ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
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# ASSESSMENT REPORT

describing

**GEOPHYSICAL SURVEYS**

at the

**JAKE PROPERTY**

| | |
|---|---|
| Jake 1-8 | YC29793-YC29800 |
| 9-16 | YC31201-YC31208 |

NTS 105G/16
Latitude 61º46'N; Longitude 131º02'W

in the

Watson Lake Mining District
Yukon Territory

prepared by

Archer, Cathro & Associates (1981) Limited

for

**STRATEGIC METALS LTD.**

by

W. Douglas Eaton, B.Sc. Geology
April 2008

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## INTRODUCTION

The Jake property was staked in spring 2006 following a research study that identified prospective silver targets in Yukon. The property is owned 100% by Strategic Metals Ltd.

This report describes helicopter-borne magnetic and variable time domain electromagnetic (VTEM) surveys conducted in August 2007 by Geotech Ltd. on behalf of Strategic Metals. The author supervised the program. Appendix I contains the author's Statement of Qualifications.

## PROPERTY LOCATION, CLAIM DATA AND ACCESS

The Jake property consists of 16 contiguous mineral claims located in southeastern Yukon at latitude 61º46'N and longitude 131º02'W on NTS map sheet 105G/16 (Figure 1). The claims are registered with the Watson Lake Mining Recorder in the name of Archer, Cathro & Associates (1981) Limited, which holds them in trust for Strategic Metals. Claim registration data are listed below while the locations of individual claims are shown on Figure 2.

| Claim Number | Grant Number | Expiry Date* |
|---|---|---|
| Jake 1-8 | YC29793-YC29800 | March 2, 2016 |
| 9-16 | YC31201-YC31208 | March 2, 2016 |

* Expiry dates include 2007 work which has been filed for assessment credit but not yet accepted.

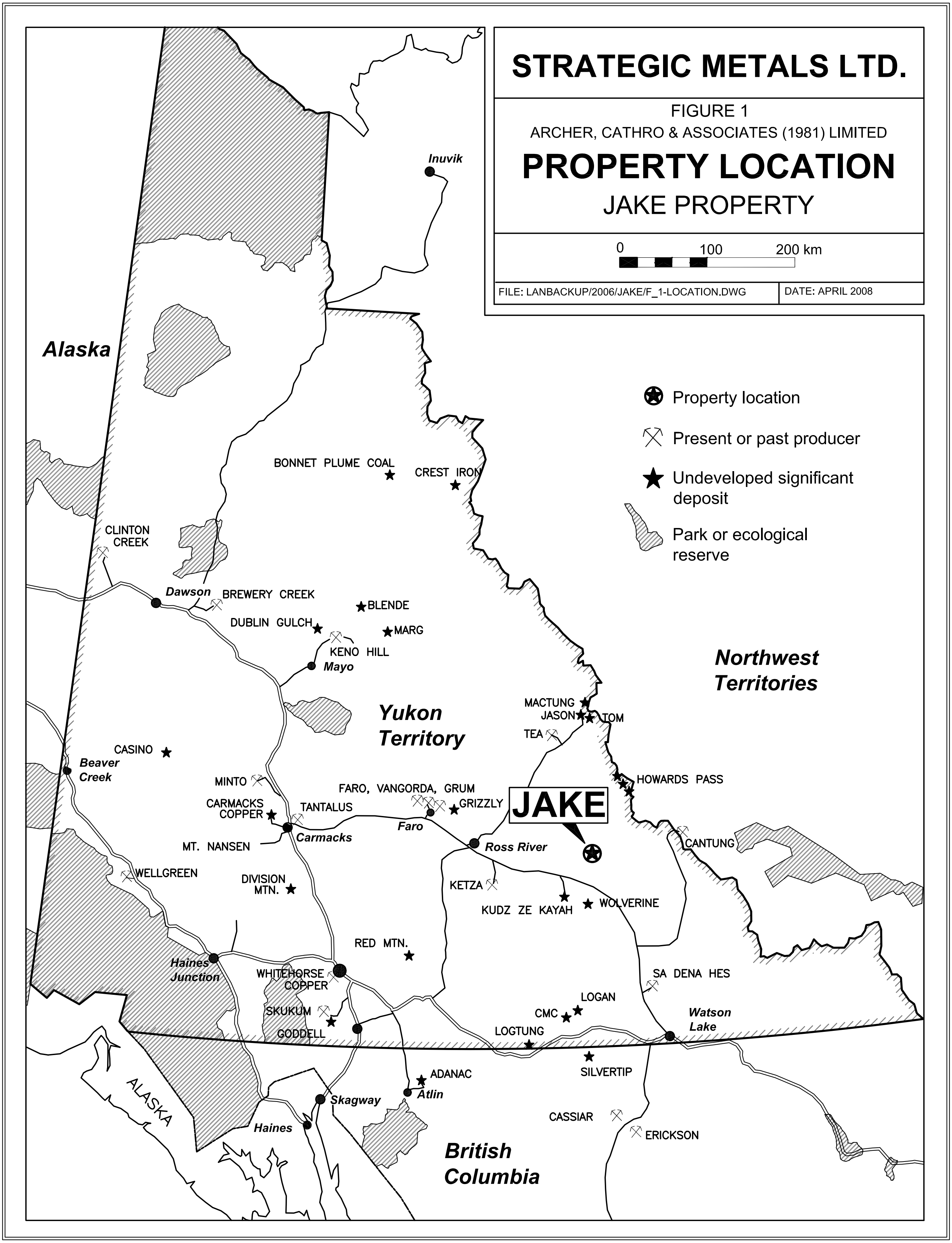
The Jake claims lie approximately 125 km due east of the village of Ross River and 295 km northeast of the city of Whitehorse. The closest road is the Robert Campbell Highway, which lies 20 km south of the property. A bulldozer trail extends from the Robert Campbell Highway to an airstrip at a fishing lodge (Inconnu Lodge) on McEvoy Lake, 5 km east of the claim block. During summer months, a helicopter and float plane are often available for contract at the fishing lodge. The 2007 geophysical surveys were conducted by a crew working from a temporary base at the Inconnu Lodge.

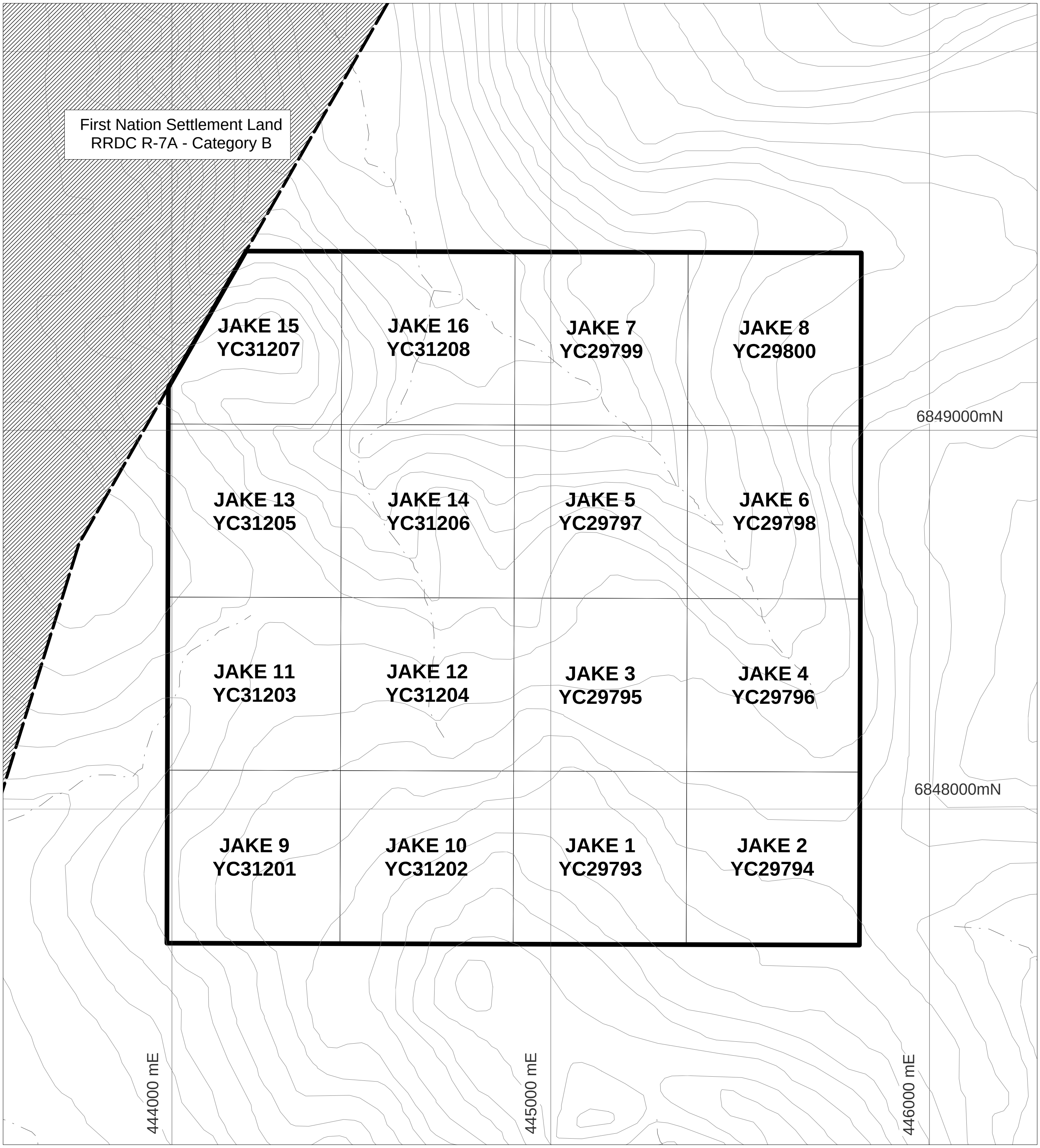
## HISTORY

The area of interest was first staked as the Jake claims by Atlas Explorations Ltd. in 1966. Atlas mapped over 20 base metal showings and conducted geochemical and geophysical surveys across the claim block. It reported a 450 m long east-west trending geochemical anomaly, a 1.6 km long magnetic anomaly and rock assays up to 490 g/t Ag, 16.2% Cu, 9.2% Pb, and 3.6% Zn.

The property was restaked in 1978 by an independent prospector but no work was reported.

