



42A01NE0043 2.8803 MAISONVILLE

010

A-521

Richmond Street West, Toronto, Canada, M5H 2K1. Telephone: (+1) 869-0010

REPORT ON AN
AIRBORNE MAGNETIC AND VLF-EM SURVEY
MAISONVILLE TOWNSHIP
LARDER LAKE MINING DIVISION, ONTARIO

for
GLEN AUDEN RESOURCES

by

TERRAQUEST LTD.
Toronto, Canada

Inval.
28305

January , 1986

RECEIVED

JAN 13 1986

MINING LANDS SECTION

TERRAQUEST LTD.



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LIST OF MAPS IN JACKET

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- No. A-521-3, VLF-EM Survey
- No. A-521-4, Interpretation



1. INTRODUCTION

This report describes the specifications and results of a geophysical survey carried out for Glen Auden Resources by Terraquest Ltd., 905 - 121 Richmond St. W., Toronto, Canada. The field work was performed on October 9, 1985 and the data processing, interpretation and reporting from October 10 to January 8, 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 Maisonville township, in the Larder Lake Mining Division of Ontario about one kilometer north of the town of Seskinika which lies about fifteen kilometres northwest of the town of Kirkland Lake. Highway #11 and the C.N.R tracks cross the western part of the property.

The latitude and longitude are 48 degrees 13 min., and 80 degrees 14 min. respectively, and the N.T.S. reference is 42 A/1.

The claim numbers are :

- L-4575-4576 (2)
- L-11157-11158 (2)
- L-15833 (1)
- L-65401 (1)
- L-65432 (1)
- L-682233-682235 (3)
- L-778368-778373 (6)
- L-778377-778379 (3)
- L-798860-798861 (2)
- L-798863-798878 (16)
- L-799289-799290 (2)
- L-799394-799395 (2)
- L-799678 (1)
- L-800344-800349. (6)



