REPORT ON A COMBINED HELICOPTER-BORNE MAGNETIC, ELECTROMAGNETIC AND VLF-EM SURVEYS MATACHEWAN AREA, ONTARIO

FOR

BIRALGER RESOURCES LTD.
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BY

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June 28, 1991

J9128

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TABLE OF

LIST OF MAPS

Maps are labelled according to map type. All black line and colour maps are presented at a scale of 1:10,000. The total magnetic field shadow map is presented at a scale of 1:20,000. Survey results are presented in one map sheet.

BLACK LINE MAPS: (Scale 1:10,000)

Map Type	Description
1.	**BASE MAP;** screened photomosaic base plus survey area boundary, UTM reference grid, title block and surrounds.
2.	**FLIGHT PATH MAP;** photocombination of the base map with flight lines, fiducials and EM anomaly symbols.
3.	**COMPILATION/INTERPRETATION MAP;** flight path map with interpretation.
4.	**TOTAL FIELD MAGNETIC CONTOURS;** with base map and flight lines.
5.	**VERTICAL MAGNETIC GRADIENT CONTOURS;** with base map and flight lines.
6.	**APPARENT RESISTIVITY CONTOURS;** apparent resistivity calculated for the 4600 Hz data, with base map and flight lines.
7.	**VLF-EM TOTAL FIELD CONTOURS;** with base map and flight lines.

COLOUR MAPS: (Scale (1:10,000)

1. **TOTAL FIELD MAGNETICS;** with superimposed contours, base map, flight lines and EM anomaly symbols.
2. **VERTICAL GRADIENT MAGNETICS;** with superimposed contours, base map, flight lines and EM anomaly symbols.
3. **APPARENT RESISTIVITY;** calculated for the 4600 Hz data with superimposed contours, base map, flight lines and EM anomaly symbols.
4. **VLF-EM TOTAL FIELD;** with superimposed contours and base map, flight lines, fiducials and EM anomaly symbols.

5A. **HEM OFFSET PROFILES;** 935 Hz 865 Hz, and 33,000 Hz data with base map, flight lines and EM anomaly symbols.

5B. **HEM OFFSET PROFILES;** 4175 Hz and 4600 Hz data with base map, flight lines and EM anomaly symbols.

DERIVATIVE COLOUR MAP: (Scale 1:20,000)

1-A. **TOTAL FIELD MAGNETICS SHADOW MAP;** at an illumination direction selected after consultation with Biralger.

REPORT ON A
COMBINED HELICOPTER-BORNE
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1. INTRODUCTION

This report describes airborne geophysical surveys carried out on behalf of Biralger Resources Ltd. (Biralger), by Aerodat Limited under a contract dated April 25, 1991. Principal geophysical sensors included a five frequency electromagnetic system, a high sensitivity cesium vapour magnetometer and a two frequency VLF-EM system. Ancillary equipment included an electronic navigation system, a colour video tracking camera, a radar altimeter, a power line monitor and a base station magnetometer.

The survey was carried out over an area of some 122 claims (approximately 20 square kilometres) located about 10 km northeast of Matachewan, Ontario. Total survey coverage was approximately 200 line kilometres (plus about 9 km of magnetic tie lines). The flight line spacing was 100 m. The Aerodat Job Number is J9128.

This report describes the survey, the data processing and the data presentation. Electromagnetic anomalies which are thought to be the response to bedrock conductors have been identified and appear on selected map products as EM anomaly symbols with interpreted source characteristics. Where EM and magnetic results supported it, anomaly centers are joined to form conductor axes. Recommendations concerning areas with favourable geophysical characteristics are made with reference to a compilation/interpretation map.

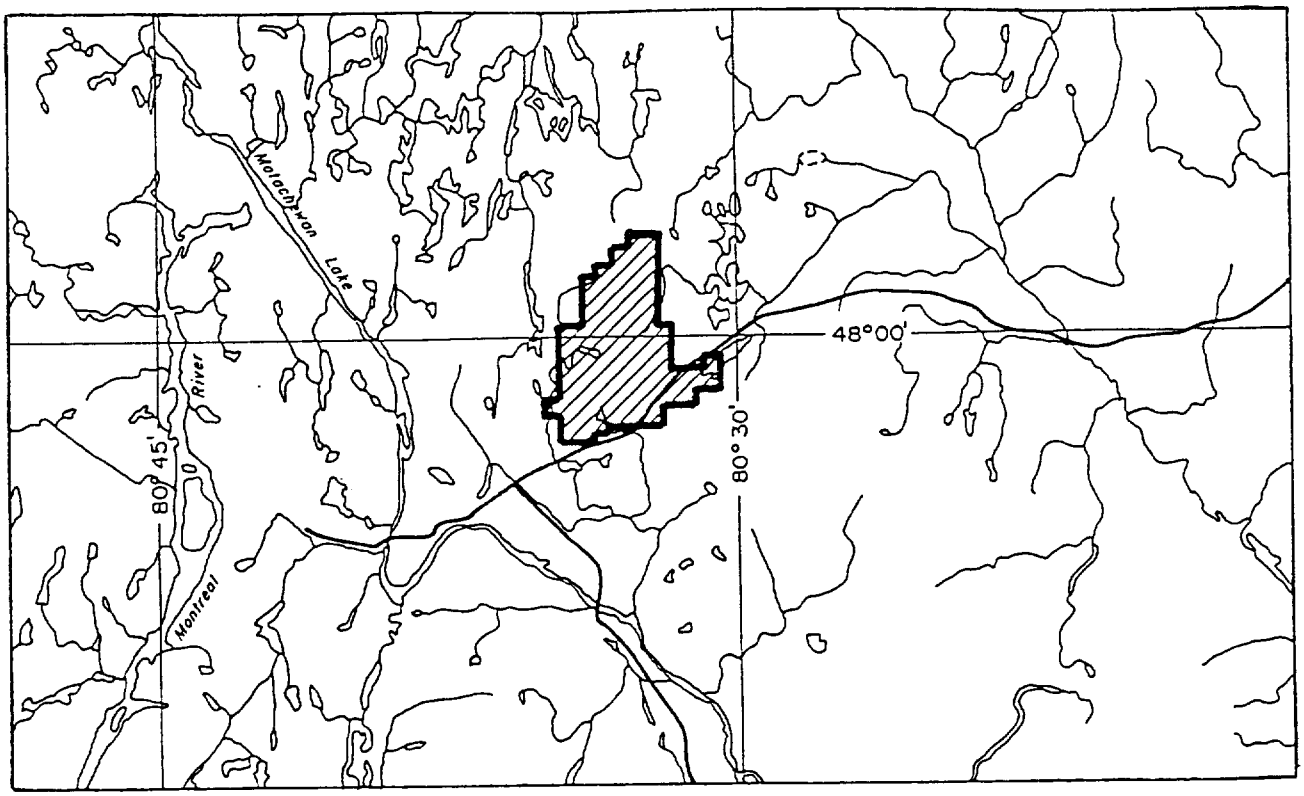
2. SURVEY AREA

The survey area is just north of Highway 66 and some 10 km northeast of Matachewan, Ontario. Area topography is shown on the 1:50,000 scale NTS maps 41P/15 - Matachewan and 42A/2 - Radisson Lake.

Local relief is moderate - elevations range from about 1100 to 1500 feet. Highway 66 from Matachewan to Kirkland Lake runs across the southeast corner of the survey area.

The survey area is shown in the attached index map which includes local topography and latitude - longitude coordinates. This index map also appears on all map legends.

The flight line direction was north-south. The survey areas were covered with a line spacing of 100 m. Three magnetic tie lines were flown.



AIRBORNE GEOPHYSICAL SURVEY
MATACHEWAN AREA, ONTARIO

on behalf of
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BY

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J9128

In this general area, the earth's magnetic field has a declination of 9° west of north and an inclination of 75°.

3. SURVEY PROCEDURES

The survey was flown on May 12 and 13, 1991. Principal personnel are listed in Appendix IV. Three (3) survey flights were required to complete the project.

The flight line spacing was 100 m. The aircraft ground speed was maintained at approximately 60 knots (30 metres per second). The nominal EM sensor height was 30 metres, consistent with the safety of the aircraft and crew.

A GPS (Global Positioning System) satellite based navigation system was used to guide the pilot over the survey grid and to generate a digital record of position. This is an autonomous system which does not require the installation of ground stations.

The UTM coordinates of survey area corners were taken from maps provided by Biralger. These coordinates are used to program the navigation system. A test flight was used to confirm that area coverage would be as required.

Thereafter the traverse lines are flown under the guidance of the navigation system. The navigator/operator marked manual fiducials over prominent topographic features. These were entered on the navigator's map - a 1:20,000 scale topographic map (a 2.5 times photographic enlargement of local 1:50,000 scale NTS maps). Survey lines which showed excessive deviation were re-flown.

The magnetic tie lines were flown using visual navigation in areas of low topographic and magnetic relief. Aircraft position was taken from the navigation system.

Calibration lines are flown at the start, middle (if required) and end of every survey flight. These lines are flown outside of ground effects to record electromagnetic zero levels.

4. DELIVERABLES

The results of the survey are presented in a report plus maps. The report is presented in four copies. White print copies of all black line maps are folded and bound with the report.

The colour maps are delivered in four copies. The shadow map is delivered in two copies. The colour and shadow maps are rolled and delivered in map tube(s).

A full list of all map types is given at the beginning of this report. A summary is given here.

MAP TYPE	DESCRIPTION
1	Base Map (Black line)
2	Flight Path Map (Black line)
3	Compilation/Interpretation Map (Black line)
4	Total Magnetic Field Contours (Black line)
5	Vertical Magnetic Gradient Contours (Black line)
6	Apparent Resistivity - 4600 Hz (Black line)
7	VLF-EM Total Field Contours (Black line)
1	Total Magnetic Field Contours (Colour)
2	Vertical Magnetic Gradient Contours (Colour
3	Apparent Resistivity Contours - 4600 Hz - (Colour)
4	VLF-EM Total Field Contours (Colour)
5A	HEM Offset Profiles - 935, 865 & 33,000 Hz (Colour)
5B	HEM Offset Profiles - 4175 & 4600 Hz (Colour)
1A	Total Field Magnetic Shadow Map (Colour)

All black line and colour maps are presented at a scale of 1:10,000. The shadow maps is presented at a scale of 1;20,000. All black line maps show a screened photomosaic base, a UTM reference grid and the survey area boundary. The survey area boundary is close to but not precisely on the claim boundaries. All colour and shadow maps show the survey area boundary and the UTM reference corners. Results are presented in one map sheet.

The processed digital data is organized on 9 track archive tape. Both the profile and the gridded data are saved on tape. A full description of the archive tape(s) is delivered with the tape(s).

All gridded data are also provided on diskettes suitable for displaying on IBM compatible 286 or 386 microcomputers using the Aerodat RTI software package.

All analog records, base station magnetometer records, flight path video tape and original map cronaflexes are delivered with the final presentation.

5. AIRCRAFT AND EQUIPMENT

5.1 Aircraft

A Bell 206L helicopter (C-GIBU), owned and operated by Canadian Helicopters, was used for the survey. Installation of the geophysical and ancillary equipment was carried out by Aerodat. The survey aircraft was flown at a mean terrain clearance of 60 metres.

5.2 Electromagnetic System

The electromagnetic system was an Aerodat 5-frequency system. Two vertical coaxial coil pairs were operated at 935 Hz, 865 Hz and 4,600 Hz and two horizontal coplanar coil pairs at 4,175 and 33,000 Hz. The transmitter-receiver separation was 7 metres. Inphase and quadrature signals were measured simultaneously for the 4 frequencies with a time constant of 0.1 seconds. The HEM bird was towed 30 metres below the helicopter.

5.3 VLF-EM System

The VLF-EM System was a Herz Totem 2A. This instrument measures the total field and vertical quadrature components of two selected frequencies. The sensor was towed in a bird 15 metres below the helicopter.

VLF transmitters are designated "Line" and "Ortho". The line station is that which is in a direction from the survey area which is ideally normal to the flight line direction. This is the VLF station most often used because of optimal coupling with near vertical conductors running perpendicular to the flight line direction. The ortho station is ideally 90 degrees in azimuth away from the line station.

The transmitters used were NAA, Cutler, Maine broadcasting at 24.0 kHz and NLK, Jim Creek, Washington broadcasting at 24.8 kHz. NAA, Cutler at 24.0 kHz was used as the line station for all survey flights. From the survey area, Cutler is 20° south of east.

5.4 Magnetometer

The magnetometer employed was a Scintrex H8 cesium, optically pumped magnetometer sensor. The sensitivity of this instrument is 0.001 nanoTeslas at a 0.2 second sampling rate. The sensor was towed in a bird 15 metres below the helicopter.

5.5 Ancillary Systems

Base Station Magnetometer

An IFG-2 proton precession magnetometer was set up at the base of operations to record diurnal variations of the earth's magnetic field. The clock of the base station was synchronized with that of the airborne system to facilitate later correlation. Recording resolution was 1 nT. The update rate was 4 seconds.

External magnetic field variations are recorded on a 3" wide paper chart and in digital form. The analog record shows the magnetic field trace plotted on a grid. Each division of the grid (0.25") is equivalent to 1 minute (chart speed) or 5 nT (vertical sensitivity). The date, time and current total field magnetic value are printed every 10 minutes.

Radar Altimeter

A King KRA-10 radar altimeter was used to record terrain clearance. The output from the instrument is a linear function of altitude.

Tracking Camera

A Panasonic colour video camera was used to record flight path on VHS video tape. The camera was operated in continuous mode. The flight number, 24 hour clock time (to .01 second), and manual fiducial number are encoded on the video tape.

GPS Navigation System

A Trimble TANS GPS positioning system was used to guide the pilot over a programmed grid. The UTM coordinates were digitally recorded. The output sampling rate is 1 second. Positional coordinates are recorded with a resolution of 0.1 m.

Analog Recorder

A RMS dot matrix recorder was used to display the data during the survey. Record contents are as follows:

Label	Contents	Scale
GEOPHYSICAL SENSOR DATA		
MAGF	Total Field Magnetics, Fine	2.5 nT/mm
MAGC	Total Field Magnetics, Course	25 nT/mm
VLT	VLF-EM, Total Field, Line Station	2.5 %/mm
VLQ	VLF-EM, Vertical Quadrature, Line Station	2.5 %/mm
VOT	VLF-EM, Total Field, Ortho Station	2.5 %/mm
VOQ	VLF-EM, Vertical Quadrature, Ortho Station	2.5 %/mm
CXI1	935 Hz, Coaxial, Inphase	2.5 ppm/mm
CXQ1	935 Hz, Coaxial, Quadrature	2.5 ppm/mm
CPI1	865 Hz, Coplanar, Inphase	10 ppm/mm
CPQ1	865 Hz, Coplanar, Quadrature	10 ppm/mm
CXI2	4600 Hz, Coaxial, Inphase	2.5 ppm/mm
CXQ2	4600 Hz, Coaxial, Quadrature	2.5 ppm/mm
CPI2	4175 Hz, Coplanar, Inphase	10 ppm/mm
CPQ2	4175 Hz, Coplanar, Quadrature	10 ppm/mm
CPI3	33000 Hz, Coplanar, Inphase	20 ppm/mm
CPQ3	33000 Hz, Coplanar, Quadrature	20 ppm/mm
ANCILLARY DATA		
RALT	Radar Altimeter	10 ft/mm
PWRL	60 Hz Power Line Monitor	-

The analog zero of the radar altimeter trace is 5 cm from the top of the analog record. A helicopter terrain clearance of 60 m (197 feet) will be seen as an analog trace 3 cm from the top of the analog record.

Chart speed is 2 mm/second. The 24 hour clock time is printed every 20 seconds. The total magnetic field value is printed every 30 seconds. The ranges or preliminary UTM coordinates from the radar navigation system are printed every minute.

The analog records for flight 3 show a 24 hour clock time which is some 6.5 minutes slow relative to the flight path map. A time of 8:02:00 for example is equivalent to position 8:08:30 on the flight path map (see section 6.2 below).

Vertical lines crossing the record are operator activated manual fiducial markers. The start of any survey line is identified by two closely spaced manual fiducials. The end of a2ny survey line is identified by three closely spaced manual fiducials. Manual fiducials are numbered in order. Every tenth manual fiducial is indicated by its number, printed at the bottom of the record.

Calibration sequences are located at the start and end of each flight and at intermediate times where needed.

Digital Recorder

A DGR-33 data system recorded the digital survey data on magnetic media. Contents and update rates were as follows:

DATA TYPE	RECORDING INTERVAL	RECORDING RESOLUTION
Magnetometer	0.2 s	0.001 nT
VLF-EM (4 Channels)	0.2 s	0.03 %
HEM (10 Channels)	0.1 s	0.03 ppm (coaxial), 0.06 ppm (coplanar - 4175 Hz) 0.125 ppm (coplanar - 33 kHz)
Position (2 Channels)	0.2 s	0.1 m
Altimeter	0.2 s	0.05 m
Power Line Monitor	0.2 s	-
Manual Fiducial		
Clock Time		

seconds. This low effective time constant gives minimal profile distortion. Following the filtering process, a base level correction was made using EM zero levels determined during high altitude calibration sequences. The correction applied is a linear function of time that ensures the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and levelled data were used in the determination of apparent resistivity (see below).

6.4 Total Field Magnetics

The aeromagnetic data were corrected for diurnal variations by adjustment with the recorded base station magnetic values. Where needed, the magnetic tie line results were used to further level the magnetic data. No corrections for regional variations were applied. The data was reduced to the pole. The corrected profile data were interpolated on to a regular grid using an Akima spline technique. The grid provided the basis for threading the presented contours. The minimum contour interval is 2 nT. A grid cell size of 25 m was used.

A page size copy of the black line contour map of the total magnetic field is attached.

6.5 Vertical Magnetic Gradient

The vertical magnetic gradient was calculated from the gridded total field magnetic data. The calculation is based on a 17 x 17 point convolution in the space domain. The results are contoured using a minimum contour interval of 0.2 nT/m. Grid cell sizes are the same as those used in processing the total field data.

6.6 Apparent Resistivity

The apparent resistivity is calculated by assuming a 200 metre thick conductive layer over resistive bedrock. The computer determines the resistivity that would be consistent with the sensor elevation and recorded inphase and quadrature response amplitudes at the selected frequency. The apparent resistivity profile data were interpolated onto a regular grid at a 25 metres true scale interval using an Akima spline technique and contoured using logarithmically arranged contour intervals. The minimum contour interval is 0.1 log(ohm.m). This gives contour lines at 100, 126, 158, 200, 251, 316, 398, 501, 631 and 794 ohm.m and multiples of 10 thereof.

The highest measurable resistivity is approximately equal to the transmitter frequency. There is no lower limit on apparent resistivity.

6.7 VLF-EM

The VLF Total Field data from the Line Station is levelled such that a response of 0% is seen in non-anomalous regions. The corrected profile data are interpolated onto a regular grid using an Akima spline technique. The grid provided the basis for threading the presented contours. The minimum contour interval is 1%. Grid cell size is 25 m.

6. DATA PROCESSING AND PRESENTATION

6.1 Base Map

The base map is a semi-controlled photomosaic prepared by Aerodat using aerial photographs form the Government of Ontario. UTM reference corners and the survey area boundary were added.

6.2 Flight Path Map

The flight path is drawn using linear interpolation between x,y positions from the navigation system. These positions are updated every second (or about 3 mm at a scale of 1:10,000). These positions are expressed as UTM eastings (x) and UTM northings (y).

Occasional dropouts occur when ranges to the ground transponders are lost. Interpolation is used to cover short gaps in the flight path. The navigator's flight path and/or the flight path recovered from the video tape may be stitched in to cover larger gaps. Such gaps may often be recognized by the distinctive straight line character of the flight path.

The manual fiducials are shown as a small circle and labelled by fiducial number. The 24 hour clock time is shown as a small square, plotted every 30 seconds. Small tick marks are plotted every 2 seconds. Larger tick marks are plotted every 10 seconds. The line and flight numbers are given at the start and end of each survey line.

The flight line and flight numbers are shown at both ends of each survey line. 104803 indicates for example, survey line 48 of survey flight number 3.

The flight path map is merged with the base map by matching UTM coordinates from the base maps and the flight path record. The match is confirmed by checking the position of prominent topographic features as recorded by manual fiducial marks or as seen on the flight path video record.

6.3 Electromagnetic Survey Data

The electromagnetic data were recorded digitally at a sample rate of 10 per second with a time constant of 0.1 seconds. A two stage digital filtering process was carried out to reject major sferic events and the reduce system noise.

Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events.

The signal to noise ratio was further enhanced by the application of a low pass digital filter. This filter has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 0.25

seconds. This low effective time constant gives minimal profile distortion. Following the filtering process, a base level correction was made using EM zero levels determined during high altitude calibration sequences. The correction applied is a linear function of time that ensures the corrected amplitude of the various inphase and quadrature components is zero when no conductive or permeable source is present. The filtered and levelled data were used in the determination of apparent resistivity (see below).

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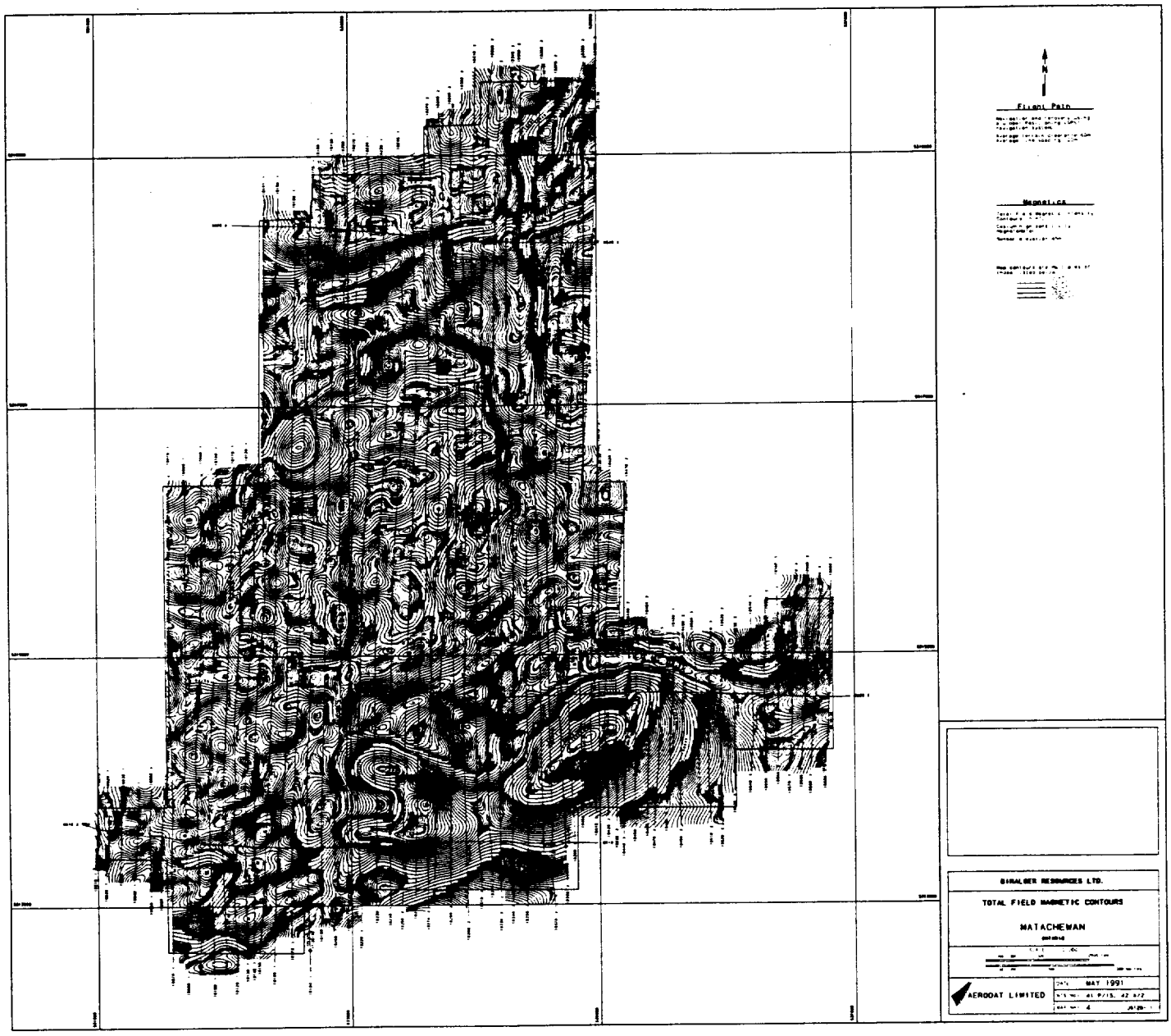
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Flight Path
Magnetics
BIRALBER RESOURCES LTD.
TOTAL FIELD MAGNETIC CONTOURS
MATACHEWAN
AERODAT LIMITED
MAY 1991

For all of flight 3, Cutler was off. For the survey lines of flight 3 (45 to 60) covering the eastern most part of the survey area, the Ortho station (Jim Creek at 24.8 kHz) VLF data has been used to generate the total field contour map.

A preliminary map of the VLF total field using the ortho station (Jim Creek) data for the whole survey was generated to determine if it would be noticeably different from that determined using a mix of Cutler (flights 1 and 2) and Jim Creek (flight 3) data. No significant differences were seen and the final presentation was made up using data from the two stations.

7. INTERPRETATION

7.1 Area Geology

Ideas on area geology and the exploration target have been taken from material supplied by Ray Bernatchez, consulting geologist to Biralger Resources Ltd. These materials included copies of

1. An evaluation of the Matachewan Properties, Alma, Cairo, Flavelle Townships, Northern Ontario, for Biralger Resources Ltd., by R.A. Bernatchez, December 4, 1990.

2. A Report on the Cairo Project, Cairo Township, Matachewan, Ontario, for Biralger Resources Ltd., by R.A. Bernatchez, March 1991.

3. 1:2,500 scale maps showing results of a ground magnetometer and VLF survey over some 13 claims just north of Highway 66. Total coverage is about 16 line kilometres with 100 and 200 m line spacings. Survey conducted in February 1991 by R.A. Bernatchez.

4. A 1:1,500 scale planimetric map of Cairo Township and parts of Powell Township showing mineral occurrences, drillhole locations, major shear zones and VLF-EM conductor axes.

5. Page size geology sketch of areas west and north of Matachewan plus part of the 1:50,000 scale GSC aeromagnetic maps.

6. A number of published papers on area geology.

The survey area is centered over the eastern part of the Cairo stock, a large syenite intrusion. The Cairo stock and related dykes and plugs of trachytic syenite and syenite porphyry intrude a folded and green schist facies metamorphosed sequence of Archaean volcanic and sedimentary rocks. The volcanic rocks are mainly andesite and basalt flows and pyroclastic rocks. Some ultramafic flows are also present in the area.

Deformation associated with the Larder Lake - Cadillac break has been recorded in all of the lithologies listed above. This regional deformation zone has been traced from Kirkland Lake to just east of the survey area and from the Matachewan townsite area to just south-west of the survey area. All of the large gold deposits are found within a few kilometres of this deformation zone in the Kirkland Lake - Larder Lake area and west of Matachewan. Tracing this deformation zone through the survey area is an exploration priority.

Proterozoic rocks include diabase dykes of the Matachewan dyke swarm which trend n/s and cut the Archaean stratigraphy but are overlain unconformably by sedimentary rocks, mainly conglomerate.

The survey area is dominated by the Cairo stock - a syenite intrusion into older metavolcanics and metasediments. These older rocks are seen trending ne/sw in the extreme south east corner of the survey area. Their extent on geology maps is limited because of overlying Proterozoic sediments. The local aeromagnetic data (from published GSC maps) suggests they extend under the sediments to the south-east. The aeromagnetic trends which probably mirror the volcanics extend along strike for tens of kilometres to the northeast and southwest. The distinctive aeromagnetic anomalies found in the south-east part of the survey area are typical of a line of regional anomalies which defines or is close to the Cadillac break.

The poor understanding of the Cadillac break within the survey area is an intriguing mystery. Locating the possible trace of this break should allow for the possibility that it may be seen as several ne/sw trending parallel deformation zones separated from each other by as much as 2 to 3 km. At least two regional deformation zones may cross the survey area.

7.2 Exploration Target

The exploration target is gold. Gold bearing deposits in the Matachewan area are classified into four separate types: A) syenite hosted deposits; B) volcanic hosted deposits; C) porphyry copper molybdenum deposits and D) quartz veins.

A) Syenite hosted deposits
Most of the gold mined in the Matachewan area are of this type - e.g. Young - Davidson and Matachewan Consolidated. These two deposits are at opposite ends of a trachytic syenite 1000 m long and up to 200 m wide. This body trends e/w and is subparallel to and close to the contact between volcanic and sedimentary rocks. Deposits mined were on the order of one to five million tons with an average grade of 3.4 g/t gold. These deposits are 3 to 4 km west of Matachewan.

B) Volcanic hosted deposits
These deposits occur as auriferous pyrite and native gold in quartz veins and stringers and along fractures. The host rocks are mainly massive basaltic flows and interbedded tuffs with some ultramafic flows and sediments. These deposits are typically 10,000 to 100,000 tonnes averaging 5 to 10 g/t gold. These deposits

are less than 1 km east of the Matachewan Consolidated gold deposit - type A (see above).

C) Porphyry Copper Molybdenum deposits
These are primarily base metal deposits that contain gold on the order of 0.17 to 0.34 g/t gold. Though generally low grade (less than 0.5% copper) some of the deposits of this type are extensive. The Cairo - Flavelle deposit is located in the southeast corner of the survey area.

These deposits are essentially quartz veinlet stockworks associated with small intrusions of syenite porphyry. Mineralized zones contain chalcopyrite, molybdenite with some pyrite (0.5%) and magnetite (2%). These deposits were formed by hydrothermal alteration.

D) Quartz vein deposits
Large quartz veins that contain gold occur throughout the Matachewan area. Veins or vein systems are up to 250 m long and 0.1 to 12 m wide. They are composed mainly of quartz with some sections of abundant to massive pyrite and in places abundant galena, sphalerite, and chalcopyrite. The McChesney deposit on the extreme eastern edge of the Cairo stock and just east of the survey area is of this type.

The most probable deposit type in the survey area is considered to be type C - porphyry copper - molybdenum deposits such as the Cairo - Flavelle deposit. All deposit types are considered possible.

It is hoped that the airborne geophysical data can define possible regional deformation zones and local expression of these zones. Locally high apparent resistivities and/or concentrations of magnetite may be geophysical characteristics of preferred target areas.

7.3 EM Anomaly Selection and Analysis

A. Selection

EM anomalies have been picked from analog records and offset profile maps. The selection is based on satisfying any of the following criterion.

* a detectable 935 Hz inphase response.
* a positive 4600 Hz inphase or quadrature response with coincident 4175 Hz inphase or quadrature low.
* a positive 4600 Hz inphase response with a coincident proportionately higher 4175 Hz inphase response

These criteria should result in the identification of all possible bedrock conductors. Even horizontal conductors should be identifiable by the edge effects. (see Appendix 1).

These criteria reject EM anomalies due to gradual changes in overburden thickness or

resistivity. For such anomalies, the coaxial and coplanar channels (either inphase or quadrature) for the same operating frequency move together and no separation is seen. This information is best seen in the contour maps of apparent resistivity.

The width of an anomaly from a bedrock conductor will depend principally on depth of burial, dip and orientation with respect to flight line direction. A near vertical conductor running normal to the flight lines will yield a coaxial EM anomaly whose width is about 2.5 times the source-sensor separation (measured from 20% of the anomaly peak). The anomaly from such conductors at surface will therefore be about 80 m. The comparable figures for a conductor under 50 m of overburden is 220 m.

Anomalies are judged to be due to cultural sources if there is a coincident response in the power line monitor as seen on the analog records. Where EM anomalies of a uniform style line up over a major road, railroad or other man made conductor but where there is no response in the power line monitor, such anomalies are also shown as due to cultural sources.

Special care is taken in areas of negative inphase response (due to magnetite). The quadrature channels may be the only indicators of a coincident conductor.

B. Analysis

The EM anomaly response amplitudes at 4600 Hz are used to estimate the conductance and depth of burial of a vertical thin sheet conductor model. These data appear in the anomaly listings in Appendix II.

The inphase anomaly amplitude and the thin sheet conductance range as determined from the 4600 Hz response amplitudes are shown with the plotted anomaly symbols. Each anomaly is identified by flight line number and letter.

Cultural anomalies are shown as open squares. Each anomaly is identified by a letter.

Conductive overburden will generally reduce thin sheet conductance estimates because of elevated background levels in the quadrature channels. Depth of burial estimates will in general be too small.

7.4 General Comments

EM

The 4600 Hz apparent resistivity map shows variations from less than 1000 ohm-m to greater than 5000 ohm-m.

All of the low and middle frequency (900 and 4500 Hz) data show low amplitude, long period variations but no significant sharp anomalies. This implies the absence of near vertical high conductance bedrock conductors such as graphites or massive sulphides.

Some EM anomalies have been picked from the 4500 Hz coaxial/coplanar quadrature channels. These anomalies were picked where the 4600 Hz quadrature trace locally separates from the 4175 Hz quadrature trace. These are thought to represent extremely weak bedrock conductors such as faults or edge effects. Edge effects are seen at the contact between two rock units of different resistivity or at a sharp change in overburden resistivity.

Relatively large areas of the offset profile maps show negative inphase anomalies. These are due to anomalously high concentrations of magnetite. As a rough rule of thumb, a negative anomaly in either coaxial EM channel (935 or 4600 Hz) of 1 ppm is equivalent to about 0.2% weight percent magnetite. Typical negative peak amplitudes are -10%. This implies roughly 2% weight percent magnetite.

MAGNETICS

The total field magnetic map shows large ne/sw trending anomalies in the southern part of the survey area. Peak amplitudes are 61,000 to 62,000 nT with background values of about 58,750 nT. The largest anomaly in amplitude and extent has a peak of almost 4000 nT over background. This anomaly is seen on the 1:50,000 scale GSC aeromagnetic maps as a 3000 nT anomaly whose major axis sits on or near Highway 66.

The middle of the survey area is seen as an area of elliptical magnetic anomalies of intermediate amplitude (50 to 250 nT) and no preferred orientation. These patterns are typical of felsic intrusives.

In the northern part of the survey area, an e/w or ene/wsw trend is re-established with a prominent magnetic low running across the entire survey area. This feature may be associated with a deformation zone which is part of the extended Cadillac break.

The calculated vertical gradient data shows the same overall pattern as seen in the total field map but in greater detail. The high magnetic features in the south appear as VG anomalies with peaks of 25 to over 100 nT/m. The lesser magnetic anomalies in the center of the survey area have peak amplitudes of 1 to 10 nT/m.

The outline of steeply dipping magnetic sources is often taken from the zero contour line of the VG contour map. This is reliable where the source is wide (i.e. on the order of 200 m or more). For narrower sources, the VG anomaly does not change shape and the determination of whether the source is wide or narrow is a geological decision.

Magnetic axes, shown on the compilation map (see below), have been taken from the peak location of VG anomalies with peak amplitudes greater than 5 nT/m.