In 1994 the area was again restaked and in 1995 those claims were optioned to Pacific Bay Minerals Ltd. Pacific Bay explored that year in a north-south trending U-shaped valley located in the north-central part of the current claim block (Wesa, 1996). Prospecting discovered trace to minor sulphide mineralization in structural zones within argillite and quartzite. An airborne


STRATEGIC METALS LTD.
FIGURE 1
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
PROPERTY LOCATION
JAKE PROPERTY
0 100 200 km
FILE: LANBACKUP/2006/JAKE/F_1-LOCATION.DWG
DATE: APRIL 2008
Property location
Present or past producer
Undeveloped significant deposit
Park or ecological reserve
Alaska
Inuvik
Northwest Territories
Yukon Territory
British Columbia
ALASKA
JAKE
BONNET PLUME COAL
CREST IRON
CLINTON CREEK
Dawson
BREWERY CREEK
BLENDE
DUBLIN GULCH
MARG
KENO HILL
Mayo
MACTUNG
JASON
TOM
TEA
CASINO
Beaver Creek
MINTO
FARO, VANGORDA, GRUM
GRIZZLY
HOWARDS PASS
CARMACKS COPPER
TANTALUS
Faro
Carmacks
Ross River
MT. NANSEN
CANTUNG
WELLGREEN
DIVISION MTN.
KETZA
KUDZ ZE KAYAH
WOLVERINE
RED MTN.
Haines Junction
WHITEHORSE COPPER
SA DENA HES
SKUKUM
LOGAN
CMC
Watson Lake
GODDELL
LOGTUNG
SILVERTIP
ADANAC
Atlin
Skagway
Haines
CASSIAR
ERICKSON



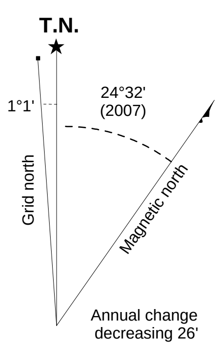




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**FIGURE 2**

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

## CLAIM LOCATION
## JAKE PROPERTY

0 100 200 m

UTM Zone 9, NAD83, NTS 105G/16

FILE: ...2007/JAKE/F_2-CLAIM.WOR | DATE: APRIL 2008 geophysical survey outlined three magnetic highs, four conductors and a resistivity low. A 1600 by 1000 m area of anomalous zinc, lead, silver and copper soil geochemistry was also outlined around the main area of mineralization, which was theorized to be related to a buried porphyry deposit.

Strategic Metals staked Jake 1-16 claims in spring 2006 and conducted prospecting and soil sampling later that year (Wengzynowski, 2007).

## GEOMORPHOLOGY

The Jake claims lie in the Pelly Mountains, 75 km northeast of the Tintina Trench. The main drainages on the property flow north into McEvoy Lake and from there into the Finlayson River, which is part of the Yukon River watershed.

Local topography is modified by Pleistocene to Recent, valley and alpine glaciation. The northern part of the property features broad northerly trending, U-shaped valleys flanked by steep ridges. Deeply incised gullies project into gently rolling grassy uplands, which underlie the southern part of the property. Elevations range from 1250 m in the valleys to 1890 m atop a peak that rises above the uplands.

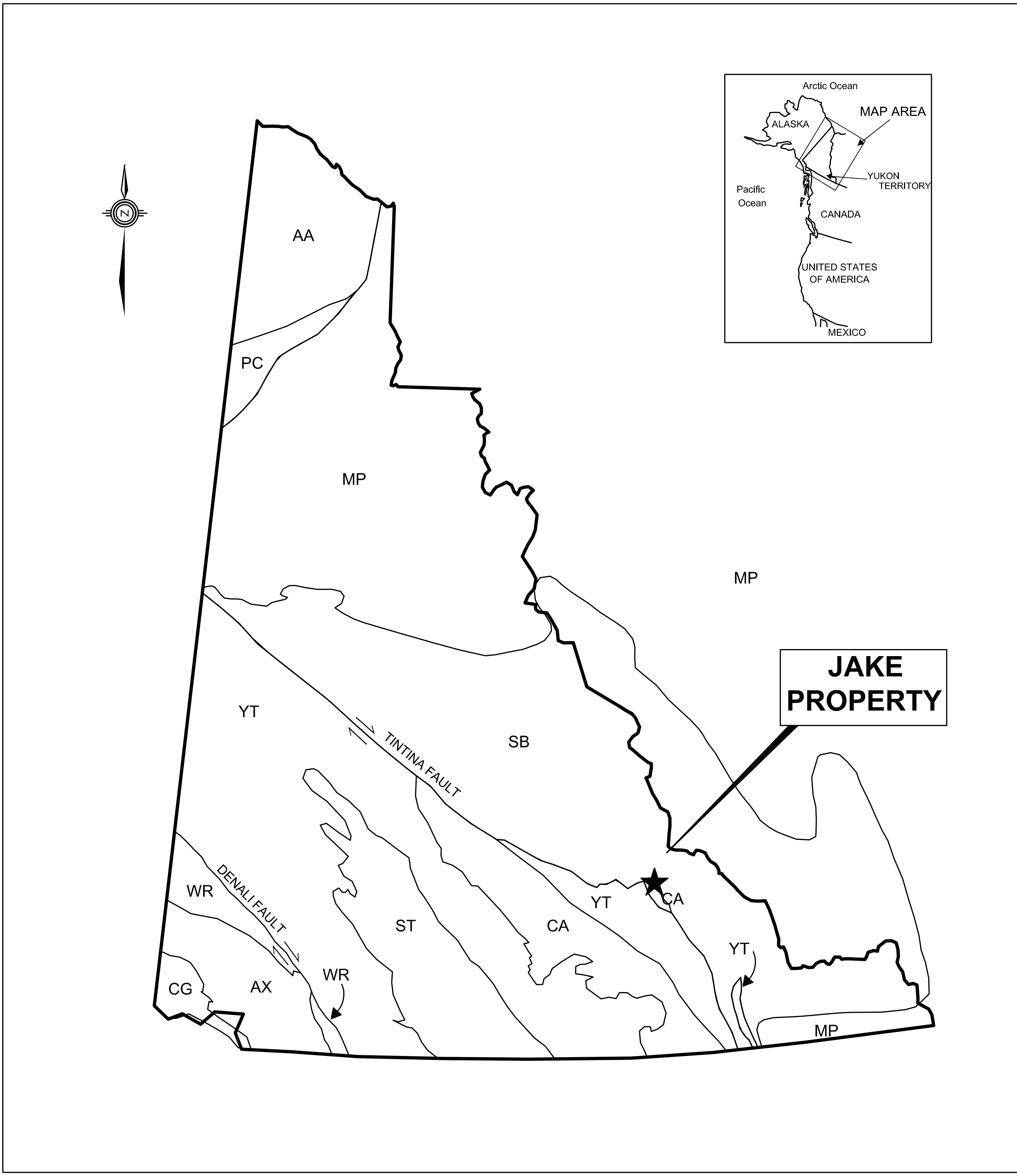
Tree line in the area is at about 1400 m with willow, alder and spruce on lower slopes gradually giving way to buckbrush and stunted spruce and finally grass and lichen above 1500 m. Most of the property is above 1500 m and much of it is blanketed with talus, felsenmeer or grassy soil. Bedrock is most abundant along ridge crests and in creek cuts.

## GEOLOGY

The Jake property is underlain by a shallow miogeoclinal sequence of upper Proterozoic to Mississippian carbonate and clastic sedimentary rocks of the Cassiar Platform tectonic element (Gordey and Makepeace, 1999) as shown on Figure 3. These rocks are intruded by Mid-Cretaceous granitic intrusions of the Tay River Plutonic Suite (Mortensen et al., 2000). The Cassiar Platform rocks lie southwest of predominantly clastic rocks of the Selwyn Basin and northeast of the Yukon-Tanana Terrane, an accreted island arc assemblage containing bimodal volcanics, coeval plutons and sedimentary rocks.

Stratigraphy in the vicinity of the claim block exhibits moderate folding that generally strikes southwest and dips gently to moderately to the northwest. Small-scale isoclinal folding is observed locally throughout the property. The main fracture set is aligned west-northwesterly and dips steeply (between 70 to 85 degrees) to the south-southwest.

Several high angle faults are mapped or inferred on the property. Their surface traces are marked by escarpments on steep hillsides and by deeply incised drainages in areas of low relief. Local fracturing, brecciation, and quartz-carbonate stockwork veining and alteration are mapped around these fault zones.




ANCESTRAL NORTH AMERICA

| | |
|---|---|
| MP | Mackenzie Platform |
| SB | Selwyn Basin |

TERRANES
Displaced Continental Margin

| | |
|---|---|
| AA | Arctic Alaska |
| CA | Cassiar |
| PC | Porcupine |

Pericratonic Terranes

| | |
|---|---|
| YT | Yukon-Tanana / Slide Mountain |

ACCRETED TERRANES

| | |
|---|---|
| ST | Stikinia / Cache Creek |
| AX | Alexander |
| WR | Wrangellia |
| CG | Chugach |

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FIGURE 3

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

# TECTONIC SETTING

## JAKE PROPERTY

0 100 200 km

DRAWN\REVISED BY: TCB

FILE: ...\FIG 03 - TECTONIC SETTING

DATE: APRIL 2008

Figure 4 illustrates geology in the core of the property as mapped by Pacific Bay in 1996 and modified by Strategic Metals in 2006. The following paragraphs describe the main rock units on the property.

**Unit 1** rocks are assigned to the Kechika Group and are Cambrian to Ordovician in age. They consist of orange-brown weathering, recessive slate, slaty phyllite, dolomitic phyllite/slate, chert, greywacke and shaly/phyllitic quartzite.

**Unit 2** is composed of dolomitic siltstone and silty dolostone with shaly siltstone and assorted fine grain clastic sediments, all of which are Silurian in age.

**Unit 3** rocks are Silurian to Lower Devonian, laminated to sucrosic dolostone, shaly dolostone and assorted pelite and immature quartzite. This is the most abundant unit on the property.

**Unit 4** is also Silurian to Lower Devonian in age but overlie unit 3 in the central and west-central parts of the property. It comprises recessive, dark grey to black weathering, thinly bedded, calcareous, graphitic siltstone with gradational lenses of dolostone, quartzite and dolomitized mudstone.

**Unit 5** consists of dykes that are homogenous to porphyritic in texture and felsic to intermediate in composition. The dykes are Mid-Cretaceous age and may represent the upper portion of a larger buried intrusion because the area is marked by a weak magnetic high on regional surveys (GSC, 1961).

Quartz veins and breccia are common throughout the property. The quartz veins are generally barren and white. They cut steeply across foliation and generally follow the main fracture orientation. The breccias exhibit moderate to strong limonite staining and are composed of phyllite and quartzite clasts in calcite cement. Due to their recessive nature, none of the breccias were observed in outcrop.

Wall rocks within and adjacent to fault zones are locally altered. Silicification and carbonization are most common but minor limonite, talc, sericite and chlorite are also observed.

