown above 125 meters for more than one km were reflown if safety considerations were acceptable.
c) Diurnal magnetic variation: Less than twenty gammas deviation from a smooth background over a period of two minutes or less as seen on the base station analogue record.
d) Manoeuvre noise: Approximately +/-5 gammas.

4.4 Photomosaics

For navigating the aircraft and recovering the flight path, mosaics of aerial photographs were made from existing air photos.

5. DATA PROCESSING

Flight path recovery was carried out in the field using a video tape viewer to observe the flight path as recorded by the Geocam video camera system. The flight path recovery was completed daily to enable reflights to be selected where needed for the following day.

The magnetic data was levelled in the standard manner by tying survey lines to the tie lines. The IGRF has not been removed. The total field was contoured by computer using a program provided by Dataplotting Services Inc. To do this the final levelled data set is gridded at a grid cell spacing of 1/10th of an inch at map scale.

The vertical magnetic gradient is computed from the total field data using a method of transforming the data set into the frequency

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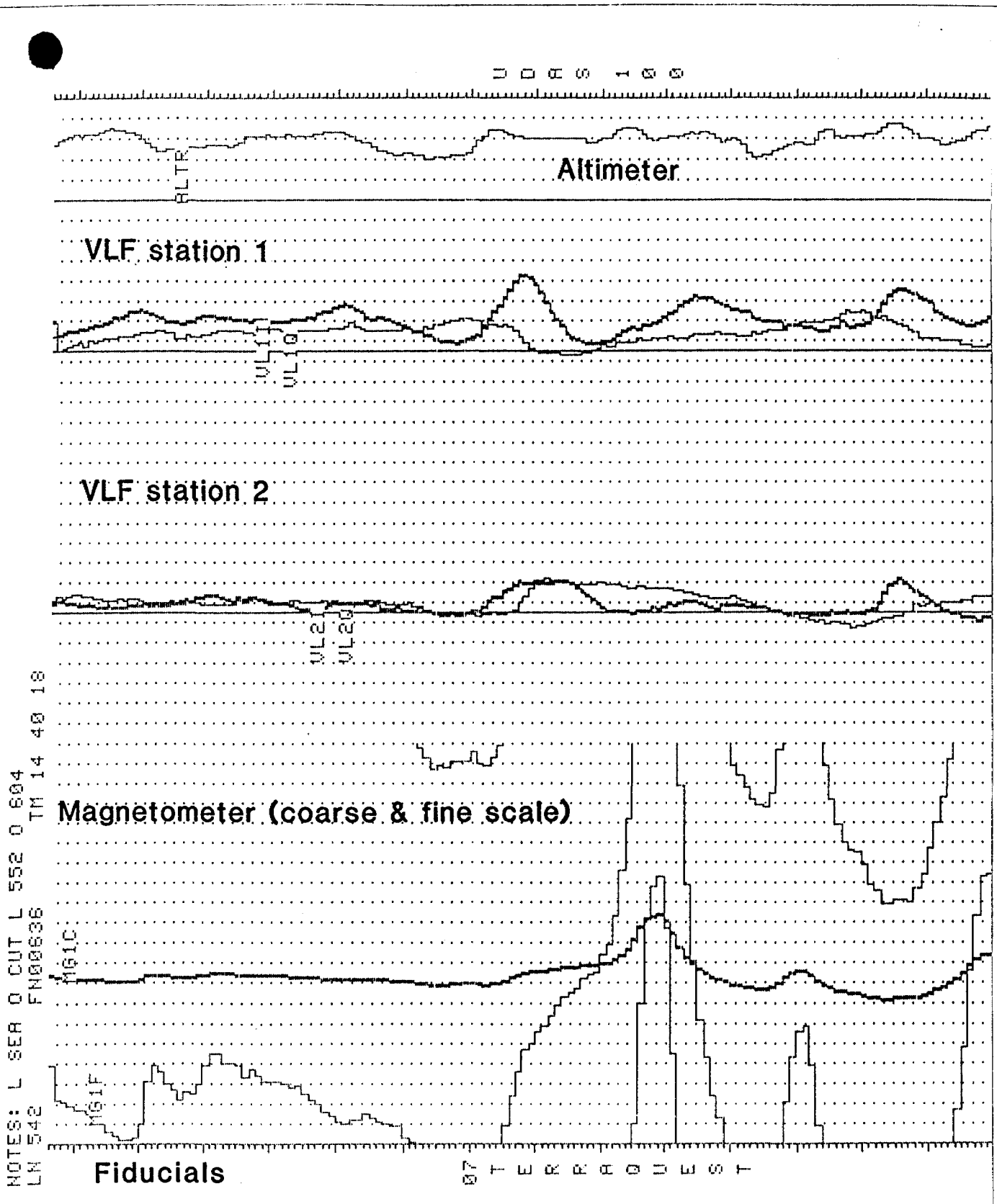