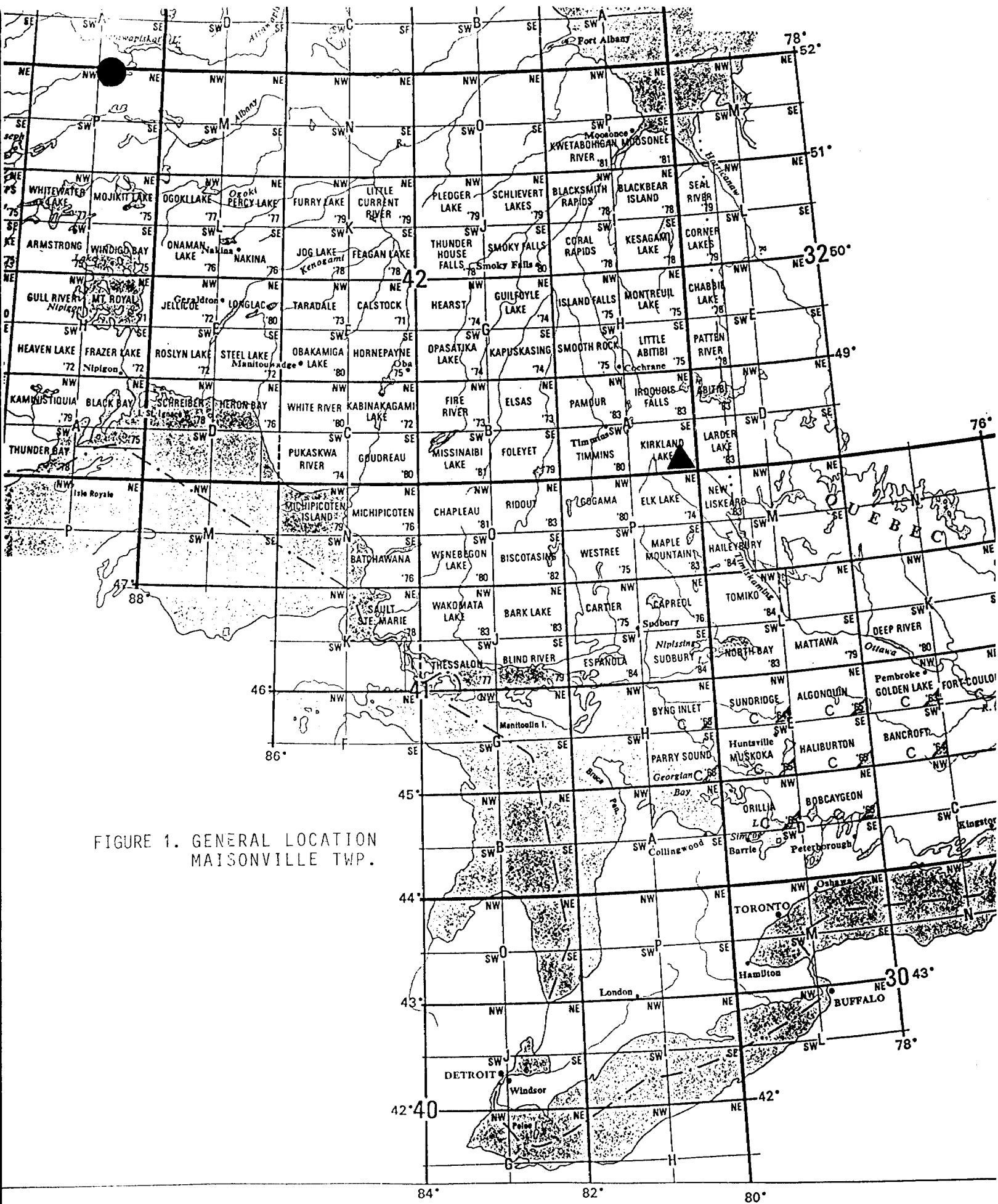


FIGURE 1. GENERAL LOCATION
MAISONVILLE TWP.

L-801217	(1)
L-801219-801222	(4)
L-801876-801878	(3)
L-802331-802343	(13)
L-802346	(1)
L-802349	(1)
L-802353-802360	(8)
L-802365	(1)
L-802744-802745	(2)
L-802747-802750	(4)
L-803557-803560	(4)

....total claims 90

3. GEOLOGY

Map References

1. Map 2215: Benoit and Maisonville Townships. scale 1:31,680
O.D.M. 1967

The survey area is underlain by the Keewatin mafic to intermediate (plus minor felsic) metavolcanics striking regionally to the north. These have been intruded by primarily sill and to a lesser degree batholithic bodies of gabbroic rocks. On outcrop scale the volcanic units may include minor portions of gabbro. Both lithological suites have been intruded by Algomian felsics as east-west trending dykes and to the north as a small stock. North trending Matachewan diabase dykes occur throughout the area. Coarse-grained sediments of the Gowganda Formation overlie the volcanics to the northwest.

Three major north-south trending faults have been mapped in the area. Bedding is vertical to steeply dipping to the east and occasionally displaying drag folds. Large scale fold axes trend north-south.

The central portion of the survey area has numerous occurrences of both base and precious metals plus sulphides. Most of these are associated with the gabbroic lithologies.

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 50000 gammas per meter
Model: GSM-8BA
Manufacturer: GEM Systems Inc., 105 Scarsdale Rd.,
Don Mills, Ontario, M3B 2R5

The VLF-EM unit uses three orthogonal 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.

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, 21.4 kHz
- h) Channel 2 (ORTHO): NAA Cutler, 24.0 kHz
- i) Line km over total survey area: 250
- j) Line km over claim groups: 170