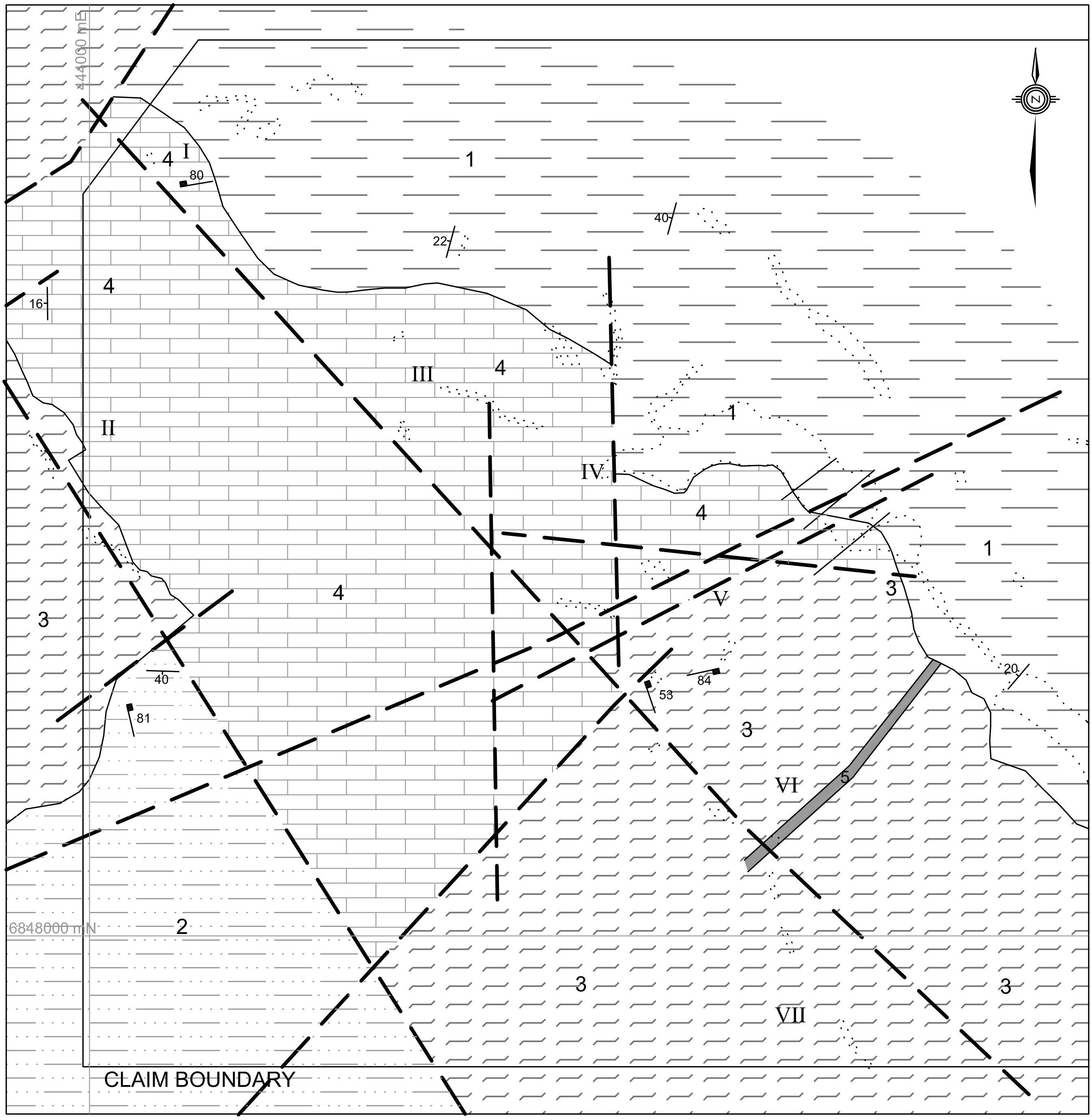
## MINERALIZATION

The two main types of mineralization that have been discovered on the property:

(1) skarn and

(2) discordant stockwork, breccia or vein.

Galena and sphalerite occurs as blebs, disseminations and fracture fillings within weakly to moderately skarnified metasediments and structurally controlled breccias. Alteration of sphalerite to hydrozincite is common. Chalcopyrite is rare and occurs as fine disseminations and fracture fillings. The main mineral occurrences are described as follows and their locations are shown on Figure 5.




CRETACEOUS

5 — Felsic to intermediate and quartz-feldspar dykes

SILURIAN TO LOWER DEVONIAN

4 — Calcareous to dolomitic, graphitic siltstone, graphitic shale/slate, laminated mudstone, sucrosic dolostone, dolomitized calc-arenite, silty and sandy dolostone, orthoquartzite

3 — Laminated to sucrosic dolostone, shaly siltstone and assorted pelitic and impure quartzitic sediments

SILURIAN

2 — Dolomitic siltstone and silty dolostone, shaly siltstone and assorted pelitic and impure quartzitic sediments

UPPER CAMBRIAN TO ORDOVICIAN

1 — Orange-brown to grey weathering slate, phyllite, siliceous shale, calcareous to dolomitic phyllite, chert, greywacke

Fault

Inferred contact

Outcrop

80 — Joint or fracture orientation

20 — Bedding orientation

I — Showing refered to in text

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FIGURE 4

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

# PROPERTY GEOLOGY

## JAKE PROPERTY

0 — 500 m

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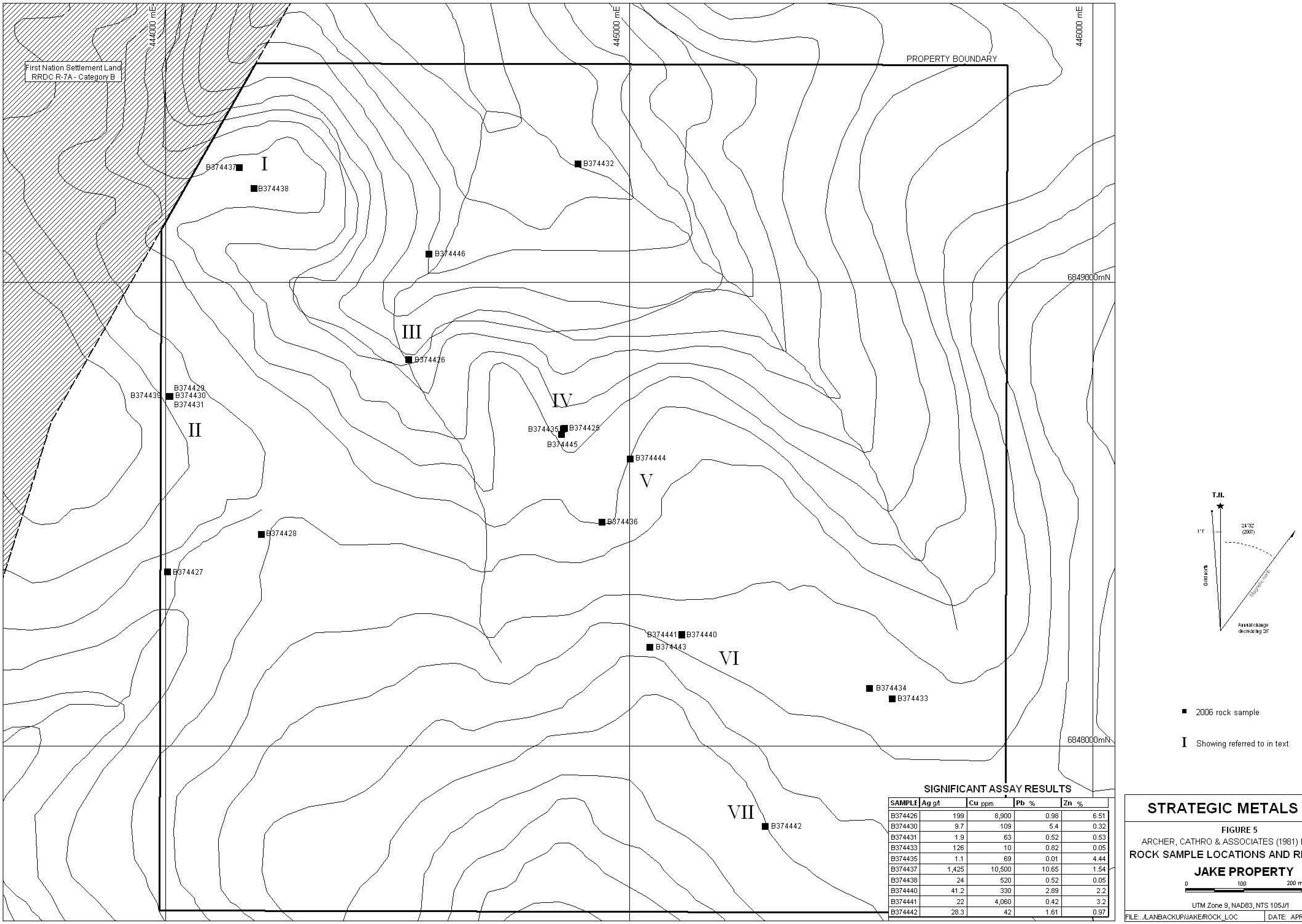
FILE: ...\FIG 04 - PROPERTY GEOLOGY

DATE: APRIL 2008




SIGNIFICANT ASSAY RESULTS

| SAMPLE | Ag g/t | Cu ppm | Pb % | Zn % |
|---|---|---|---|---|
| B374426 | 199 | 8,900 | 0.98 | 6.51 |
| B374430 | 9.7 | 109 | 5.4 | 0.32 |
| B374431 | 1.9 | 63 | 0.52 | 0.53 |
| B374433 | 126 | 10 | 0.82 | 0.05 |
| B374435 | 1.1 | 69 | 0.01 | 4.44 |
| B374437 | 1,425 | 10,500 | 10.65 | 1.54 |
| B374438 | 24 | 520 | 0.52 | 0.05 |
| B374440 | 41.2 | 330 | 2.89 | 2.2 |
| B374441 | 22 | 4,060 | 0.42 | 3.2 |
| B374442 | 28.3 | 42 | 1.61 | 0.97 |

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**FIGURE 5**

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**ROCK SAMPLE LOCATIONS AND RESULTS**

**JAKE PROPERTY**

0 100 200 m

UTM Zone 9, NAD83, NTS 105J/1

FILE: ../LANBACKUP/JAKE/ROCK_LOC | DATE: APRIL 2008

Showing I is an outcrop characterized by limonitic silica altered, argillaceous phyllite. A grab sample taken from the most limonite altered section of the outcrop returned 1425 g/t Ag, 1.05 % Cu, 10.65 % Pb and 1.54 % Zn. No historical samples are reported from this area.

Showing II represents a 10 m wide area of skarn float consisting of strongly limoniticed cobbles with blebs and stringers of galena, a specimen from which returned 9.7 g/t Ag and 5.4 % Pb.

Showing III comprises skarn mineralization containing limonite, manganese, hydrozincite and stingers of galena. Minor remnant sphalerite is also present. Numerous quartz veins were noted in the area. None of the skarn was sampled but a specimen of quartz veined phyllite returned 199 g/t Ag, 0.89 % Cu, 0.98 % Pb and 6.51 % Zn.

Showing IV is a fault breccia that does not outcrop but that has produced relatively abundant float boulders over a 10 m distance along a hillside. Mineralization varies from disseminated to coarsely granular, sphalerite and galena in breccia boulders primarily composed of quartz, limonite and carbonate. A sample from one of the boulders returned 4.44% Zn. Historical assays in this area yielded maximum values of 143.3 g/t Ag, 1.25% Cu and 1.6 % Zn.