Possible faults have been drawn along breaks or discontinuities as seen in the black line contour map of the vertical gradient. Supporting evidence from the total field magnetic and VLF-EM contour maps has been considered.

VLF

The contoured VLF total field data shows variations of from -20% to +35%. The strongest anomaly trends ene/wsw across the top of the survey area. Peak amplitudes are on the order of 15 to 35%. These VLF anomalies lie on the aeromagnetic total field low which might be the geophysical response to a deformation zone.

In the center part of the survey area, VLF anomalies favour the ese direction of the transmitter (Cutler) although an ene/wsw grain is also present.

In the southern part of the area, moderate amplitude VLF anomalies (5 to 15%) trend e/w or nen/wsw. As in the north, VLF highs lie over aeromagnetic lows. The pattern is more confused however on ene/wsw structural feature in this part of the survey area appears to have been broken and displaced.

7.5 Compilation Map

The compilation map shows:

- EM conductor axes
- magnetic axes (moderate and strong)
- faults (inferred from the magnetics)
- areas of anomalous weight percent magnetite
- VLF conductor axes
- favourable target area labels
- outline of known mineral deposits

A page size copy of the compilation map is attached.

Conductor axes are drawn through EM anomaly centers using similarities in EM anomaly patterns and magnetic strike from the contoured vertical gradient map.

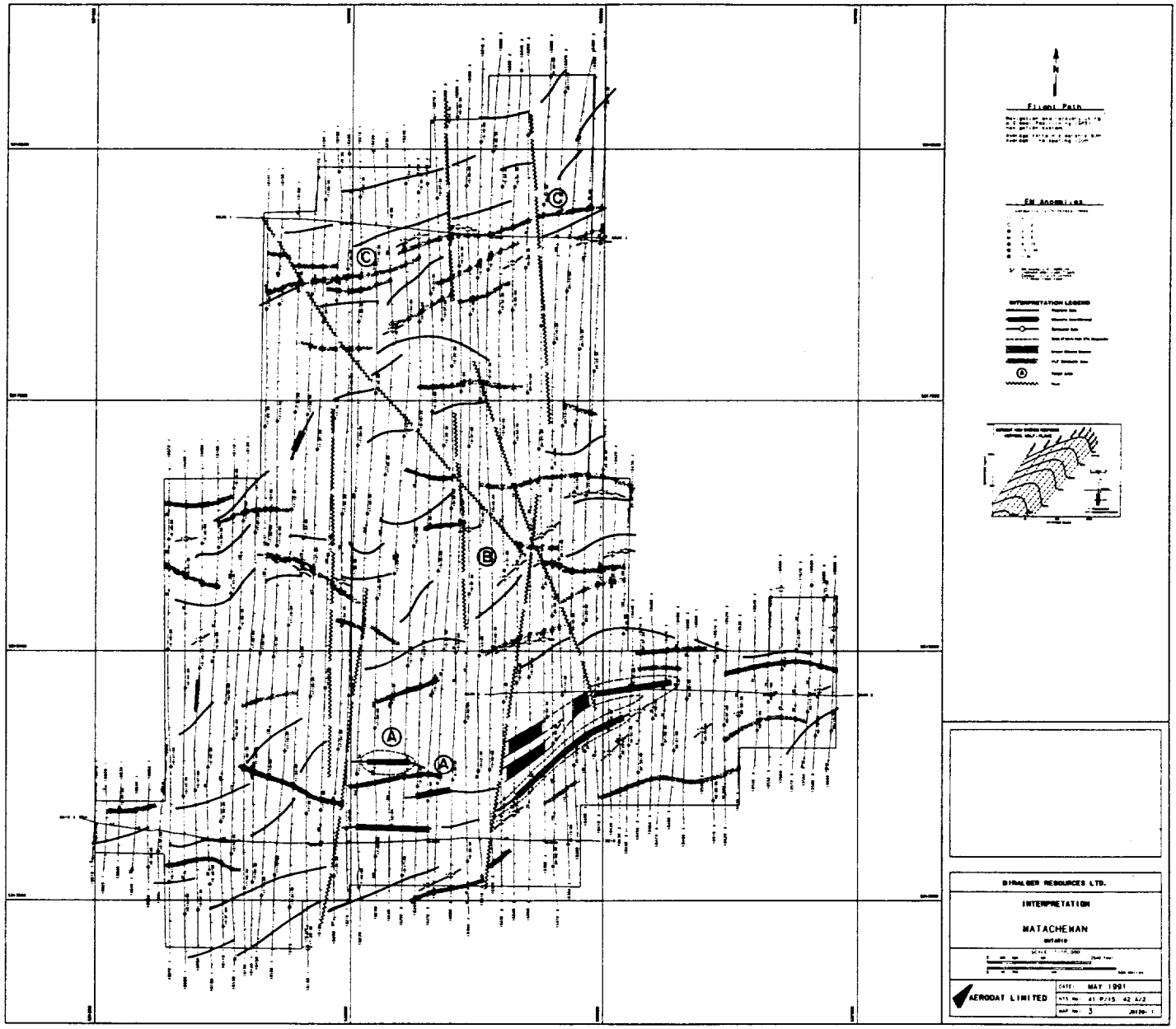
Magnetic axes are drawn through the peak of prominent vertical gradient anomalies. Strong axes indicate peak amplitudes of 25 nT/m or more.

Faults are inferred from breaks seen in the black line contour map of vertical gradient data.

Areas of anomalous weight percent magnetite have been taken from the offset profiles of the 4600 Hz inphase data. Negative anomalies of more than about 5 ppm are included.

7.6 Favourable Areas

Major features of the geophysical setting of the porphyry copper-molybdenum deposits near the eastern edge of Cairo Township are shown on the compilation map. These deposits are seen to be 100 to 200 m north of the source of a strong (4000 nT) aeromagnetic anomaly. The source outline has been taken from the contoured vertical gradient data and a coincident zone of high magnetite content.


N
Flight Path
EM Anomalies
INTERPRETATION LEGEND
A
B
C
BYRALGER RESOURCES LTD.
INTERPRETATION
MATACHEWAN
ONTARIO
AERODAT LIMITED
DATE: MAY 1991
NTS No: 41 P/15, 42 A/2
MAP No: 3

The Cairo-Flavelle deposit, on the Township boundary is seen on strike with another strong magnetic feature. The two are interrupted by a possible fault. The source outline across the fault appears consistent. Only the geophysical character changes when moving from east to west across this interpreted fault.

These mineral deposits have no clear geophysical signature. This applies in particular to EM and VLF data - both sensors show a lack of response over the known deposits.

Some 500 m northwest of the Cairo-Flavelle deposit are ene/wsw trending EM anomalies and near coincident VLF conductor axis. The EM anomalies are thought to represent a contact between more conductive rocks to the north and less conductive rocks to the south. This may be a geological contact or an expression of the McChesney fault.

Target areas are shown on the compilation map as A, B and C.

Both A symbols indicate areas with a geophysical setting similar to that of the Cairo-Flavelle deposit. They are shown 100 to 200 m north of the high magnetic feature some 1000 m west of the known deposits and again immediately east of the same anomaly. Both areas are free of VLF and EM responses.

Target B is at the junction of a number of possible faults, VLF and EM conductor axes. It is in an area of low magnetic relief and amplitudes. It may be on or near the McChesney fault.

Target type C is meant to indicate the probable deformation zone which may pass across the northern part of the survey area. Further work would focus on the e/w trending zone of EM and VLF conductor axes and coincident magnetic low. Cross-cutting faults might be areas of special interest.

8. CONCLUSIONS

High resolution helicopterborne geophysical surveys have been completed over an area of about 20 square kilometres located 10 km northeast of Matachewan, Ontario. Total coverage is 200 line kilometres plus magnetic tie lines. Results are presented on black line and colour maps at a scale of 1:10,000. Map types include EM anomaly centres, apparent resistivity, contoured magnetic field, contoured vertical magnetic gradient and contoured VLF-EM Total Field data.

Preferred geophysical characteristics have been built up from a model geological target. These characteristics have been extracted from various map products and transferred to a compilation/interpretation map. Favourable areas are discussed with reference to this compilation map.

Respectfully submitted,

Ian Johnson, Ph.D., P.Eng.
Consulting Geophysicist
for
AERODAT LIMITED
June 28, 1991

J9128

REGISTERED PROFESSIONAL ENGINEER
I. M. JOHNSON
PROVINCE OF ONTARIO

APPENDIX I

GENERAL INTERPRETIVE CONSIDERATIONS

Electromagnetic

The Aerodat four frequency system utilizes two different transmitter-receiver coil geometries. The traditional coaxial coil configuration is operated at two widely separated frequencies. The horizontal coplanar coil configuration is similarly operated at two different frequencies where at least one pair is approximately aligned with one of the coaxial frequencies.

The electromagnetic response measured by the helicopter system is a function of the "electrical" and "geometrical" properties of the conductor. The "electrical" property of a conductor is determined largely by its electrical conductivity, magnetic susceptibility and its size and shape; the "geometrical" property of the response is largely a function of the conductor's shape and orientation with respect to the measuring transmitter and receiver.

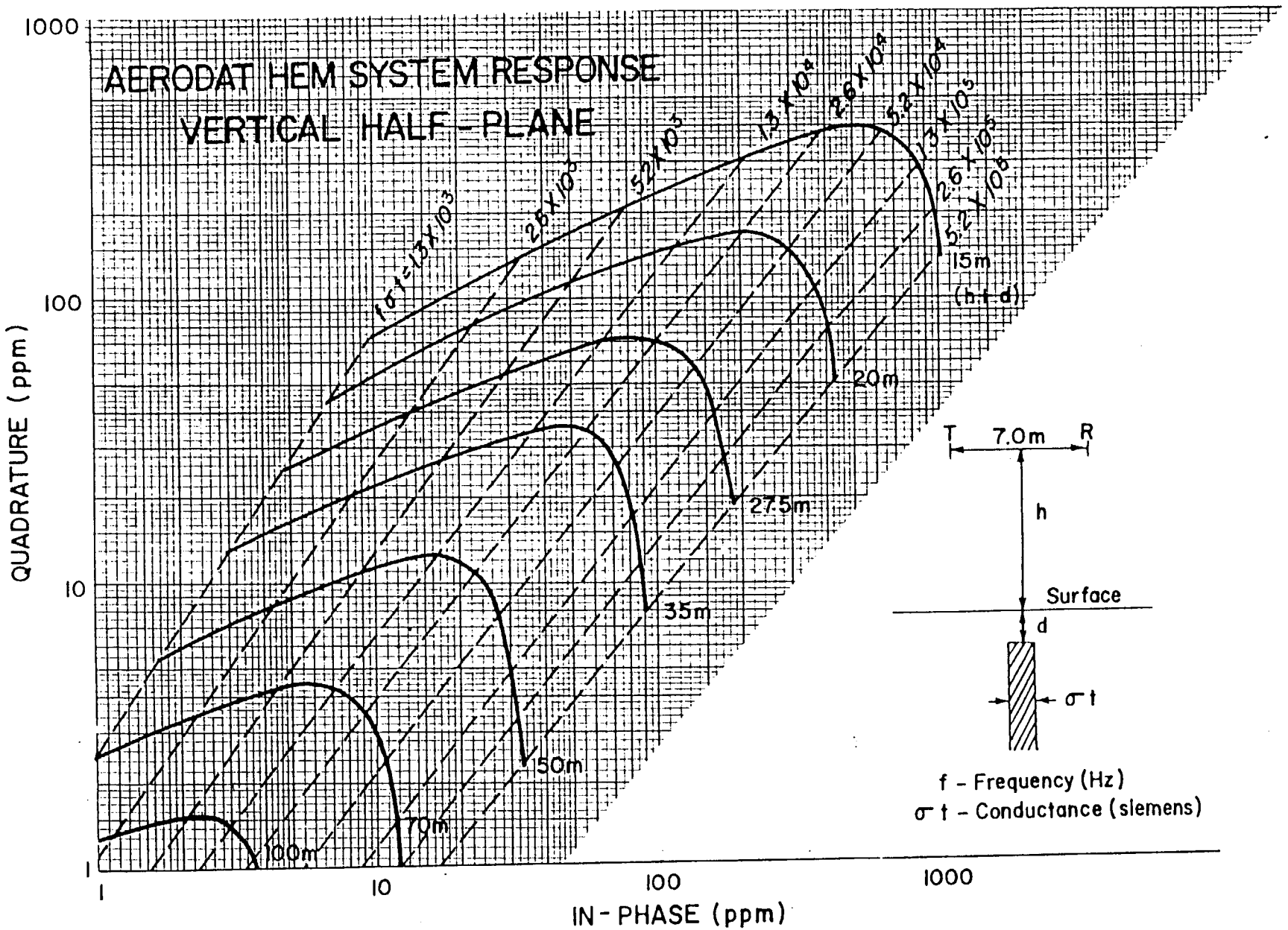
Electrical Considerations

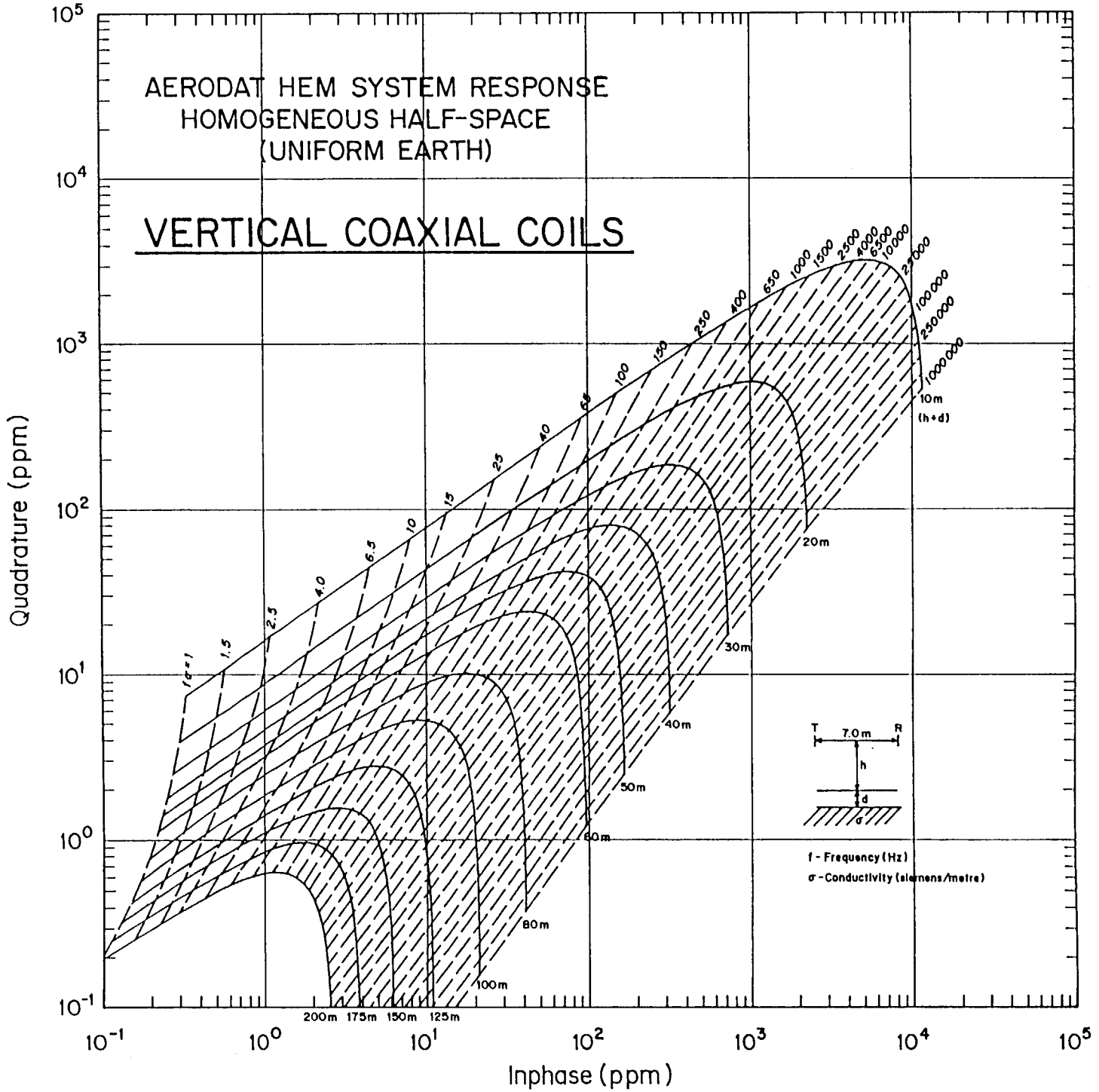
For a given conductive body the measure of its conductivity or conductance is closely related to the measured phase shift between the received and transmitted electromagnetic field. A small phase shift indicates a relatively high conductance, a large phase shift lower conductance. A small phase shift results in a large inphase to quadrature ratio and a large phase shift a low ratio. This relationship is shown quantitatively for non-magnetic vertical half-plane and half-space models on the accompanying phasor diagrams. Other physical models will show the same trend but different quantitative relationships.

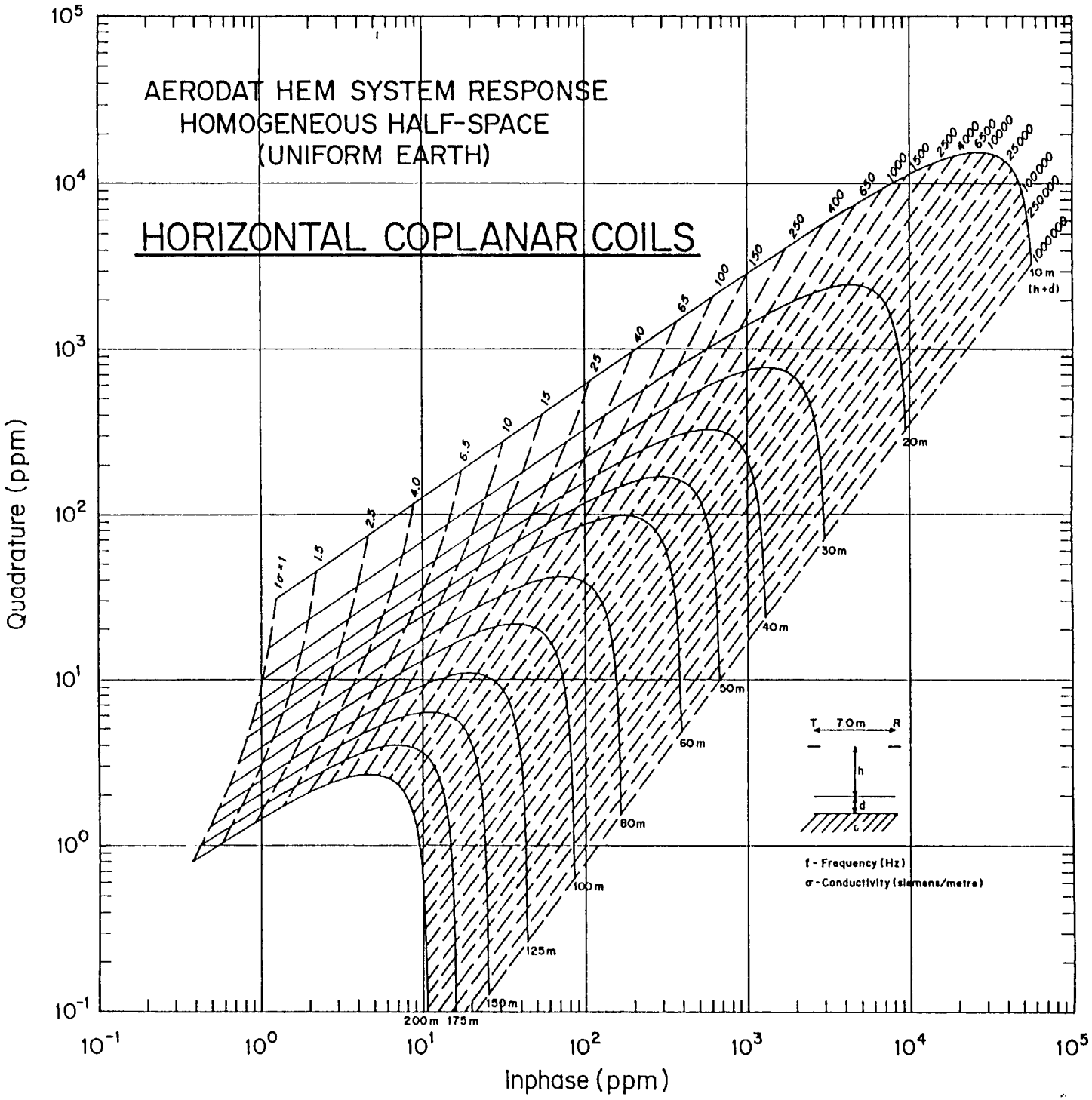
The phasor diagram for the vertical half-plane model, as presented, is for the coaxial coil configuration with the amplitudes in parts per million (ppm) of the primary field as measured at the response peak over the conductor. To assist the interpretation of the survey results the computer is used to identify the apparent conductance and depth of selected anomalies. The results of this calculation are presented in anomaly listings included in the survey report and the conductance and inphase amplitude are presented in symbolized form on the map presentation.

The conductance estimate is most reliable when anomaly amplitudes are large and background resistivities are high. Where the EM anomaly is of low amplitude and background resistivities are low, the conductance estimates are much less reliable. In such situations, the conductance estimate is often quite low regardless of the true nature of the conductor. This is due to the elevated background response levels in the quadrature channel. In an extreme case, the conductance estimate should be discounted and should not prejudice target selection.

The conductance and depth values as presented are correct only as far as the model approximates the real geological situation. The actual geological source may be of limited length, have significant dip, or may be strongly magnetic. Its conductivity and thickness may vary with depth


AERODAT HEM SYSTEM RESPONSE
VERTICAL HALF-PLANE
QUADRATURE (ppm)
IN-PHASE (ppm)
1000
100
10
1
1
10
100
1000
1.6 x 10³
1.3 x 10⁴
2.6 x 10⁴
5.2 x 10⁴
1.3 x 10³
2.6 x 10³
5.2 x 10³
15m
(h+d)
20m
27.5m
35m
50m
70m
100m
T
7.0m
R
h
Surface
d
σ t
f - Frequency (Hz)
σ t - Conductance (siemens)


AERODAT HEM SYSTEM RESPONSE
HOMOGENEOUS HALF-SPACE
(UNIFORM EARTH)
VERTICAL COAXIAL COILS
Quadrature (ppm)
Inphase (ppm)
10m (h+d)
20m
30m
40m
50m
60m
80m
100m
200m 175m 150m 125m
T 7.0m R
h
d
σ
f - Frequency (Hz)
σ - Conductivity (siemens/metre)


AERODAT HEM SYSTEM RESPONSE
HOMOGENEOUS HALF-SPACE
(UNIFORM EARTH)
HORIZONTAL COPLANAR COILS
Quadrature (ppm)
Inphase (ppm)
10 m (h+d)
20m
30m
40m
50m
60m
80m
100m
125m
150m
200m
175m
T 7.0m R
h
d
f - Frequency (Hz)
σ - Conductivity (siemens/metre)

and/or strike and adjacent bodies and overburden may have modified the response. In general the conductance estimate is less affected by these limitations than is the depth estimate, but both should be considered as relative rather than absolute guides to the anomaly's properties.

Conductance in mhos is the reciprocal of resistance in ohms and in the case of narrow slab-like bodies is the product of electrical conductivity and thickness.

The higher ranges of conductance, greater than 2-4 mhos, indicate that a significant fraction of the electrical conduction is electronic rather than electrolytic in nature. Materials that conduct electronically are limited to certain metallic sulphides and to graphite. High conductance anomalies, roughly 10 mhos or greater, are generally limited to massive sulphides or graphites.

Sulphide minerals, with the exception of such ore minerals as sphalerite, cinnabar and stibnite, are good conductors. Sulphides may occur in a disseminated manner that inhibits electrical conduction through the rock mass. In this case the apparent conductance can seriously underrate the quality of the conductor in geological terms. In a similar sense the relatively non-conducting sulphide minerals noted above may be present in significant concentrations in association with minor conductive sulphides, and the electromagnetic response will only relate to the minor associated mineralization. Indicated conductance is also of little direct significance for the identification of gold mineralization. Although gold is highly conductive, it would not be expected to exist in sufficient quantity to create a recognizable anomaly. Minor accessory sulphide mineralization may however provide a useful indirect indication.

In summary, the estimated conductance of a conductor can provide a relatively positive identification of significant sulphide or graphite mineralization. A moderate to low conductance value does not rule out the possibility of significant economic mineralization.

Geometrical Considerations

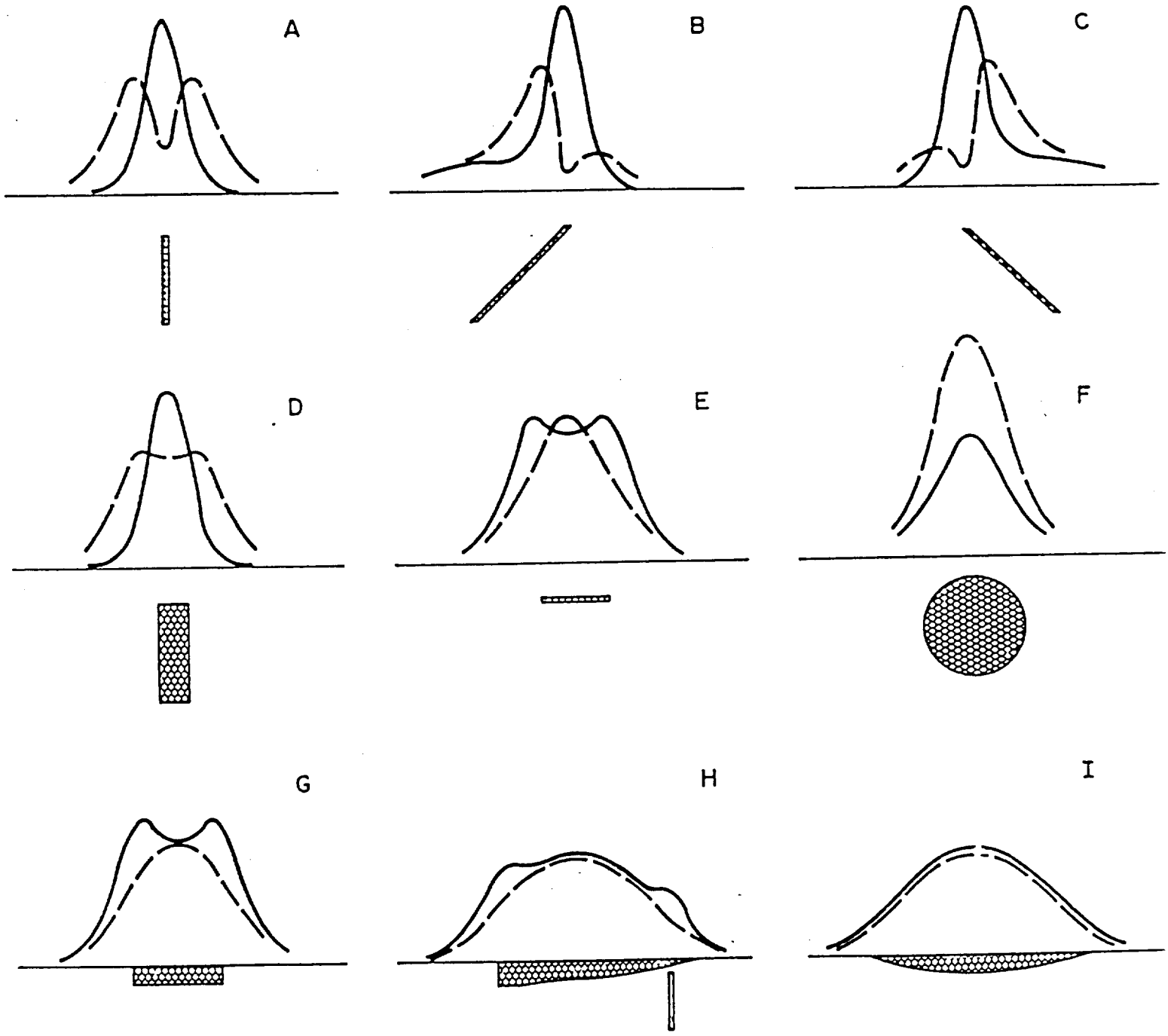
Geometrical information about the geologic conductor can often be interpreted from the profile shape of the anomaly. The change in shape is primarily related to the change in inductive coupling among the transmitter, the target, and the receiver. The accompanying figure shows a selection of HEM response profile shapes from nine idealized targets. Response profiles are labelled A through I. These labels are used in the discussion which follows.

In the case of a thin, steeply dipping, sheet-like conductor, the coaxial coil pair will yield a near symmetric peak over the conductor. On the other hand, the coplanar coil pair will pass through a null couple relationship and yield a minimum over the conductor, flanked by positive side lobes.(Profile A) As the dip of the conductor decrease from vertical, the coaxial anomaly shape changes only slightly, but in the case of the coplanar coil pair the side lobe on the down dip side strengthens relative to that on the up dip side.(Profiles B and C).

As the thickness of the conductor increases, induced current flow across the thickness of the

HEM RESPONSE PROFILE SHAPE AS AN INDICATOR OF CONDUCTOR GEOMETRY

——— COAXIAL vertical scale 1 ppm/unit
— — — COPLANAR vertical scale 4ppm/unit



conductor becomes relatively significant and complete null coupling with the coplanar coils is no longer possible.(Profile D) As a result, the apparent minimum of the coplanar response over the conductor diminishes with increasing thickness, and in the limiting case of a fully 3 dimensional body or a horizontal layer or half-space, the minimum disappears completely.

A horizontal conducting layer such as a horizontal thin sheet or overburden will produce a response in the coaxial and coplanar coils that is a function of altitude (and conductivity if not uniform). The profile shape will be similar in both coil configurations with an amplitude ratio (coplanar:coaxial) of about 4:1*.(Profiles E and G).

In the case of a spherical conductor, the induced currents are confined to the volume of the sphere, but not relatively restricted to any arbitrary plane as in the case of a sheet-like form. The response of the coplanar coil pair directly over the sphere may be up to 8* times greater than that of the coaxial pair.(Profile F)

In summary, a steeply dipping, sheet-like conductor will display a decrease in the coplanar response coincident with the peak of the coaxial response. The relative strength of this coplanar null is related inversely to the thickness of the conductor. A pronounced null indicates a relatively thin conductor. The dip of such a conductor can be inferred from the relative amplitudes of the side-lobes.

Massive conductors that could be approximated by a conducting sphere will display a simple single peak profile form on both coaxial and coplanar coils, with a ratio between the coplanar to coaxial response amplitudes as high as 8*.

Overburden anomalies often produce broad poorly defined anomaly profiles.(Profile I) In most cases, the response of the coplanar coils closely follows that of the coaxial coils with a relative amplitude ratio of 4*.

Occasionally, if the edge of an overburden zone is sharply defined with some significant depth extent, an edge effect will occur in the coaxial coils. In the case of a horizontal conductive ring or ribbon, the coaxial response will consist of two peaks, one over each edge; whereas the coplanar coil will yield a single peak.(Profile H)

* It should be noted at this point that Aerodat's definition of the measured ppm unit is related to the primary field sensed in the receiving coil without normalization to the maximum coupled (coaxial configuration). If such normalization were applied to the Aerodat units, the amplitude of the coplanar coil pair would be halved.

Magnetics

The Total Field Magnetic Map shows contours of the total magnetic field, uncorrected for regional variation. Whether an EM anomaly with a magnetic correlation is more likely to be

caused by a sulphide deposit than one without depends on the type of mineralization. An apparent coincidence between an EM and a magnetic anomaly may be caused by a conductor which is also magnetic, or by a conductor which lies in close proximity to a magnetic body. The majority of conductors which are also magnetic are sulphides containing pyrrhotite and/or magnetite. Conductive and magnetic bodies in close association can be, and often are, graphite and magnetite. It is often very difficult to distinguish between these cases. If the conductor is also magnetic, it will usually produce an EM anomaly whose general pattern resembles that of the magnetics. Depending on the magnetic permeability of the conducting body, the amplitude of the inphase EM anomaly will be weakened, and if the conductivity is also weak, the inphase EM anomaly may even be reversed in sign.

The interpretation of contoured aeromagnetic data is a subject on its own involving an array of methods and attitudes. The interpretation of source characteristics for example from total field results is often based on some numerical modelling scheme. The vertical gradient data is more legible in some aspects however and useful inferences about source characteristics can often be read off the contoured VG map.

The zero contour lines in contoured VG data are often sited as a good approximation to the outline of the top of the magnetic source. This only applies to wide (relative to depth of burial) near vertical sources at high magnetic latitudes. It will give an incorrect interpretation in most other cases.

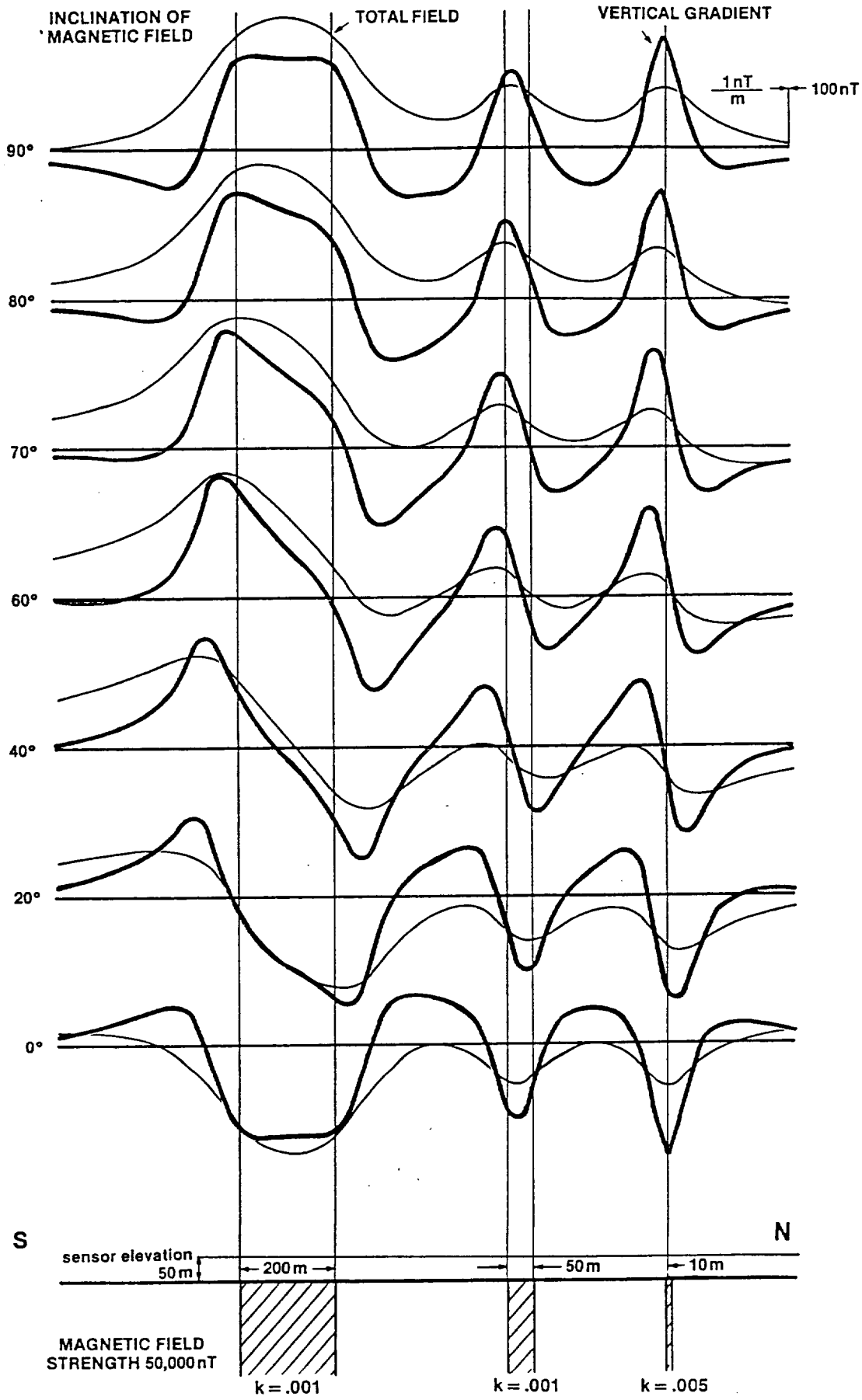
Theoretical profiles of total field and vertical gradient anomalies from tabular sources at a variety of magnetic inclinations are shown in the attached figure. Sources are 10, 50 and 200 m wide. The source-sensor separation is 50 m. The thin line is the total field profile. The thick line is the vertical gradient profile.