FIGURE 3. Sample of analogue data

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domain, applying a transfer function to calculate the gradient, and then transforming back into the spatial domain. The method is described by a number of authors including Grant, 1972 and Spector, 1968. The computer program for this purpose is provided by Paterson, Grant and Watson Ltd. of Toronto

The VLF data was treated automatically so as to normalize the non conductive background areas to 100 (total field strength) and zero (quadrature). The algorithms to do this were developed by Terraquest and will be provided to anyone interested by application to the company.

All of these dataprocessing calculations and map contouring were carried out by Dataplotting Services Inc. of Toronto.

INTERPRETATION

6.1 General Approach

To satisfy the purpose of the survey as stated in the introduction, the interpretation procedure was carried out on both the magnetic and VLF data. On a local scale the magnetic gradient contour patterns were used to outline geological units which have different magnetic intensity and patterns or "signatures". Where possible these are related to existing geology to provide a geological identity to the units. On a regional scale the total field contour patterns were used in the same way.

Faults and shear zones are interpreted mainly from lateral displacements of otherwise linear magnetic anomalies but also from long narrow "lows". The direction of regional faulting in the general area is taken into account when selecting faults. Folding is usually seen as curved regional patterns. Alteration zones can show up as anomalously quiet areas, often adjacent to strong, circular anomalies that represent intrusives. Magnetic anomalies that are caused by iron deposits of ore quality are usually obvious owing to their high amplitude, often in tens of thousands of gammas.

Grant, F.S. and Spector A., 1970: Statistical Models for Interpreting Aeromagnetic Data; Geophysics, Vol 35

Grant, F.S., 1972: Review of Data Processing and Interpretation Methods in Gravity and Magnetics; Geophysics Vol 37-4

Spector, A., 1968: Spectral Analysis of Aeromagnetic maps; unpublished thesis; University of Toronto

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VLF anomalies are categorized according to whether the phase response is normal, reverse, or no phase at all. The significance of the differing phase responses is not completely understood although in general reverse phase indicates either overburden as the source or a conductor with considerable depth extent, or both. Normal phase response is theoretically caused by surface conductors with limited depth extent.

Areas showing a smooth response somewhat above background (ie. 110 or so) are likely caused by overburden which is thick enough and conductive enough to saturate at these frequencies. In this case no response from bedrock is seen.

6.2 Interpretation

The total magnetic field possesses a relatively strong relief of approximately 1,250 gammas and displays a broad, strong anomaly in the centre of the map that overwhelms the surrounding responses. The vertical magnetic gradient is very successful in the improvement of the resolution, permitting the identification of detailed lithologies and structure. The relative magnetic intensities were obtained from the total magnetic field data.

The granitic rocks (Unit 6) and the minor volcanics (Unit 1) to the north correlate with weak magnetic responses and make up the quiet magnetic background. Three mafic intrusive trends have been interpreted to intrude the granites. Moderately to strongly magnetic diabase dykes (Unit 9) occur as early, infrequent, northwest trending dykes and as frequent, north-northwest trending dykes. These have been intruded by a Middle Precambrian diabase (Unit 14) which trends to the northeast. This forms a wide, solitary, strongly magnetic dyke or possible sill.

Numerous parallel faults with minimal lateral displacement have been interpreted to strike to the north-northeast.