Showing V consists of skarnified calc-silicate float hosting pervasive chalcopyrite and galena. Secondary malachite and hydrozincite stain weathered surfaces. A specimen returned 61.5 g/t Ag, 0.89% Cu and 1.26 % Zn.

Showing VI hosts similar mineralization to Showing V. The best sample from it assayed 41.2 g/t Ag, 2.89% Pb and 2.2% Zn.

Showing VII features galena and sphalerite in dolomitic quartzite float cobbles, a sample from which returned 28.3 g/t Ag, 1.61 % Pb and 0.97 % Zn.

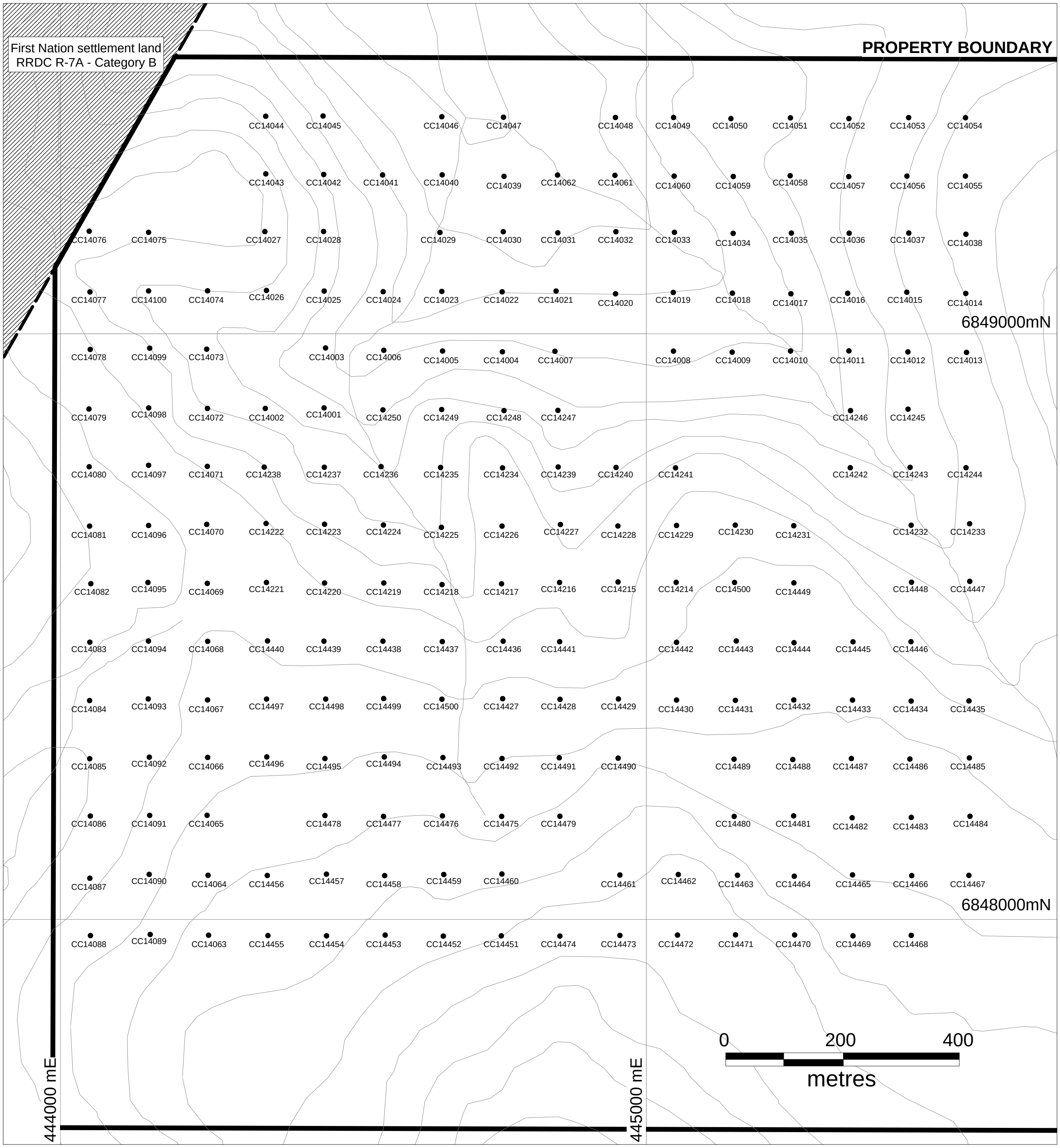
## SOIL GEOCHEMISTRY

The soil sampling was conducted by Strategic Metals in 2006 to confirm and expand geochemical anomalies outlined by previous operators. Figures 7 to 10 illustrate silver, copper, lead, and zinc results, respectively. Table I lists threshold and peak values for each metal.

**Table I – Selected Geochemical Data**

| Metal | Threshold Values Weak | Threshold Values Moderate | Threshold Values Strong | Peak Value |
|---|---|---|---|---|
| Silver | 1 ppm | 2 ppm | 5 ppm | 12.6 ppm |
| Lead | 100 ppm | 200 ppm | 500 ppm | 5540 ppm |
| Zinc | 200 ppm | 500 ppm | 1000 ppm | 4210 ppm |
| Copper | 50 ppm | 100 ppm | 200 ppm | 645 ppm |

Silver, lead, copper and zinc show a high degree of correlation especially among moderately to strongly anomalous values. The best results are from a 700 by 500 m area, located in the central part of the property.



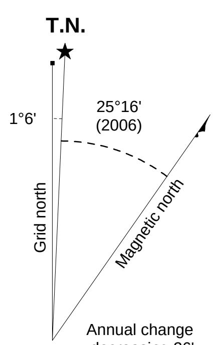




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**FIGURE 6**

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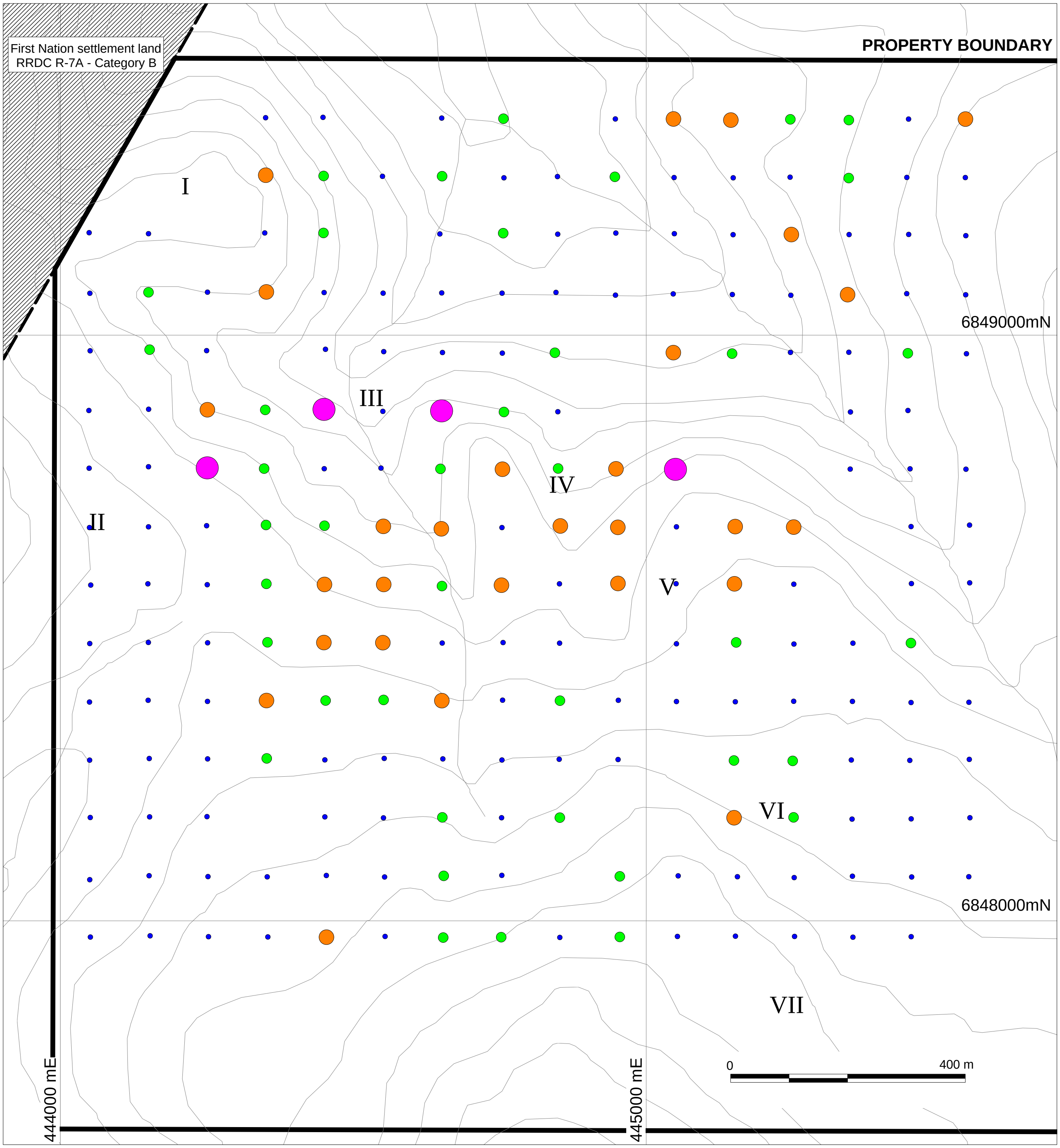
## SOIL SAMPLE LOCATIONS

## JAKE PROPERTY

UTM Zone 9, NAD83, NTS 105G/16

| | |
|---|---|
| FILE: .../2007/JAKE/Ag_GEOCHEM.WOR | DATE: APRIL 2008 |

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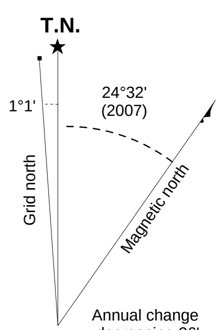