The following comments about source geometry apply to contoured vertical gradient data for magnetic inclinations of 70 to 80°.

Outline

Where the VG anomaly has a single sharp peak, the source may be a thin near-vertical tabular source. It may be represented as a magnetic axis or as a tabular source of measureable width - the choice is one of geological preference.

Where the VG anomaly has a broad, flat or inclined top, the source may be a thick tabular source. It may be represented as a thick body where the width is taken from the zero contour lines if the body dips to magnetic north. If the source appears to be dipping to the south (i.e. the VG anomaly is asymmetric), the zero contours are less reliable indicators of outline. The southern most zero contour line should be ignored and the outline taken from the northern zero contour line and the extent of the anomaly peak width.


INCLINATION OF MAGNETIC FIELD
TOTAL FIELD
VERTICAL GRADIENT
1nT/m
100nT
90°
80°
70°
60°
40°
20°
0°
S
N
sensor elevation 50m
200m
50m
10m
MAGNETIC FIELD STRENGTH 50,000nT
k = .001
k = .001
k = .005

Dip

A symmetrical vertical gradient response is produced by a body dipping to magnetic north. An asymmetrical response is produced by a body which is vertical or dipping to the south. For southern dips, the southern most zero contour line may be several hundred meters south of the source.

Depth of Burial

The source-sensor separation is about equal to half of the distance between the zero contour lines for thin near-vertical sources. The estimated depth of burial for such sources is this separation minus 50 m. If a variety of VG anomaly widths are seen in an area, use the narrowest width seen to estimate local depths.

VLF Electromagnetics

The VLF-EM method employs the radiation from powerful military radio transmitters as the primary signals. The magnetic field associated with the primary field is locally horizontal and normal to a line pointing at the transmitter.

The Herz Totem uses three coils in the X, Y, Z configuration to measure the total field and vertical quadrature component from two VLF stations. These stations are designated Line and Ortho. The line station is ideally in a direction from the survey area at right angles to the flight line direction. Conductors normal to the flight line direction point at the line station and are therefore optimally coupled to VLF magnetic fields and in the best situation to gather secondary VLF currents. The ortho station is ideally 90 degrees in azimuth from the line station.

The relatively high frequency of VLF (15-25) kHz provides high response factors for bodies of low conductance. Relatively "disconnected" sulphide ores have been found to produce measurable VLF signals. For the same reason, poor conductors such as sheared contacts, breccia zones, narrow faults, alteration zones and porous flow tops normally produce VLF anomalies. The method can therefore be used effectively for geological mapping. The only relative disadvantage of the method lies in its sensitivity to conductive overburden. In conductive ground the depth of exploration is severely limited.

The effect of strike direction is important in the sense of the relation of the conductor axis relative to the energizing electromagnetic field. A conductor aligned along a radius drawn from a transmitting station will be in a maximum coupled orientation and thereby produce a stronger response than a similar conductor at a different strike angle. Theoretically, it would be possible for a conductor, oriented tangentially to the transmitter to produce no signal. The most obvious effect of the strike angle consideration is that conductors favourably oriented with respect to the transmitter location and also near perpendicular to the flight direction are most clearly rendered and usually dominate the map presentation.

The total field anomaly is an indicator of the existence and position of a conductor. The response will be a maximum over the conductor, without any special filtering, and strongly favour the upper edge of the conductor even in the case of a relatively shallow dip.

Conversely a negative total field anomaly is often seen over local resistivity highs. This is because the VLF field produces electrical currents which flow towards (or away from) the transmitter. These currents are gathered into a conductor and are taken from resistive bodies. The VLF system sees the currents gathered into the conductor as a total field high. It sees the relative absence of secondary currents in the resistor as a total field low.

As noted, VLF anomaly trends show a strong bias towards the VLF transmitter. Structure which is normal to this direction may have no associated VLF anomaly but may be seen as a break or interruption in VLF anomalies. If these structures are of particular interest, maps of the ortho station data may be worthwhile.

Conductive overburden will obscure VLF responses from bedrock sources and may produce low amplitude, broad anomalies which reflect variations in the resistivity or thickness of the overburden.

Extreme topographic relief will produce VLF anomalies which may bear no relationship to variations in electrical conductivity. Deep gullies which are too narrow to have been surveyed at a uniform sensor height often show up as VLF total field lows. Sharp ridges show up as total field highs.

The vertical quadrature component over steeply dipping sheet-like conductor will be a cross-over type response with the cross-over closely associated with the upper edge of the conductor.

The response is a cross-over type due to the fact that it is the vertical rather than total field quadrature component that is measured. The response shape is due largely to geometrical rather than conductivity considerations and the distance between the maximum and minimum on either side of the cross-over is related to target depth. For a given target geometry, the larger this distance the greater the depth.

The vertical quadrature component is rarely presented. Experience has shown the total field to be more sensitive to bedrock conductors and less affected by variations in conductive overburden.

AERODAT LIMITED
June, 1991.

APPENDIX II

ANOMALY LISTINGS

BIRALGER RESOURCES LTD. - MATACHEWAN,ONT

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
1	10080	A	0	1.8	4.3	0.1	20	39
1	10090	A	0	0.5	5.4	0.0	1	32
1	10140	A	0	0.3	2.7	0.0	0	48
1	10150	A	0	0.4	4.1	0.0	0	53
1	10150	B	0	0.1	5.0	0.0	0	40
1	10170	A	0	1.4	4.8	0.0	8	43
1	10170	B	0	0.4	4.8	0.0	0	46
1	10180	A	0	-0.3	3.2	0.0	0	44
1	10190	A	0	0.6	4.6	0.0	0	54
1	10200	A	0	-0.2	4.3	0.0	0	39
1	10200	B	0	-0.4	4.2	0.0	0	41
1	10200	C	0	0.2	5.6	0.0	0	47
1	10210	A	0	0.3	6.9	0.0	0	48
1	10230	A	0	1.7	8.2	0.0	0	42
1	10240	A	0	-0.6	4.3	0.0	0	38
1	10240	B	0	1.9	5.8	0.0	0	55
2	10250	A	0	1.2	10.6	0.0	0	46
2	10270	A	0	1.0	10.7	0.0	0	44
2	10290	A	0	3.4	8.8	0.1	1	44
2	10290	B	0	1.2	7.1	0.0	0	44
2	10300	A	0	2.3	7.2	0.0	0	46
2	10300	B	0	-0.2	5.2	0.0	0	39
2	10330	A	0	0.9	4.5	0.0	2	44
2	10330	B	0	-1.8	3.8	0.0	0	42
2	10330	C	0	-4.3	4.2	0.0	0	32
2	10340	A	0	1.9	14.9	0.0	0	39
2	10340	B	0	-1.1	8.2	0.0	0	37
2	10340	C	0	-1.4	5.5	0.0	0	39

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

BIRALGER RESOURCES LTD. - MATACHEWAN,ONT

FLIGHT	LINE	ANOMALY	CATEGORY	AMPLITUDE (PPM) INPHASE	QUAD.	CONDUCTOR CTP MHOS	DEPTH MTRS	BIRD HEIGHT MTRS
2	10340	D	0	-1.6	3.7	0.0	0	41
2	10350	A	0	-1.9	5.5	0.0	0	39
2	10360	A	0	0.0	12.3	0.0	0	38
2	10360	B	0	0.9	13.8	0.0	0	37
2	10360	C	0	-1.6	7.0	0.0	0	37
2	10370	A	0	-0.1	10.7	0.0	0	35
2	10370	B	0	0.0	9.4	0.0	0	37
2	10390	A	0	-1.7	9.6	0.0	0	34
2	10390	B	0	-0.8	11.5	0.0	0	35
2	10390	C	0	-0.5	4.9	0.0	0	51
2	10400	A	0	-0.2	6.7	0.0	0	45
2	10400	B	0	-0.2	12.4	0.0	0	35
2	10410	A	0	-2.1	7.4	0.0	0	38
2	10420	A	0	-0.2	5.8	0.0	0	45
2	10420	B	0	-1.4	5.7	0.0	0	39
2	10420	C	0	-1.4	5.5	0.0	0	52
2	10430	A	0	-0.1	6.4	0.0	0	51
2	10430	B	0	-3.1	6.8	0.0	0	32
3	10450	A	0	-2.4	5.7	0.0	0	44
3	10500	A	0	1.3	6.1	0.0	4	39
3	10530	A	0	2.7	4.9	0.2	5	55
3	10560	A	0	-0.9	3.0	0.0	0	33
3	10590	A	0	0.8	4.1	0.0	0	48
3	10600	A	0	1.3	26.4	0.0	0	37

Estimated depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or overburden effects.

APPENDIX III

CERTIFICATE OF QUALIFICATIONS

I, IAN JOHNSON, certify that:

1. I am registered as a Professional Engineer in the Province of Ontario.

2. I reside at 38 Tinti Place in the town of Thornhill, Ontario.

3. I hold a Ph.D. in Geophysics from the University of British Columbia, having graduated in 1972.

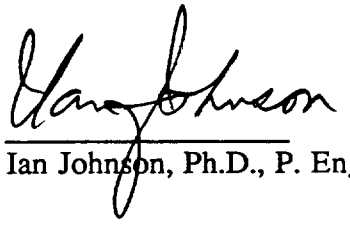
4. I have been continuously engaged in both professional and managerial roles in the minerals industry in Canada and abroad for the past fourteen years.

5. The accompanying report was prepared from published or publicly available information and material supplied by Biralger Resources Ltd. and Aerodat Limited in the form of government reports and proprietary airborne exploration data. I have not personally visited the specific property.

7. I have no interest, direct or indirect, in the property described nor in Biralger Resources Ltd.

8. I hereby consent to the use of this report in a Statement of Material Facts of the Company and for the preparation of a prospectus for submission to the appropriate securities commission and/or other regulatory authorities.

Signed,



Ian Johnson, Ph.D., P. Eng.

J9128
Thornhill, Ontario
June 28, 1991

APPENDIX IV

PERSONNEL

FIELD

Flown	May 12 and 13, 1991
Pilot	Greg Charbonneau
Operator	Scott Wessler

OFFICE

Processing	Tom Furuya George McDonald
Report	Ian Johnson

OM 91 - 078

BIRALGER RESOURCES LTD.

CAIRO PROJECT

R.A. Bernatchez, P.Eng.
Consulting Geologist

SUMMARY

The 1991 exploration program consisted of the detailed evaluation of the very favourable results obtained in the 1990 program. Follow-up detailed prospecting and geological reconnaissance mapping was carried out over numerous areas of the Property and beyond the Property's boundary in Cairo, Flavelle, Holmes and Alma Twp. This work was greatly enhanced by the extensive logging road access in the south and east portion of the Property.

The first objective of the 1991 program was to evaluate the ground VLF-EM and magnetic survey. It was confirmed at various locations within the 15 km grid that about 30-40% of the coincident magnetic and VLF-EM anomalies were found to be mineralized zones. These zones contain mineralization as disseminated grains of pyrite and chalcopyrite in fractured syenite and/or volcanic and/or sedimentary rocks. All of the zones examined within the syenites also contained quartz veining as parallel and/or stockwork quartz veining. This quartz veining also contained all or some of the following minerals: chalcopyrite, galena, tourmaline, fluorite. This was consistent with the zones intersected in the three holes drilled in the 1990 program. Many of the mineralized zones within the syenite are coincident with magnetic lows and low to moderate conductivity.

The conductivity within the volcanic and sedimentary rocks is stronger due to an increase in sulphides. This is especially true of the rocks south of Hole C-91-1 and C-91-2. These rocks have a high magnetite content and consequently the conductors are coincident with high magnetic anomalies.

Detailed evaluation of the diamond drill core of the three holes indicated intense alteration consisting of chloritization, sericitization and silicification. All three holes contained quartz veining, both, within the syenites and volcanic rocks.

More detailed prospecting north, east, south and west near Holes C-91-1 and C-91-2 and C-91-3 resulted in the observation of widespread sulphide mineralization as disseminated grains and along fractures and in quartz veining. The area north, east and south of Hole C-91-2 showed considerable potential, additional and similar type mineralization with excellent potential for a large tonnage low grade zone. This mineralization consisted of disseminated and semimassive bedded sulphides containing pyrite, pyrrhotite, magnetite and chalcopyrite in syenites, volcanics and sedimentary rocks.

SEveral different rock types were observed southeast of the Cairo Stock contact with the volcanics. The past mapping in this area did not indicate the abundancy of volcqnic and intrusive syenite dykes in this area along the Cairo-Flavelle Twp. line north and south of Highway 66. The geology of this area is very similar to that of the Macassa Mine.

The 1991 exploration program also consisted of an airborne magnetic and electromagnetic survey over 123 of Biralger's present 203 claims. Thw survey consisted of over 209 km of flight line at 100 metre spacing. The results of this survey were surprising. Two of the four major deformation zones defined by Hodgson (1989) were defined in this survey. The other two zones were beyond the Company's boundary. Biralger has labelled these deformation zones as the Galer Lake (at the north end of the Property) and Middleton-St. Paul Deformation Zone (at the south end of the Property). Biralger's drill Hole

C-91-2 is located at the north edge of the Middleton-St. Paul Deformation Zone. This Zone was also tested behond the Company's boundary near Morrison and St. Paul Lakes. Drill logs submitted by Dominion Gulf (1953) to the Ministry describes identical geology and mineralogy to Biralger's Hole C-91-2. Two holes 600 metres west of St. Paul Lake both report strong zones of blue-grey quartz veining with minor chalcopyrite and pyrite over 30-50 metre widths. Similar geology and mineralogy was observed in two holes drilled at the west end and from the south shore of Morrison lake. It is possible that these holes did not intersect the entire width of the deformation zone located along the north side of the Lake. The airborn survey which barely covers the Morrison Lake area has detected a strong resistivity anomaly trending north-east and coincident with this deformation zone. This anomaly trend extends northeast to the southwest end of Middleton Lake. Projecting this anomaly further northeast could coincide with one of Hodgson's deformation zones located at the northeast end of Middleton Lake.

A strong resistivity anomaly was also detected on the northern portion of the Property at the Alma-Cairo Twp. line. This anomaly trends east northeast and is coincident with one of Hodgson's Deformation Zones. Several strong gold showings are located along and near this deformation zone in Holmes and Cairo Twps. The area coincident with the resistivity anomaly on the Property does not appear to have been prospected. A reconnaissance geological survey was made in this area in 1991. Most of the area surveyed is covered with over-burden with no outcrop exposure. A follow-up program of line cutting and ground geophysical survey is highly recommended in this area, to locate more accurately, the airborne anomalies.

A third and fourth zone of airborne anomalies were also detected in the air-borne survey. These anomalies also coincided with a zone of deformation not identified by Hodgson. Several gold showings, however, occur within this deformation zone east and north of Biralger's Property in Flavelle Twp. east and west of Wiley Lake. Two strong blue-grey quartz veins containing low gold and silver values were found in a geological survey on the Company's Property. This coincides with a strong resistivity anomaly in the central and east part of the 123 claim survey.

Additional reconnaissance geological surveys were carried out beyond the west-ern, eastern and northeast boundaries of the Property.

A survey at Browning Lake at the barite occurrence has revealed the presence of ruby silver (proustite or pyrargerite) associated with the barite veining on the west shore of Browning Lake. This mineral occurred near the vein contact with the syenite porphyry within the barite vein. The ruby silver occurs as silvery, dark red, disseminated grains 1-3 mm diameter. Several samples were noted in a pile of barite ore at the site. No silver assays were performed on this material as it occurs on a claim held by Extender Minerals.

Two other locations were investigated in Flavelle Two. on Conc. VI Lot II, north and south of Hwy 66. The south occurrence is the copper occurrence re-ported in Moore's report which returned 0.53% copper in a diorite. The rocks in this area contain disseminated grains of sulphides, pyrite, chalcopyrite and/or pyrrhotite in a medium grained diorite. The disseminated sulphides occur over a 100-150 metre width. The sulphide content varied from $<\frac{1}{2}\%$ to 1%.

A similar occurrence was examined 100-200 metres north of the highway on the same lot. Here, the diorite or gabbro was very coarse grained and it contained 1-2% sulphides with minor chalcopyrite, pyrrhotite and pyrite. The rock also contains magnetite. Both of these showings are located near two major deform-

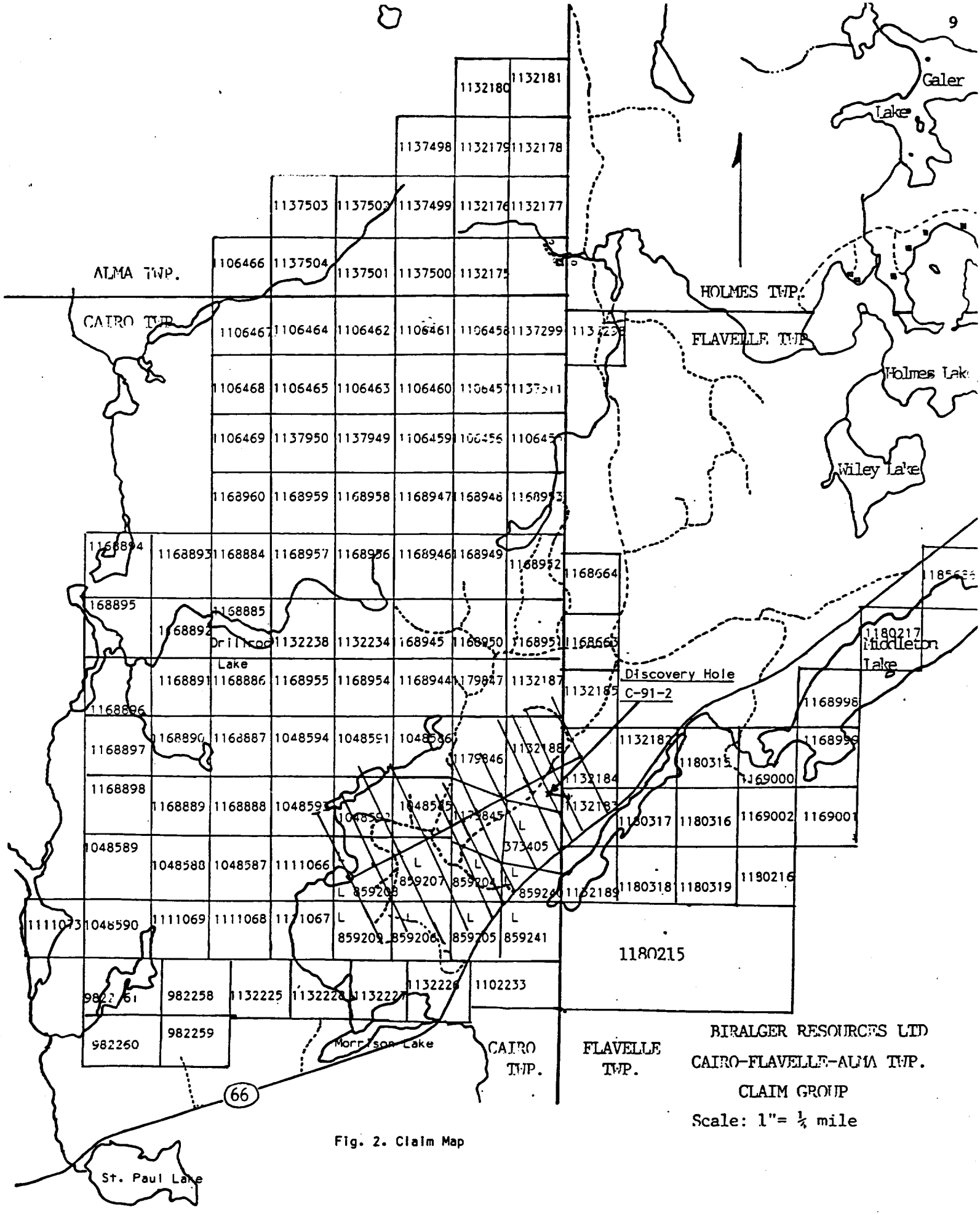
ation zones identified by Hodgson (1989). A recent ground magnetic and VLF-EM survey carried out by Hysvex has detected several anomalous trends in the area, some coincident with the structures. These areas may represent similar and strong targets for copper-gold mineralization. This area may also have potential for the discovery of massive sulphide copper-zinc deposits.

The remainder of the 1991 program consisted of the evaluation and compilation of all data gathered to date. This data is documented in a report written by the author and is contained in a Memorandum submitted. The author has made strong recommendations to continue the evaluation of this Property.

The results of the reconnaissance geological program and the interpretation of the airborne data has inititated the Company to stake an additional 80 claims in Flavelle Twp.

The author has recommended an expenditure of $509,641.00 on the Property, to be carried out in two phases. Phase I consists of line cutting, geophysical surveys, diamond drilling, assaying, for an expenditure of $121,172.15. Phase II consists of additional line cutting, geophysical surveys, geological mapping, mechanical stripping, trenching and blasting, diamond drilling, assaying and an airborne survey over the new block of 80 claims for a total expenditure of $388,468.85. The total expenditures of Phases I and II amounts to $509,641.00.

R.A. Bernatchez, P.Eng.,
Consulting GEologist



BIRALGER RESOURCES LTD
CAIRO-FLAVELLE-ALMA TWP.
CLAIM GROUP
Scale: 1"= ½ mile

Fig. 2. Claim Map

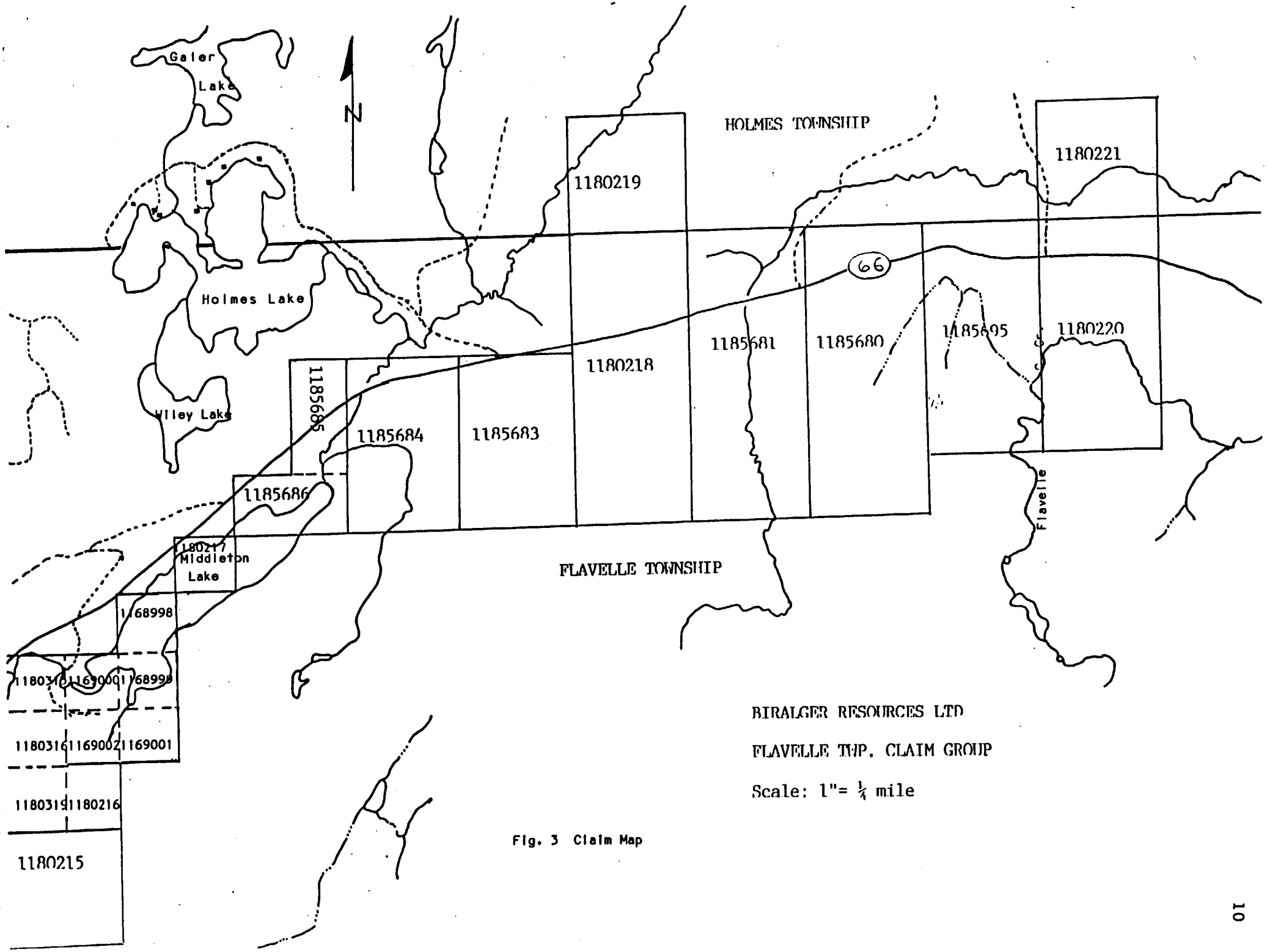


Fig. 3 Claim Map

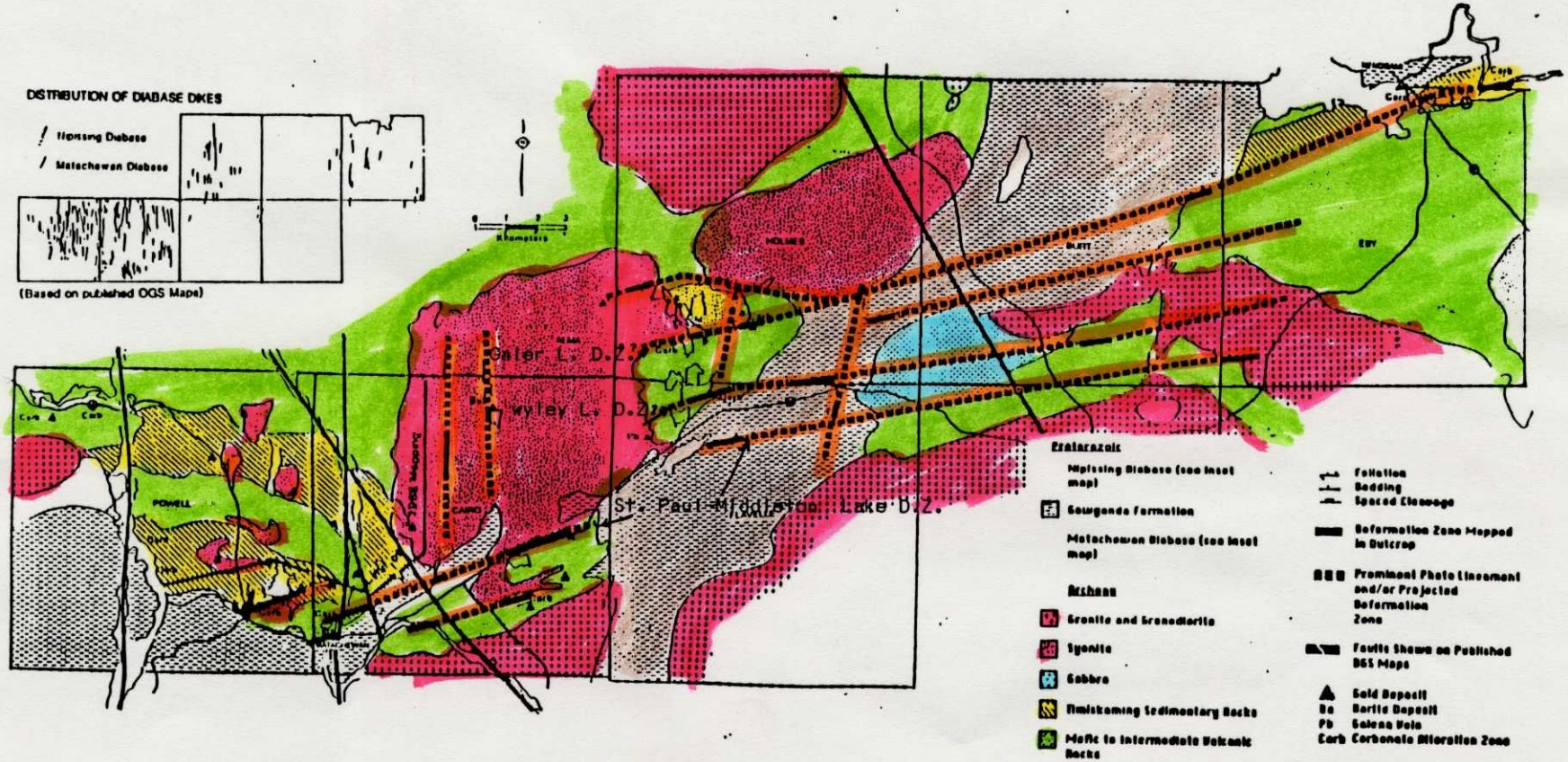


Figure 329.2. *Geological map of 1988 study area (Eby, Burt, Holmes, Flavelle, Cairo and Powell townships). After Lovell (1967, 1972) and Moore (1966).*

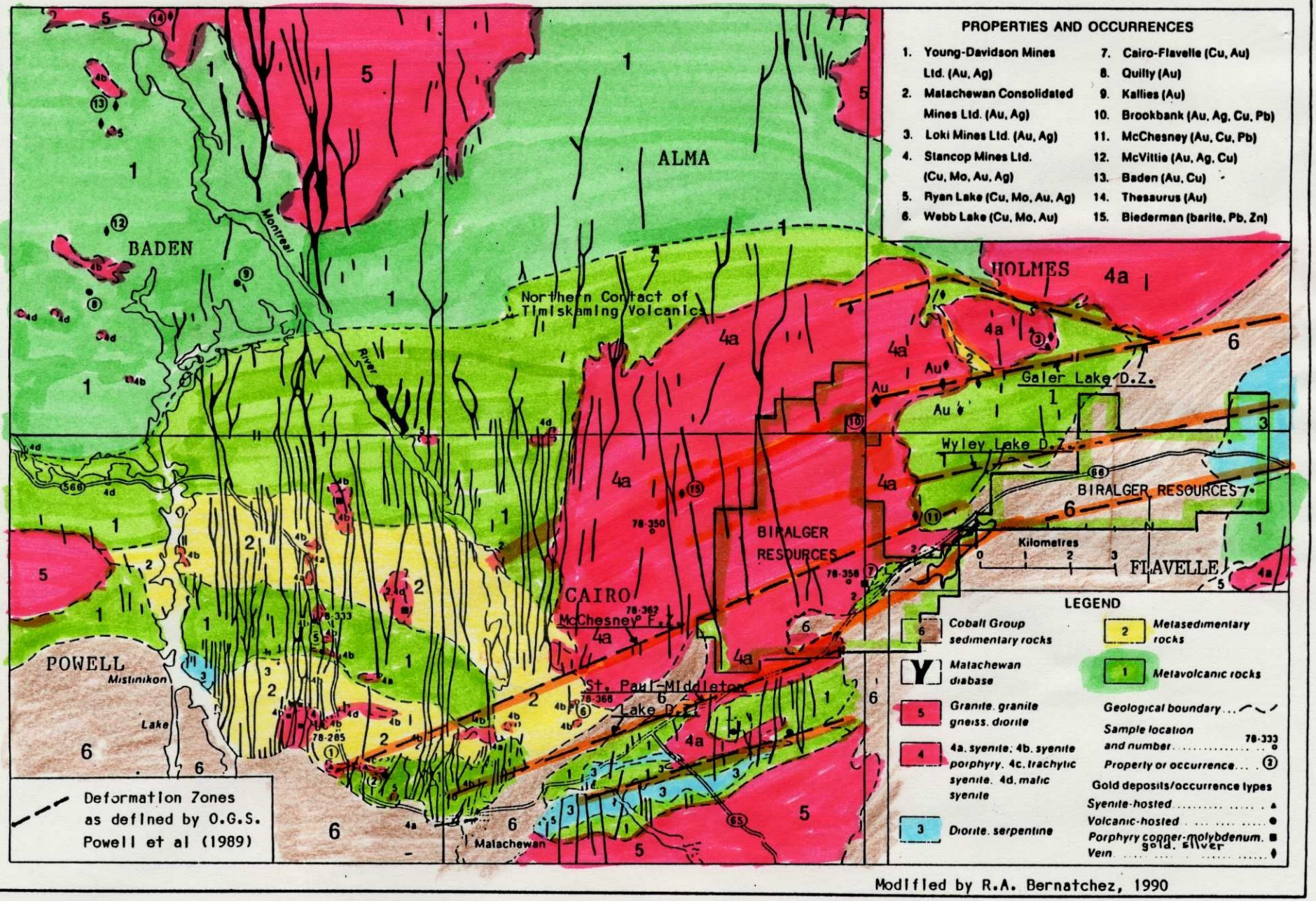


FIGURE 2. General geology of the Matachewan area (modified from Moore, 1966 and Lovell, 1967).

fig. 7 · Geology and property locations, Matachewan area.