TERRAQUEST
 OTE 09 01 85 TH 12 28 20: BY: M.M.
 ACFT C-FAKK FH 8437 FLTN 051

PRG.VER.280184-GRAD.
 SURALT 100M

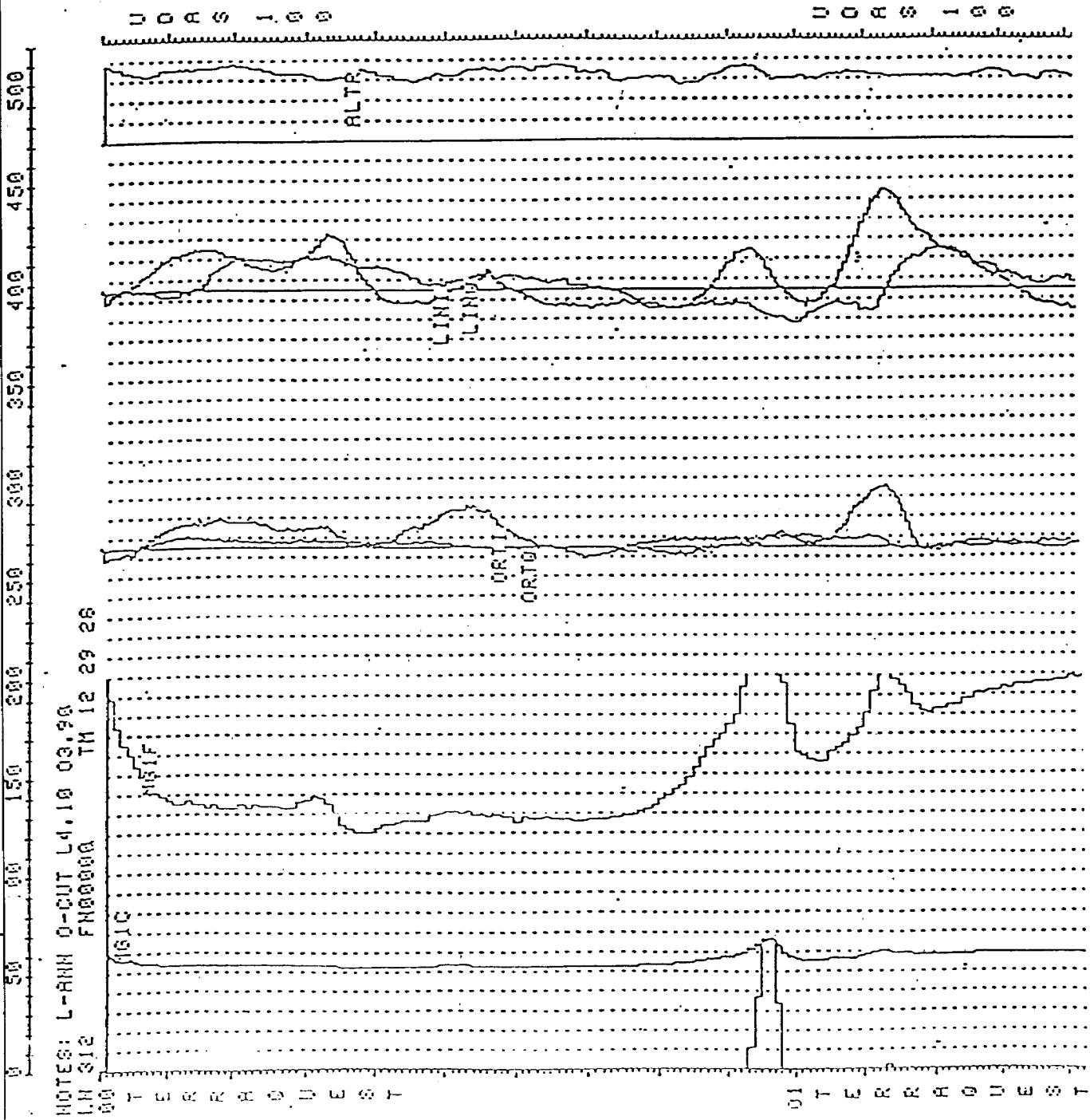


FIGURE 3. SAMPLE OF ANALOGUE DATA

TERRAQUEST LTD.



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.

In order to provide a semi-controlled base the photos were laid down on a topographic map which had been photographically adjusted to the photo scale. The laydown was then photographed and printed at the final map scale.

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 was 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 1/4 the flight line spacing.

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

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

Grant, F.S.; Review of Data Processing and Interpretation Methods in Gravity and Magnetics; Geophysics, August 1972.

Spector, A.; Spectral Analysis of Aeromagnetic maps; unpublished thesis; University of Toronto, 1961.

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.

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 has a relief of about 1,750 gammas, the stronger responses being located in the centre of the survey area.

The vertical derivative data map offers considerable improvement in the resolution and delineation of the magnetic units. Approximately three quarters of the gabbroic exposures possess excellent correlation with the strong magnetic responses and as such permit improved geological mapping. The remaining gabbroic exposures clearly do not adhere to this relationship, some even coinciding with areas of very low magnetic response. These two characteristics have been identified on the interpretation map as units 4m and 4 respectively.

Similarly the volcanics possess two contrasting magnetic associations and have been identified on the interpretation map in a similar manner. The magnetic units may be related to (a) the more mafic components of the volcanic assemblage, (b) intrusive gabbroic rocks of the magnetic type within the volcanic or (c) increased proportions of magnetite type mineralization such as pyrrhotite.

There is little to nil magnetic response associated with the felsic intrusives, the diabase dykes and the Algomian sediments. The magnetic responses to the northwest are characteristic of the underlying volcanics and gabbroic rocks; the sediments do not appear on their interpretation map.

Diabase dykes which are frequently magnetically active despite their small size have presumably lost their magnetic attraction through alteration.

Faulting in this area is poorly defined; those presented on the interpretation represent only one concept of numerous possibilities. Indirect evidence suggests that the northwest trending faults may be displaced by northeast trending faults. The geologically mapped regional north-south faults can not be substantiated by displacement of magnetic units.

The broad magnetic-low zone on the eastern part of the survey area may represent (a) a deep rooted fault system (as mapped geologically) with possible attendant alteration, or (b) a wedge of recessive Keewatin metasediments or poorly magnetic volcanics.

On the basis that the gabbroic sills and the magnetic metavolcanics define semicontinuous, mappable horizons a structural model for mineralization can be made. The magnetic units appear to form two closed folds with a common northeast trending axis, closing toward each other at the centre of the property. As abundant mineralization has already been discovered about the southern fold nose, the northern

fold nose area would thereby represent an ideal target zone.

The VLF-EM results have limited exploration value in this particular survey, perhaps due to the poor coupling direction of the available VLF transmitters or to the masking effect of overburden. The railway tracks are manifested as a strong response only by the quadrature (out of phase component). The northwest trend of the conductors identified on the interpretation map may be related to faulting or overburden.

7. SUMMARY

A combined magnetic and VLF-EM survey has been done on the survey area at a data density of approximately 1.6 km. per mineral claim. The magnetic data has been used to substantially 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 which are generally believed to be related to faulting and/or overburden.

TERRAQUEST LTD.



Charles Q. Barrie, M.Sc.
Geologist

TERRAQUEST LTD.