**Ag Geochemistry (ppm)**

- ≥ 5 < 12
- ≥ 2 < 5
- ≥ 1 < 2
- ≥ 0.1 < 1

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**FIGURE 7**

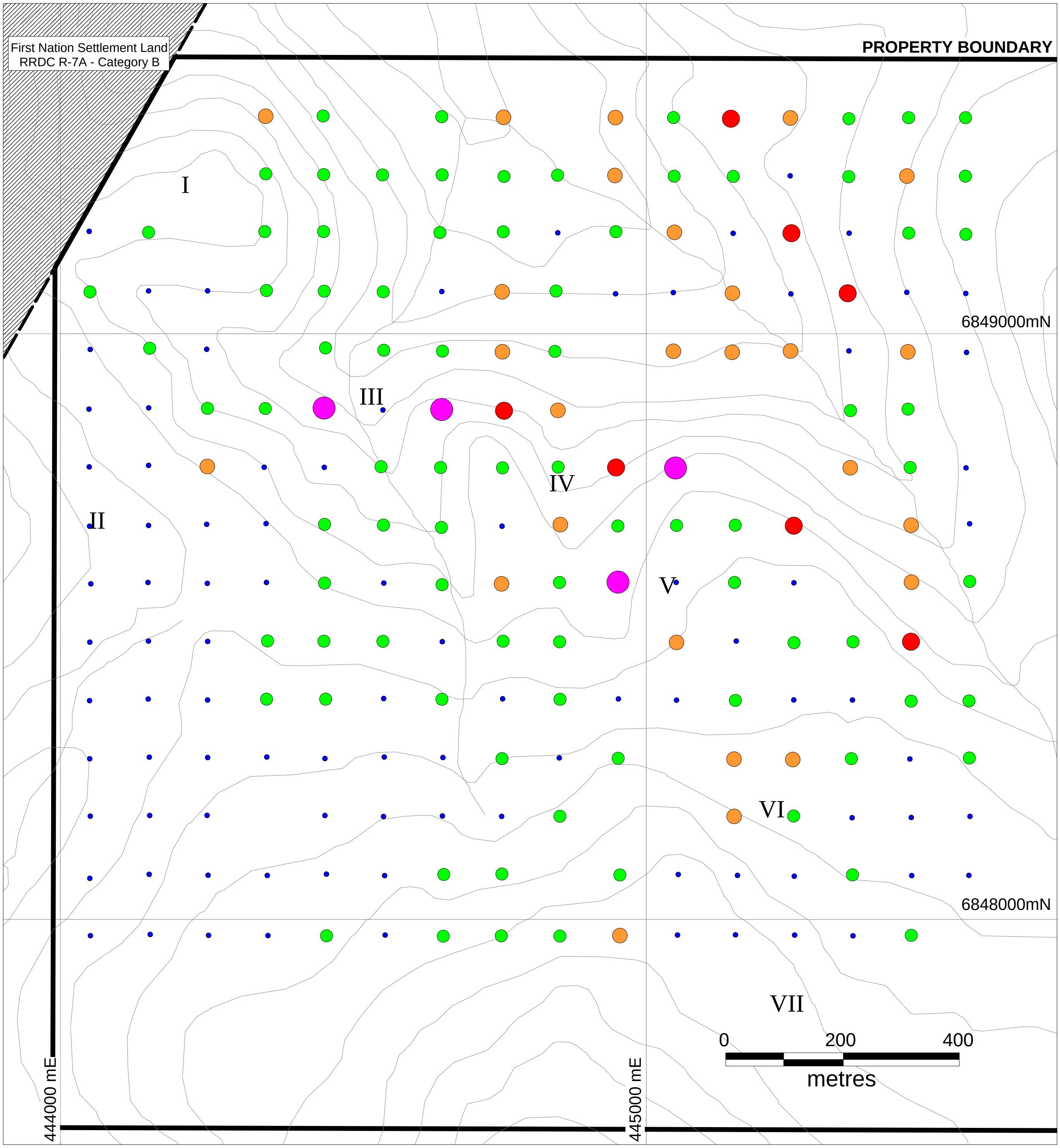
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

## SILVER GEOCHEMISTRY

## JAKE PROPERTY

UTM Zone 9, NAD83, NTS 105G/16

FILE: .../2007/JAKE/Ag_GEOCHEM.WOR | DATE: APRIL 2008

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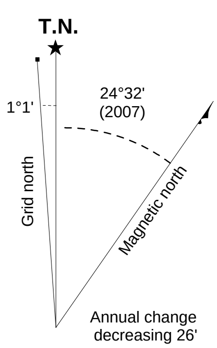


Cu Geochemistry (ppm)

- ≥ 400 < 645
- ≥ 200 < 400
- ≥ 100 < 200
- ≥ 50 < 100
- ≥ 5 < 50

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FIGURE 8

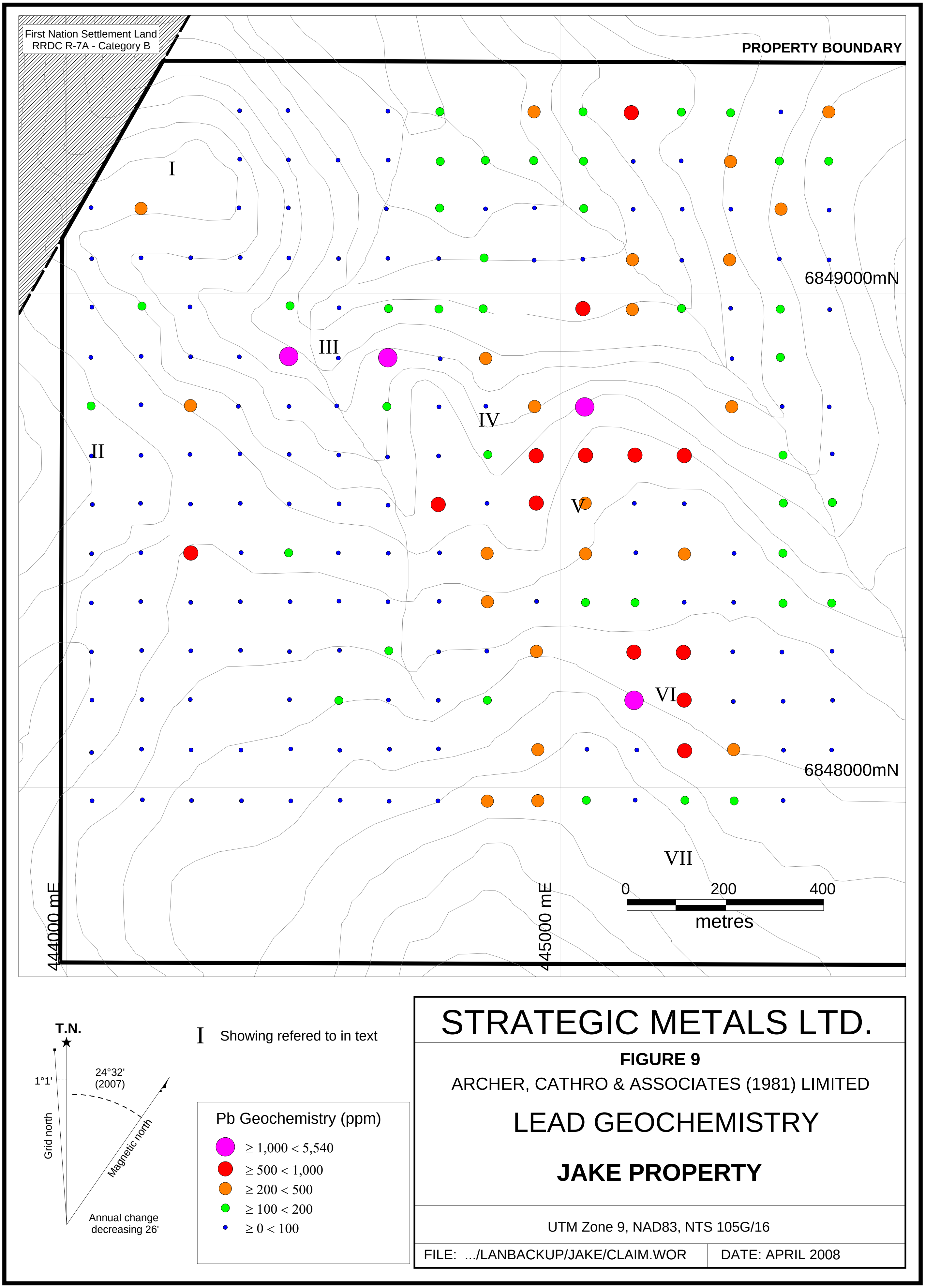
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

## COPPER GEOCHEMISTRY

## JAKE PROPERTY

UTM Zone 9, NAD83, NTS 105G/16

FILE: .../2007/JAKE/Cu_GEOCHEM.WOR | DATE: APRIL 2008




I Showing refered to in text

**Pb Geochemistry (ppm)**

- ≥ 1,000 < 5,540
- ≥ 500 < 1,000
- ≥ 200 < 500
- ≥ 100 < 200
- ≥ 0 < 100

# STRATEGIC METALS LTD.

**FIGURE 9**

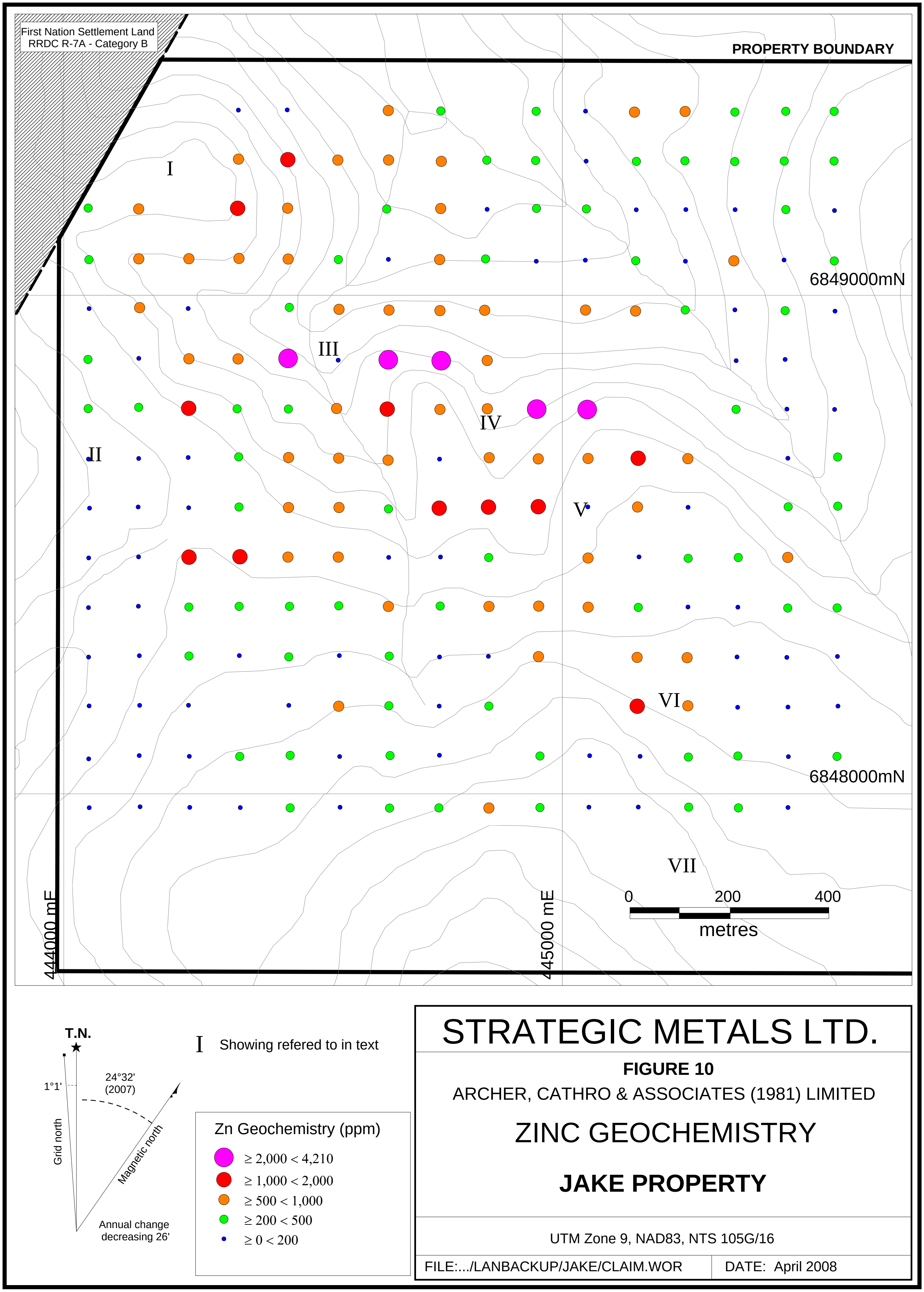
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