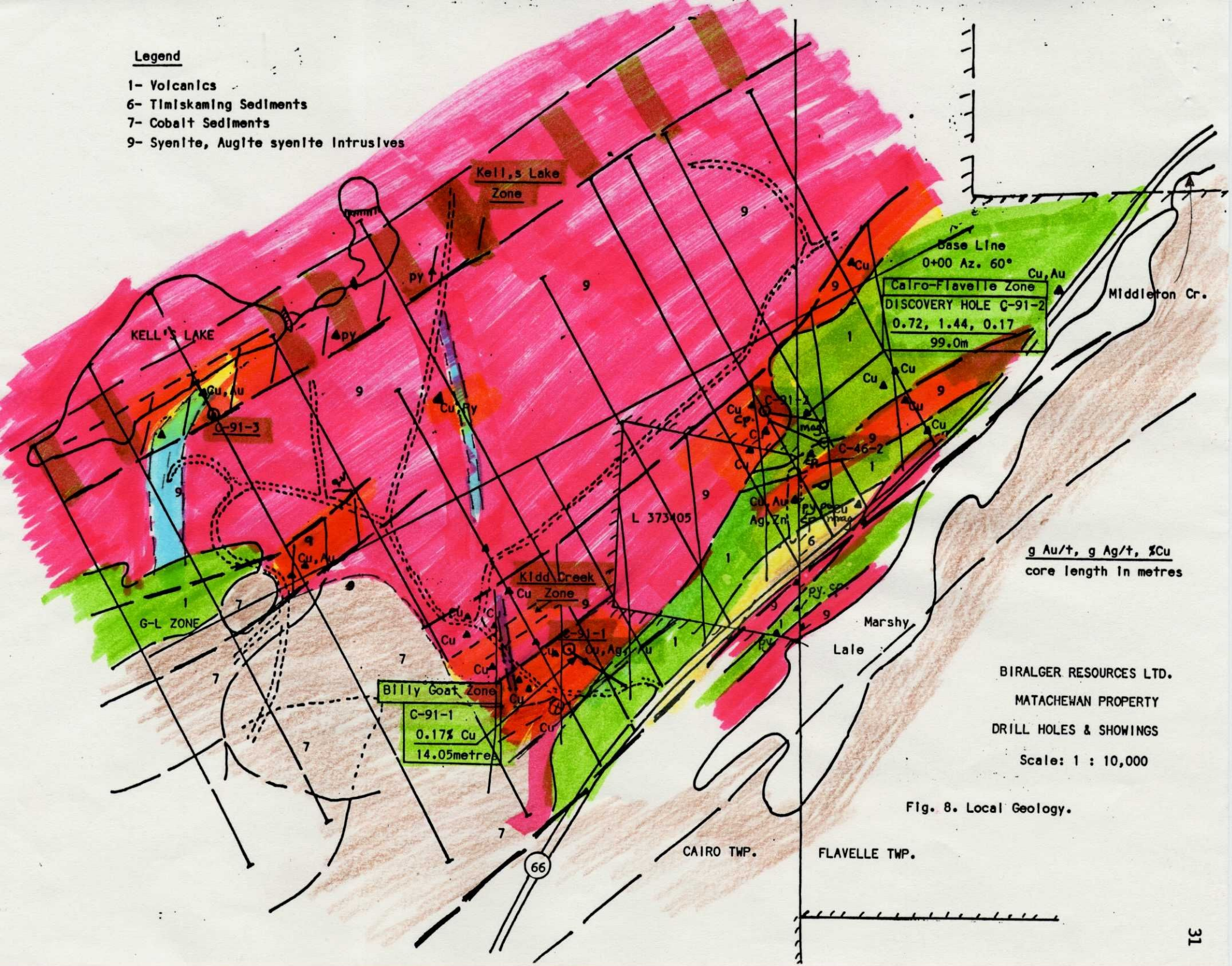
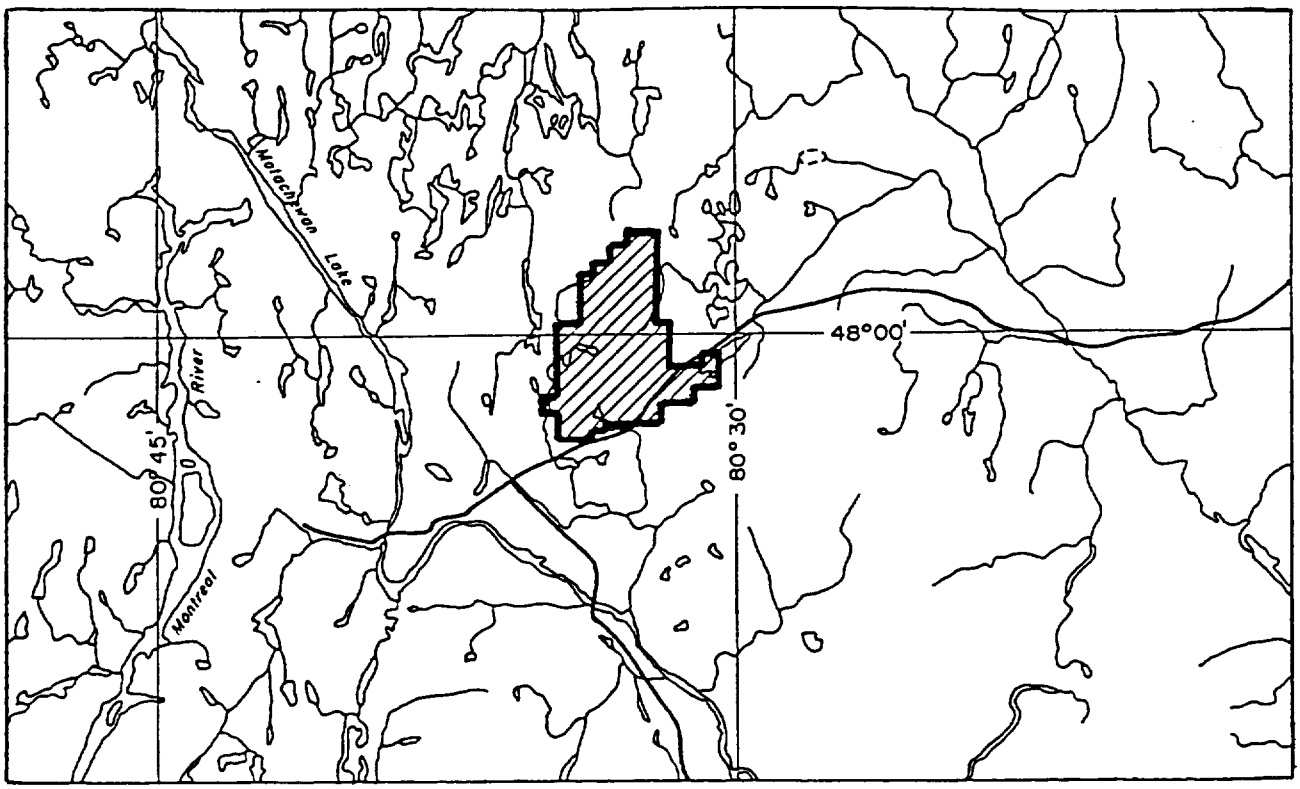


Fig. 8. Local Geology.



AIRBORNE GEOPHYSICAL SURVEY
MATACHEWAN AREA, ONTARIO

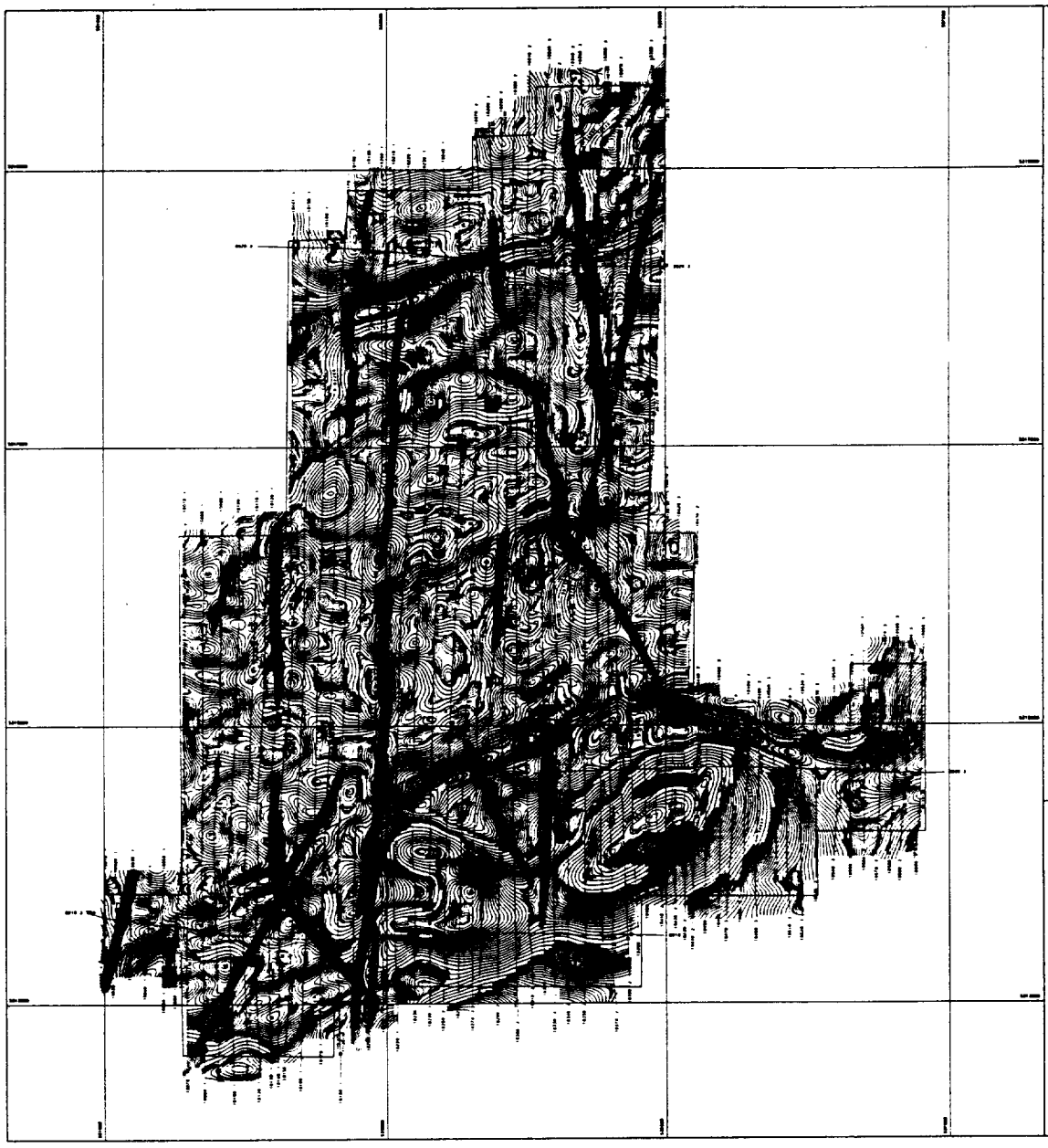
on behalf of

BIRALGER RESOURCES LIMITED

BY

AERODAT LIMITED

J9128



Flight Path

Magnetics

BIRALGER RESOURCES LTD.

TOTAL FIELD MAGNETIC CONTOURS

MATACHEWAN

ONTARIO

AERODAT LIMITED

MAY 1991

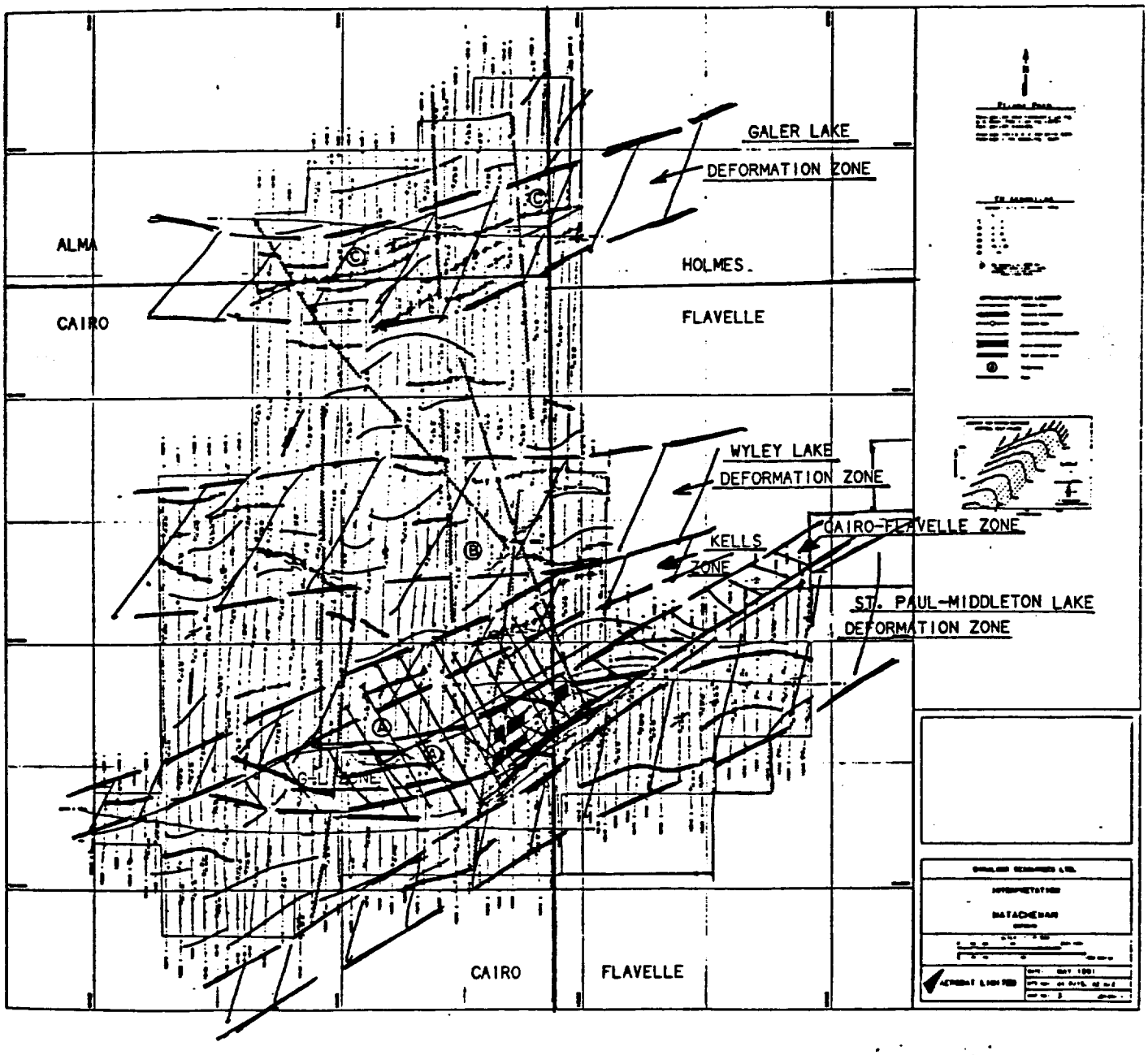


Fig. 10. Airodat Interpretation Map

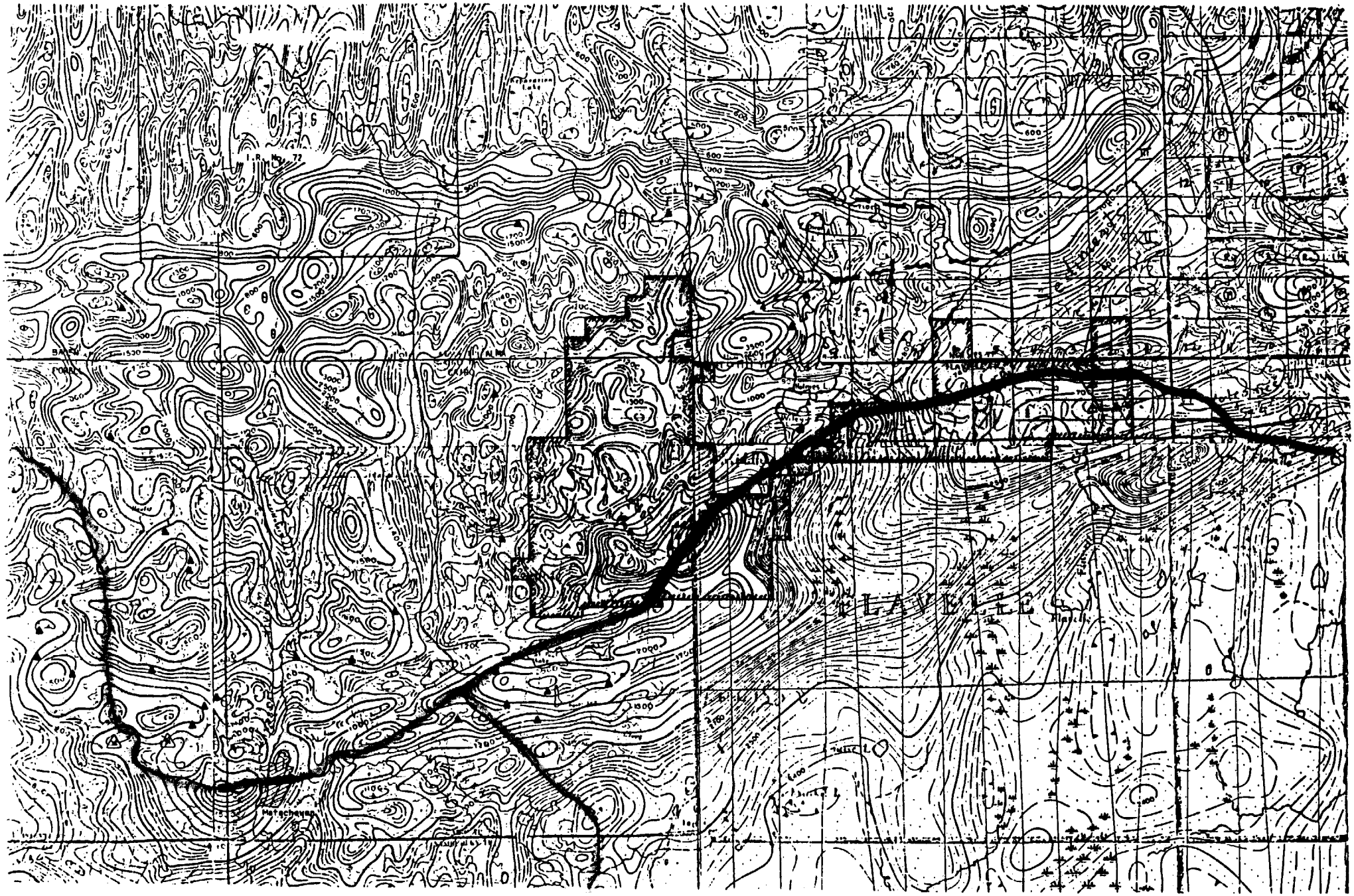
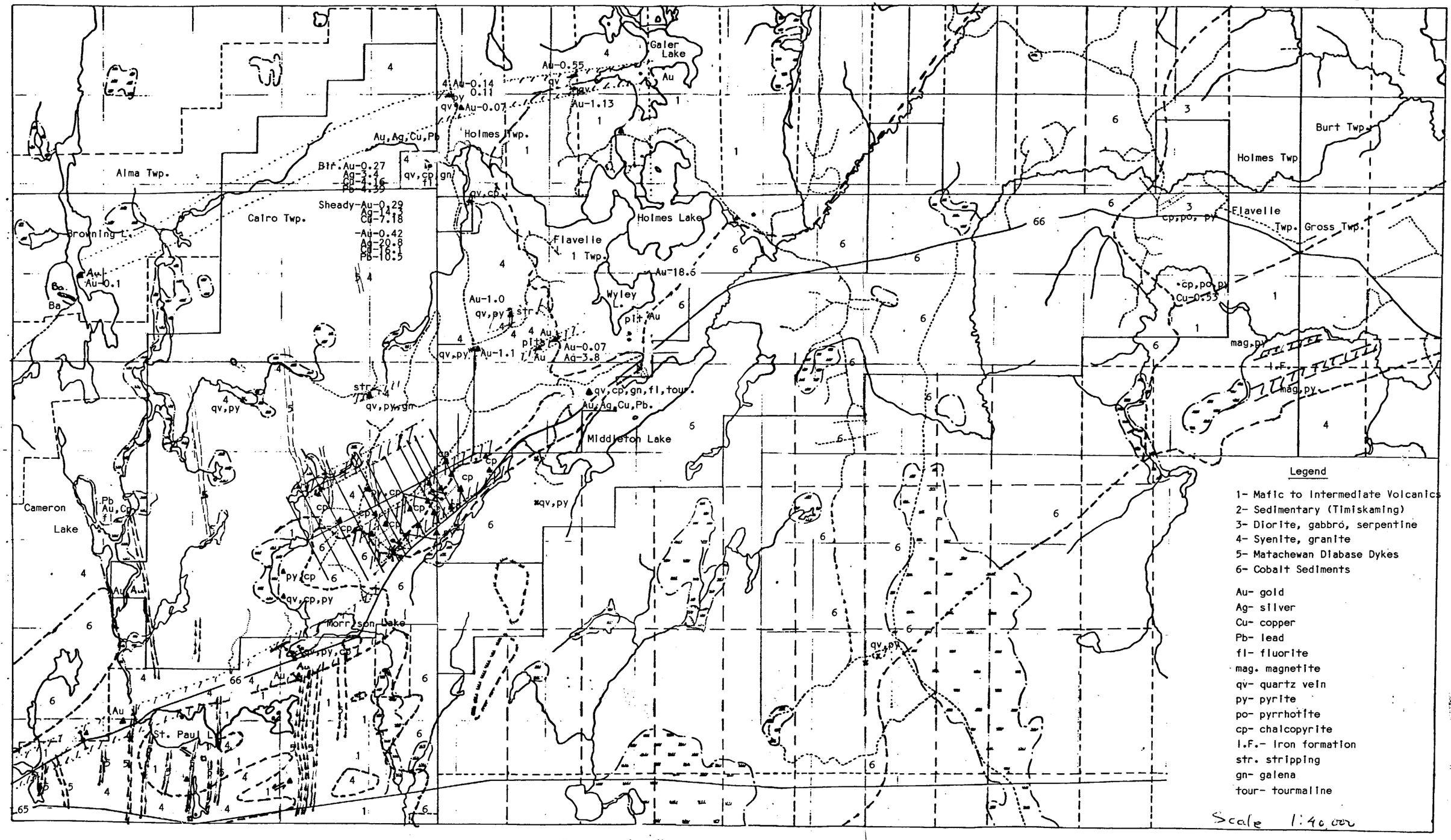
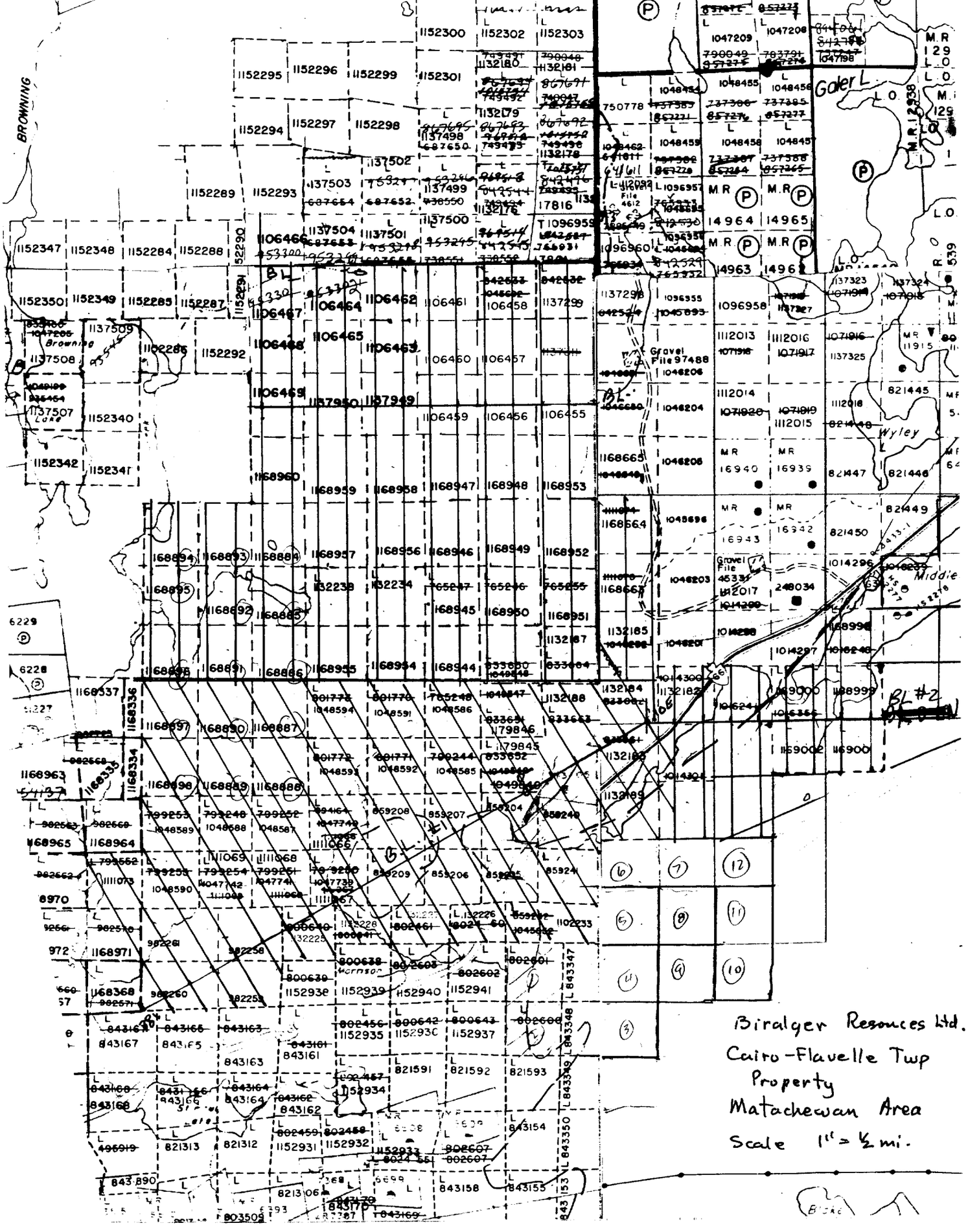


Fig. 11. Aeromagnetic Map - Matachewan East Area



General geology Map.

R.A. Bernatsky, P Eng

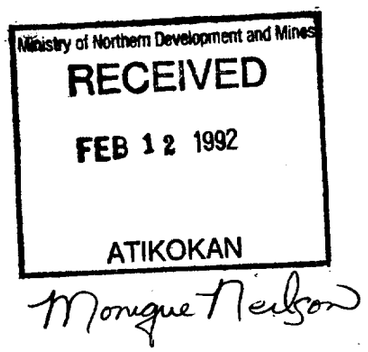

Biralger Resources Ltd.
Cairo-Flavelle Twp
Property
Matachewan Area
Scale 1" = ½ mi.
BROWNING
Goler L.
Wyley
Middle
Gravel File 97488
Gravel File 45331
BL #2

Box 1376, 126 Willow Road
Atikokan, Ontario POT 1CO

Telephone
(807) 597-4526

OFFERING MEMORANDUM

No Securities Commission or similar authority in Canada has in any way passed upon the merits of the securities offered hereunder and any representation to the contrary is an offence. This memorandum constitutes an offering of the securities only in those jurisdictions where they may be lawfully offered for sale. The offering is exempt from prospectus requirements under the securities act (Ontario).



DATE: December 3, 1991

BIRALGER RESOURCES LTD.
(the Corporation)

(1,000,000 common shares) at $.25 per share

Minimum Subscription $8.000.00 or 32,000 shares @ $.25/share

Maximum Subscription $25,000.00 or 100,000 shares @ $.25/share

Subscriptions received will be subject to rejection in whole or in part and the Corporation has the right to close the subscription book without notice. At the discretion of the Corporation, subscriptions will be accepted for part of the minimum (less than $8,000.00) or maximum subscription (greater than $25,000.00).

The offering will remain open only until January 31, 1992 and no sales will be made after the Closing Date.

This offering if fully subscribed, will net the Company $250,000.

SECTION A

THE CORPORATION

THE CORPORATION AND ITS BUSINESS

Biralger Resources Ltd. (the `Corporation') was incorporated in the Province of Ontario on August 22, 1986 as a private company for the purpose of conducting exploration, development and mining of minerals.

SUBSCRIPTION PRICE OF COMMON SHARES

The directors of the Corporation have fixed the price of each share at $.25 per common share for this offering memorandum.

The directors of the Corporation have established that the minimum required proceeds from this subscription shall be $100,000.00.

A share certificate shall be issued to each subscriber for the number of shares purchased upon receipt of payment to the Corporation of the full subscription price for the shares purchased. The Corporation reserves the right to close the subscription book without notice once the quota for the sale of these shares has been met.

The Corporation has established a general accountat the Royal Bank of Canada, 111 St. Clair Avenue West, Toronto, Ontario, and agrees to deposit all subscription payments received for shares and to use these deposits in the manner described under the heading `Conclusions' and `Recommendations' and `Budget'.

The Corporation will issue progress reports as work is completed.

APPLICATION OF PROCEEDS

From the Offering of One Million (1,000,000) Common Shares

Upon successful completion of the sales of all the shares in this offering, the Corporation will have received a maximum of $250,000.00 through the sale of one million shares.

The proceeds from the sale of each subscription will be deposited to the general account at the Royal Bank of Canada at 111 St. Clair Ave. Toronto, Ont. The funds will be drawn from this account as expenditures are incurred in implementing and carrying out the objectives of the Company.
Any interest earned on the funds in the Corporation's trust account will be transferred to the Corporation's general account from time to time as earned.

The Corporation has applied for and received certification of an Ontario Mineral Incentive grant in the amount of $20,000.00 to be awarded if the Corporation spends a total of $40,000.00 on the Property in 1991.

The Corporation will retain the OMIP grant funds and will allocate said funds towards regular corporate expenditures.

Please refer to page 51-53 for complete exploration expenditures recommended on Biralger Resources Ltd.'s Property.

Expenses of the issuer will be paid out of general funds. In the event that insufficient funds are raised through a minimum of 25 subscriptions, Biralger Resources Ltd. will retain all funds to carry out additional fund raising to explore and to continue its effort to qualify for listing on a Canadian stock exchange.

DESCRIPTION OF SECURITIES

COMMON SHARES

The common shares without par value entitles the holder therof to

receive notice of all meetings of shareholders and to one vote for each common share held. The holder of the common shares is entitled to dividends as and when declared by the Board of Directors, and are entitled upon liquidation, dissolution or winding up of the Corporation, to receive pro rata share of the assets of the Corporation, distributable to the holders of the common shares. The common shares carry no pre-emptive or conversion rights. All issued and outstanding common shares including those offered hereby, will be fully paid and non-accessible. The Corporation is permitted to purchase its common shares.

PRINCIPLE SHARE HOLDERS

Name and Address	Shares Owned	% of Common Shares
Raymond A. Bernatchez 126 Willow Road Atikokan, Ontario POT 1CO	315,001	21.5 %
Gerard H. Bernatchez 76 Roche Street Matachewan, Ontario POK 1MO	155,001	10.6 %
William Plavac 350 Parkridge Road, Oakville, Ontario L6M 1B1	175,001	11.9 %
Larry Kindrachuk 2215 Wellesley Avenue Windsor, Ontario M8W 2G1	155,001	10.6 %
TOTAL SHARES	800,004	

It is intended that Raymond Bernatchez, Gerard Bernatchez, William Plavac and Larry Kindrachuk enter into a voting trust agreement. Such agreement will effect and control the nominations of the Board of Directors and a shareholder's agreement whereby each party will grant the other a right of first refusal with respect to the purchase of the above noted shares and any additional shares which may be acquired.

MINING CLAIMS ACQUIRED by the Corporation

At the time of incorporation (1986) the following mining claims were purchased from the principal share holders listed above. The purchase price of $116,000 included the fair market value of the claims plus expenses incurred by the claim holders. The claims purchased were numbered as follows:

CAIRO GROUP - 10 claims	859204 to 859209	859240 & 859241
	1102233 & 1111066	
FLAVELLE GROUP - 53 claims	812724 to 812726	812864 to 812878
	812728 to 812734	843204 to 813206
	812736 & 812737	843209
		859172 to 859191
		859195 & 859196

All other claims have been obtained at staking cost.

The Flavelle Group eventually expired because of non submittal of assessment work due to lack of financing.

DIRECTORS AND OFFICERS

NAME, POSITION, RESIDENTIAL ADDRESS	PRINCIPAL OCCUPATION
Raymond A. Bernatchez President and Director 126 Willow Road Atikokan, Ontario POT 1CO	Consulting Geologist Extensive background in mineral expl'n, mine development, mine production
Gerard H. Bernatchez Director 76 Roche Street, Matachewan, Ontario POK 1MO	Teacher Part-time prospector Reeve, Dist. of Matachewan, Ontario
William (Bill) Plavac Secretary-Treasurer and Director 350 Parkridge Road, Oakville, Ontario L6M 1B1	Imperial Oil Ltd. Franchise Development Manager Part-time prospector

Larry Kindrachuk Director 2215 Wellesley Ave., Windsor, Ontario N8W 2G1	Quality control Engineering 2215 background Part-time prospector
Marc Nebel Director 33 Grove Hill Drive, Scarborough, Ontario M1T 3E1	Imperial Oil Ltd. Sr. Strategic Planner Extensive management experience

AUDITOR: Sheila A. Brown, Chartered Accountant
21 Amber Street, Suite 9A
Markham, Ontario L3R 4Z3

LEGAL COUNSEL: Keith J. Jobbitt, Barrister and Solicitor
1020 Victoria AVenue East, P.O. Box 125
Thunder Bay, Ontario P7C 4V5

RISK FACTOR

This offering is speculative in nature. The funds raised will be spent to explore the property described in this memorandum. The said property does not contain a known commercial ore body. If the program is successful, additional funds will be required to fully evaluate the potential for a commercial mineral body.

The following information relating to the Corporation's Properties was compiled and prepared by Raymond A. Bernatchez, P.Eng., a consulting geological engineer and one of the principal parties involved in Biralger Resources Ltd. At present he is the holder of 21.5% of the issued stock in the Corporation.

CORPORATION'S HOLDINGS

Biralger Resources Ltd. presently holds a large block of claims located in Cairo, Flavelle, Alma, and Holmes Townships located east of Matachewan, Ontario. This block of claims consists of mining claims comprising 8080 acres. The Property extends from latitude 47 58' to 48 07'; longitude 80 24' to 80 35' with its west boundary 5.6 kilometres (3.5 miles) northeast of Matachewan and 55 kilometres (34 miles) west southwest of Kirkland Lake. Paved Highway 66 runs through the south and east portion of the Property.

Most of the claims are 100% owned by the Corporation. Sixteen (16) claims are held in joint ownership with Mike Sutton, a prospector from Kirkland Lake, Ontario. Claims numbered 1137498 to 1137504 are 75% held by Mike Sutton and 25% by Biralger Resources Ltd.; claims numbered 1132175 to 1132181 are 75% held by Biralger Resources Ltd. and 25% by Mike Sutton; claims numbered 1168663 and 1168664 are 90% held by Biralger Resources Ltd. and 10% by Mike Sutton. No option payments are due on these claims.

The Property is favourably located within the Matachewan Gold Camp. The Matachewan area has had nine past producing mines. Four of these mines were gold producers, one was polimetallic copper-gold-silver, one was moly-copper, one was lead-zinc and two were asbestos producers. The area presently has a barite poroducer, Extender Minerals. The four (4) gold producers were: the Matachewan Consolidated Mine, Young-Davidson Mine, Ashley and Stairs Mines. The first three mines produced a total of 34,489,711 g gold (1,006,242 oz); 9,371,756 g silver (243,343oz). The Matachewan Consolidated and Young-Davidson Mines produced 95% of that gold from 1934 to 1957.