42A01NE0043 2.8803 MAISONVILLE

900

Mining Lands Section

File No 28803

Control Sheet

TYPE OF SURVEY GEOPHYSICAL
 GEOLOGICAL
 GEOCHEMICAL
 EXPENDITURE

MINING LANDS COMMENTS:

J. Hurst

Signature of Assessor

Feb 19/86.

Date

*T.D.
601*

List of 79 Claims

<u>Claim #</u>	<u>Recorded Holder</u>
L 778 378	Glen Auden Resources Limited
L 778 379	Glen Auden Resources Limited
L 798 863	Glen Auden Resources Limited
L 798 864	Glen Auden Resources Limited
L 798 865	Glen Auden Resources Limited
L 798 866	Glen Auden Resources Limited
L 798 867	Glen Auden Resources Limited
L 798 868	Glen Auden Resources Limited
L 798 869	Glen Auden Resources Limited
L 798 870	Glen Auden Resources Limited
L 798 871	Glen Auden Resources Limited
L 798 872	Glen Auden Resources Limited
L 799 289	Glen Auden Resources Limited
L 799 290	Glen Auden Resources Limited
L 800 347	Glen Auden Resources Limited
L 800 348	Glen Auden Resources Limited
L 800 349	Glen Auden Resources Limited
L 801 217	Glen Auden Resources Limited
L 801 877	Glen Auden Resources Limited
L 801 878	Glen Auden Resources Limited
L 801 876	Glen Auden Resources Limited
L 802 332	Glen Auden Resources Limited
L 802 333	Glen Auden Resources Limited
L 802 334	Glen Auden Resources Limited
L 802 335	Glen Auden Resources Limited
L 802 336	Glen Auden Resources Limited
L 802 337	Glen Auden Resources Limited
L 802 338	Glen Auden Resources Limited
L 802 339	Glen Auden Resources Limited
L 802 340	Glen Auden Resources Limited
L 802 353	Glen Auden Resources Limited
L 802 354	Glen Auden Resources Limited
L 802 355	Glen Auden Resources Limited
L 802 356	Glen Auden Resources Limited
L 802 357	Glen Auden Resources Limited
L 802 358	Glen Auden Resources Limited
L 802 359	Glen Auden Resources Limited
L 802 360	Glen Auden Resources Limited
L 802 365	Glen Auden Resources Limited

LARDER LAKE
 MINING DIV.
RECEIVED
 JAN - 3 1986
 AM 18 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 PM

<u>Claim #</u>	<u>Recorded Holder</u>
L 802 744	Glen Auden Resources Limited
L 802 745	Glen Auden Resources Limited
L 802 746	Glen Auden Resources Limited
L 802 747	Glen Auden Resources Limited
L 802 749	Glen Auden Resources Limited
L 803 557	Glen Auden Resources Limited
L 803 558	Glen Auden Resources Limited
L 803 559	Glen Auden Resources Limited
L 803 560	Glen Auden Resources Limited
L 778 370	Glen Auden Resources Limited
L 778 371	Glen Auden Resources Limited
L 778 372	Glen Auden Resources Limited
L 778 373	Glen Auden Resources Limited
L 778 377	Glen Auden Resources Limited
L 778 368	Glen Auden Resources Limited
L 778 369	Glen Auden Resources Limited
L 799 678	Glen Auden Resources Limited
L 800 344	Glen Auden Resources Limited
L 798 873	Glen Auden Resources Limited
L 798 874	Glen Auden Resources Limited
L 798 875	Glen Auden Resources Limited
L 798 876	Glen Auden Resources Limited
L 798 877	Glen Auden Resources Limited
L 798 878	Glen Auden Resources Limited
L 800 345	Glen Auden Resources Limited
L 800 346	Glen Auden Resources Limited
L 801 219	Glen Auden Resources Limited
L 801 220	Glen Auden Resources Limited
L 801 221	Glen Auden Resources Limited
L 801 222	Glen Auden Resources Limited
L 802 331	Glen Auden Resources Limited
L 802 341	Glen Auden Resources Limited
L 802 342	Glen Auden Resources Limited
L 802 343	Glen Auden Resources Limited
L 802 346	Glen Auden Resources Limited
L 802 347	Glen Auden Resources Limited
L 802 348	Glen Auden Resources Limited
L 802 349	Glen Auden Resources Limited
L 802 748	Glen Auden Resources Limited
L 802 750	Glen Auden Resources Limited



1986 01 17

File: 2.8803

Mining Recorder
Ministry of Northern Development and Mines
4 Government Road East
Kirkland Lake, Ontario
P2N 1A2

Dear Sir:

We received reports and maps on January 13, 1986 for Airborne Geophysical (Magnetometer and Electro-magnetic) Surveys submitted on Mining Claims L 682233, et al, in Maisonville Township.

This material will be examined and assessed and a statement of assessment work credits will be issued.

We do not have a copy of the report of work which is normally filed with your office prior to the submission of this technical data. Please forward a copy as soon as possible.