## LEAD GEOCHEMISTRY

**JAKE PROPERTY**

UTM Zone 9, NAD83, NTS 105G/16

FILE: .../LANBACKUP/JAKE/CLAIM.WOR | DATE: APRIL 2008




# STRATEGIC METALS LTD.

**FIGURE 10**

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

## ZINC GEOCHEMISTRY

**JAKE PROPERTY**

UTM Zone 9, NAD83, NTS 105G/16

FILE:.../LANBACKUP/JAKE/CLAIM.WOR | DATE: April 2008

## 2007 GEOPHYSICAL SURVEYS

The geophysical surveys were conducted by Geotech Ltd. using an Astar B3 helicopter contracted from TRK Helicopter Ltd. of Langley B.C. The equipment was flown at a constant speed of 80 km/hr and at an average ground speed of 120 m. The traverse lines are spaced 100 m apart and are aligned east-west. The tie lines are 1000 m apart and are aligned north-south.

The total magnetic field values on the property range from 57800 nT to 58200 nT. The anomalies occur in bands that trend northwesterly across the property (Figure 11). Some high values are in the vicinity of known intrusions and other highs may indicate buried plutons. Linear magnetic lows correspond to some mapped faults, which trend northwesterly and east northeasterly. Other lows could correspond to parallel, unmapped structures.

The VTEM data identified broad relatively strong conductors within an area underlain by calcareous to dolomitic graphitic siltstone and shale interbedded with mudstone, dolostone and orthoquartzite (Figure 12). The anomalies partially coincide with magnetic highs and modelled EM response suggests that they are controlled by or offset by northwest trending faults (Figure 13). They exhibit good conductivity and are laterally extensive. The geophysical analysis concluded that the most important conductors are likely due to a graphite-rich horizon or a skarnified zone containing massive sulphide mineralization.

## DISCUSSION AND CONCLUSIONS

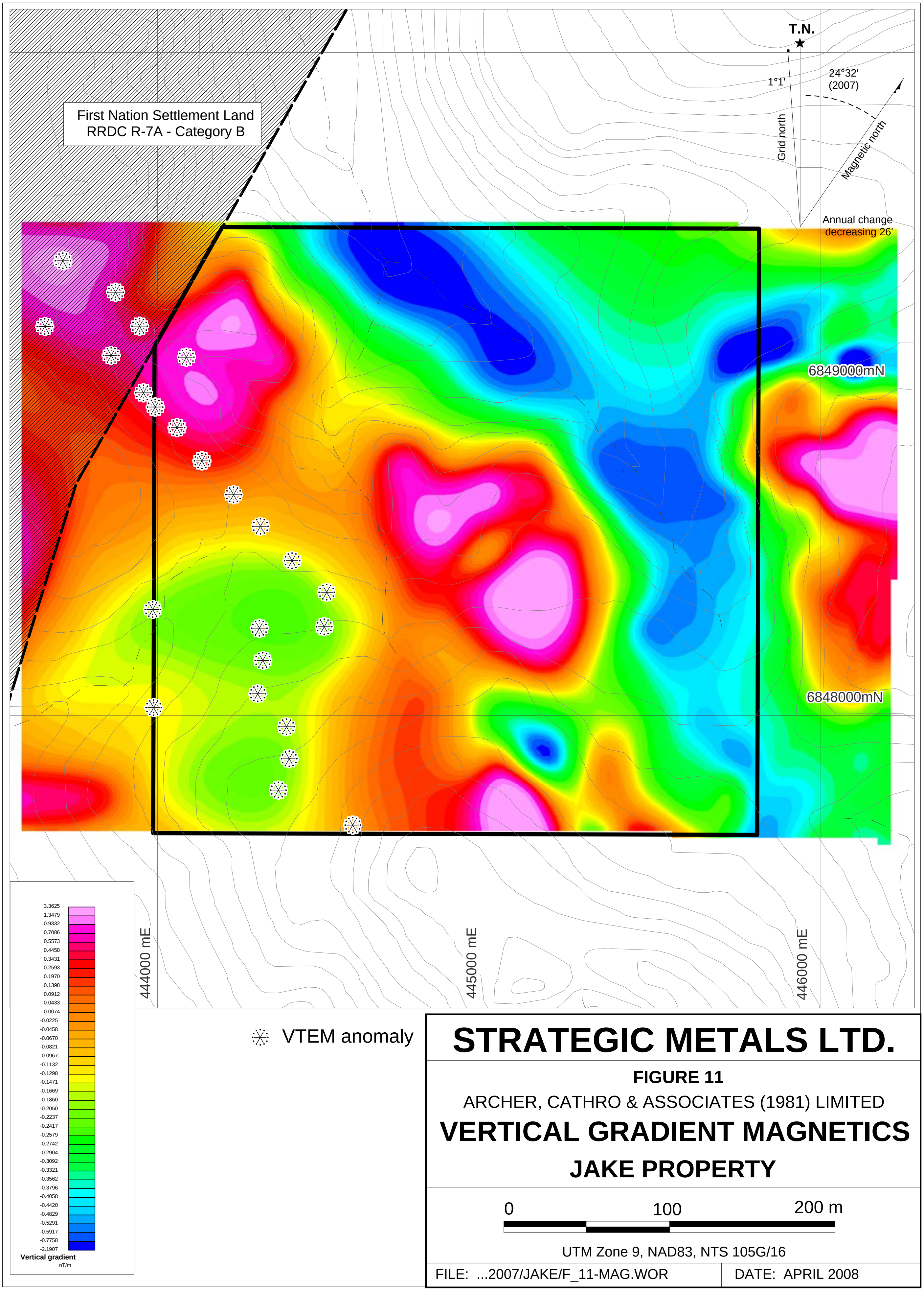
Results from the 2007 geophysical surveys at the Jake property are encouraging and support the potential for a large skarn hosted, silver-lead-zinc-copper deposit. Skarn mineralization has been discovered in several parts of the property but lack of bedrock exposure and thick vegetation has frustrated prospecting. The main geochemical anomalies are located in areas with limited bedrock exposure and are much stronger than would normally be expected, considering the modest size and grade of the known showings.

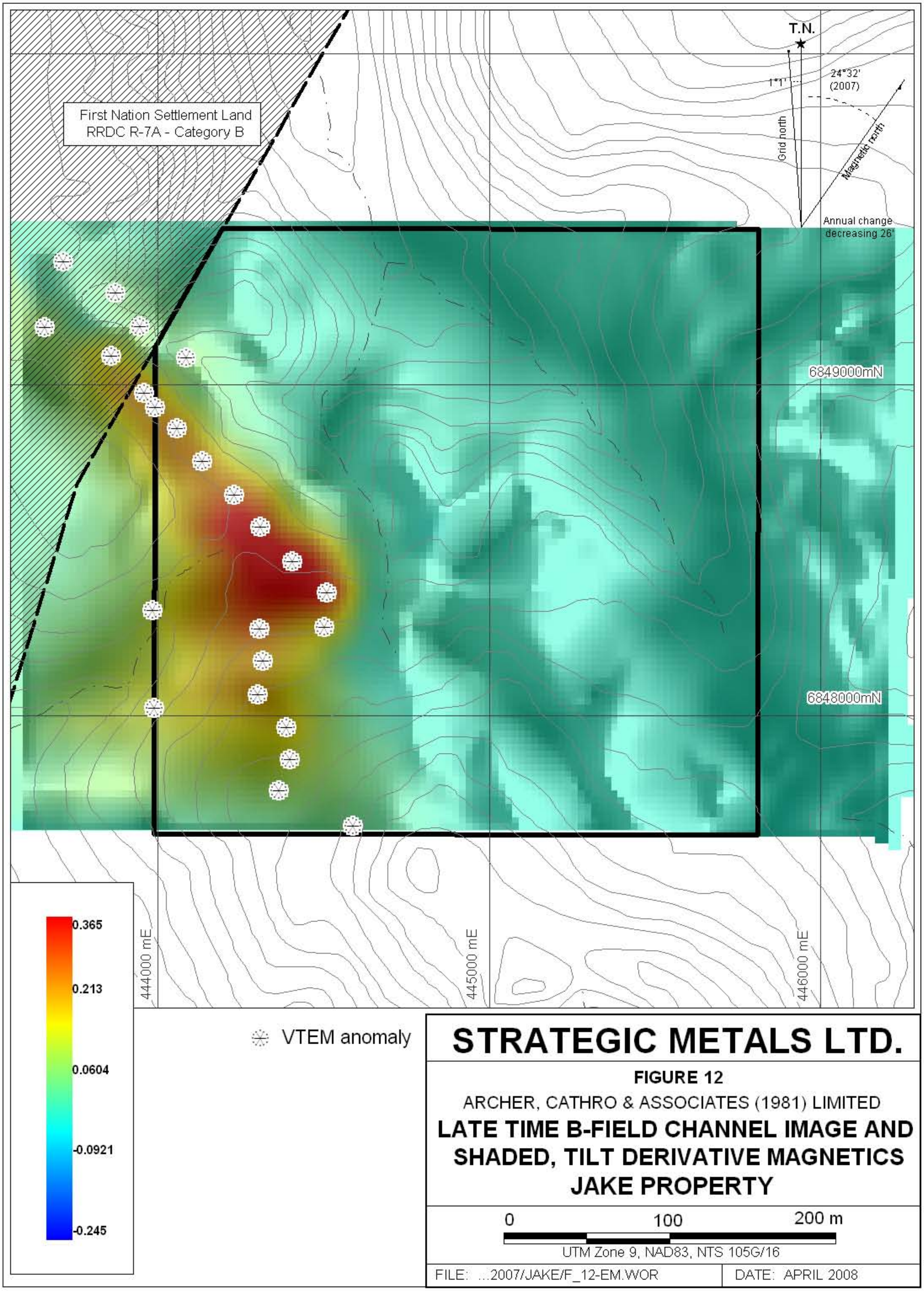
The next phase of work should involve more detailed evaluation of the VTEM data; and, if warranted, two or three diamond drill holes to test the strongest EM conductors. The drilling should be done with daily helicopter support from the nearby Inconnu Lodge.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