The Matachewan area is a high mineral potential area hosting several types of mineral deposits and numerous mineral occur-

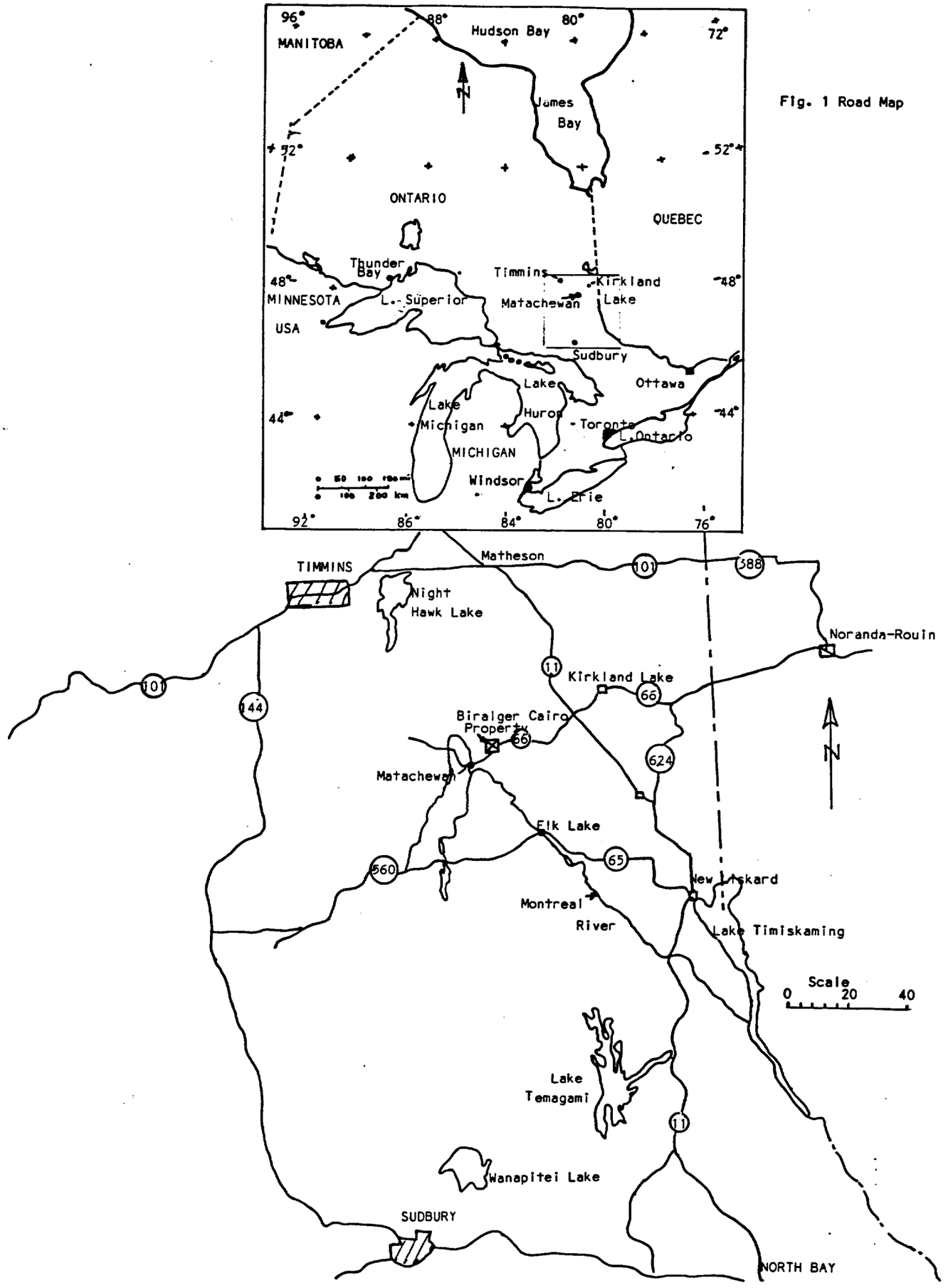


Fig. 1 Road Map

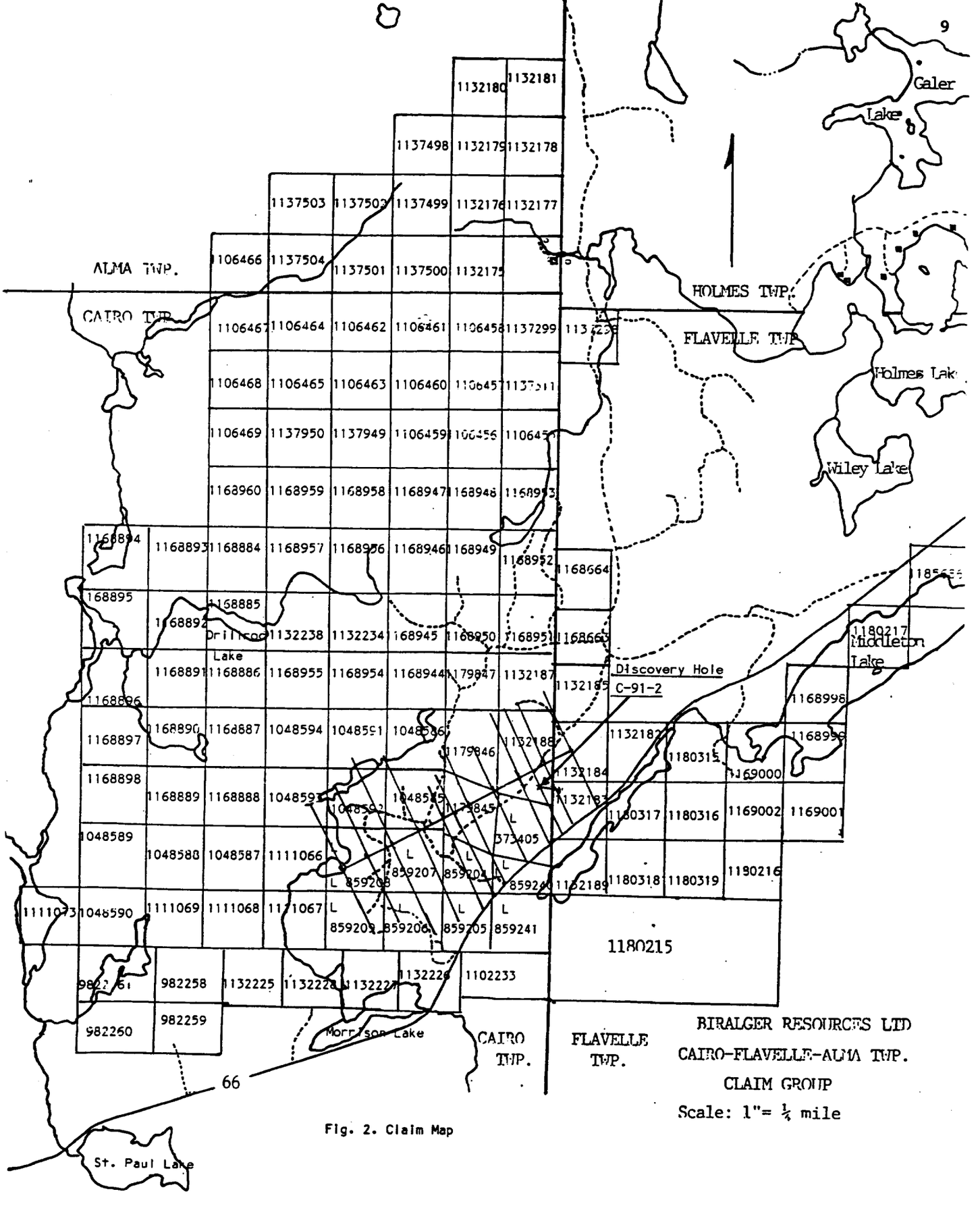


Fig. 2. Claim Map

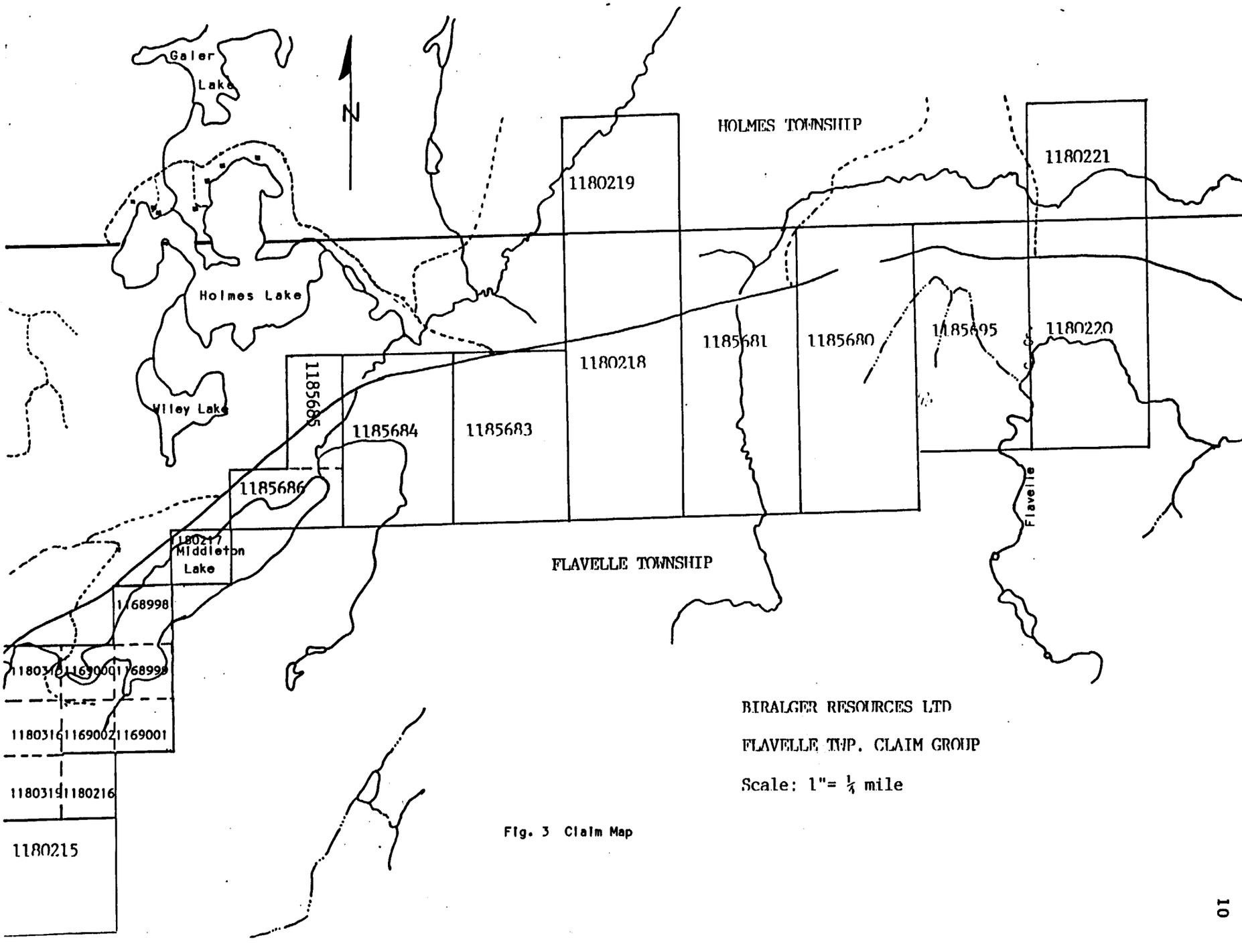


Fig. 3 Claim Map

rences. The type despoits are as follows:

1. Gold deposits with silver by-product
2. Copper deposits with gold, silver by-product
3. Copper-molybdenum deposits with gold, silver by-product
4. Copper-zinc base metal deposits
5. Copper-nickel base metal deposits
6. Asbestos deposits
7. Barite deposits

Biralger Resources Ltd.'s Cairo Property has the potential for hosting the first four types. These type deposits are described in detail in "Section B" of this offering memorandum.

The rocks found in the Matachewan Gold Camp are very similar to those found in the Kirkland Lake Gold Camp. Most of the gold found in both camps is localized near the major deformation zone known as the Matachewan-Kirkland Lake-Larder Lake Break or Deformation Zone.

Three (3) major deformation zones have been identified on the Property. They are a) the St. Paul-Middleton Lake Deformation Zone b) the Wiley Lake Deformation Zone c) the Galer Lake Deformation Zone.

Biralger Resources Ltd. has spent over $80,000 for exploration on the Property since 1985. This work has led to the discovery of a major zone of copper-gold-silver mineralization capable of producing a large tonnage-low grade open pit operation.

It is Biralger's objective to raise sufficient financing through the issuance of common shares to explore and develop the full mineral potential of the Property.

The following "Section B" is an evaluation report on Biralger Resources Ltd.'s Cairo Property by Raymond A. Bernatchez, P.Eng., consulting geological engineer and President of Biralger Resources Ltd.

ECONOMIC EVALUATION

of the

CAIRO PROPERTY
Cairo - Alma - Flavelle - Holmes
Townships

MATACHEWAN, ONTARIO

Lat. 47 58' to 48 02'
Long. 80 24' to 80 35'

NTS 43-P-15
42-A-2

for

Biralger Resources Ltd.
126 Willow Road
P.O. Box 1376
Atikokan, Ontario P0T 1C0

by

R.A. Bernatchez, P.Eng.
Consulting Geological Engineer

President,
Biralger Resources Ltd.

December 1, 1991

TABLE OF C

INTRODUCTION

Since 1985 Biralger Resources Ltd. has identified several wide zones of copper, gold and silver mineralization in syenite porphyry and mafic volcanic rocks. These zones are known as the a) Cairo-Flavelle Zone b) Kidd Creek Zone c) Billy Goat Zone d) G-L Zone e) Kells Zone f) Wiley Lake Zone g) Galer Lake Zone h) Flavelle Creek North and South Zones.

Most of the mineralization is hosted in fractured and altered mafic volcanic rocks or alkalic intrusive rocks of the syenite suite.

The fracturing is controlled by the emplacement of major deformation zones within the above rock types belonging to the Timiskaming and Kenojevis suite of rocks. These two rock suites are host to all the major gold mines in the Matachewan and Kirkland Lake gold camps.

The main deformation zone within these two gold camps is the Matachewan-Kirkland Lake-Larder Lake Break (or Deformation Zone). Four such breaks have been identified in the Cairo, Flavelle, Alma, and Holmes Townships by Powell et al (1989). Three of these deformation zones have been defined on Biralger's Property. They are: a) St. Paul-Middleton Lake Deformation Zone b) Wyley Lake Deformation Zone c) Galer Lake Deformation Zone.

Many copper, gold and silver occurrences have been found within these deformation zones, both, on and beyond the Property boundary. All three deformation zones have potential for hosting a major mineral deposit. One such zone, the Cairo-Flavelle Zone has been partially defined by drilling and surface prospecting.

This report describes and evaluates all of the known major mineralized zones listed above.

LOCATION AND ACCESS

The Corporation's Property is located 6.5 km (3.5 mi) east of Matachewan and 55 km (34 mi) west of Kirkland Lake. The Property can be reached via Highway 66, 6.5 km (3.5 mi) east from Matachewan on Highway 66. Hwy 66 connects with Hwy 11, 33 km (20 mi) southwest of Kenogami. Paved Highway 66 crosses the south and east portion of the Property. Several logging roads have been constructed from Highway 66 extending through the Property. Approximately 40% of the Property has been timbered (since 1982). This logging operation has provided numerous bedrock exposures not previously visible. This has given many opportunities for the discovery of new mineralized zones.

PROPERTY DESCRIPTION

PHYSICAL GEOGRAPHY

The topography on the Property is expressed as gently rolling high grounds with good drainage. Two small lakes and a creek system drain through its northern and central portion. A marshy pond 1.5 km long by 150 metres wide (0,93 mi x 492 ft) is located just east of the Cairo-Flavelle Twp boundary south of Highway 66.

The western portion of the Property is thinly covered with glacial till overburden with a possible thickness of 15.2 metres or more (50+ feet) in the swamps, creek and lake areas. On the eastern portion of the Property this bedrock is moderately covered with up to 15 metres (50 feet) of glacio-fluvial silty sand. Scattered outcrops are found throughout the area.

Approximately 40% of the Property has been logged and has provided excellent access to the south and east portions of the Property.

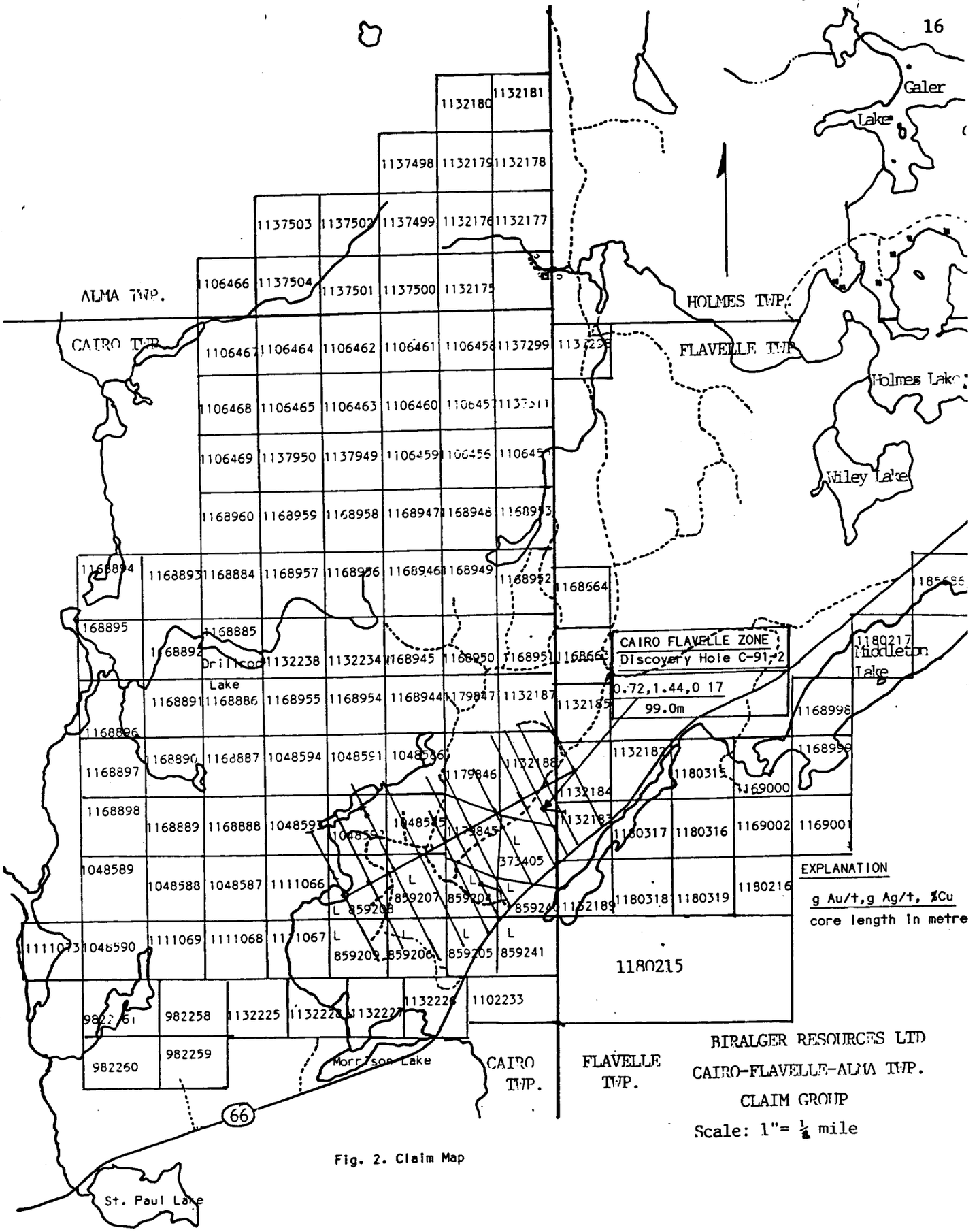


Fig. 2. Claim Map

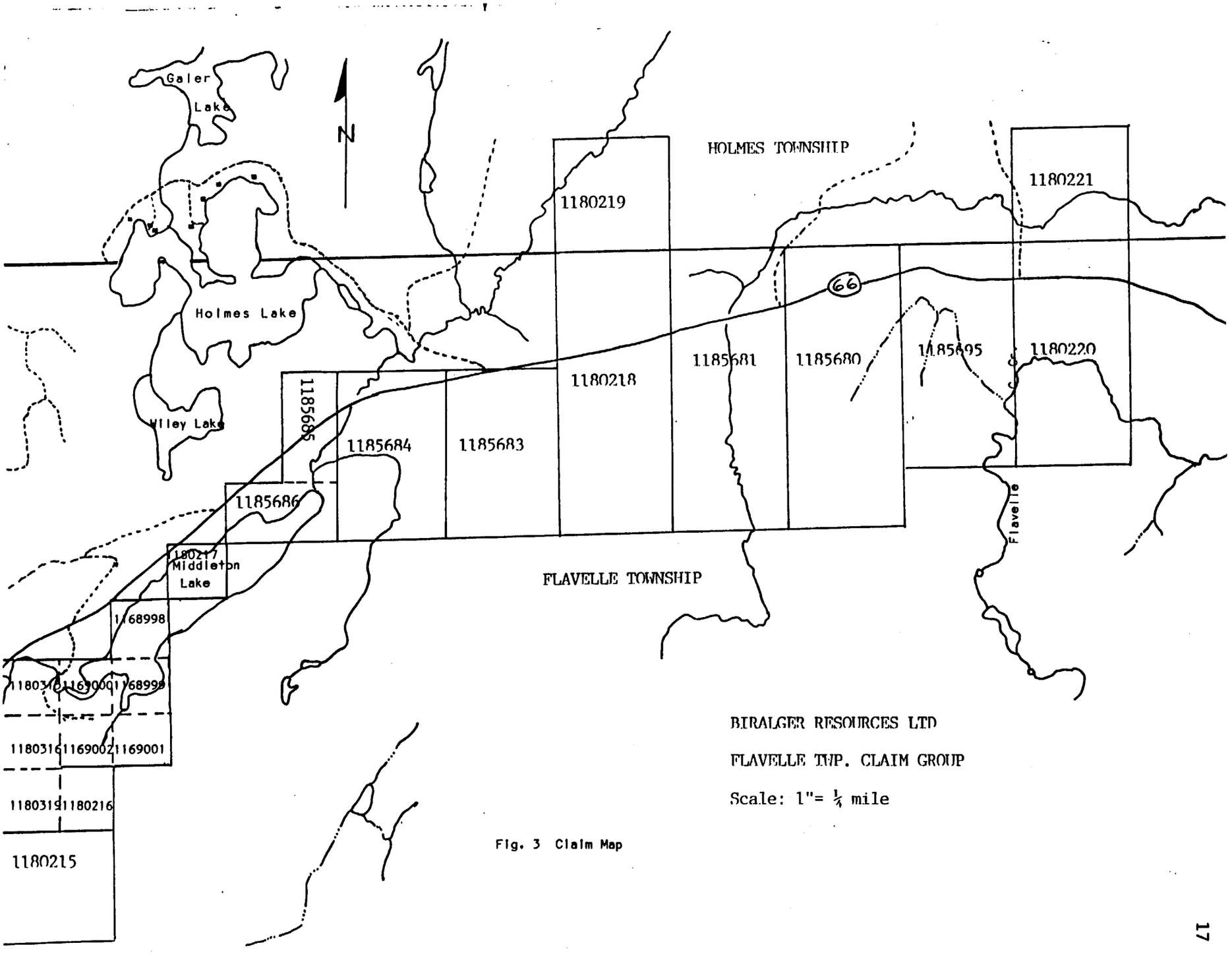


Fig. 3 Claim Map

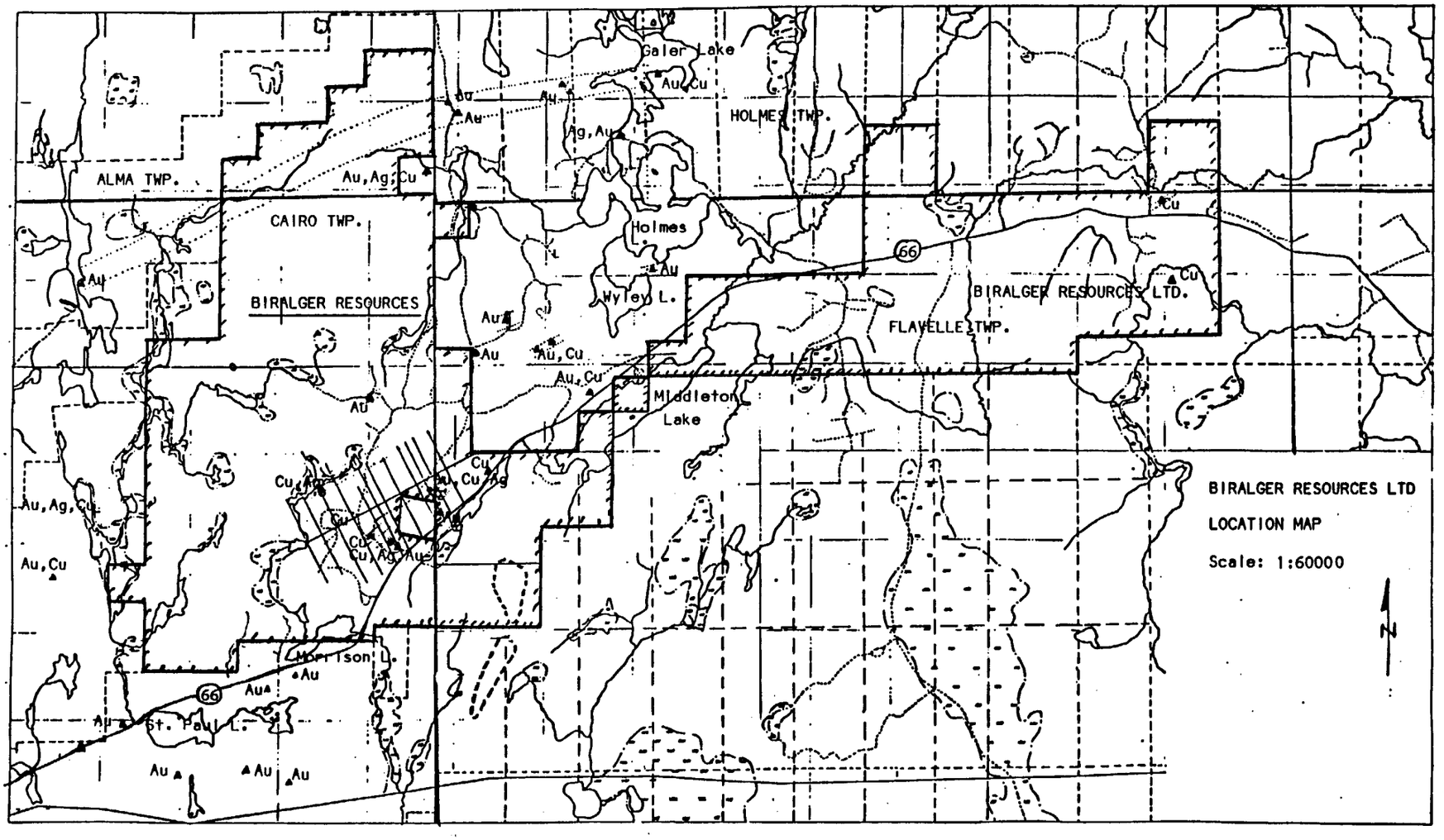


Fig. 4. Geography Map

All of the main showings are located within 1.2 km (0.75 mi) or less from Highway 66.

EXPLORATION HISTORY

MATACHEWAN AREA

Gold was first discovered in the Matachewan area in 1916 by Jake Davidson on Davidson Creek 3.2 kilometres west of Matachewan. This discovery became the Young-Davidson Mine. A second discovery was made shortly afterward by Sam Otisse 1 kilometre northeast of the Davidson discovery. This discovery later became the Matachewan Consolidated Mine. These two discoveries eventually became the two largest gold producers in the Matachewan Gold Camp.

From 1934 to 1957 these two mines produced a total of 32,781 kg gold (956,119 oz) and 9,110 kg silver (265,699 oz).

Since the development of these two mines, considerable exploration interest was generated in the area, and numerous types of mineral deposits such as gold, copper, silver, nickel, lead, zinc, molybdenum, asbestos and barite have been found in the Matachewan area. Eight of these occurrences became producers.

The Matachewan area has had sporadic periods of exploration activity since 1957. Some of this exploration has been directed on the two past producing gold properties, the Matachewan Consolidated and Young-Davidson Mines. Recent work on these properties by Pamorex (now Royal Oaks) has defined substantial ore reserves below the old workings of these two mines. A production decision has not been announced but is forthcoming. A new base metal discovery has been made by Queenston Minerals and Strike Resources in Robertson Township, 15 km (9.3 mi) northwest of Matachewan, with work still in progress. Inco has staked and has initiated a drilling program on its property near the

northwest corner of Biralger's Property.

EXPLORATION HISTORY OF PROPERTY AND IMMEDIATE AREA

The area was first prospected for gold in the 1920's and 1930's by J.B. Moyneur, Hugh Kells, Ed Otisse, J. O'Brien, Frank Westcutt and D. Miller near the southern contact of the Cairo Stock and the volcanic, from St.Paul Lake and Morrison Lake. Several old prospect pits have been found in this area by Biralger and others. Dyer (1935) reported that prior to 1935, Bloom Lake Consolidated Mines Ltd. carried out some stripping and trenching on ten claims in the Morrison Lake area in a highly silicified and carbonatized shear zone at this syenite-volcanic contact. Dyer also reported that gold values were reported from this contact.

Work was carried out in 1914 by L. Brookbank on a single claim at the southeast corner of Alma Twp. Two old pits were excavated on a quartz vein lens striking N15 E. The quartz vein contains chalcopyrite, galena, calcite, and fluorite. Lovell (ODM 1967) obtained from 5 grab samples, an average assay of 9.2 g/t gold (0.27 oz/ton) and 445.7 g/t silver (133 oz/ton). Biralger (1989) obtained assays of 9.2 g/t gold (0.27 ox/ton); 120 g/t silver (3.5 oz/ton); 4% copper and 3.5% lead from the same vein.

In 1952, Dominion Gulf Company carried out line cutting, a ground magnetic survey, and detailed geological mapping in the St. Paul-Morrison Lake area, and on the Cairo-Flavelle Zone, 2 km northeast of Morrison Lake. This work was followed up with the drilling of 4 holes. Two of the holes were drilled 321 m (1054 ft) and 335 m (1100 ft) deep just under the west end of Morrison Lake from Highway 66. These holes intersected a highly silicified and shear volcanics and syenite porphyry mineralized with chalcopyrite, pyrite, quartz and calcite veining. Two other holes were drilled north and south 800 metres (2,624.7 feet) west

of St. Paul Lake on the north edge of the road. These holes also intersected similar mineralization over 30 metres (98.4 feet) in width but with higher quartz veinlet content. Their detailed geological mapping arouond the Cairo-Flavelle Zone did not detect any chalcopyrite mineralization, yet Biralger Resources Ltd. observed frequent disseminated chalcopyrite mineralization in both, the syenite and volcanic rocks in this area.

The Morrison Lake area was explored again in 1965 by Sisco Metals of Ontario. Line cutting and a magnetic survey was carried out and their survey covered Biralger's claims 859205, 859240 and 859241. Strong magnetic anomalies were detected east and west of Highway 66 and north of Morrison Lake, along the Cairo-Flavelle Twp. line. Drilling was recommended but none was carried out.

From 1974 to 1979 F.J. Garbutt carried out a ground magnetic, soil geochemical, radiometric survey and geological mapping over present leased claim L373405. Garbutt's soil geochem survey detected copper and zinc anomalies on this claim. He then optioned his claim to Ecstall Mining in 1974. Ecstall staked an additional 23 claims in the area and carried out line cutting, ground geophysical magnetic survey on these claims. Mechanical stripping was performed on 3 claims 373405, 387568, 387569. Several diamond and rotary drill holes were drilled over the stripped areas. Only one diamond drill hole C-46-2 was reported for assessment work. It was drilled at an Azimuth of N45 W, at -45 dip, 30 metres (100 ft) north and 60 metres (200 ft) east of No.1 post of claim L373405. This hole intersected 183.1 metres (601.7 ft) of mineralized mafic volcanics and syenite porphyry. Chalcopyrite, quartz-calcite veins, magnetite, pyrite and fluorite are the main minerals noted in the log sheets. No assays were reported by Ecstall. Biralger's Hole C-91-2 was drilled 25 metres (32 ft) northeast of Hole C-46-2 and it intersected similar mineralization and rock types; however, Biralger's Hole was drilled in the opposite direction, to the east southeast. Biralger's hole C-91-2 returned 0.72 g/t gold (0.021oz/ton), 1.44 g/t silver

(0.042 oz/ton) and 0.17% copper over 98.8 metres (324 feet). Ecstall dropped the option on the Property in 1976.

In 1979, Garbutt concluded that the claim had potential for large tonnage low grade copper-gold-silver deposits hosted in sheared, silicified and carbonatized syenite porphyry and mafic volcanic rocks.

Exstall's drilling did define a copper-gold-silver zone containing 350,000 tons grading 1.71 g/t gold (0.05 oz/ton) and 0.5% copper (verbal communication H. Lovell Resident Geologist MNDM Kirkland Lake). This zone is known as the Cairo-Flavelle Zone.

In 1985 Falconbridge optioned several properties from various groups in Cairo, Flavelle and Holmes Townships. Mechanical stripping, geological mapping, trenching and diamond drilling was carried out on the Goldhunter Property located along Highway 66 and south of Biralger's Property. Falconbridge also carried out mechanical stripping northwest of Highway 66 in Cairo Twp on Biralger's present claims 1179846 and 179847. They also carried out an extensive airborne survey over a large block of claims in Holmes, Flavelle and Cairo Townships but not on the Goldhunter Property. Falconbridge subsequently dropped all of their options and interest in the area.

In 1989 and 1990 Roger Dufresne carried out prospecting and mechanical stripping in the northwest corner of Flavelle Township northwest of Highway 66. Some of this work covered the old workings of Stan Welsh south and northeast and west of Wiley Lake. Gold values were found in a highly carbonatized shear zone in the northeast corner of Wiley Lake. Several new grey-blue quartz veins were exposed by mechanical stripping 1 km (0.62 mi) west of Wiley Lake on the north side of a new logging road. It is reported that one of these veins return-ed over 34 g/t gold (1.0 oz/ton). A small outcrop containing blue-grey quartz vein, along the Separation Lake Road on the east boundary of

Biralger's claim 1168664 near post No.1 is reported to contain over 38 g/t gold (1.1 oz/ton) (reported by Mike Sutton, Kirkland Lake). All of the veins in this area have a N70-80 E strike.

The old McChesney showing located southwest of Wiley Lake is reported to contain visible gold (Moore, 1966). This Property was worked in the 1930's and 1940's. In 1966 Moore sampled this showing and reported 2.4 g/t gold (0.07 oz/ton) and 130 g/t silver (3.8 oz/ton).