Weak to moderate strength VLF-EM conductor axes have been identified and follow two main trends. Those of the north-northwest striking set are most common and are probably related to the diabase dykes, either as electrolytic (porosity or overburden) or mineralogic (graphite or pyrrhotite) sources. Four northwest striking conductor axes may be related to the other diabase set or possibly to regional fault systems.

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7. SUMMARY

An airborne combined magnetic and VLF-EM survey has been done on the property at line intervals of 100 metres. The total field and vertical gradient magnetic data, VLF-EM data and interpretation maps are produced at a scale of 1:10,000.

The magnetic data has been used to modify and update the existing geology and has shown a number of new contacts and faults. A number of VLF-EM conductor axes were found of which some are believed to be related to diabase dykes or faulting.

TERRAQUEST LTD.

Charles Q. Barrie, M.Sc.
Geologist

Qual. 2.8305

Suite 905, 121 Richmond Street West, Toronto, Canada, M5H 2K1. Telephone (416) 869-0010

Ministry of Northern Affairs and Mines

Ontario

Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

316/86

Mining /

41P12SE0528 2.9434 BENNEWEIS

900

Type of Survey(s)
AIRBORNE MAG & VLF-EM

BENNEWEISS TWP

Claim Holder(s)
BOB LELIEVER & GARY CARNOVALE

Prospector's Licence No.
A-43578 & M-21859

Address
20 ADVANCE BLVD., BRAMPTON, ONTARIO L6T 4R7

Survey Company
TERRAQUEST LTD.

Date of Survey (from & to)
08 06 85 | 08 06 85
Day Mo. Yr. | Day Mo. Yr.

Total Miles of line Cut

Name and Address of Author (of Geo-Technical report)
C. Q. Barrie 905-121 Richmond St. West, Toronto, Ontario M5H 2K1

Credits Requested per Each Claim in Columns at right

Special Provisions		Days per Claim
For first survey: Enter 40 days. (This includes line cutting)	Geophysical - Electromagnetic	
	- Magnetometer	
	- Radiometric	
For each additional survey: using the same grid: Enter 20 days (for each)	- Other	
	Geological	
	Geochemical	

Man Days		Days per Claim
Complete reverse side and enter total(s) here	Geophysical	
	- Electromagnetic	
	- Magnetometer	
	- Radiometric	
	- Other	
	Geological	
	Geochemical	

Airborne Credits		Days per Claim
Note: Special provisions credits do not apply to Airborne Surveys.	Electromagnetic	40
	Magnetometer	40
	Radiometric	

RECEIVED
OCT 01 1986
MINING LANDS SECTION

RECORDED
OCT 02 1986

Expenditures (excludes power stripping)

Type of Work Performed

Performed on Claim(s)

RECEIVED
OCT 2 1986
Mining Lands Section

Calculation of Expenditure Days Credits

Total Expenditures: $ ÷ 15 = Total Days Credits

Instructions
Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

Date: Oct 1/86

Recorded Holder or Agent (Signature)

Mining Claims Traversed (List in numerical sequence)

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
P	849865	
	848866	
	849867	
	849868	
	849869	
	849870	
	849871	
	849872	
	849873	
	849874	
	849875	
	849876	
	849877	
	849878	
	849879	
	849880	
	849881	
	849882	
	849883	
	849884	
	849885	
	849886	
	849887	

Mining Claim Prefix	Mining Claim Number	Expend. Days Cr.
P	849888	
	849889	
	849890	
	849891	
	849892	
	849893	
	849894	
	849895	
	849896	
	849897	
	849898	
	849899	
	849900	
	849901	
	849902	
	849903	
	849904	
	849905	
	849906	
	849907	
	849908	
	849909	
	849910	

SEE ATTACHED LIST FOR REMAINING CLAIMS

Total number of mining claims covered by this report of work: 60

For Office Use Only

Total Days Cr. Recorded: 4800

Date Recorded: Oct. 2/86

Date Approved as Recorded: 87.3.4

Mining Recorder: [signature]

Branch Director: [signature]

Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

Name and Postal Address of Person Certifying
C.Q. Barrie Terraquest Ltd. 905-121 Richmond St. West
Toronto, Ontario M5H 2K1