Yours sincerely,

S.E. Yundt
Director
Land Management Branch

Whitney Block, Room 6643
Queen's Park
Toronto, Ontario
M7A 1W3
Phone:(416)965-4888

AB/mc

cc: Glen Auden Resources
Suite 905
121 Richmond Street West
Toronto, Ontario
M5H 2K1

Terraquest Ltd
Suite 905
121 Richmond Street West
Toronto, Ontario
M5H 2K1
Attention: Charles Barrie

BENOIT TWP. - M.326

THE TOWNSHIP OF
OF
MAISONVILLE

Jan. 9/86

DISTRICT OF
TIMISKAMING

LARDER LAKE
MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEE TWP. - M.360

BERNHARDT TWP. - M.327

GRENFELL TWP. - M.351

LEGEND

- PATENTED LAND ● or ⊙
- CROWN LAND SALE C.S.
- LEASES ⊕
- 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 —
- PATENTED S.R.O. —

NOTES

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

Areas withdrawn from staking under Section 43 of the Mining Act, R.S.O. 1970. (Sec. 42, R.S.O. '60)

Order No.	File	Date	Disposition
NRW 5/81	22032	11/8/70	S.R.O.
	22032	23/1/81	S.R.O.

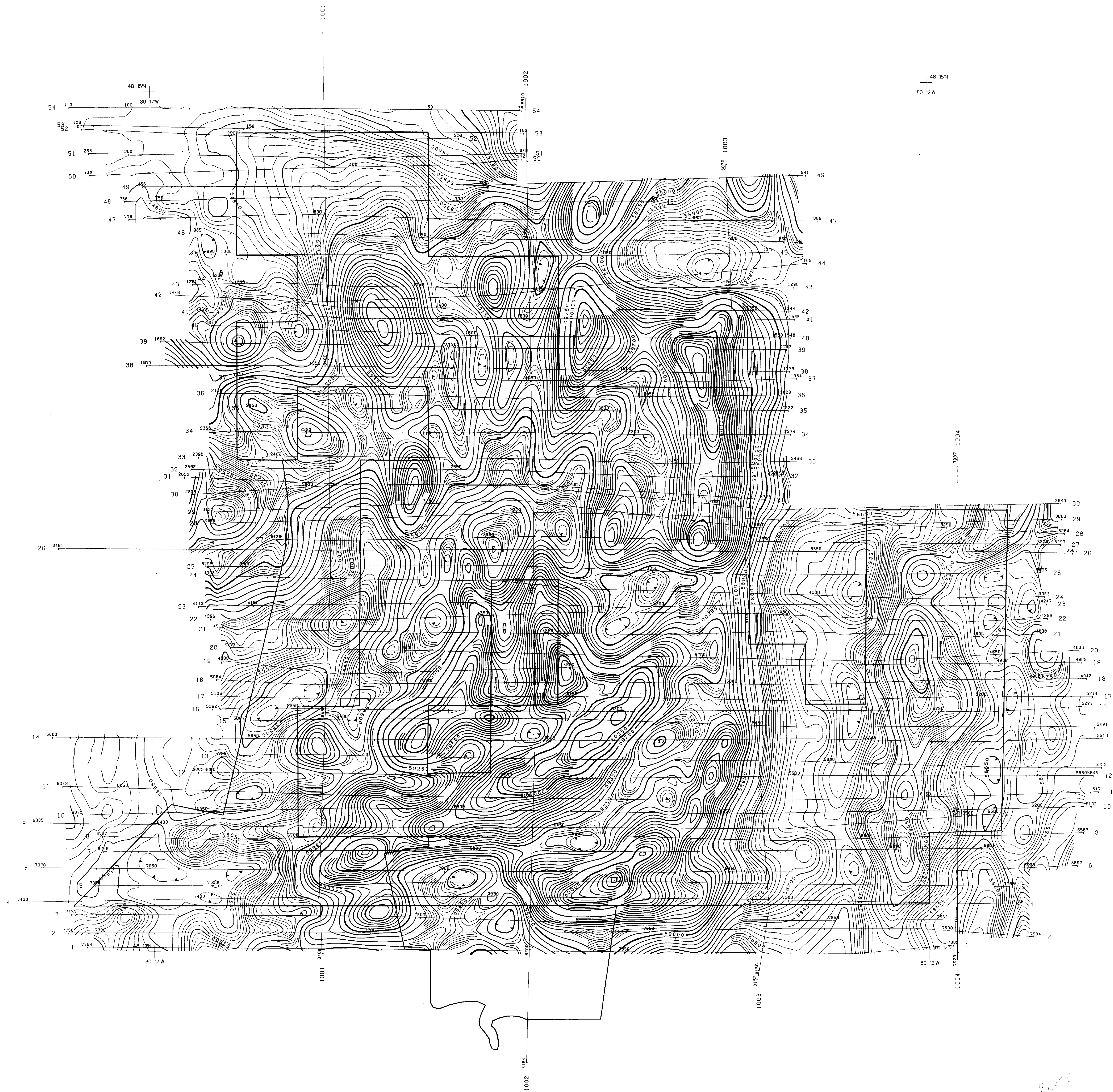
All islands in Sesekinika Lake are withdrawn from staking by Order-in-Council dated Dec. 7, 1921.