In 1970, Mr. G.S. (Stan) Welsh, a well-known prospector and mine developer from Matachewan, conducted a magnetic survey in the same vicinity, a portion of which was over Biralger's present claims numbered 859204, 859240, 1102233. Similar magnetic high anomalies were detected in this surveyed area. No further work was done.

In 1982-83, Pamour Porcupine Mines Ltd. carried out a geophysical magnetic and VLF-EM survey and geological mapping over a large area of Biralger's present claims in Cairo Township. The geophysical survey detected several magnetic and electromagnetic anomalies. The old trenches on present claim 1048592 were also noted by Pamour. Further work was recommended by Kren A. Jensen but none was carried out.

In 1989, Queenston Mining Inc. optioned the Dufresne Property. In 1990, Queenston carried out a program of line cutting, geophysical surveys and geological investigation on the Property. This work was followed by a diamond drilling program in the Wiley Lake area. In June of 1990, Queenston Mining reported in the Northern Miner, an assay of 641.1 g/t gold (18.6 oz/ton) obtained from a grab sample from the gold showing in the northeast corner of Wiley Lake.

In 1985 the group of R. Bernatchez, G. Bernatchez, B. Plavac and L. Kindrachuk, staked claims in Cairo and Flavelle Townships. In

1986 the group incorporated Biralger Resources Ltd. From 1986 to 1987, Biralger Resources Ltd. carried out limited mechanical stripping along the east and west side of the logging road on claims L859204. This stripping exposed two wide disseminated copper zones in fractured and altered syenite porphyry. The fractured zones measured 50 to 150 metres (164 to 492.1 feet) in width. The mineralization consists of pyrite, chalcopyrite, quartz-calcite veins, fluorite, magnetite, minor galena and molybdenite. In November of 1989 Biralger carried out additional mechanical stripping on claim L859204, L859240 and 1179845. This work confirmed the eastern extension of the two zones discovered in 1987. The two main zones were named the Kidd Creek Zone, located on claims 859204 and 1179845 and the Billy Goat Zone, located on claims 859204 and 859240. These showings are located on present grid lines 3+00 and 4+00W at 2+50S and 4+50S respectively.

In 1989-90 Biralger continued to acquire additional claims in the Cairo, Alma and Flavelle Twp.

During the winter of 1990-91, Biralger Resources Ltd. carried out a limited program of line cutting, ground geophysical surveys and diamond drilling. The geophysical surveys confirmed numerous magnetic and VLF-EM anomalies. The drilling program consisted of drilling three holes to test some of the known copper zones. The first hole, C-91-1 was drilled southeast at Az 130 , -45° dip to a depth of 182.5 metres (600 feet) to test the Billy Goat Zone exposed by mechanical stripping in 1989. This hole intersected 152.4 m (500 ft) of mineralized, silicified and hematized syenite porphyry. The upper section contained significant chalcopyrite mineralization from 6.8 m to 20.9 m [14.1 m (46.2 ft0)] returning 0.2 % copper. Additional copper mineralization was found over 80 metres (263 feet) of outcrop north of the collar of this hole.

Hole C-91-2 was drilled to a depth of 182.5 m (598.8 ft) on line 3+00E at 1+52S at -45° dip Az 100° to test the Cairo-Flavelle

Zone. This hole is located 25 metres (82 feet) northwest but was drilled in the opposite direction from Ecstall's (1976) drill hole C-46-2. Hole C-91-2 intersected continuous chalcopyrite mineralization from 5.5 metres (18.0 feet) to the bottom of the hole at 182.5 metres (598.8 feet). Values of up to .6% copper and 3.42 g/t gold (0.1oz/ton)
were obtained from this hole. A section from 20.5 m to 119.3 m (98.8 metres {324 feet}) averaged 0.72 g/t gold (0.021 oz/ton); 1.44 g/t silver (0.042 oz/ton) and 0.17% copper. This zone has excellent potential for an open pit, large tonnage, low grade deposit. Further prospecting in the summer of 1991 has traced disseminated chalcopyrite mineralization across another 50 metres (164 feet) north, 800 metres (2,625 feet) east and 300 metres (984 feet) south of the collar of hole C-91-2.

Hole C-91-3 was drilled on line 8+00W at 4+25N to a depth of 117.0 metres (384 ft) at a dip of -45° and Az 333° on claim 1048592 to test the Kells Zone. This hole confirmed the mineralization exposed on surface in some old trenches but was not drilled deep enough to intersect the McChesney Fault Zone located downhole another 50 to 75 metres (164 to 246 feet). The ground geophysical survey in this area confirmed this fault zone under Kells Lake north of this hole. Trace gold and copper values were obtained from this hole.

In May of 1991, Biralger contracted Aerodat Ltd. to conduct a 200 kilometre geophysical survey over 122 claims in Cairo, Flavelle and Alma Townships. The survey detected three (3) major geophysical anomaly trends coinciding with the three deformation zones identified by Powell (OGS 1989) in Flavelle and Holmes Townships. Several known copper, gold and silver occurrences are coincident with these deformation zones and anomalies. Weak EM airborne conductors were detected, and coincident with these deformation zones.

A limited geological program was carried out by Biralger in the

summer of 1991 evaluating these airborne geophysical anomalies and other showings on the Property and in the area.

This geological evaluation resulted in the staking of a new block of ground in Flavelle Twp. Two old copper showings were investigated at the east end of Flavelle Twp. Moore (OGM 1966) reported obtaining 0.53% copper from metadiorite south of Flavelle Creek on Conc.VI Lot 2, S½ NW ¼. A second showing was investigated in the same concession and lot in the N « NW ¼, 100 metres (328 feet) north of Hwy 66. Recent work by Resources Hysoex Inc. (1988) in this area has identified strong east northeast magnetic and electromagnetic anomalies near these two copper showings.

Exploration activity in the Matachewan area is ongoing. Royal Oaks Resources has delineated by drilling, significant gold reserves below the old workings of the two former gold producers, the Young-Davidson Mine and the Matachewan Consolidated Mine. Queenston Mining Inc. and Strike Minerals continue to explore their Robertson Twp. base metal copper-zinc Property 15 km (9.3 mi) northwest of Matachewan.

Inco is inititating a drill program on their Property near the northwest corner of Biralger's Property. They are testing the western section of the Galer Lake Deformation Zone within the Cairo stock.

In 1991,Strike Minerals staked a block of 44 claims at the west boundary of Biralger's Property. No work has been done on these claims as yet.

REGIONAL GEOLOGY

The geology of the Matachewan area was mapped by Burrows (1918, 1920), Cooke (1919), Dyer (1935), and more recently by Moore

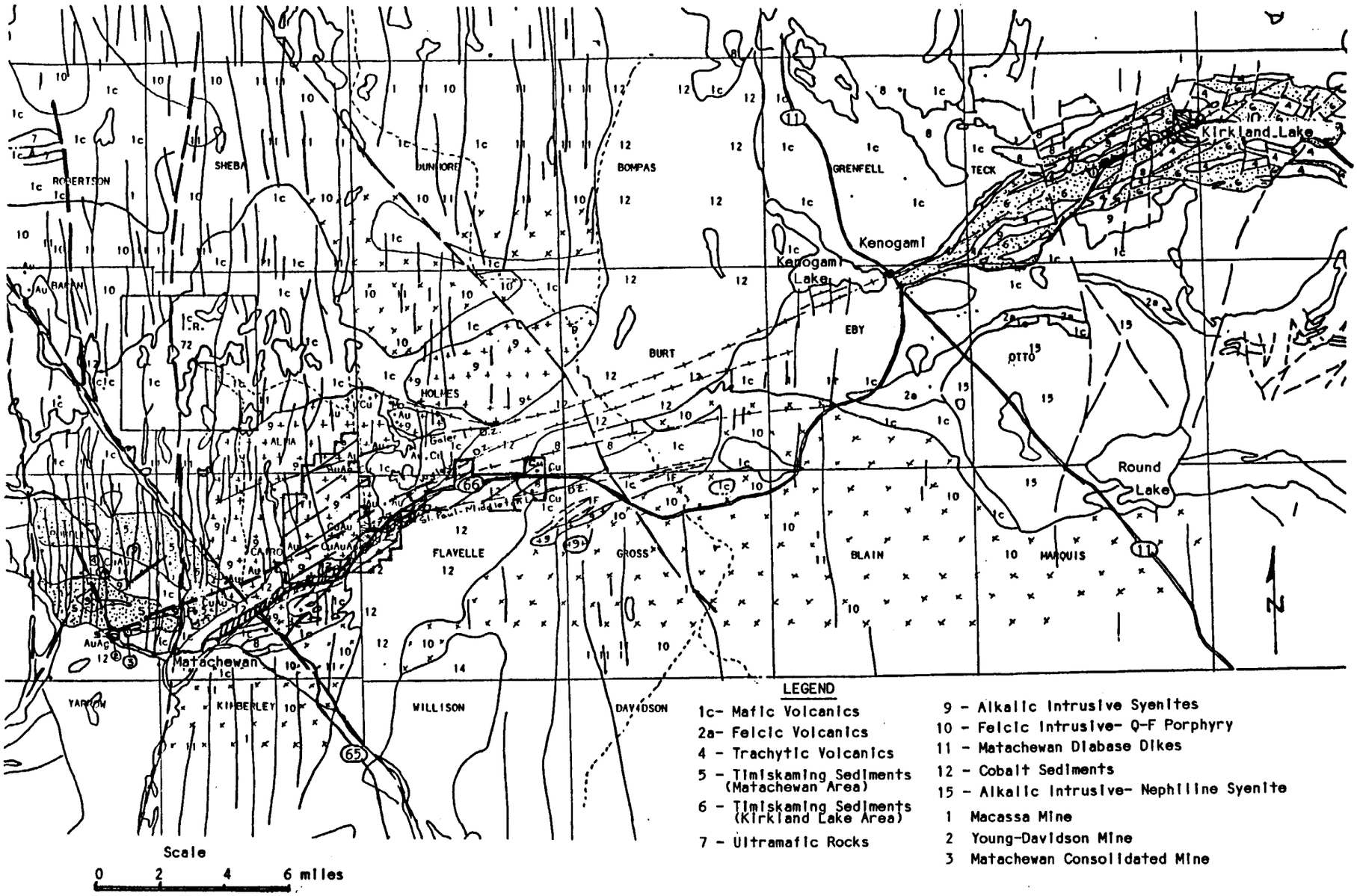


Fig. 5 Regional Geology Map - Matachewan - Kirkland Lake Area.

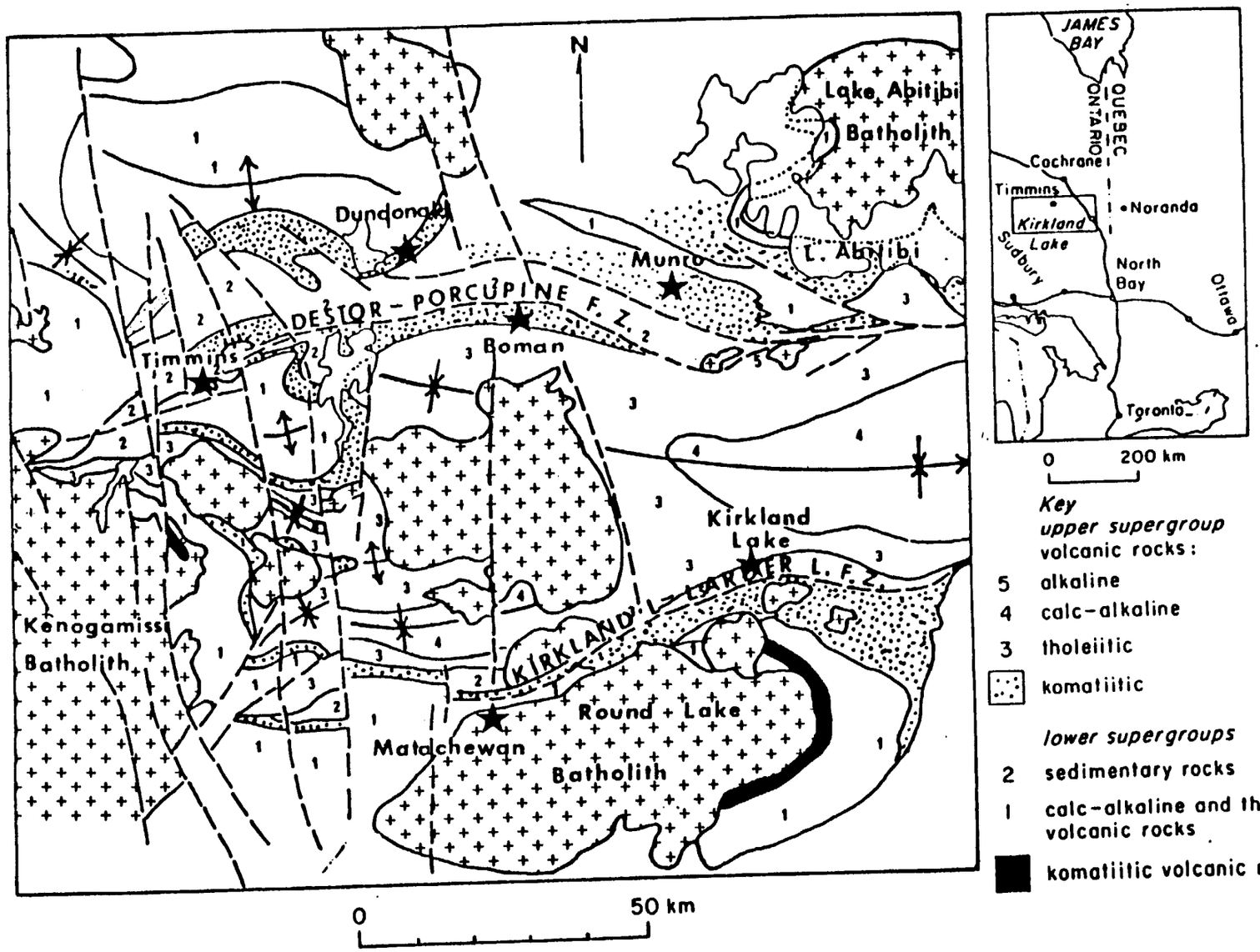


Figure 6. Distribution of komatiites and general stratigraphy in the Timmins-Kirkland Lake part of the Abitibi Subprovince (Jensen and Pyke 1982).

(1966), Lovell (1967), Sinclair (1978) and Powell-Hodgson-Hanes (1989).

The rocks in the region are of Precambrian Age, and they form part of the Abitibi Greenstone Belt. The older Archean rocks consist of tholeiitic basalts and andesite flows with minor iron formation and interflow sedimentary rocks. A younger series of Archean rocks which belongs to the Timiskaming Group is also found in the area. The Timiskaming Group forms an east-west trending narrow continuous belt through the Matachewan-Kirkland Lake area measuring 0.5 km to 10 km (0.31 mi to 6.21 mi) in width. The Group consists of sedimentary, volcanic and intrusive rocks. The conglomeritic sediments are composed of massive and porphyritic syenitic, granitic, rhyolitic, trachytic, dioritic, gabbroic quartz, jasper and chert pebbles and boulders with a fine to medium-grained sandstone and greywacke matrix. The Timiskaming alkalic volcanic rocks consist of massive, pillowed and amygdaloidal trachytic flows. The intrusive rocks consist of syenite, augite syenite and porphyritic syenite.

The late intrusive activity consists of a period of felsic intrusions. These intrusions predominantly consist of trondhjemite, tonalite and younger granodiorite. The Otto, Cairo, Holmes and Nixon Lake Stocks form part of these late felsic intrusives. Matachewan diabase dikes intrude the above rock formations in the Matachewan area.

LOCAL GEOLOGY

The local geology of the area is dominated by the Cairo Stock. This Stock intrudes the Blake River, Kinojevis and Timiskaming group of rock in Cairo, Alma, Holmes and Flavelle Townships. This suite of rocks extends further west-northwest and easterly into Powell, Bannockburn, Hincks, Cleaver, McNeil, and Robertson

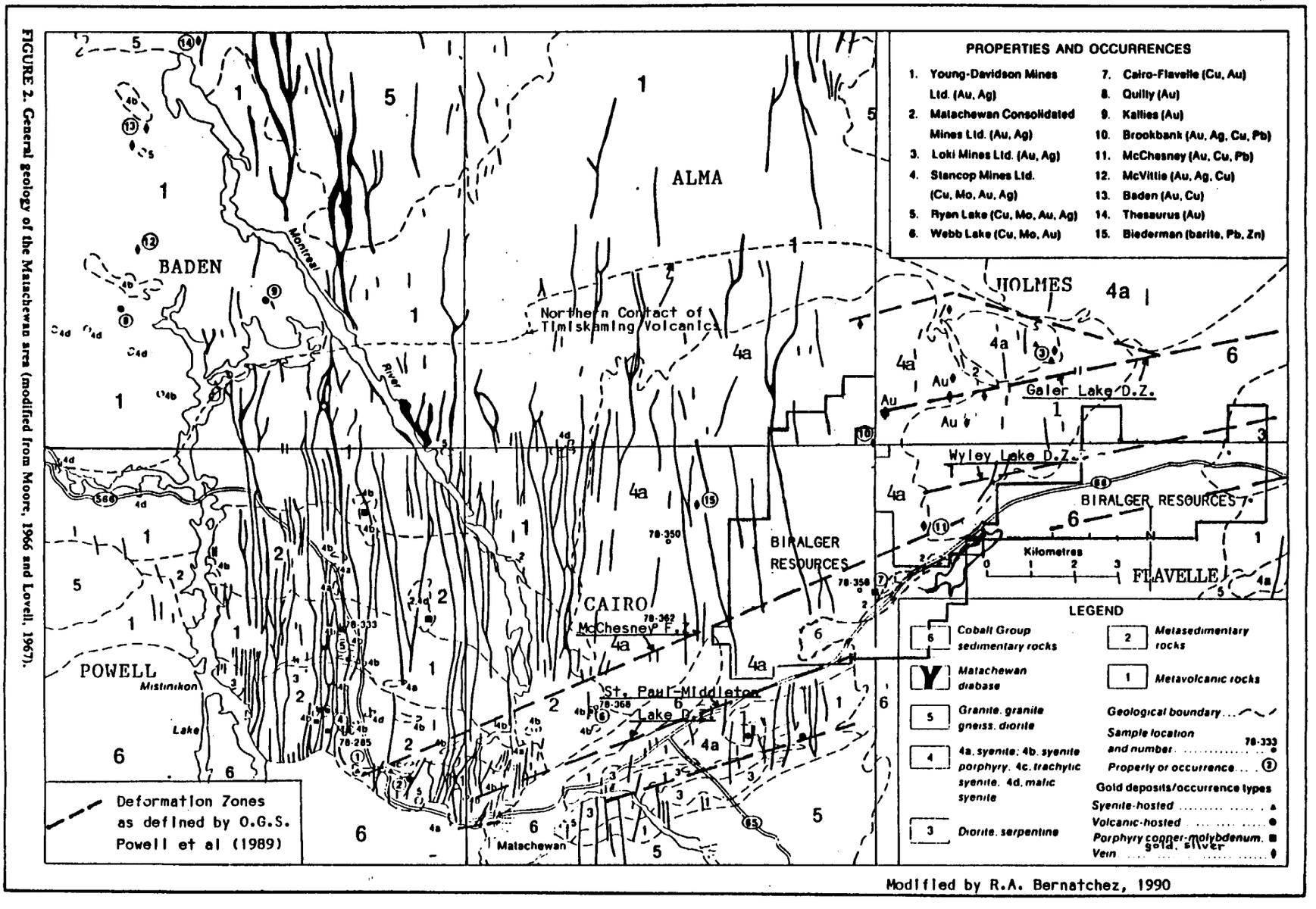


FIGURE 2. General geology of the Matachewan area (modified from Moore, 1966 and Lovell, 1967).

fig. 7 Geology and property locations, Matachewan area.

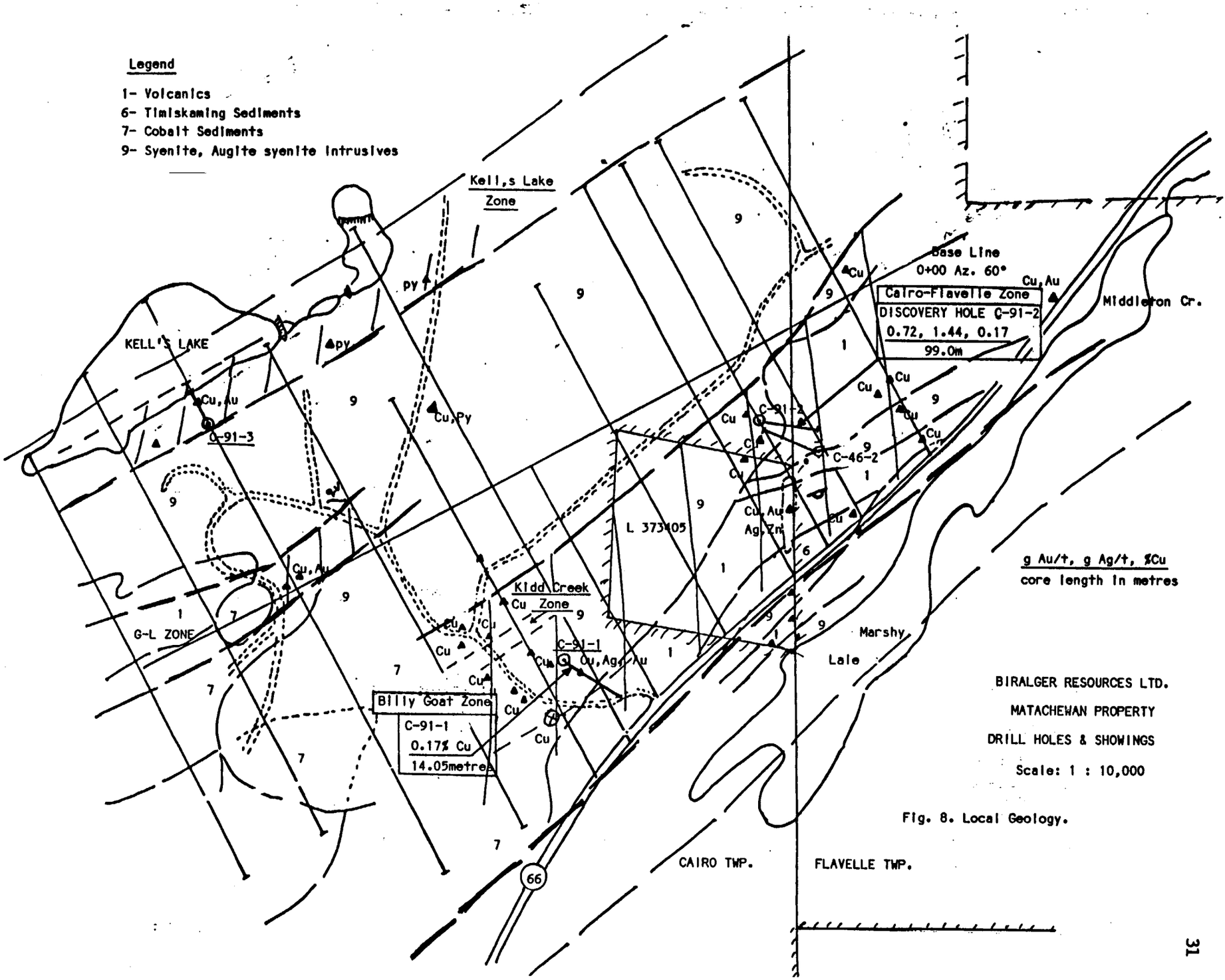


Fig. 8. Local Geology.

Townships.

The Blake River and Kinojevis groups form a synclinal fold plunging gently eastward and extending to the Kirkland Lake Gold Camp. The contact between these two units is also the host for the new copper-zinc base metal deposit discovered by Queenston Mining Inc. and Strike Minerals in Robertson Twp. 15 km (9.3 mi) northwest of Biralger's Property.

Timiskaming and Kinojevis rocks are found striking east-northeast in Powell, Cairo, Flavelle and Holmes Townships. The Cairo Stock dominates the geology on the western portion of Biralger's Property. It has intruded within the central portion of the Kinojevis-Timiskaming suite of rocks. The volcanic rocks consist of tholeiitic and calc-alkalic suites of the Kinojevis Group and the trachitic suite belonging to the Timiskaming Group. The volcanic rocks are overlain conformably to the south by Timiskaming sedimentary rocks composed of conglomerates, arkose greywacke and quartzite. The Timiskaming sediments in turn are overlain to the south conformably by basalts and ultramafic lavas, followed by turbiditic sedimenary rocks of the Larder Lake Group. Timiskaming sediments and Kinojevis trachytic volcanic rocks occupy the southern and eastern portion of the Property. Both, the Cairo Stock and the Timiskaming and Kinojevis suites have been intruded by late Matachewan north-south trending diabase dykes. In the southeast section of Cairo Twp., southwest and central part of Flavelle Twp., the Timiskaming and Larder Lake suites of rocks are covered by the younger Huronian Cobalt sediments. The Cobalt sediments also cover a large portion of the St. Paul - Middleton Lake Deformation Zone in Flavelle Twp. No information is available as to how thick these late sediments are in this area. Some outcrops of these sediments in Cairo Twp. north of Morrison Lake are about 10-12 metres (33-39 feet) thick. It can be inferred from topographic maps of the area that the late Cobalt sediments are at least 40-50 metres (131-164 feet) thick along prominent ridges 1.5 km (0.9 mi) southeast of the Cairo-Flavelle

zone south of Highway 66; and over 40 metres (131.2feet) thick in Conc. VI Lot 4 of Flavelle Two south of Highway 66. The remaining area may be covered with a thinner layer of Cobalt sediment because of the lower topographic relief.

The syenite that forms the Cairo Stock and related dykes in the Matachewan area varies texturally and compositionally. It consists of medium to coarse grained equigranular hornblende syenite consisting of 70-80% orthoclase, 10-15% hornblende and 5-10% albite with minor quartz, biotite, magnetite and sphene. The central part of the Stock is enriched in quartz and may represent a crude mineralogical zonation. The western part of the Stock is very coarse grained, trachytic syenite porphyry.

Numerous offshoots of small syenite dykes and plugs intrude the Archean and sedimentary rocks. They consist of syenite porphyry and trachytic syenite.

The syenite porphyry consists of 20% orthoclase as phenocrysts in a matrix of albite, hornblende and/or biotite and minor quartz. Trachytic syenite ranges from fine to coarse grained consisting mainly of orthoclase with minor amounts of albite. The trachytic syenite was an important host for the gold ore mined at the Matachewan Consolidated and the Young-Davidson Mines.

The age of the syenite has been established at about 2700 million years (Ma). Some syenite bodies appear deformed at their contacts which suggests that they may be only slightly younger than the volcanics they intrude.

STRUCTURAL GEOLOGY

Recent work carried out by Powell, Hodgson and Hanes (OGS 1989) in the Matachewan-Kenogami area has identified four (4) deformation zones in Holmes and Flavelle Twps. These deformation zones

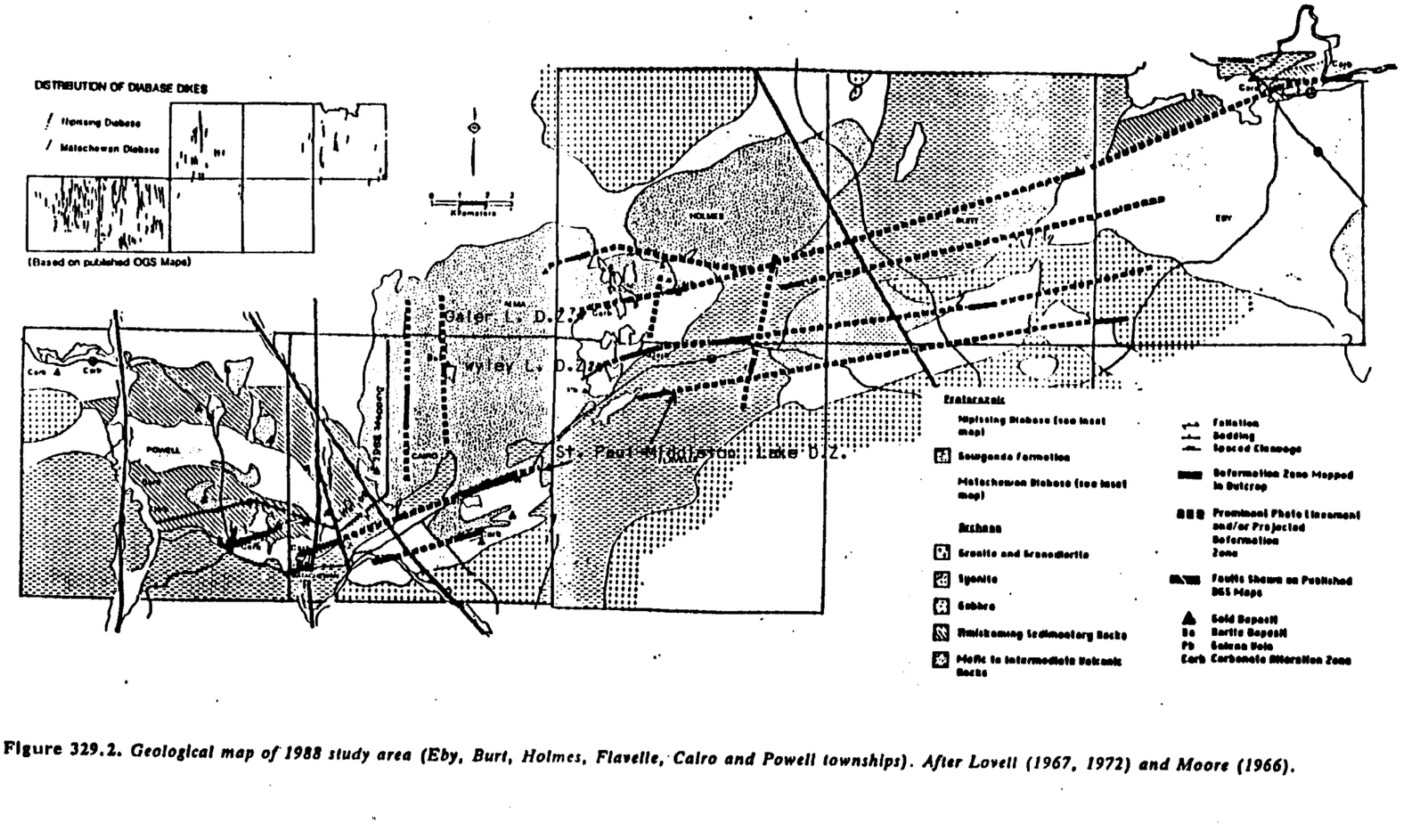


Figure 329.2. *Geological map of 1988 study area (Eby, Burt, Holmes, Flavelle, Cairo and Powell townships). After Lovell (1967, 1972) and Moore (1966).*

form the western extension of the Kirkland Lake-Larder Lake-Cadillac Break west of Kenogami through to Matachewan. Biralger has named these 4 deformation zones (D.Z.) as follows from the north to south: 1) Willard Lake D.Z. 2) Galer Lake D.Z. 3) Wiley Lake D.Z. and 4) St.Paul-Middleton Lake D.Z. The last three (3) deformation zones have been defined on Biralger's Property. Lovell (ODM 1966) mapped a wide shear zone in the St.Paul Lake and Morrison Lake areas of Cairo Twp. This shear zone coincides with the St. Paul-Middleton Lake Deformation Zone.

The Wiley Lake DZ is located between Wiley and Holmes Lakes. The third deformation zone striking west and west-southwest from Galer Lake is known as the Galer Lake Deformation Zone.

All three major deformation zones consist of zones of moderate to intense and brittle to ductile shearing. Multiple parallel to sub-parallel fracture zones may occur within or between these deformation zones. The fracture zones may trunkate to form a wider single zone such as the St. Paul-Middleton Lake Deformation Zone.

These deformation zones are the major host for the copper, gold and silver mineralization on the Property and in the Matachewan area.

These structures could be host to very large copper-gold-silver deposits similar in size, grade and geology to the Mt. Milligan deposit. The Mt. Milligan deposit contains 300 million tonnes grading at 0.5 g/t gold (330 million tons at 0.015 oz/ton) and 0.22% copper.

The Wiley Lake Deformation Zone strikes west-southwesterly towards the Matachewan Consolicated and the Young-Davidson Mines. The Drill Bit Zone and the Kells Zone are also coincident with this deformation zone.

The third and most northerly Galer Lake Deformation Zone strikes east-northeast through the Cairo Stock from Whiskeyjack Lake eastward to Galer and Abel Lakes. It is covered east of Abel Lake by late Cobalt Sediments and glacial silty sand. This deformation zone can be traced to the Ryan Lake copper-gold-silver past producer.

Most of the gold deposits in the Matachewan and Kirkland Lake Gold Camps are contained within or adjacent to these east-northeast deformation zones which form the westerly extension of the Kirkland Lake-Larder Lake-Cadillac Break.

ECONOMIC GEOLOGY

The Matachewan area has had six (6) producing gold and base metal mines. Their production outputs are listed below:

Gold Mines		Au (oz)	Ag (oz)
1) Young-Davidson Mine	(1934-56)	585,690	131.989
2) Matachewan Consolidated Mine	(1934-54)	370,429	133,710
3) Ashley Gold Mine	(1932-36)	50,123	7,644
4) Stairs Mine	(1966)	3,573	1,767

Base Metal Mines		Au (oz)	Ag (oz)	Cu (tons)	Mo (tons)	Pb (tons)	Zn (tons)
5) Ryan Lake Mine	(1950-57) (1964-65)	1,352	36,141	2,498	5.7		
6) Matarrow Mines	(1952-53)		4,853			1230	458

TOTALS	Au (oz)	Ag (oz)	Cu (tons)	Mo (tons)	Pb (tons)	Zn (tons)
	1,011,167	316,104	2,498	5.7	1230	458

Other minerals such as barite and asbestos have been produced in the Matachewan area. Over 45 other gold and base metal occurrences have also been documented in the area.

These gold and base metal occurrences are found in a variety of geological environments. These environments are classified as follows:

a) Gold Deposits
   1) quartz-calcite veins in fractured syenites
   2) " " " " " volcanics
   3) auriferous pyrite in syenite porphyry
   4) quartz-carbonate veins in green carbonates

b) Base Metal Deposits
1) copper-gold-silver in fractured altered syenite
2) " " " " " " volcanics
3) vein copper in volcanics
4) volcanogenic massive sulphide copper-zinc
5) volcanogenic lead-zinc deposits
6) copper-nickel in ultramafic intrusives

The most productive environments have been the syen-ite porphyry and volcanic hosted gold deposits, such as in the Young-Davidson and Matachewan Consolidated Mines. These two types of deposits are found on Biralger's Property.