Date Certified: Oct 1, 1986

Certified by (Signature): [signature]

2.9434

BENNEWEISS TWP CONTINUED

P 849911
849912
849913
849914
849915
849916
849917
849918
849919
849920
849921
849922
849923
849924

TOTAL CLAIMS -60-

REFERENCES

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. – MINING RIGHTS ONLY

S.R.O. – SURFACE RIGHTS ONLY

M.+ S. – MINING AND SURFACE RIGHTS

	Description	Order No.	Date	Disposition	File
(1)	SEC 43/70	W.2/78	19/10/78	S.R.O.	153115
(2)	Re-opened Dec. 10, 1979			S.R.&M.R.	171609

SAND AND GRAVEL

(1) M.T.C. GRAVEL PIT 1358 File 153115

(2) M.T.C. GRAVEL PIT 1351

△ Trapline Cabin

NOTES

400' SURFACE RIGHTS RESERVATION AROUND MINISINAKWA LAKE TO M.N.R. FILE - 160708.

41P12SE0528 2.9434 BENNEWEIS

200

ST. LOUIS TWP.

CHESTER TWP.

CHAMPAGNE TWP.

VROOMAN TWP.

5M. 4M. 3M. 2M. 1M.

Bernice

Benneweis

Robitaille

Annex

Mollie

Mollie Lake

Little Mollie Cr.

Makwa Lake

Lucienne Lake

Irene

Colleen L.

Amelia L.

Makwa

Doris L.

Cr.

R

Line

Transmission

ONT. HYDRO

P. 1221

See NOTES

(1) (2)

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 OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

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	▼
ORDER-IN-COUNCIL	OC
RESERVATION	(R)
CANCELLED	⊗
SAND & GRAVEL	(S)

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC 1.