Withdrawn from staking, see 3 (b) pending application under public lands Act.

PLAN NO. **M.361 #2**

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH





LEGEND

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

GLEN AUDEN RESOURCES

**AIRBORNE MAGNETIC SURVEY
TOTAL MAGNETIC FIELD**

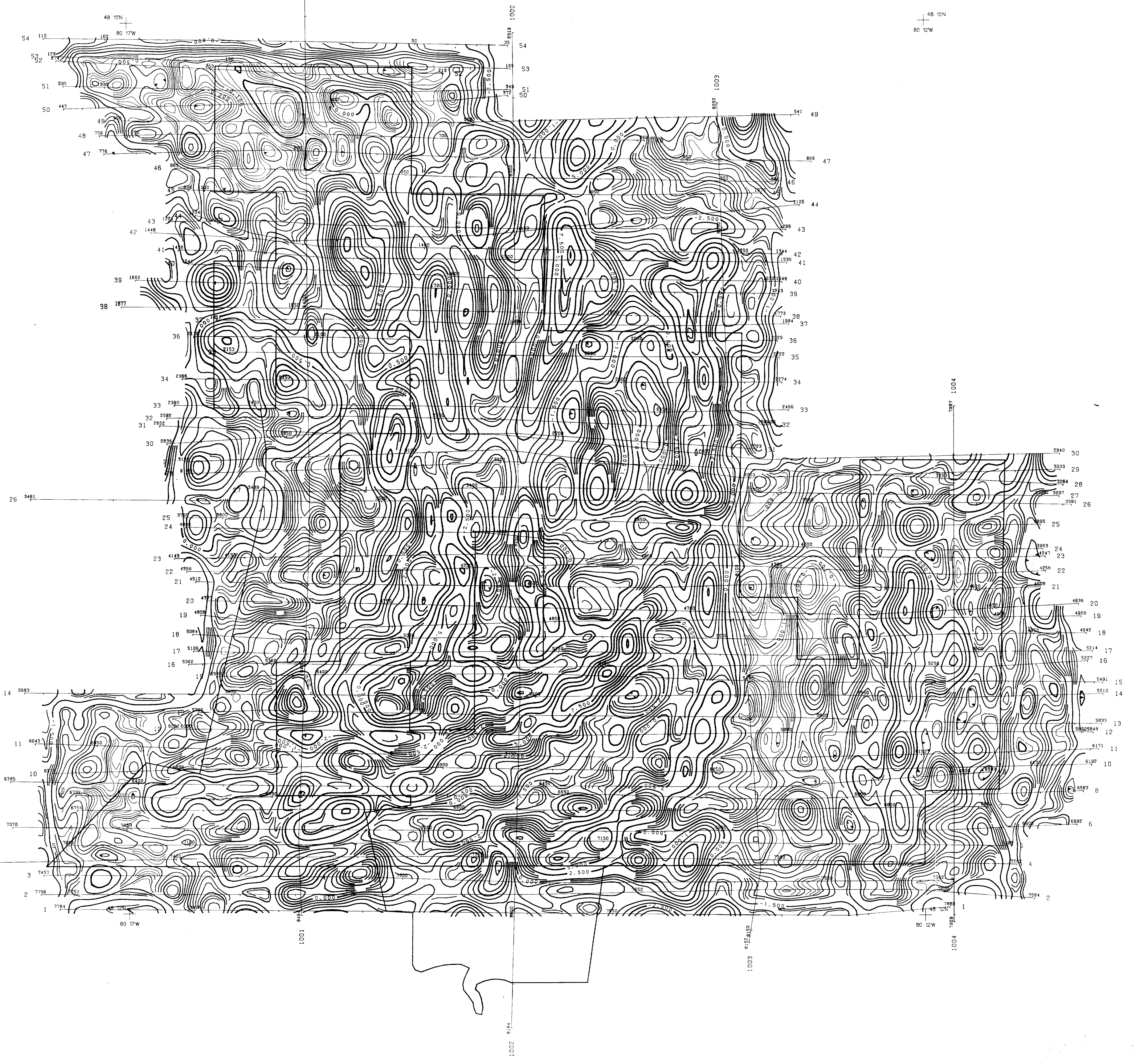
MAISONVILLE TOWNSHIP
ONTARIO

N.T.S. NO: 42A/1 DRAWING NO. A-521-1

SCALE 1:10,000 DATE: January 1986

TERRAQUEST LTD.
TORONTO, CANADA





LEGEND

- Terrain Clearance 100 meters
- Line Spacing 100 meters
- 2500 gammas / meter
- 500 gammas / meter
- 100 gammas / meter
- .025 gammas / meter