W. Douglas Eaton, B.Sc. Geology


First Nation Settlement Land
RRDC R-7A - Category B
T.N.
1°1'
24°32'
(2007)
Grid north
Magnetic north
Annual change
decreasing 26'
6849000mN
6848000mN
444000 mE
445000 mE
446000 mE
3.3625
1.3479
0.9332
0.7086
0.5573
0.4458
0.3431
0.2593
0.1970
0.1398
0.0912
0.0433
0.0074
-0.0225
-0.0458
-0.0670
-0.0821
-0.0967
-0.1132
-0.1298
-0.1471
-0.1669
-0.1860
-0.2050
-0.2237
-0.2417
-0.2579
-0.2742
-0.2904
-0.3092
-0.3321
-0.3562
-0.3796
-0.4058
-0.4420
-0.4829
-0.5291
-0.5917
-0.7758
-2.1907
Vertical gradient
nT/m
VTEM anomaly
STRATEGIC METALS LTD.
FIGURE 11
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
VERTICAL GRADIENT MAGNETICS
JAKE PROPERTY
0
100
200 m
UTM Zone 9, NAD83, NTS 105G/16
FILE: ...2007/JAKE/F_11-MAG.WOR
DATE: APRIL 2008



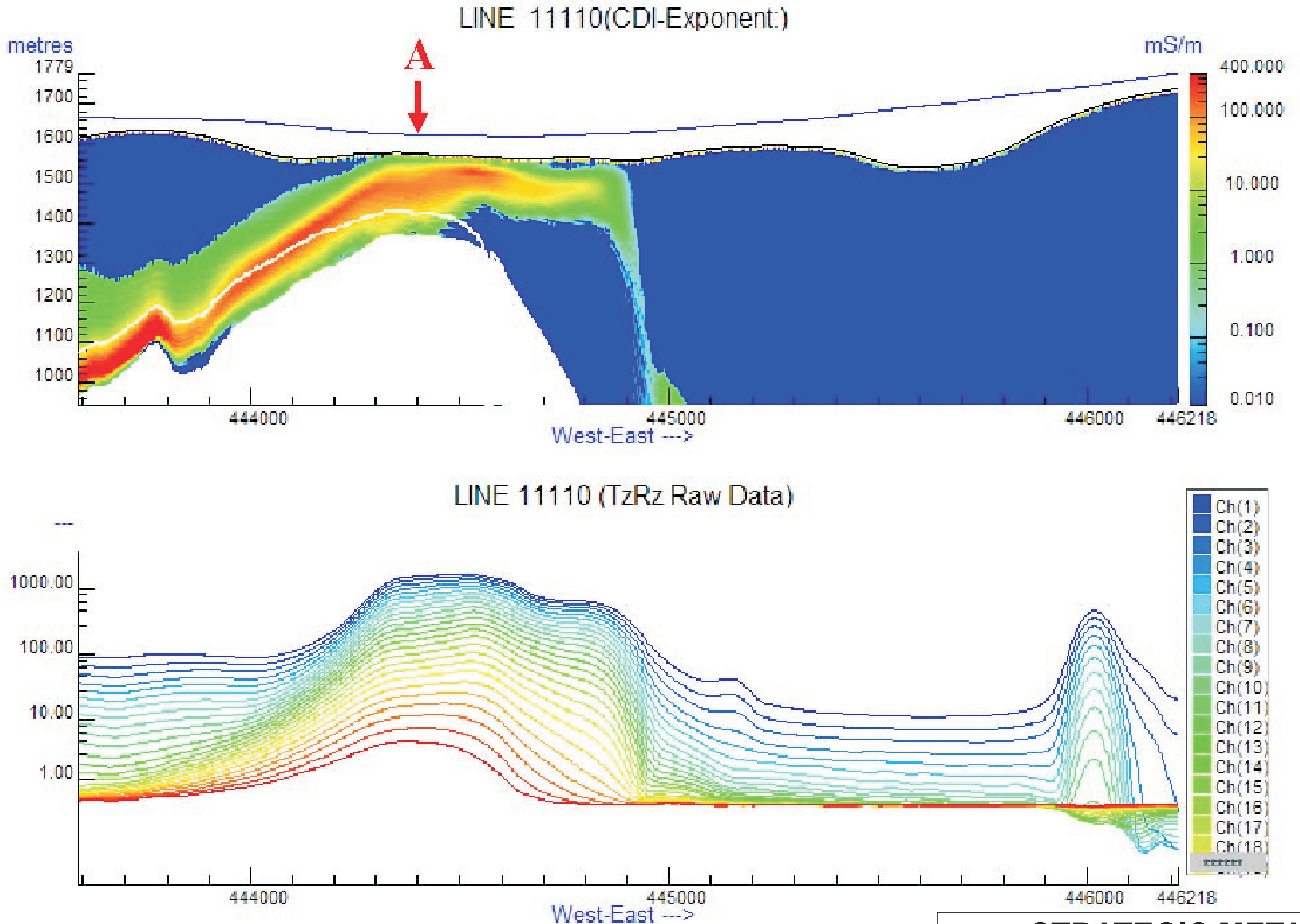

**STRATEGIC METALS LTD.**

**FIGURE 12**

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

**LATE TIME B-FIELD CHANNEL IMAGE AND SHADED, TILT DERIVATIVE MAGNETICS JAKE PROPERTY**

FILE: ...2007/JAKE/F_12-EM.WOR | DATE: APRIL 2008




**STRATEGIC METALS LTD.**

**FIGURE 13**

**ARCHER, CATHRO & ASSOCIATES (1981) LIMITED**

# MODEL EM CROSS SECTION
# L11110 dB/dt DATA
# JAKE PROPERTY

0 — 1 km

FILE:...2007/JAKE/F13 APRIL 2008

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Wesa, G.
1996 Geological and Geochemical Report on the JK Property, assessment report for Pacific Bay Minerals Ltd. Assessment Report #093589.

# APPENDIX I

# STATEMENT OF QUALIFICATIONS

## STATEMENT OF QUALIFICATIONS

I, W. Douglas Eaton, geologist, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia and residential address in North Vancouver, British Columbia, hereby certify that:

1. I graduated from the University of British Columbia in 1980 with a B.Sc. majoring in Geological Sciences.

2. From 1971 to present, I have been actively engaged in mineral exploration in British Columbia and Yukon Territory and on June 1, 1981, became a partner in Archer, Cathro & Associates (1981) Limited.

3. I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.

W. Douglas Eaton, B.Sc. Geology

## APPENDIX II

## GEOPHYSICAL REPORTS BY GEOTECH LTD., INCLUDING CD'S WITH THE DIGITAL SURVEY DATA

# REPORT ON A HELICOPTER-BORNE TIME DOMAIN ELECTROMAGNETIC GEOPHYSICAL INTERPRETATION

## JAKE PROPERTY

**Yukon Territory, Canada**

**For**

## Strategic Metals Ltd.

**By**


**Geotech Limited**

**245 Industrial Parkway North**

**L4G 4C4 Aurora, Ontario, Canada**

**Tel: 1.905.841.5004**

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**Survey flown in August 2007**


**Project 7067**

**March, 2008**

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REPORT ON A HELICOPTER-BORNE
TIME DOMAIN ELECTROMAGNETIC INTERPRETATION

**JAKE Property**, Yukon Territory, Canada

## *1. INTRODUCTION*

In August 2007, a helicopter-borne electromagnetic survey was carried out by Geotech Ltd. for Atac Resources Ltd. over the JAKE Property located in Yukon Territory, Canada.

This report includes the results of the geophysical interpretation, over this Property. The Property is located at approximately 300 km north-east from Whitehorse, in the Yukon Territory. The geographic coordinates of the block extents are: longitudes, 130º 06’27” W and 129º 59’17” W, and latitudes, 61º 44’27” N and 61º 47’20” N. The surveyed area is 5 km$^2$, and the total line kilometers flown are 57 km (Fig. 1).

The survey was conducted using Geotech Ltd VTEM system. Principal geophysical sensors included a versatile time domain electromagnetic system and a high resolution cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter.

Data processing and map compilation, including generation of final digital data products were achieved at the office of Geotech Ltd in Aurora, Ontario.

The present report describes the results of the geophysical interpretation of this Property.


Fig. 1 Location map of the JAKE Property on the satellite image.

## 2. SURVEY DESCRIPTION

In August 2007, Geotech Ltd. carried out a helicopter-borne geophysical survey over the JAKE property located in Yukon. Geotech Ltd. utilized a Versatile Time Domain Electromagnetic System to measure the electromagnetic induction field (B-field) and the vertical component of its time derivative (dB/dt). The electromagnetic measurements were made at the off-time mode. The concentric in-loop system was towed at a distance of 42 m from the helicopter. The VTEM Transmitter uses a trapezoid waveform shape with 7.2 ms duration operating at a base frequency of 30Hz. The dipole moment was approximately 425 000 NIA. The half-waveform was 16.7 ms.
A towed cesium and high resolution magnetometer was used to measure the Earth's magnetic field intensity. Data positioning and navigation were assured by a Novatel WAA GPS with accuracy less then 3 m.
A Terra TRA radar altimeter was used to measure the terrain clearance. The helicopter was flying at a constant speed of 80 km/h and an average ground clearance of 120 m. The traverse lines direction was EW and the tie lines direction was NS. The distance between the traverse lines and the tie lines was 100 m and 1000 m, respectively. A more detailed description of the survey parameters is provided in the logistics/processing report.

## 3. *GEOLOGICAL CONSIDERATIONS*

### *3.1 Topography*

The terrain is mountainous and very rugged with alternating valleys and streams. The absolute altitudes range from 1300 m to 1800 m approximately. Due to the terrain roughness of this area, it was difficult to keep a constant ground clearance while surveying this area.


Fig.2 Topographic relief map of the JAKE Property with flight path.

## *3.2 Regional geological context*

The Yukon Territory is situated in the northern part of the large geologic (and physiographic) belt known as the Cordillera. It is composed of relatively young mountain belts that range from Alaska to Mexico. The Yukon Territory is composed of a diverse type of rocks recording more than a billion years of geological history. Most of them have been affected by folding, faulting, metamorphism and uplift during various tectono-metamorphic events over at least the last 190 million years. This deformation has resulted in a complex arrangement of rock units and the mountainous terrain that has shaped today's geology. Geologically, Yukon is divided into two main components which are largely separated by the Tintina Trench. Formations northeast of the Tintina Fault consist of a thick, older sequence of sedimentary rocks which was deposited upon a stable geological basement. Rocks southwest of the Tintina Trench are composed of a younger, complex mosaic of igneous and metamorphic, representing numerous accreted terranes (Fig. 3).