SCALE: 1 INCH = 40 CHAINS

FEET 0 1000 2000 4000 6000 8000

METRES 0 200 1000

TOWNSHIP

BENNEWEIS

M.N.R. ADMINISTRATIVE DISTRICT

GOGAMA

MINING DIVISION

PORCUPINE

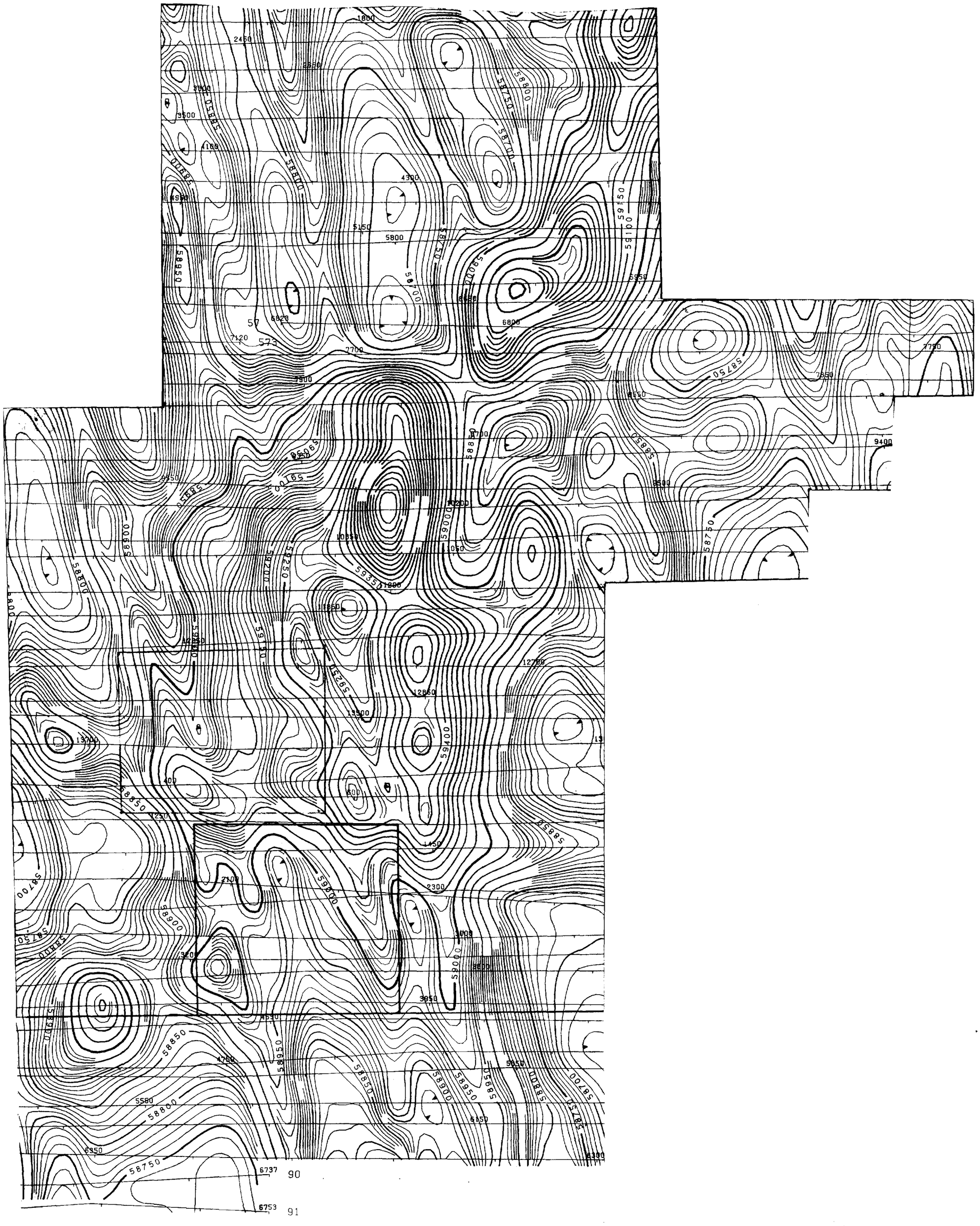
LAND TITLES / REGISTRY DIVISION

SUDBURY

Ontario Ministry of Natural Resources — Land Management Branch

Date MARCH, 1985

Number G-3222



LEGEND

Terrain Clearance	100 meters
Line Spacing	100 meters
1000 gammas	
250 gammas	
50 gammas	
10 gammas	