Since 1986, Biralger Resources Ltd. has identified seven major exploration targets which may host gold and/or copper-gold-silver deposits. Four of these targets have been confirmed to contain significant copper, gold and silver mineralization. The three other targets are known to contain mainly gold with values up to 1.13 oz/ton. The following is a list of the zones found on the Property:

1) Cairo-Flavelle Zone
2) Billy Goat Zone
3) Kidd Creek Zone
4) G-L Zone
5) McChesney Zone
6) Wiley Lake Zone
7) Galer Lake Zone

1) CAIRO - FLAVELLE ZONE

This zone is located on line 3+00E from 0+50S to 4+00S along the Flavelle Twp. boundary line 350 metres (1148 feet) north of Highway 66 on claims 1132183, 1132184 and 1132188. The zone is located at the syenite porphyry-volcanic contact. The syenite and volcanic rocks have been extensively fractured, altered and mineralized with disseminated chalcopyrite quartz-calcite veins with minor bornite and pyrite in both, the rock types and in the veins. The copper zone has been traced across a width of over 350 metres (1148 feet) and a length of over 800 metres (2625 feet) in scattered outcrops. Biralger's hole C-91-2 drilled at -45° dip and to a depth of 182.5m (598.7 ft) returned 0.72 g gold/t (0.02 oz per ton); 1.44 g silver/t (0.042 oz/ton) and

0.17% copper over 99.0m (324.8 ft) from 20.5m to 119.5m. Chalcopyrite was observed throughout every metre of core from 5.5-182.5m {177m (580.7ft)}. Lower grades of copper, gold and silver are also present with this copper mineralization. The consistancy, width, disseminated nature, and grade of this mineralization makes this zone very amenable to open pit mining. The above grade is comparable to the porphyry copper-gold deposits found in British Columbia, such as the Mt. Milligan deposit which is reported to contain 300 million tonnes at 0.5 g gold/t (330 million tons at 0.015 oz/ton) and 0.22% copper. The tonnage potential for the Cairo-Flavelle zone could be substantial if the zone can be traced over the dimension indicated above.

2) BILLY GOAT ZONE

This zone was discovered in 1987 as a result of mechanical stripping. It is located on claim 859204, 859240 and may extend onto leased claim 373405. The zone has been partially exposed by mechanical stripping between 3+00W and 5+00W from 3+50S and 5+00S. Hole C-91-1 drilled 182.5 m (598.7 ft) deep at -45° dip at Az 130° intersected 152.4m (500 ft) of the mineralizd zone in syenite porphyry. The syenite porphyry is fractured, mineralized and highly silicified. The mineralization in the syenite consists of pyrite and chalcopyrite, fluorite and galena as dissemination in fractures and in quartz veinlets. Pyrite is the most abundant sulphide (up to 10%) throughout the core. A section from 6.8m, 20.9m (14.1 m) (46.2 ft) contains significantly more chalcopyrite with secondary malachite along the fractures. This section graded 0.20% copper and 0.7 g/t silver (0.02 oz/ton) and trace gold. The remaining section from 152.4 to 182.5 m (30.1 m) (98.7 ft) consisted of mafic volcanic tuffs, lapilli tuffs and pillowed flows mineralized with 5-15% disseminated magnetite grains minor pyrite and calcite veining. More copper mineralization was observed in outcrops for 80 metres (263 feet) north of the drill hole collar.

3) KIDD CREEK ZONE

This zone is located 300 metres (984 feet) northwest of Highway 66 on claims 859204 and 1179845. It has been exposed by mechanical stripping, near line 3+00w, 4+00W and 6+00W from 2+25S to 3+50S. The zone strikes N60 E. The zone consists of fractured, sheared, silicified, pyritized and hematized syenite porphyrpy. The syenite porphyry is mineralized with disseminated pyrite, chalcopyrite and quartz-calcite veining. The veining contains chalcopyrite, galena, fluorite and pyrite. This zone strikes directly towards the Cairo-Flavelle zone 600 metres (1969 feet) to the northeast through claim L373405. The geophysics survey detected a coincident magnetic low and weak VLF-EM conductor associated with the central portion of the shear zone on line 4+00W and 3+00W at 2+50S. Further work is required on this zone.

4) G-L ZONE

This zone is located 25 to 50 metres (82 to 164 feet) north of the baseline at 8+00W on claims 859207 and 1048585. It also strikes N80 E. It is partially exposed along the edge of a creek flowing southward. The zone consists of fractured, silicified and hematized syenite porphyry mineralized with disseminated pyrite, minor chalcopyrite, quartz veinlets and fluorite. It has been traced southwest for about 100 metres (328 feet) to the edge of a cliff of Cobalt Sediments. A strong coincident VLF-EM survey has been detected coinciding with this zone. The conductive zone appears to flank the south edge of a magnetic high under the Cobalt Sediments. The magnetic high is presumed to be caused by mafic volcanic rocks containing high magnetite content. This zone may be similar to the Cairo-Flavelle copper zone. Volcanic rocks have been located in outcrops 200 metres (656 ft) north of the conductor between lines 10+00W and 12+00W. Aerodat hass classified this area as a priority target.

5) KELLS ZONE

This zone is located on claims 1048585, 1048586, 1048592, 1049547, 1049548. It trends N60 E and shows up as a prominant

airphoto lineament in the Cairo Stock. This lineament can be traced northeastward from line 8+00W, 5+30N for 3 km (1.86 mi) to the McChesney showing on the adjacent property. Samples taken from the old McChesney showing by Moore (ODM 1966) reported a grab sample with 2.4 g/t gold (0.07 oz/ton) and 130 g/t silver (3.8 oz/ton). Biralger drilled the Kells Zone with hole C-91-3 on line 8+00W at 4+25N at -45° dip and 333° Az. The hole failed to intersect the McChesney Fault but did intersect mineralized altered and hematized syenite porphyry. Limited financing prevented the Company from drilling the hole deeper. The mineralization consists of disseminated pyrite, chalcopyrite and magnetite in silicified and hematized syenite porphyry. The fractures in the syenite contain quartz-calcite veinlets with minor chalcopyrite, galena, tourmaline and fluorite. Some fractures contain chlorite. Movement is indicated along these chlorite fractures. This drill hole should be extended another 100 metres (328 feet) to test the McChesney Fault under Kells Lake.

6) WILEY LAKE ZONE

This zone is located 1.5 km (0.93 mi) northwest of Highway 66. It has been clearly identified outside the Property at the northeast corner of Wiley Lake as a wide shear zone trending N70-80° E. This zone can be traced west southwest from this location for another 1.7 km (1 mi) to a multiple blue-grey quartz vein zone striking N70-80° E onto Biralger's east claims 1168664, 1168949 - 952. One of these blue-gray quartz veins is located along the Separation Lake Road near the northeast corner of claim 1168664. A sample taken by Mike Sutton from this vein is reported to contain 38 g/t gold (1.11 oz/ton). Two other blue grey quartz veins have been found on Biralger's claim 1168945 on the south side of the bush road. Biralger sampled the veins in 1991 and assay results of two samples

The north vein is 0.5 metres (1.5 ft) and the south vein is 1 metre (3.3 ft) wide. The veins are about 3-4 metres apart (9.8-13.1 ft) and are hosted in highly sheared and silicified syenite

porphyry. The airborne survey detected several conductive anomalies in this area. The veining described above coincides with the above airborne anomalies. Aerodat has designated this as a high priority exploration target because of the intersection of N-S faults and the east-northeast Wiley Lake Deformation Zone.

7) GALER LAKE ZONE

This zone coincides with the Galer Lake Deformation Zone which strikes N70° E through the Cairo Stock from Abel Lake to Fort Matach- ewan. Several gold showings have been identified along this deformation zone at Galer Lake, west of Galer Lake and at Browning Lake. Grades have varied from 3.42 g/t gold (0.10 oz/ton) to 38.7 g/t gold (1.13 oz/ton). Most of the work done on this structure has been on claims outside the Property to the east. This structure has been shown to be strongly auriferous. The numerous anomalies detected in the airborne survey on the Property have never been explored. The area is extensively covered with overburden and will require detailed geophpysical evaluation with follow-up mechanical stripping and diamond drilling.

DRILL RESULTS

The 1991 winter drill program consisted of drilling three (3) holes each testing a separate geophysical anomaly and known mineralized copper zones.

Hole C-91-1 was spotted at 3+50W, 4+25S and drilled to a depth of 182.5 metres (600 feet) at 130 ° Az and a dip of -45 ° southeast. This hole tested a wide zone of copper mineralization in altered syenite porphyry exposed in stripping in 1989. This hole was collared at surface in bedrock and intersected 155.7 metres (511 feet) of altered, fractured and mineralized syenite porphyry.

The mineralization consisted of pyrite, chalcopyrite, galena, fluorite and quartz. The syenite porphyry is highly silicified and hematized. A good copper zone was intersected from 6.8 metres to 20.9 metres [(14.1 m) (462 ft)], returning 0.20% copper with trace gold and silver values. The core from surface to 6.8 metres (22.3 ft) was oxidized and weathered. Further copper mineralizaion was noted in outcrops for an additional 80 metres northwest of the hole collar. Consistent low gold and silver values were detected in the first 155 metres (508 feet) of this hole.

Hole C-91-2 was started on line 3+00E at 1+52S and drilled to a depth of 182.5 metres (600 feet) at 110° Az and a dip of -45° southeast. This hole intersected continuous chalcopyrite mineralization in both, the syenite porphypry and mafic trachytic volcanic rocks. The hole was collared in bedrock at 5.5 metres 18 feet) and intersected mainly syenite with minor mafic volcanic from 5.5 to 88.6 m [(83.1 metres)(272.6 feet)] and mainly mafic volcanic from 88.6 to 182.5 m [(93.9 metres)(308 feet)]. Both rock types were mineralized, fractured and altered. Mineralization consisted mainly of chalcopyrite with minor bornite, pyrite, magnetite. Blue-grey quartz veining was observed in both rock types but was more abundant in the volcanics. The chalcopyrite was found disseminated and in fractures in both, the host rocks , and in the blue-grey quartz veining. This mineralization is very similar to that found by Dominion Gulf in their drilling in the St.Paul and Morrison Lake area. A prospecting program in the summer of 1991 also confirmed the presence of diseminated chalcopyrite mineralization in several small scattered outcrops 800 metres (2625 feet) east, 150 metres (492 feet) north, 800-1000 metres (2625-3280 feet) west and 300 metres (984 feet) south of this hole. A strong VLF-EM anomaly is located on strike on line 6+00E at 1+00S. Surface prospecting revealed no outcrop at this location. This anomaly could not be verified by surface prospecting because of overburden, but represents a prime exploration target.

The third hole, C-91-3 failed to test the McChesney Fault. It is located on line 3+00 W at 4+25N at an Az of 333° and dipping -45° northwest to a depth of 117 metres (384 feet). This hole intersected fractured, altered and mineralized hornblende syenite and syenite porphyrpy intruded by a mafic dyke. The syenites are pervasively fractured and mineralized with disseminated pyrite, chalcopyrite, fluorite, magnetite, tourmaline and quartz-calcite veinlets. Sulphides are present in the altered syenite and quartz-calcite veinlets. Some of the syenite has been intensely hematized to a brick red colour. A total of 32 samples representing 58.6 metres (192.2 feet) of core were analysed for gold. Only trace amounts of gold were detected. Only the first four (4) samples were assayed for copper with only anomalous values obtained. This hole did intersect mineralization south of the fault but did not intersect the McChesney Fault. The ground and airborne geophysical surveys identified a bedrock conductor and magnetic low anomaly associated with this Fault. The drilling did confirm the presence of a wide zone of fractured and mineralized syenite typical of the gold bearing syenite porphyries in the Matachewan area. The McChesney Fault can be traced northeastward to the old McChesney gold showing in Flavelle Township. The McChesney showing is reported to contain visible gold. One sample taken by Moore (1966) returned 2.4 g/t gold (0.07 oz/ton) and 130 g/t silver (3.8 oz/ton).

GEOPHYSICAL SURVEYS

The Geological Survey of Canada's airborne magnetic map sheets 1506 G, 289 G, 287 G and 290 G (1959-60) have clearly defined the Cairo Stock, Timiskaming and Kinogevis volcanic and sedimentary rocks between Kirkland Lake and Matachewan as an east northeast oriented magnetic trend.

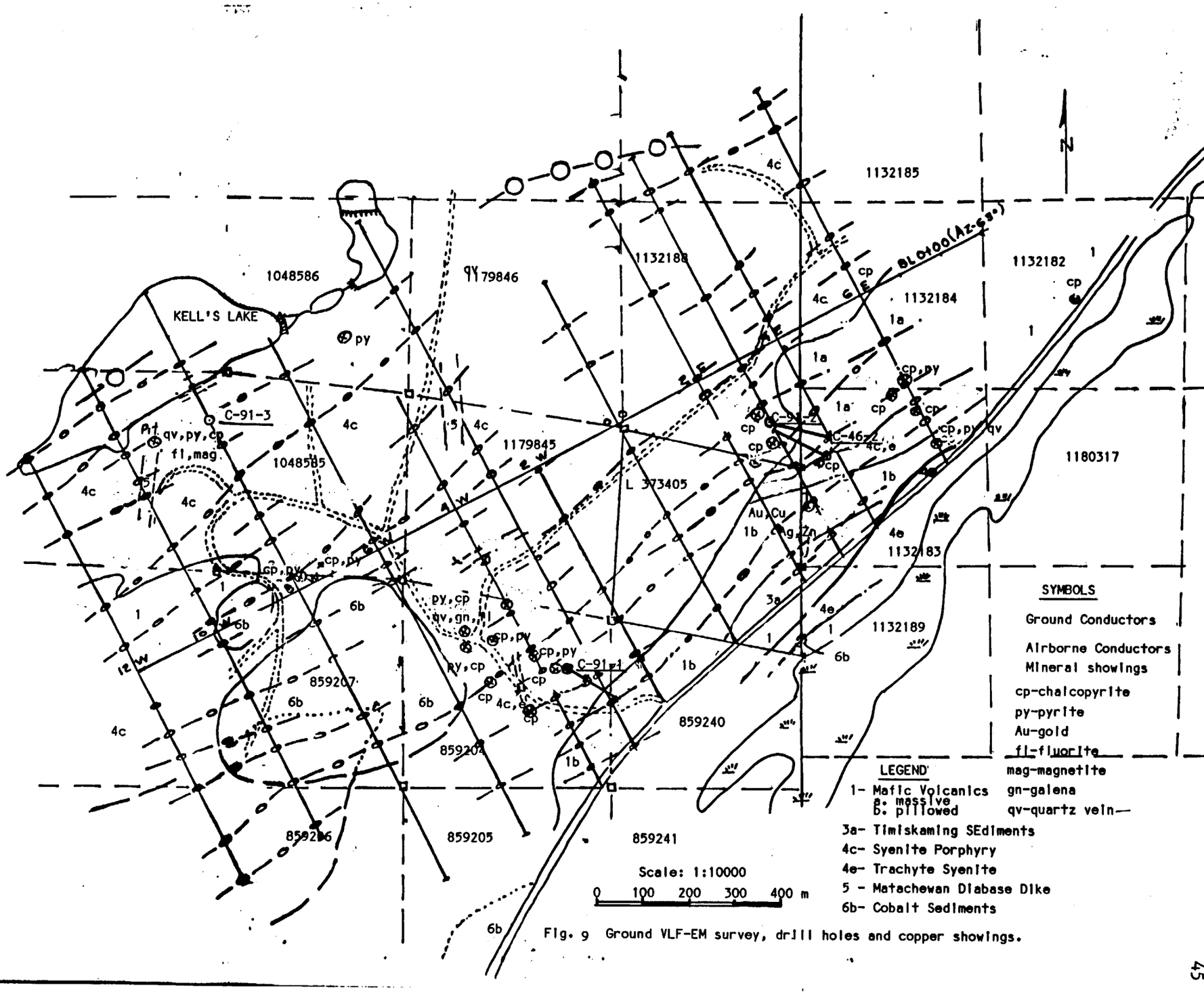


Fig. 9 Ground VLF-EM survey, drill holes and copper showings.

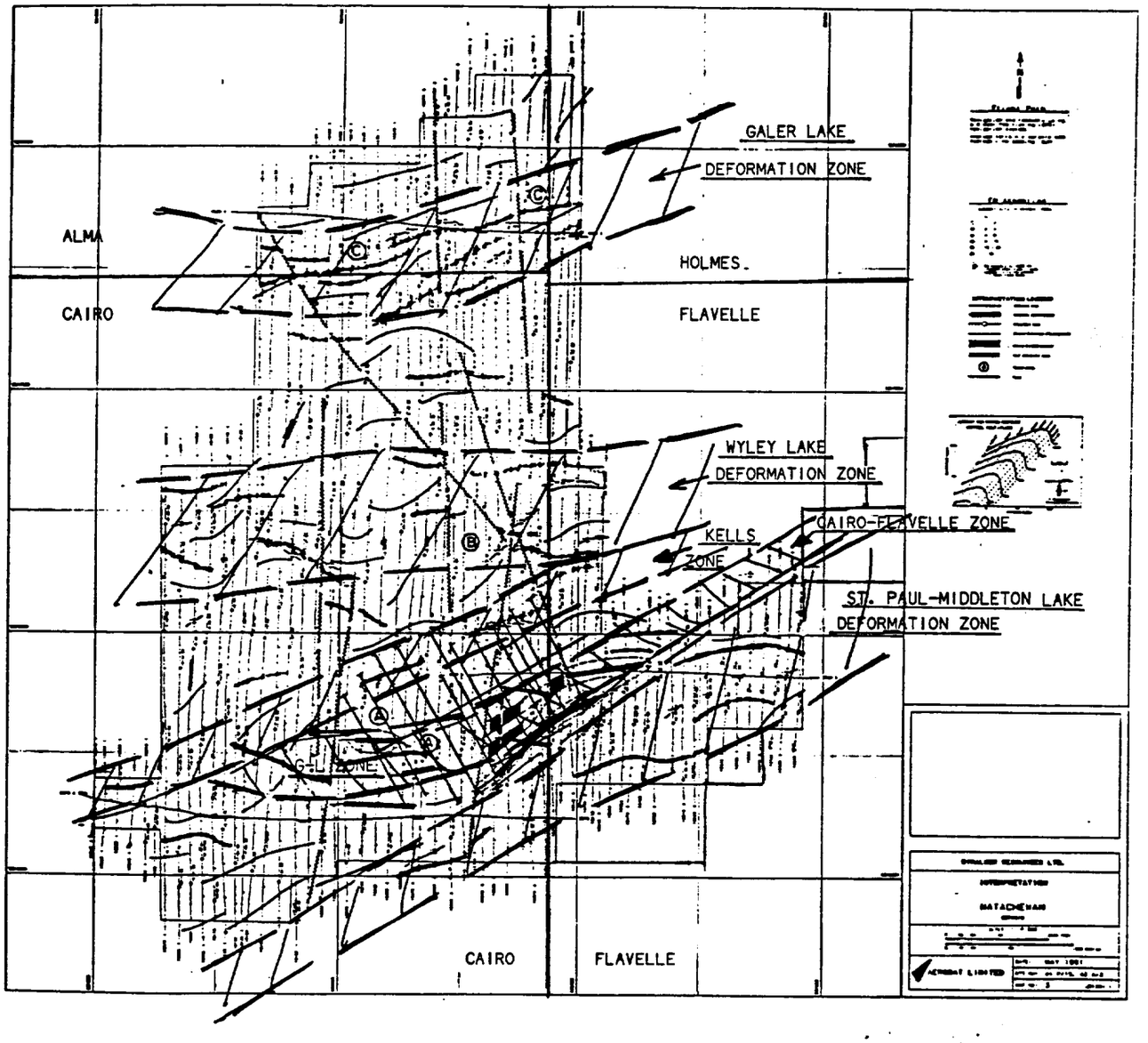


Fig. 10. Airodat Interpretation Map

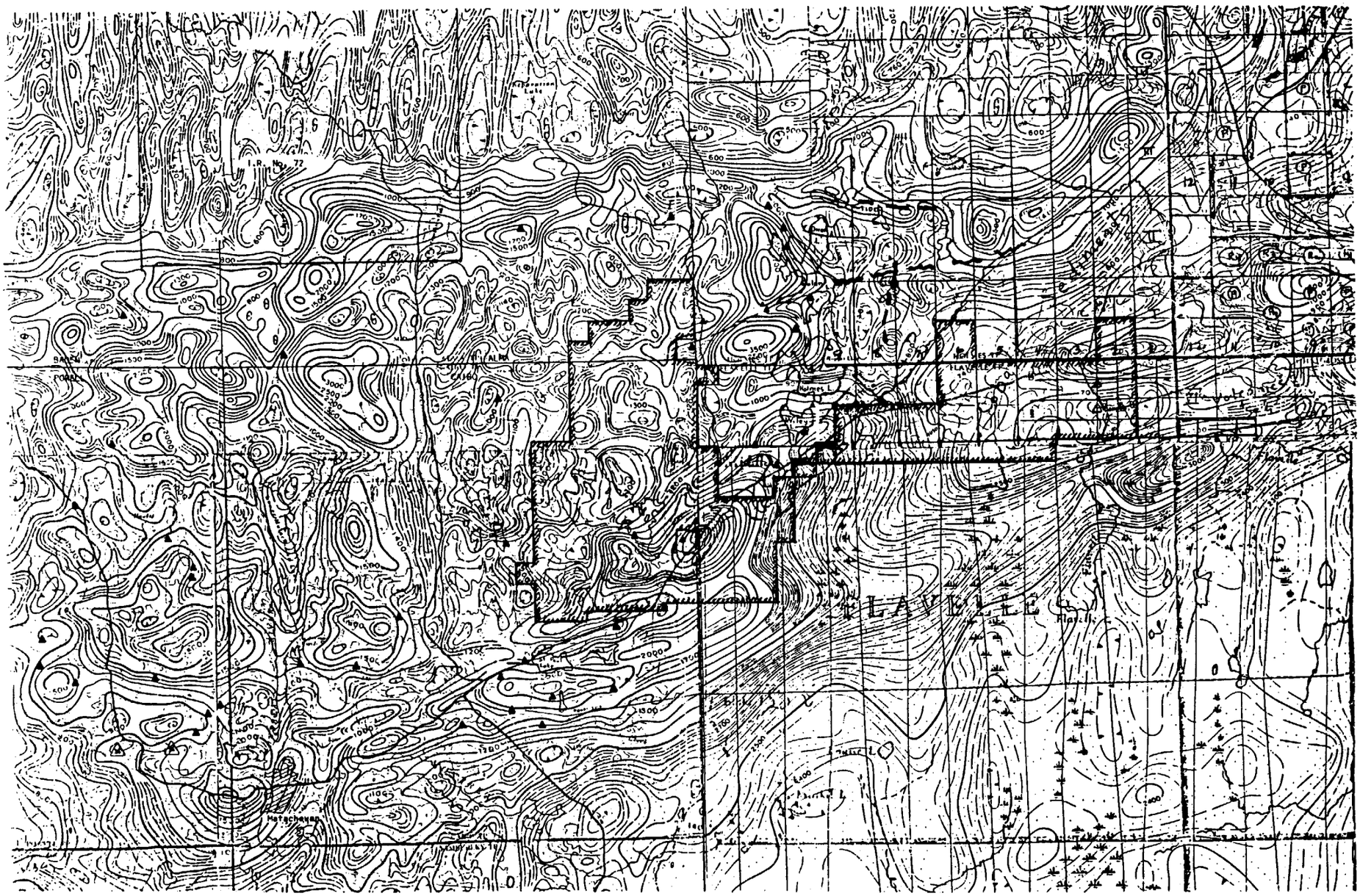


Fig. 11. Aeromagnetic Map - Matachewan East Area

The deformation zones defined by Powell et al (1989) can be traced on these G.S.C. magnetic maps as lineal magnetic low trends suggesting alteration and silicification of the syenite rocks within these deformation zones. Biralger's airborne data has confirmed the above observations.

Biralger's 1991 ground geophysical survey has successfully delineated all three major deformation zones. The ground geophysical magnetic and electromagnetic surveys have clearly and accurately defined several known and unknown structures over a small portion of Biralger's Property. Only about 5-10% of the Property has been surveyed. Complete coverage of the Property with a magnetic and VLF-EM survey is highly recommended. Biralger has covered only 10% of its Property by ground geophysical surveys.

CONCLUSIONS

The 1991 exploration program on the Matachewan Property has been very successful in identifying eight (8) separate major zones of copper, gold and silver mineralization.

These mineralized zones are localized within fractured and altered syenite porphyry and mafic volcanic trachytic flows of Timiskaming age.

The four (4) fractured zones in Holmes and Flavelle Twp. are the westerly expression of the Kirkland Lake-Larder Lake Deformation Zone.

The rock types hosting the mineralization on the Property are very similar to the gold bearing host rocks found at the Matachewan Consolidated, Young-Davidson and several of the major gold producers in the Kirkland Lake Gold Camp.

The Property has potential to host several major deposits associated with the three deformation zones a) St.Paul-Middleton Lake Deformation Zone b) Wiley Lake Deformation Zone c) Galer Lake Deformation Zone. The St.Paul-Middleton Lake and Wiley Lake Deformation Zones extend eastward under the Cobalt Sediments in Holmes and Flavelle Twps. These two Zones have never been explored under the Cobalt Sediments.

The Cairo-Flavelle Zone represents a major proven copper-gold-silver bearing zone for the development of a large tonnage-low grade deposit. The Zone has been defined for 1000 metres (3280 feet) in length and 250 metres (820 feet) in width. This Zone may extend further east under Middleton Creek and the Cobalt Sediments.

The Kidd Creek and Billy Goat Zones appear to be southwest extensions of the Cairo-Flavelle Zone.

The St.Paul-Middleton Lake Deformation Zone is known to contain copper and gold as indicated in Dominion Gulf's 1953 drilling in the St.Paul and Morrison Lake area. Gold values of up to 3.42 g/t (0.10 oz/ton) have been reported in this Zone in the Morrison Lake area. This Zone also coincides with a strong apparent resistivity anomaly detected in Biralger's airborne survey. This anomaly has a 4 km (2.5 mi) strike length on the Propery and parallels the Cairo-Flavelle zone 500 metres (1640 feet) to the south. This resistivity anomaly extends on the Property for 4.0 kilometres (2.5 miles) from the west end of Morrison Lake to the southwest end of Middleton Lake. The resistivity anomaly extends northeast onto Biralger's newly staked ground to the east in Flavelle Twp. The northeast end of the St.Paul-Middleton Lake D.Z. extends northeastward under the Cobalt Sediments.

The G-L Zone is located near the base line between 8+00W and 12+00W. Several ground VLF-EM conductors were detected in this area. This Zone is classified by Aerodat Limited as a high priority exploration target. Copper mineralization was found in altered syenite porphyry in this area 55 metres (180 feet) north at the baseline at 8+00W.

The Kell's Lake Zone is located on strike with the McChesney showing 3.5 km (2.2 mi) to the northeast. The McChesney Fault can be traced southwest to the Matachewan Consolidated and Young-Davidson Mines. Hole C-91-3 tested the south portion of this deformation zone. The hole should be deepened northward to intersect the conductor and the McChesney Fault Zone under Kell Lake.

The Wiley Lake D.Z. is a newly defined gold bearing structure striking through Wiley Lake and westward onto the central portion of the Cairo Twp. claims. This Zone on the Property hosts gold bearing blue-grey quartz veins striking N60 - 70 E in sheared and silicified syenite porphyry. A narrow vein near post No.1 of claim 1188664 has returned 38 g/t gold (1.1 oz/ton). Two similar

blue-grey parallel quartz veins were found on claim 1168945.

Very minor exploration has been done on this Zone in the past. This area has also been designated as a prime exploration target by Aerodat because of the intersection of a N-S and E-W fault system.

The Galer Lake Deformation Zone has also been designated by Aerodat as another major exploration target. This Zone is strongly defined on the airborne survey as an east northeast trend of magnetic, electromagnetic and VLF-EM anomalies. The anomalies are on strike with several known gold showings in Holmes Twp. where values of up to 38.7 g/t gold (1.13 oz/ton) have been obtained.

RECOMMENDATIONS

The following work is recommended on the Cairo Property located near Matachewan, Ontario.

PHASE I

Phase I consists of line cutting and geophysical surveys over portions of the eastern extension of the Cairo-Flavelle Zone, the St.Paul-Middleton Lake Deformation Zone, west of the G-L Zone, the Kells Zone and the Wiley Lake Zone.

This work will be followed up with further diamond drilling on the Cairo-Flavelle Zone and the St.Paul-Middleton Lake D.Z.

PHASE 1

Line Cutting - 60 km @ $275.00/km	$ 16,500.00
Geophysical Surveys	
Magnetometer - 60 km @ $110.00/km	6,600.00
VLF-EM - 55 km @ $110.00/km	6,350.00
Diamond Drilling - 2000 feet @ $18.00/ft.	36,000.00
Assaying and Sampling	6,500.00
Core Logging - 2000 feet @ $4.00/ft.	8,000.00
Project Supervision & Reports	20,000.00
Transportation & Accomodation & Food	3,000.00
	102,950.00
10% Contingencies	10,295.00
	113,245.00
7% GST	7,927.15
	$121,172.15

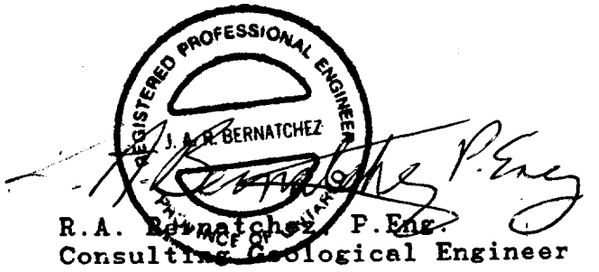
PHASE II

Phase II consists of more line cutting and geophysical surveys over the Galer Lake Zone, and the western extension of the Wiley Lake Zone. Geological mapping will be done over the grid lines cut in Phases I and II. This work will be followed by mechanical stripping, trenching and blasting over specified zones. A major drilling program will continue, to test the Cairo-Flavelle Zone, St.Paul-Middleton Lake Zone, Wiley Lake Zone and the Galer Lake Zone.

PHASE 11

Line Cutting - 60 km @ $275.00	16,500.00
Geophysical Surveys	
Magnetic - 60 km @ $110.00/km	6,600.00
VLF-EM - 55 km @ $110.00/km	6,350.00
Geological Mapping - 120 km @ $100.00/km	12,000.00
Mechanical Stripping - 200 hours @ $50.00/hr.	10,000.00
Trenching & Blasting - 2 men 15 days	
- @ $125.00/day	3,750.00
Airborne Survey over new Flavelle Twp Claims	20,000.00
Equipment Rental - 1 plugger 12 days	
- @ $50.00/day	600.00
Assaying & Sampling - 1 man 10 days	
- @ $125.00/day	1,250.00
Drilling - 10,000 feet @ $15.00/ft.	150,000.00
Core Logging - 10,000 feet @ $4.00/ft.	40,000.00
Core Assaying - 1250 samples @ $20.00	25,000.00
Project Supervision and Report	40,000.00
	$330,050.00
10% Contingencies	33,005.00
	$363,055.00
7% GST	25,413.85
	$388,468.85

TOTAL PHASE I and PHASE II $509,641.00



R.A. Bernatchez, P.Eng.
Consulting Geological Engineer

November 30, 1991

PROPERTY CLAIMS

CLAIM NUMBERS	NO. of CLAIMS (units)	RECORDING DATE	TOTAL ASSESS.	EXPIRY DATE
859204 - 859209	6	Oct. 25/85	$26,400.	1995
859240 - 859241	2	Oct. 25/85	$ 8,800.	1995
982258 - 982261	4	Nov. 26/87	$ 3,960.	1996
1048585 - 1048594	10	Oct. 17/88	$22,000.	1993
1102233	1	Dec. 18/89	$ 3,080.	1996
1106455 - 1106469	15	Feb. 14/90	$26,400.	1994
1111066 - 1111069	4	Aug. 29/89	$ 8,800.	1994
1111073	1	Nov. 2/89	$ 2,200.	1994
1132175 - 1132181	7	May 9/90	$12,320.	1994
1132182 - 1132185	4	May 9/90	$ 8,000.	1995
1132187 - 1132189	3	May 9/90		1995
1132225 - 1132228	4	Jan. 7/91		1993
1132234	1	Feb.25/91		1993
1132238	1	Feb.25/91		1993
1137298 - 1137299	2	Feb.14/90		1994
1137311	1	Feb.14/90		1994
1137498 - 1137504	7	Jan.11/90		1993
1137949 - 1137950	2	Feb.27/91		1995
1168663 - 1168664	2	Feb.28/91		1993
1168944 - 1168960	17	Feb.28/91		1993
1168884 - 1168898	15	Feb.28/91		1993
1168998 - 1169002	5	Mar.19/91		1993
1179845 - 1179847	3	Mar.15/91		1993
1180315 - 1180319	5	June28/91		1993
* new staking in Flavelle Twp.				
1180215 - 1180217	10 (3 cl)	Nov.18/91		1993
1180218 - 1180221	26 (4 cl)	Nov.22/91		1993
1185680 - 1185681	20 (2 cl)	Nov.18/91		1993
1185683 - 1185686	16 (4 cl)	Nov.18/91		1993
1185695	8 (1 cl)	Nov.18/91		1993

Total No. of Units (claims)- 202 units (claims)
Total Approximate Acreage - 8080 acres (3264 hectares)

* Staking under the new Mining Act allows for more than one unit per claim. One unit = One old claim containing 40 acres/claim.

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NOTES

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

The subdivision of this Township into lots and concessions is partially annulled. December 3rd 1963

(G) M.T.C. GRAVEL PIT 203.

(G3) M.T.C. PIT 1394.

(H) SURFACE AND MINING RIGHTS WITHDRAWN FROM STAKING, SECTION 36/80 ORDER NO. W93/84, 8/6/1984.