GLEN AUDEN RESOURCES

AIRBORNE MAGNETIC SURVEY
 VERTICAL MAGNETIC GRADIENT
 Calculated From Total Field

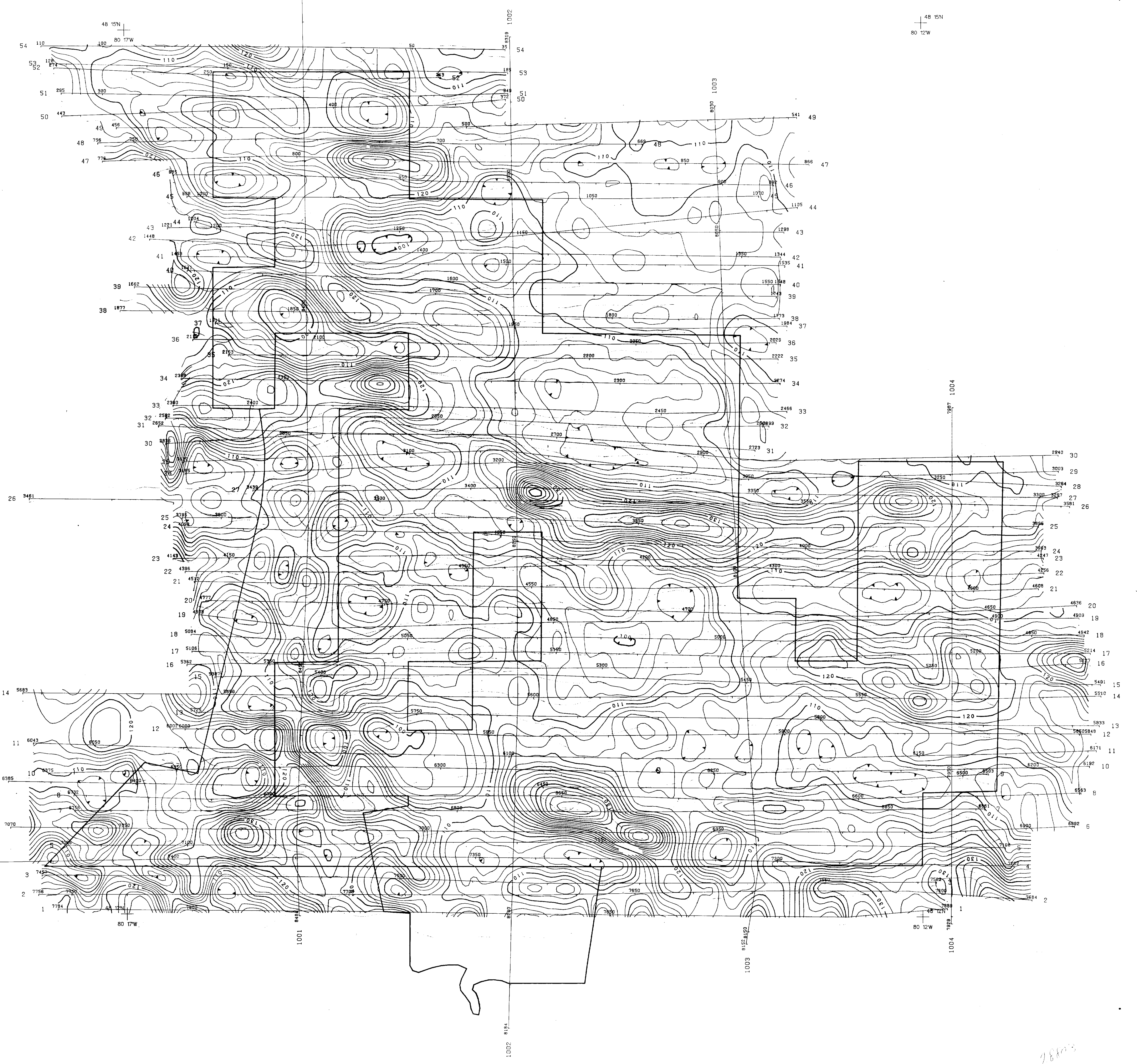
MAISONVILLE TOWNSHIP
 ONTARIO

N.T.S. NO: 42A/1 DRAWING NO. A-521-2

SCALE 1:10,000 DATE: January 1986

TERRAQUEST LTD.
 TORONTO, CANADA





230



VLF TRANSMITTER
Annapolis 21.4 kHz
152.07-AZ

LEGEND

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

GLEN AUDEN RESOURCES

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

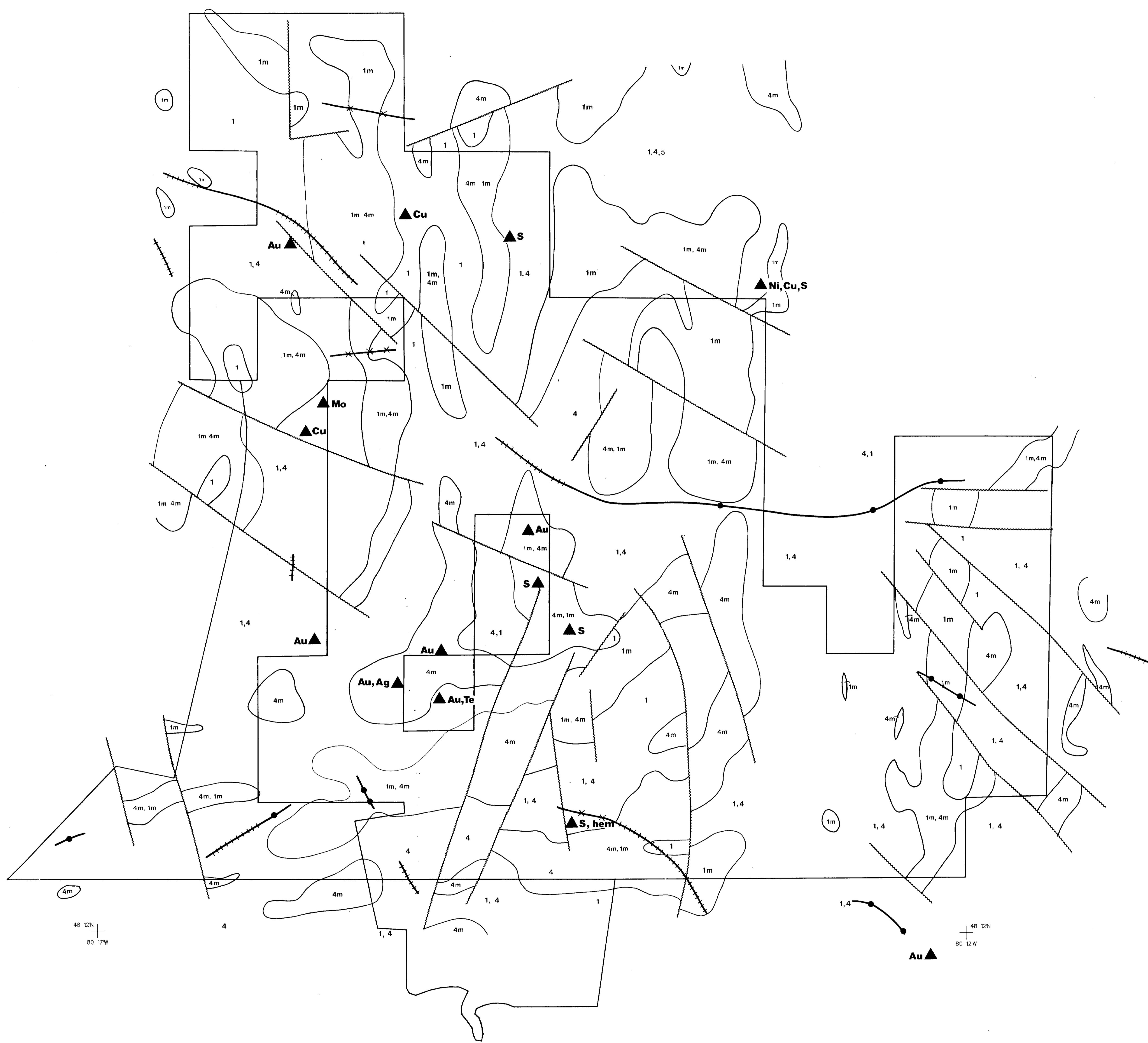
MAISONVILLE TOWNSHIP
ONTARIO

N.T.S. NO: 42A/1 DRAWING NO. A-521-3
SCALE 1:10,000 DATE: January 1986

TERRAQUEST LTD.
TORONTO, CANADA

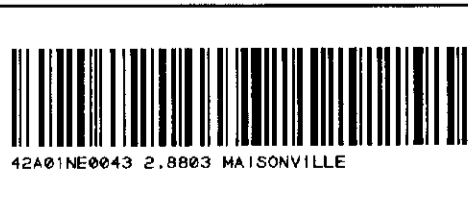
48 15N
80 17W

48 15N
80 12W



48 12N
80 17W

48 12N
80 12W



240



VLF TRANSMITTER
Annapolis 21.4 kHz
150° 0' Az.

LEGEND	
INTERPRETATION	LITHOLOGY
— Contact	5 Felsic intrusives
--- Fault	4 Magnetic gabbro
--- Property Boundary	4 Gabbroic
VLF-EM Conductor Axes	1m Magnetic units within 1
--- normal quadrature	1 Intermediate to mafic volcanics
--- reverse quadrature	
--- in phase only (no quadrature)	
SYMBOLS	SYMBOLS
▲ Mineralization	

GLEN AUDEN RESOURCES

INTERPRETATION

MAISONVILLE TOWNSHIP
ONTARIO

N.T.S. NO: 42A/1 DRAWING NO. A-521-4

SCALE 1:10,000 DATE: January 1986

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