633861 ONTARIO LTD.

AIRBORNE MAGNETIC SURVEY
TOTAL MAGNETIC FIELD

BENNEWEIS TOWNSHIP,
ONTARIO

N.T.S. NO. 41P/12	DRAWING NO. A-639-1
SCALE: 1:10,000	DATE: September 1986

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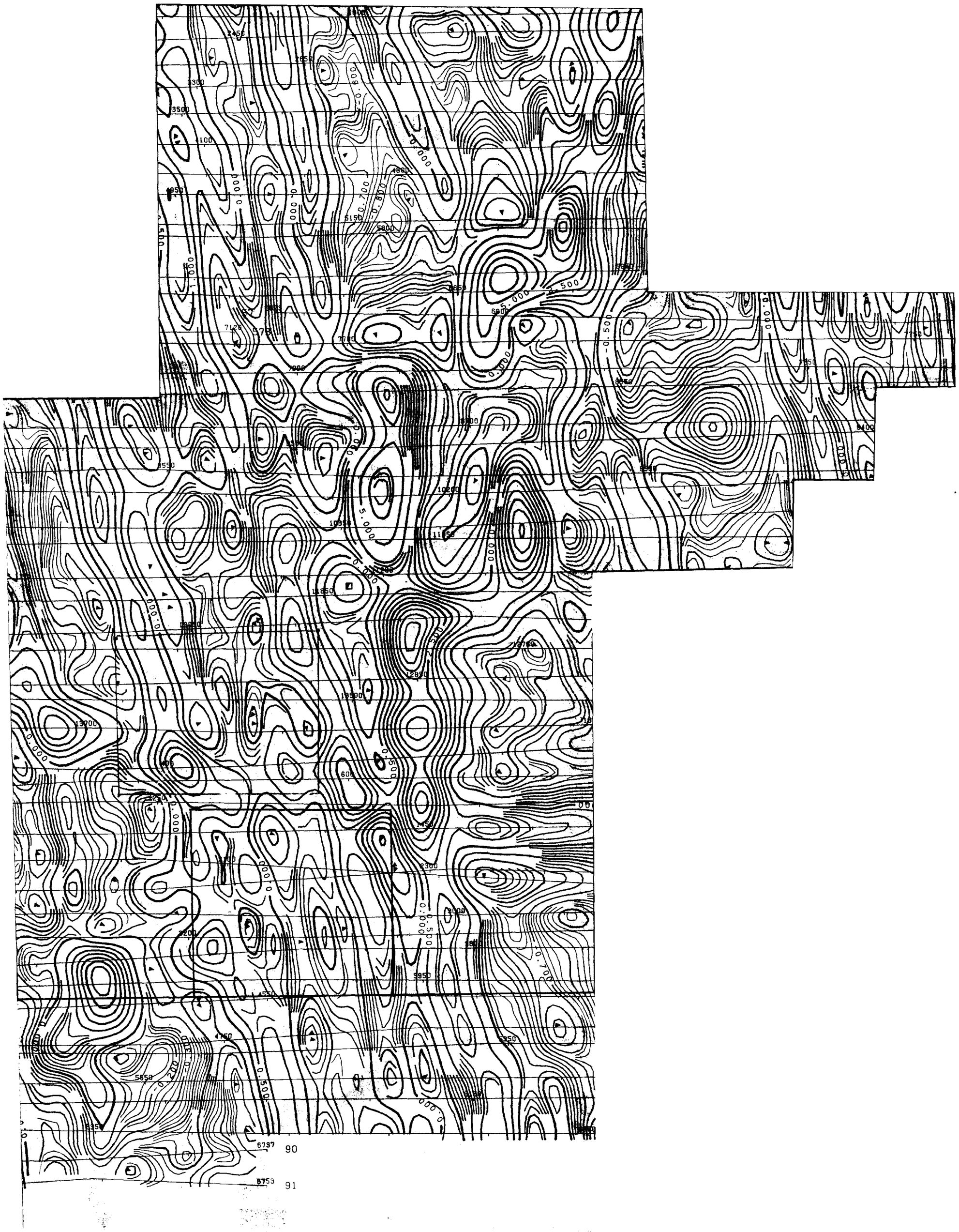


LEGEND

Terrain Clearance	100 meters
Line Spacing	100 meters
2.500 gammas / meter	———
.500 gammas / meter	———
.100 gammas / meter	———
.025 gammas / meter	———