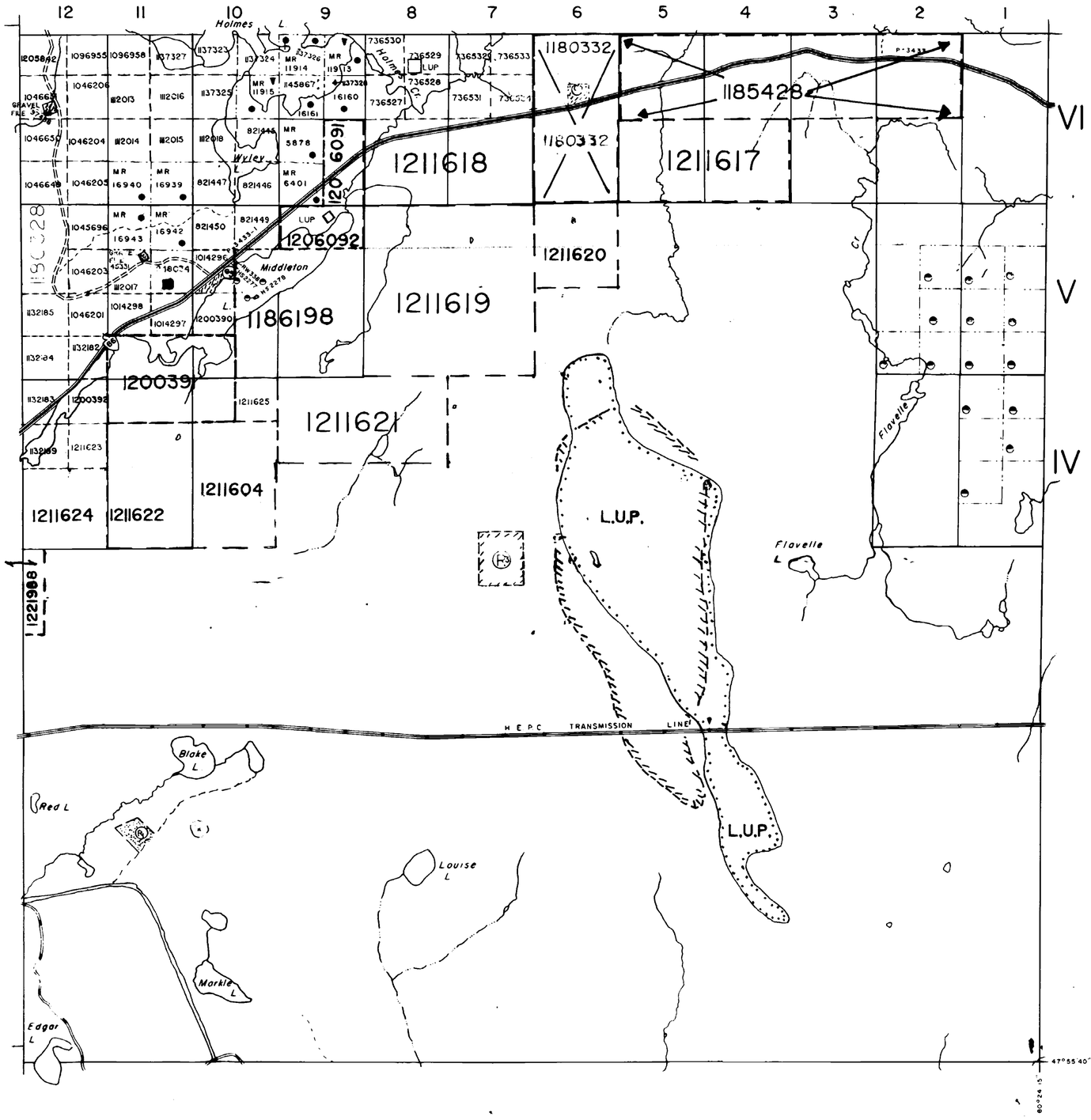
(F3) SURFACE RIGHTS WITHDRAWN FROM STAKING, SECTION 31(8) AUGUST 13/1987.

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP / AREA FALLS WITHIN THE PICKLE MANAGEMENT UNIT AND MAY BE SUBJECT TO FORESTRY OPERATIONS. THE MNR UNIT FORESTER FOR THIS AREA CAN BE CONTACTED AT: P. O. BOX 129
SWASTIKA, ONTARIO
P0K 1T0
(705)642-3222

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON.

HOLMES Tp. M. 224



CAIRO Tp. M. 210

GROSS Tp. M. 487

WILLISON Tp. M.259

CIRCULATED OCTOBER 19, 1994

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
- MARSH 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

FEET 0 500 1000 2000 4000 6000 8000

METRES 0 200 400 600 800 1KM 2KM

ACRES	HECTARES
40	16

DATE OF ISSUE
MAY 19 1998
PROVINCIAL RECORDING OFFICE - SUDBURY

TOWNSHIP

FLAVELLE

DISTRICT

TIMISKAMING

MINING DIVISION

LARDER LAKE

Ministry of Natural Resources
Ontario Surveys and Mapping Branch

Date Feb '73

Whitney Block
Queen's Park, Toronto

Plan No. M. 220

Dunmore Twp.

Alma Twp.

Burt Twp.

Flavelle Twp.

Chief L.

Kenoja Cr.

Englehart R.

Middleton

Galer L.

Holmes L.

1226820

1226876

1225108

1206082

1213844

1213851

1211613

1211614

1211615

1211616

1040777

1203307

1180159

1180158

VI

V

IV

III

II

I

12 11 10 9 8 7 6 5 4 3 2 1

THE TOWNSHIP OF

HOLMES

DISTRICT OF TIMISKAMING

LARDER LAKE 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

NOTES

400' Surface rights reservation around lakes & rivers

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
(R) SEC. 36/80	W. 24/82	29/11/82	S.R.O. & M.R.	188522

DATE OF ISSUE

MAY 19 1998

PROVINCIAL RECORDING OFFICE - SUDBURY

PLAN NO.- M.224

ONTARIO

MINISTRY OF NATURAL RESOURCES

SURVEYS AND MAPPING BRANCH

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP/AREA FALLS WITHIN THE PLONSKI FOREST MANAGEMENT UNIT

AND MAY BE SUBJECT TO FORESTRY OPERATIONS. THE MNR UNIT FORESTER FOR THIS AREA CAN BE CONTACTED AT: P.O. BOX 129 SWASTIKA, ONT. P0K 1T0 705-642-3222

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES. AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES. FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON.

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
~~(R) SEC. 36, RSO~~	~~NRW 65/83~~	~~NOV. 18, 1983~~	~~M.+S.~~	
~~1980~~				

(R1) MINING & SURFACE RIGHTS REOPENED TO PROSPECTING, SALE OR LEASE. ORDER O-L-10/95, PREVIOUSLY WITHDRAWN UNDER ORDER W 65/83.

(R2) Mining and Surface Rights Withdrawn Order No. W-L-17/95 Dated March30, 1995. Previously withdrawn under Order NWR 65/83.

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON

NOTES

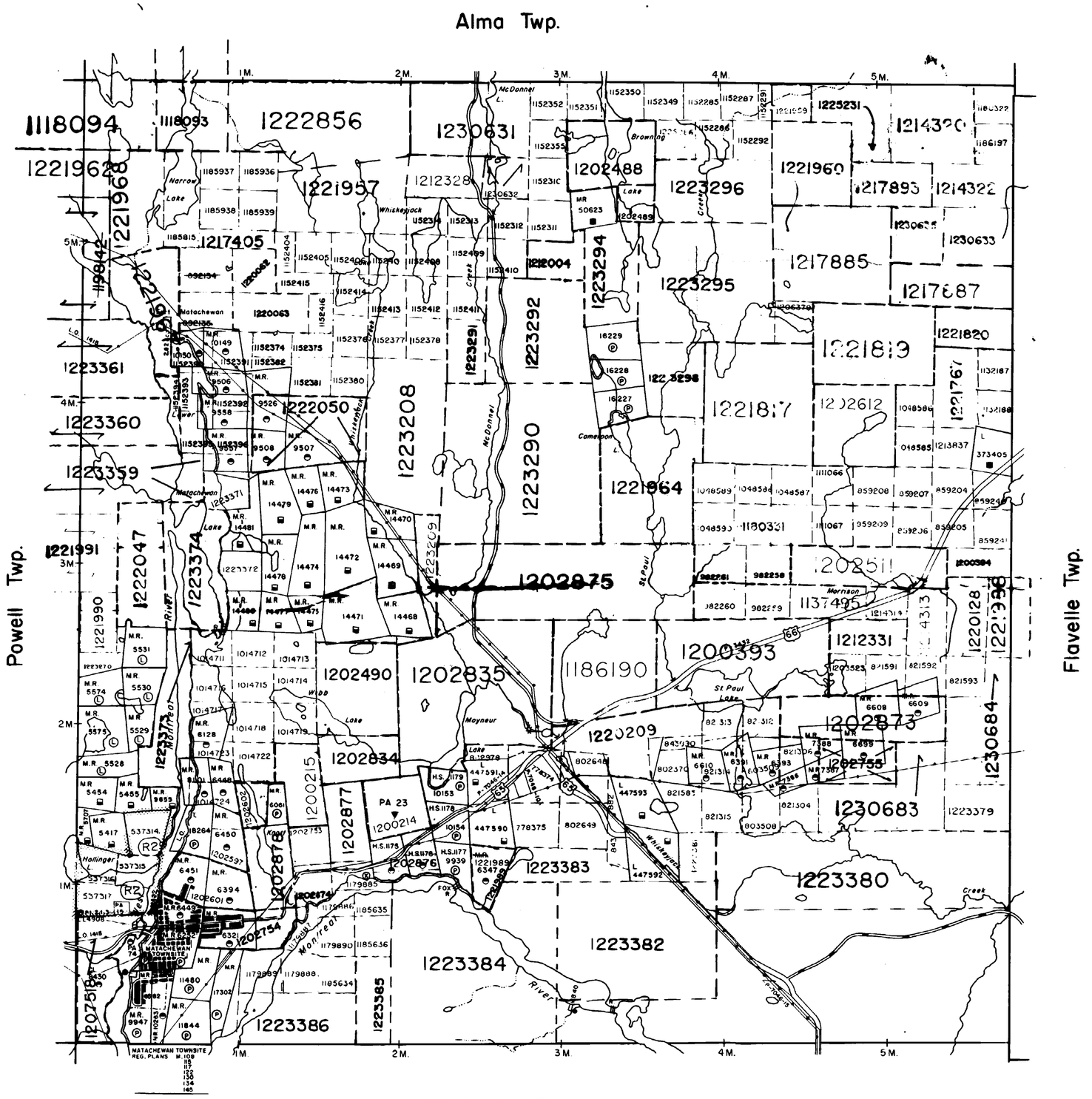
UP - LAND USE PERMIT

NOTICE OF FORESTRY ACTIVITY

THIS TOWNSHIP / AREA FALLS WITHIN THE ——

PLONSKI FOREST MANAGEMENT UNIT

AND MAY BE SUBJECT TO FORESTRY OPERATIONS. THE MNR UNIT FORESTER FOR THIS AREA CAN BE CONTACTED AT: P.O. BOX 129
SWASTIKA, ONT.
POK 1TO
705-642-3222



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	P or ●
" , SURFACE RIGHTS ONLY	◓
" , MINING RIGHTS ONLY	◒
LEASE, SURFACE & MINING RIGHTS	L or ■
" , SURFACE RIGHTS ONLY	▣
" , MINING RIGHTS ONLY	▤
LICENCE OF OCCUPATION	L.O. or ▼
ORDER-IN COUNCIL	OC
RESERVATION	®
CANCELLED	⊗
SAND & GRAVEL	Ⓢ

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 2000 (1 KM) (2 KM)

TOWNSHIP

CAIRO

DATE OF ISSUE

MAY 19 1998

PROVINCIAL RECORDING OFFICE - SUDBURY

M.N.R. ADMINISTRATIVE DISTRICT

KIRKLAND LAKE

MINING DIVISION

LARDER LAKE

LAND TITLES / REGISTRY DIVISION

TIMISKAMING

Ontario

Ministry of Natural Resources

Ministry of Northern Development and Mines

Date: JULY 1986

Number: G-3209

CIRCULATED JANUARY 17, 1995 MI

THE TOWNSHIP OF ALMA

DISTRICT OF TIMISKAMING

LARDER LAKE MINING DIVISION

SCALE: 1-INCH=40 CHAINS

Sheba Twp.

Baden Twp.

Holmes Twp.

Cairo Twp.

MATACHEWAN INDIAN RESERVE

I. R. 72

1223510 1220069 1211531 1220077 1220076 1220078 1223503 1223504 1223505 CANOE 1225119 1223506 1225150 1221986 1225122

Squaw L. Beaver L. Bird L. Jackson L. Blackburn L. Turtle L. Separation L. Chief L. LITTLE CHIEF L. Baptiste L. Steve L. McNaughton L. 1206319 BASTIAN WEIDY BROWNING McDONNEL

1225082 1225081 1221766 1221656 1180148 1206320 1206321 1180149 1206322 1223369 1223278 1225275 1225273 1223370 1223279 1225276 1221961 1118094 1118093 1222855 1222196 1203417 1206259 1222064. 1221996

MR 7080 MR 7081 MR 7079 5611 5612 7082 MR 7078 MR 7077

Con. 6 Con. 5 Con. 4 Con. 3 Con. 2 Con. 1

1M 2M 3M 4M 5M

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.

DATE OF ISSUES

Matachewan Indian Reserve shown thus:-

MAY 19 1998

400' Surface rights reservation around all lakes and rivers.

PROVINCIAL RECORDING OFFICE - SUDBURY

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON

COPY OF THIS MYLAR ARCHIVED JUNE 25/92
COPY OF THIS ARCHIVED AUGUST 16, 1994
ARCHIVED JUNE 11/96

PLAN NO.- M-202

ONTARIO #3

MINISTRY OF NATURAL RESOURCES

SURVEYS AND MAPPING BRANCH

Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line spacing 100m

EM Anomalies

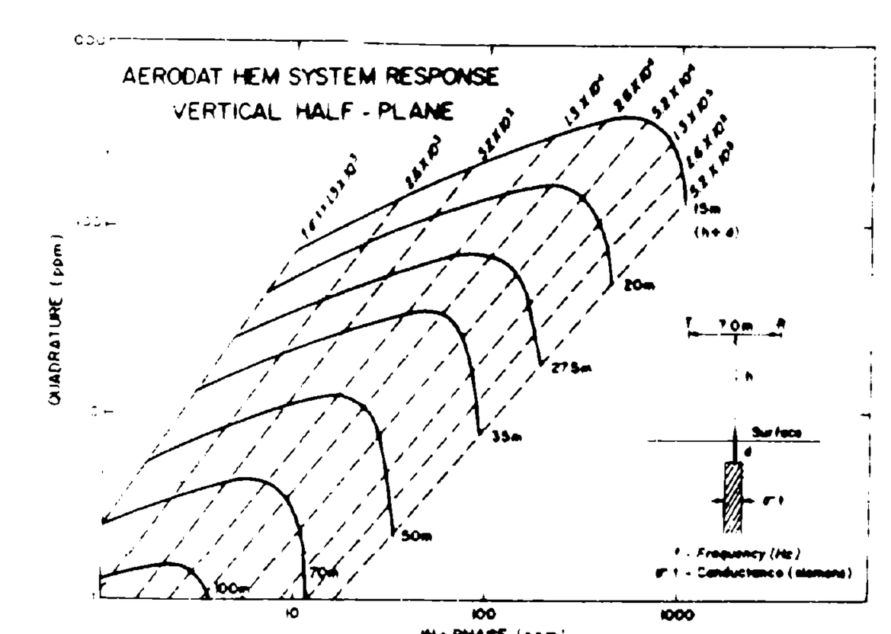
Conductivity Thickness (mhos)

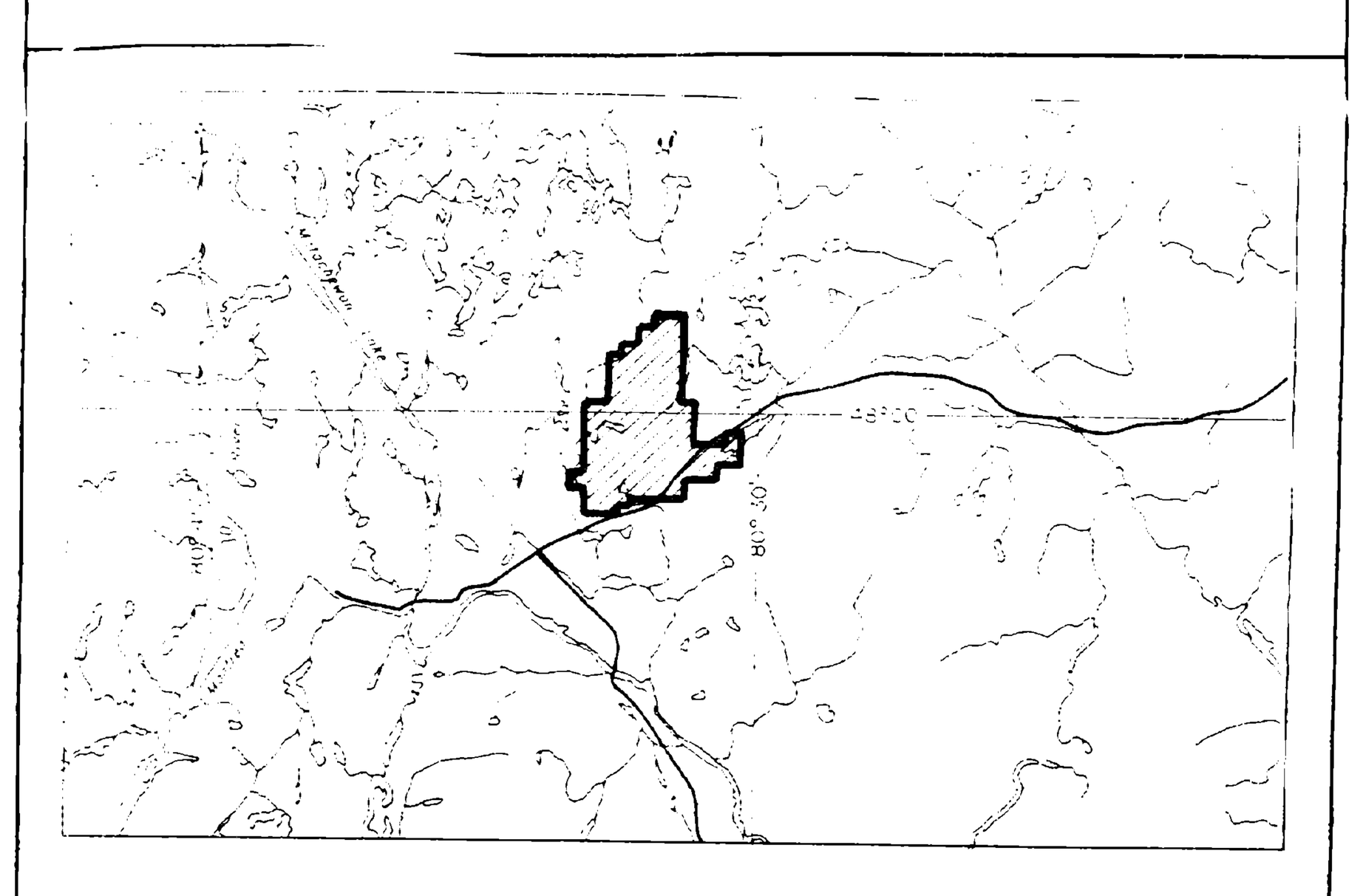
0 - 1
1 - 2
2 - 4
4 - 8
8 - 15
15 - 30
> 30

EM Anomaly 4, 4600 Hz
Inphase amplitude 7 ppm
Conductivity thickness
1-2 mhos (see model)

INTERPRETATION LEGEND

Magnetic Axis
Magnetic Axis (Strong)
Conductor Axis
Area of More than 2% Magnetite
Known Mineral Deposit
VLF Conductor Axis
Target Area
Fault





BIRALGER RESOURCES LTD.

INTERPRETATION

MATACHEWAN

ONTARIO

SCALE 1:10,000

0 330 660 1320 2640 Feet

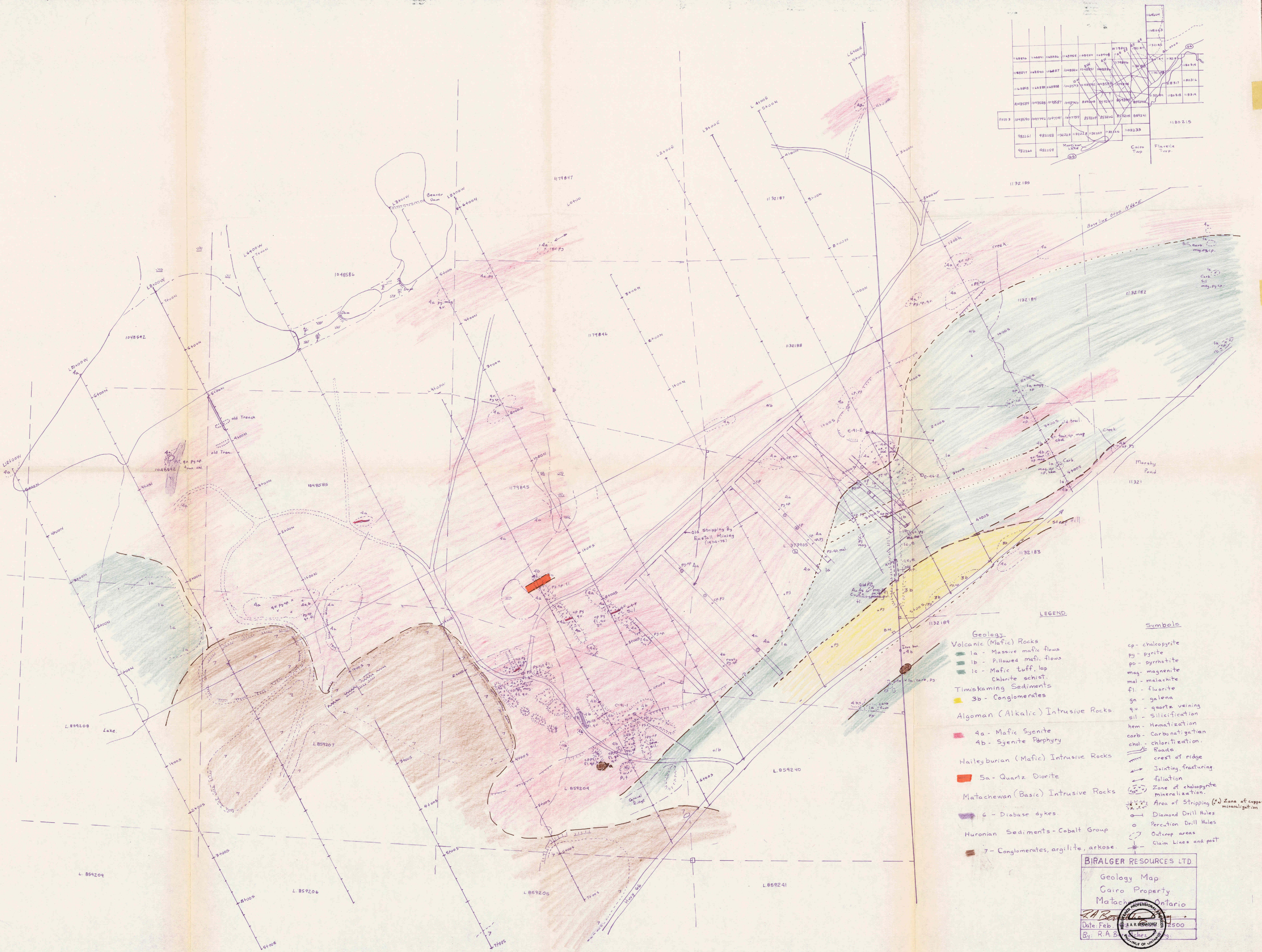
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: MAY 1991

NTS No: 41 P/15, 42 A/2

MAP No: 3 J9128-1



GALER LAKE DEFORMATION ZONE

ST PAUL - MIDDLETON LAKE DEFORMATION ZONE

WILEY LAKE DEFORMATION ZONE

Au - 0.55 opt

Au 1.13 opt

Au 0.19

Au 0.11

Au - 0.10 opt.

Au - 1.00 opt.

Au - 18.6 opt.

Au 0.07.

Ag 3.

q.v. Au - 11 opt.

Au 0.01 opt.

Alma Twp

Cairo Twp

Holmes Twp

Flavelle Twp

Burt Twp

Gross Twp.

GALER LAKE

HOLMES LAKE

WILEY LAKE

Middleton Lake

Browning Lake

Cameron Lake

Morrison Lake

St Paul Lake

Blake Lake

Flavelle Lake

Flavelle Creek

Middleton Creek

Builders pyrite pit

Cu, Au, Ag, Mo. gn. pt.

Au Pit

Rusty zone

Legend

Geology

1 - Mafic Volcanics

2 -

3 - Metasediments (Timiskaming)

4 - Alkalic Felsic Intrusives

5 - Mafic Intrusives (Haileybarian)

6 - Matachewan Diabase Dykes

7 - Cobalt Sediments.

Symbols.

cp - chalcopyrite

mag - magnetite

Cu - Copper

Au - Gold

Ag - Silver

Zn - Zinc.

S.Z. - Shear Zone (or Deformation Zone)

Swamp.

BIRALGER RESOURCES LTD.

Regiona Geology Map

Cairo Property

Matachewan, Ontario.

R.A. Bernatchez P.Eng.

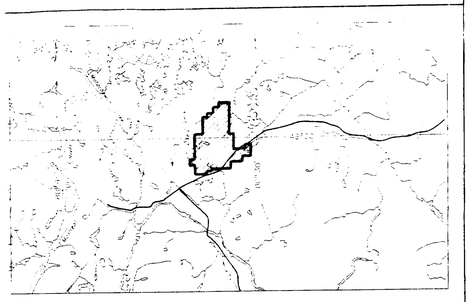
Date: Dec. 1991 Scale: 1:2500

By: R.A. Bernatchez, P. Eng.

REGISTERED PROFESSIONAL ENGINEER I.A.R. BERNATCHEZ PROVINCE OF ONTARIO

531000
533000
535000
537000
5319000
5317000
5315000
5313000

1132180
1132181
1137498
1137503
1106466
532000,
5318000
536000,
5318000
1168665
1168894
1168998
532000,
5313000
1102233
1132225
536000,
5313000
982260
982259



BIRALGER RESOURCES LTD.

BASE MAP

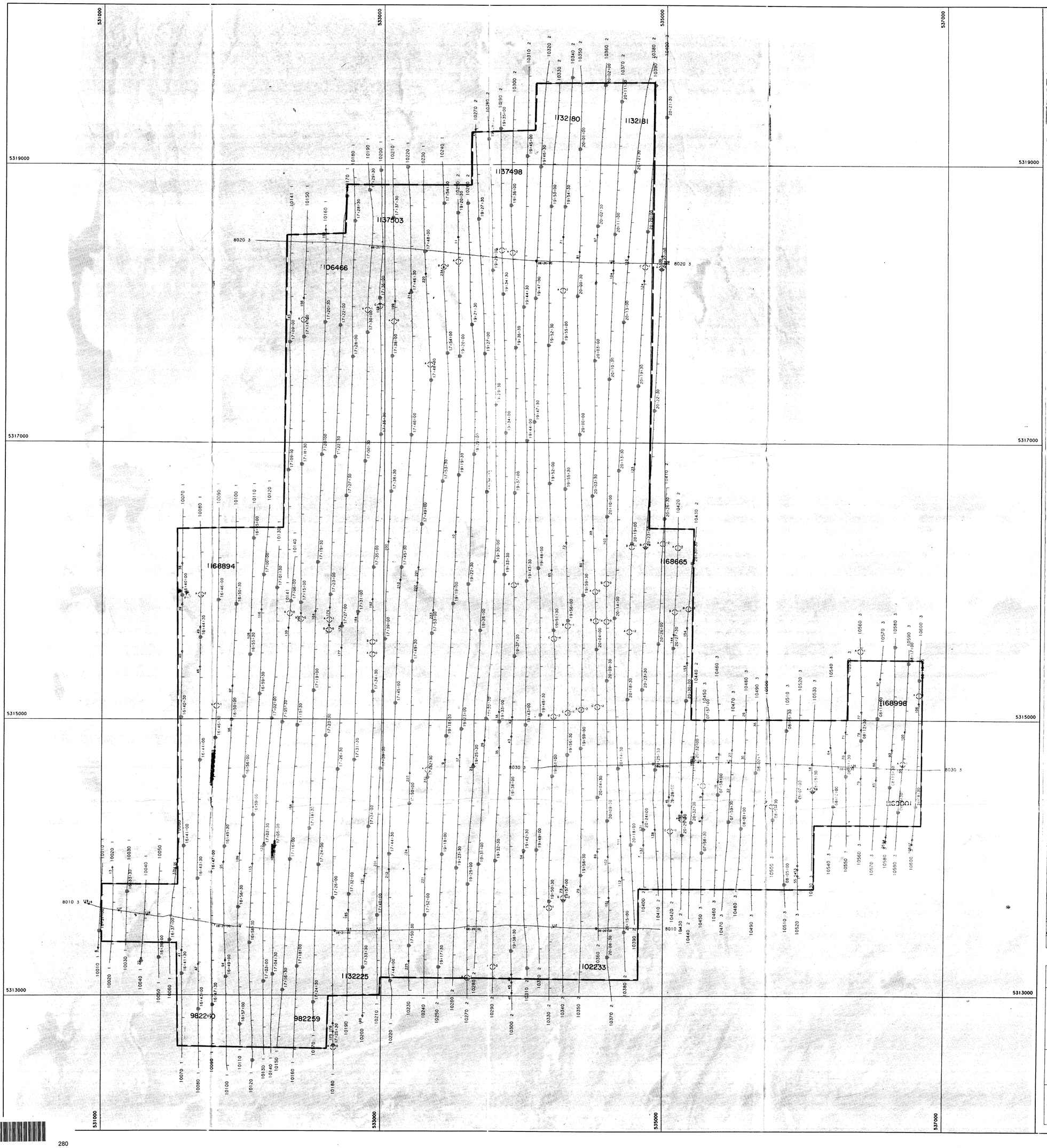
MATACHEWAN

ONTARIO

SCALE 1:10,000
1cm = 100 Metres
1 Inch = 833.33 Feet

AERODAT LIMITED

DATE: MAY 1991
NTS No: 41 P/15, 42 A/2
MAP No: 1 J9128-1



N

Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

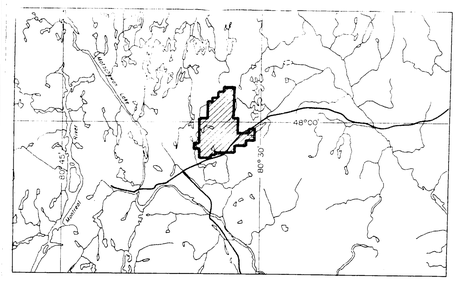
Average terrain clearance 60m
Average line spacing 100m

EM Anomalies

Conductivity Thickness (mmos)

- 0 - 1
- 1 - 2
- 2 - 4
- 4 - 8
- 8 - 15
- 15 - 30
- + 30

EM Anomaly A, 4600 Hz inphase amplitude 7 ppm, Conductivity thickness 1-2 mmos (see code).



BIRALGER RESOURCES LTD.

FLIGHT PATH

MATACHEWAN

ONTARIO

Ministry of Northern Development and Mines
RECEIVED
FEB 12 1992
ATIKOKAN

SCALE 1:10,000

0 330 660 1320 2640 Feet
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: MAY 1991
NTS No: 41 P/15, 42 A/2
MAP No: 2 J9128- 1

531000 533000 535000 537000

5319000 5317000 5315000 5313000

N

Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line spacing 100m

Magnetics

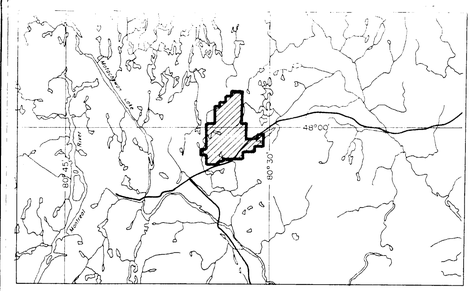
Total Field Magnetic Intensity Contours in nT.

Cesium high sensitivity magnetometer.

Sensor elevation 45m

Map contours are multiples of those listed below

- 2 nT
- 10 nT
- 50 nT
- 250 nT
- 1000 nT



BIRALGER RESOURCES LTD.

TOTAL FIELD MAGNETIC CONTOURS

MATACHEWAN
ONTARIO

SCALE 1:10,000

0 330 660 1320 2640 Feet
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: MAY 1991
NTS No: 41 P/15, 42 A/2
MAP No: 4 J9128- 1

Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line spacing 100m

VLF-EM

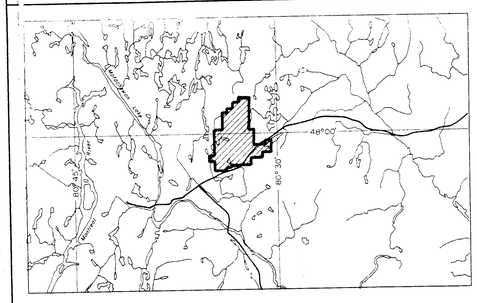
VLF-EM Total Field Intensity in percent.

Station: NAA Flights 1-2
Cutler, Maine
24.0 kHz
Station: NLK Flight 3
Seattle, Washington
24.8 kHz

Sensor elevation 45m

Map contours are multiples of those listed below

- 1 %
- 5 %
- 25 %
- 100 %



BIRALGER RESOURCES LTD.

VLF-EM TOTAL FIELD CONTOURS (LINE CHANNEL)

MATACHEWAN
ONTARIO

Ministry of Northern Development and Mines
RECEIVED
FEB 12 1992
ATIKOKAN

SCALE 1:10,000

0 330 660 1320 2640 Feet
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: MAY 1991
NTS No: 41 P/15, 42 A/2
MAP No: 7 J9128- 1

531000 533000 535000 537000

5319000 5317000 5315000 5313000

1132180 1132181 1137498 1137503 106466 1168894 1168665 1168998 1169001 1102233 1132225 982260 982259

8020 3 8030 3 8010 3

N

Flight Path

Navigation and control using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line separation 100m

Apparent Resistivity

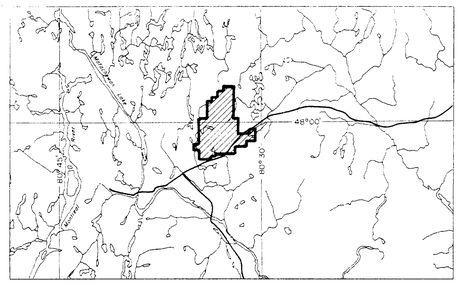
Calculated from 4600 Hz coaxial EM response assuming a 200 m conductive layer.

Contouring in ohm•m at logarithmic intervals.

Sensor elevation 30m

Map contours are multiples of those listed below

- 0.1 (log ohm•m)
- 0.7 (log ohm•m)
- 5.0 (log ohm•m)
- 5.30 (log ohm•m)



BIRALGER RESOURCES LTD.

APPARENT RESISTIVITY CONTOURS (4600 Hz)

MATACHEWAN
ONTARIO

SCALE 1:10,000

AERODAT LIMITED

DATE: MAY 1991
NTS NO: 41 P/15, 42 A/2
MAP NO: 6 J9128- 1

531000 533000 535000 537000

5319000 5317000 5315000 5313000

8020 3 8030 3 8010 3

Flight Path

Navigation and recovery using a Global Positioning (GPS) navigation system.

Average terrain clearance 60m
Average line spacing 100m

Vertical Gradient

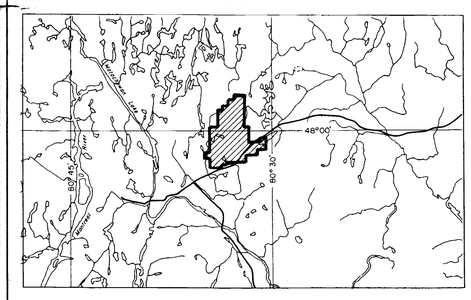
Vertical Magnetic Gradient calculated from the total field magnetic intensity in nT/m.

Cesium high sensitivity magnetometer.

Sensor elevation 45m

Map contours are multiples of those listed below

- 0.20 nT
- 1.00 nT
- 5.00 nT
- 25.0 nT
- 100.0 nT



BIRALGER RESOURCES LTD.

CALCULATED VERTICAL MAGNETIC GRADIENT

MATACHEWAN
ONTARIO

SCALE 1:10,000

0 330 660 1320 2640 Feet
0 100 200 500 1000 Metres

AERODAT LIMITED

DATE: MAY 1991
NTS No: 41 P/15, 42 A/2
MAP No: 5 J9128- 1