220

633861 ONTARIO LTD.

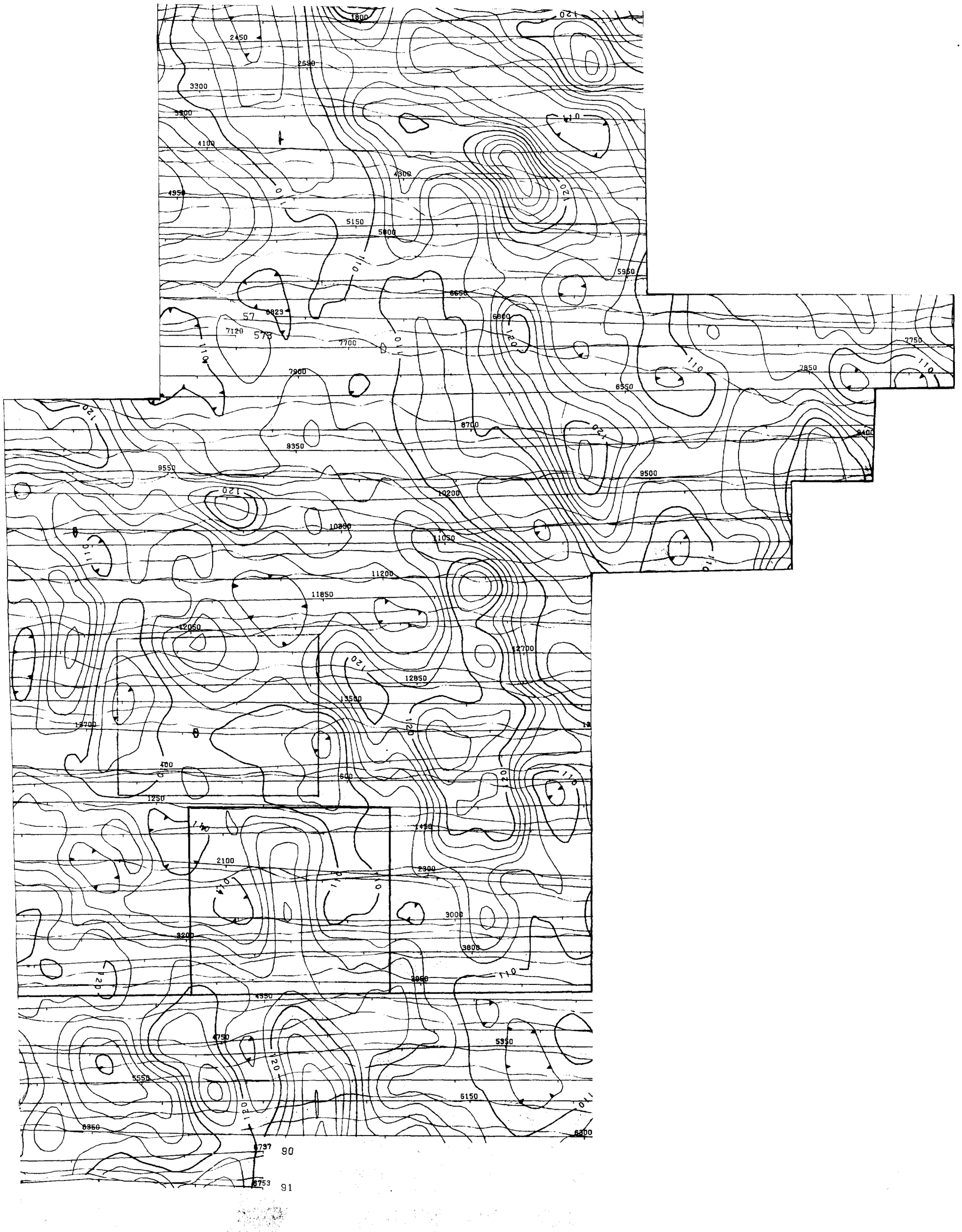
AIRBORNE MAGNETIC SURVEY

VERTICAL MAGNETIC GRADIENT
Calculated From Total Field

BENNEWEIS TOWNSHIP,
ONTARIO

N.T.S. NO. 41P/12	DRAWING NO. A-639-2
SCALE: 1:10,000	DATE: September 1986

TERRAQUEST LTD.
TORONTO, CANADA



NSS Annapolis
21.4 kHz
Azimuth 152

QUADRATURE
Normal Slope

−10% +10%

Reverse Slope

−10% +10%

LEGEND

Terrain Clearance	100 meters
Line Spacing	100 meters
Field Strength	
50%	———
10%	———
2%	———

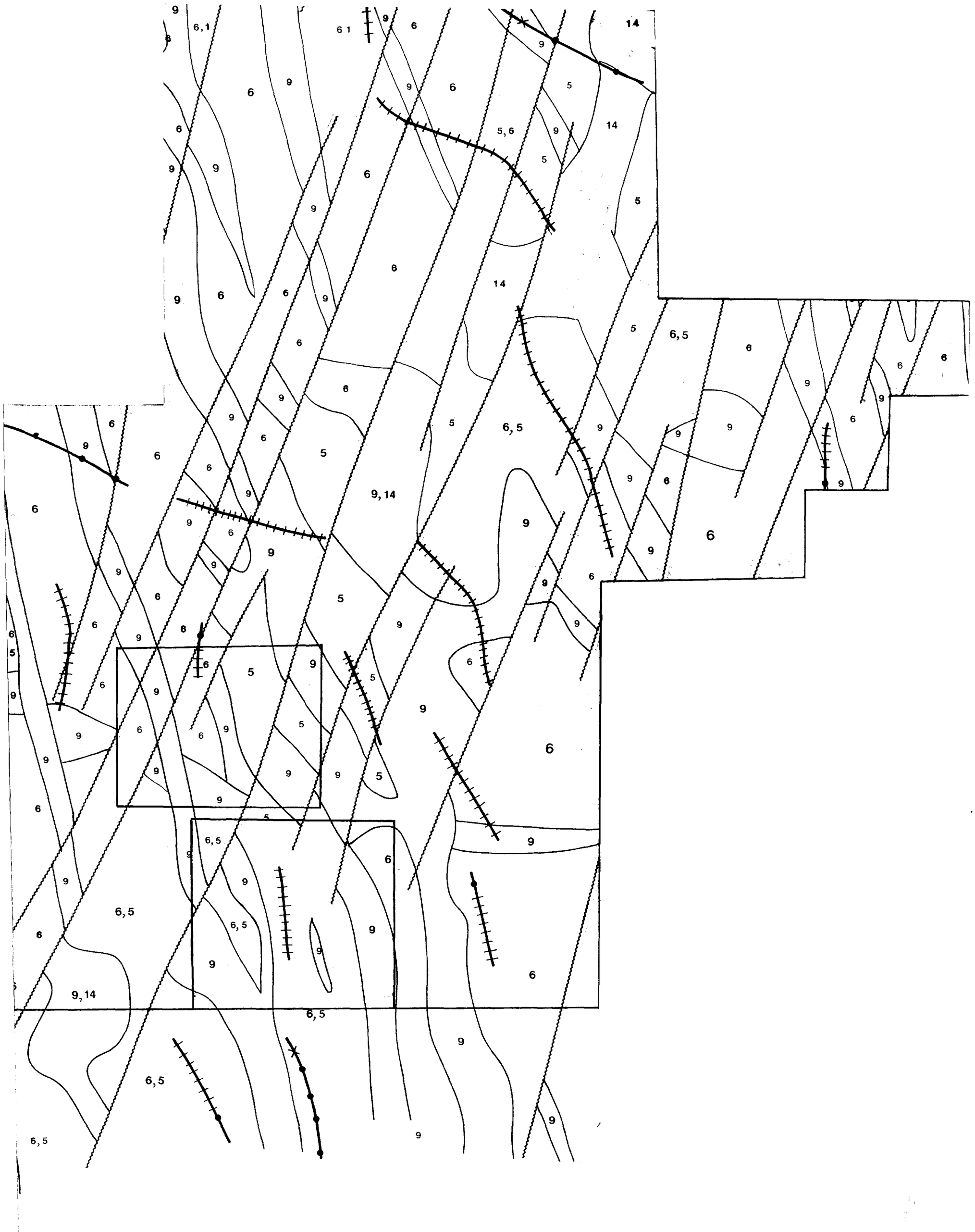
633861 ONTARIO LTD.

AIRBORNE VLF-EM SURVEY
CONTOURS OF TOTAL FIELD STRENGTH
PROFILES OF QUADRATURE

BENNEWEIS TOWNSHIP,
ONTARIO

N.T.S. NO. 41P/12	DRAWING NO. A-639-3
SCALE: 1:10,000	DATE: September 1986

TERRAQUEST LTD.
TORONTO CANADA



NSS Annapolis
21.4 kHz
Azimuth 152

LITHOLOGY

MIDDLE PRECAMBRIAN

14	Diabase, granophyre dykes and sheets

EARLY PRECAMBRIAN

9	Diabase dykes
6	Felsic batholithic intrusives
5	Migmatitic rocks
1	Mafic to intermediate metavolcanics

LEGEND

INTERPRETATION

- Contact
- Fault
- Property Boundary

VLF-EM Conductor Axes

- in phase only (no quadrature)
- reverse quadrature
- normal quadrature

Terrain Clearance ..... 100 meters
Line Spacing ..... 100 meters

633861 ONTARIO LTD.

INTERPRETATION

BENNEWEIS TOWNSHIP,
ONTARIO

N.T.S. NO. 41P/12	DRAWING NO. A-639-4
SCALE: 1:10,000	DATE: September 1986

TERRAQUEST LTD.
TORONTO, CANADA

41P12SE0528 2.6434 BENNEWEIS

240