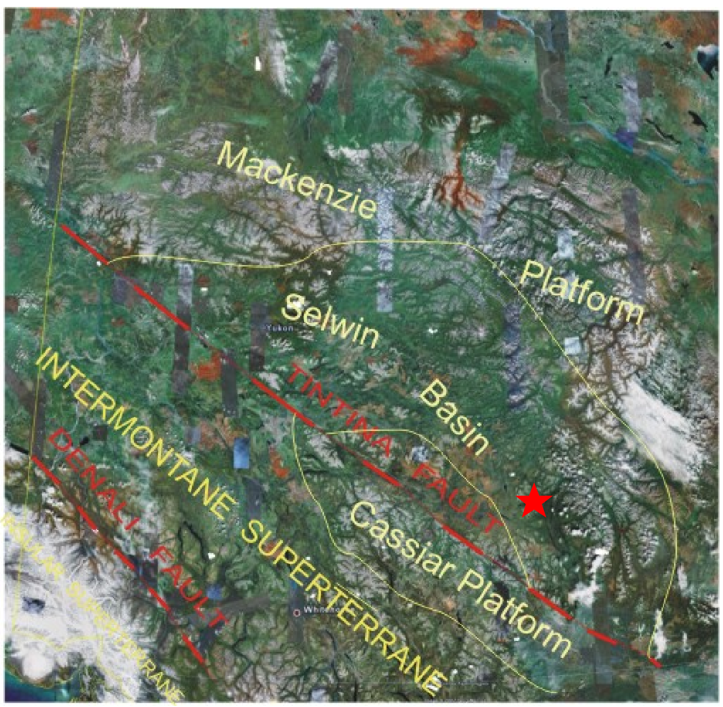



Fig.3. The major tectonic elements of Yukon superimposed on the satellite image. The figure indicates that the territory is composed of two dominant rock packages separated by the Tintina Fault: thick packages of sediments (northeast) and accreted Terranes (Southwest). The star indicates the location of the JAKE property.

## *3.3 Geological context of the JAKE Property*

The Jake property is underlain by a shallow marine mio-geoclinal sequence of upper Proterozoic to Mississippian age carbonate and clastic sedimentary rocks of Cassiar Platform tectonic element. These rocks are intruded by Mid-Cretaceous granitic intrusions of the Tay River plutonic suite which lie within the Selwyn magmatic province. The main units are the following:

- Cambrian to Ordovician consisting of orange-brown weathering, recessive slate, phyllite, dolomitic phyllite/slate, chert, greywacke and quartzite;
- Silurian unit composed of dolomitic siltstone and silty dolostone, and shaley siltstone;
- Silurian to Lower Devonian consisting of dolostone and mature orthoquartzite. The unit comprises recessive, dark grey to black weathering, thinly bedded, calcareous, graphitic siltstone with gradational lenses of dolostone, quartzite, and dolomitized mudstone.

Quartz veins and breccia veins are common throughout the property. Quartz veins are generally barren and bull white in nature, while breccias exhibit moderate to strong limonitic alteration composed of phyllite and quartzite clasts in calcrete cement. Quartz veins cut steeply across foliation generally along the main fracture orientation.

Rocks underlying the claim block are altered primarily by silicification and carbonization with local limonite, talc, sericite, and chlorite. The alteration is mainly localized and controlled by faults and shears that crosscut the property.

Stratigraphy in the vicinity of the claim block exhibits moderate folding that generally strikes southwest and dips gently to moderately to the northwest. Isoclinal folding was observed locally throughout the property. The main fracture set is aligned west-northwest and dips steeply (between about 70 to 85 degrees) to the south-southwest.

Major and secondary structures are present on the property, both as steep sided normal faults or high angle reverse faults. They are observed on surface as fault escarpments on cliff faces and as steep drainages. Local fractures, breccias, quartz and carbonate stockwork veining and alteration are mapped around the fault and shear zones.

### 3.4 Mineralization

The two main types of mineralization identified in the Jake Property are (1) skarn and (2) quartz stockwork breccias or vein. The three main economic minerals found of the property include galena, sphalerite and chalcopyrite. Galena and sphalerite occurs as blebs, disseminations and fracture fillings within weakly to moderately skarnified metasediments, structurally derived breccias and lesser diopside actinolite skarn. Alteration of sphalerite to hydrozincite is common. Chalcopyrite is rare and occurs as fine disseminations and fracture fillings.

Several showings were identified in the Jake property. Samples returned anomalous values of Ag (up to 1500 g/t), Cu (up to 1.5%), Pb (up to 10 %) and Zn (up to 6.5%).

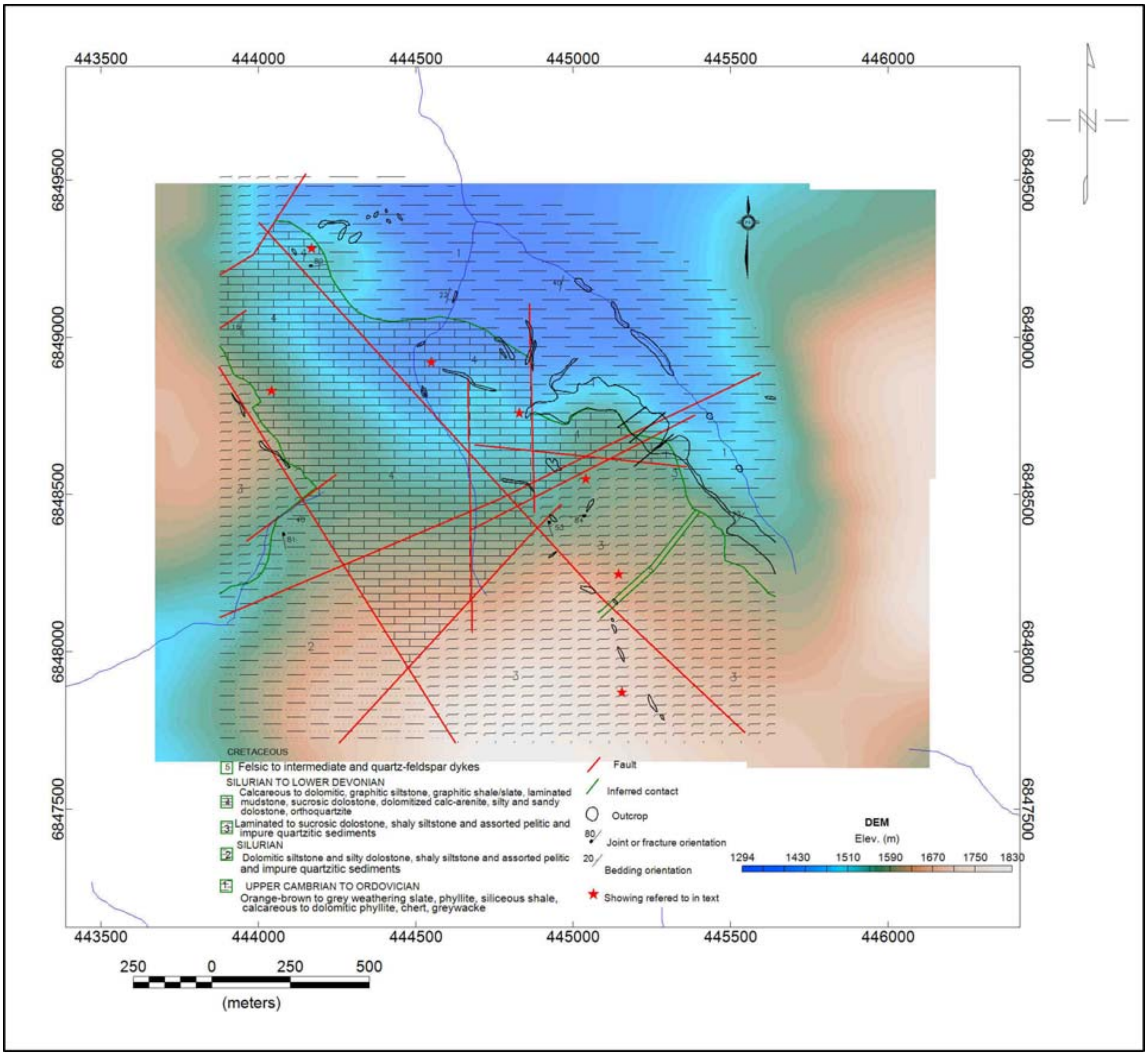



**Fig. 4 Simplified Geological map of the JAKE Property.**

# 4. INTERPRETATION OF THE MAGNETIC DATA

## 4.1 Introduction

Aeromagnetic surveys are routinely used as a powerful tool at different stages in mining exploration and in geological mapping. Because geological formations have different concentrations of magnetic minerals, they exhibit different magnetic signatures in the magnetic field, depending on the susceptibility contrast of rocks and the characteristics of the magnetic field. Thus, observed magnetic field over an area, can provide useful information that can assist the lithological and the structural mapping. It can be used to detect iron-rich mineral deposits, and/or mineral deposits associated with highly magnetic rocks (mafic and ultramafic formations).

## 4.2 Analysis of the Magnetic data

The observed magnetic field over the JAKE Property is shown in Figs. 5a-5b. The total magnetic field values are ranging from 57800 nT to 58200 nT approximately, yielding an amplitude difference of 400 nT. The TMI map shows banding anomalies trending in the NW direction. The banding anomalies are observed over the intrusive outcrops that are likely to be relatively more magnetic than the surrounding sedimentary rocks. A magnetic high is also observed in the eastern edge of the block and may be associated with hidden intrusive rocks. A NW trending magnetic low is observed in the east of the block. It may be associated with a major fault. Elsewhere, the magnetic field exhibits a quiet character over the non-magnetic sedimentary formations.

Since the contents of the observed magnetic maps include the response of shallow and deep magnetic sources, it is difficult to analyze the maps containing various wavelength anomalies. Distinguishing shallow features from deeper ones can be performed via several methods of field separation and filtering.

Figure 6 shows the reduced to the pole magnetic field map, upward continued to 100m. The map shows smoother anomalies with reduced intensities. The map clearly shows NW trending banding anomalies associated with intrusive rocks. As shown on the RTP map, intrusions are controlled by NW trending faults. The magnetic low observed in the east of the block is probably associated with a deep fault.

Figure 7 illustrates the vertical gradient of the TMI. The vertical gradient is used to enhance magnetic signals caused by shallow sources and related to faults, dykes and contacts.
The map highlights NW trending lineaments associated with the outlines of the intrusive bodies. Several faults can be identified causing offsets of anomalies axes. The can also be identified by short wavelength lineaments. The tilt derivative map illustrated in Fig. 8 yields another example of amplifying signals associated with shallow sources. The tilt derivative known as being the local

phase is computed from the vertical and horizontal gradients. As illustrated in the Tilt derivative map, a clearer outline of the NW trending intrusive structures is provided. The vertical gradient and tilt derivative maps are very useful for helping to understand the structural patterns of the area.

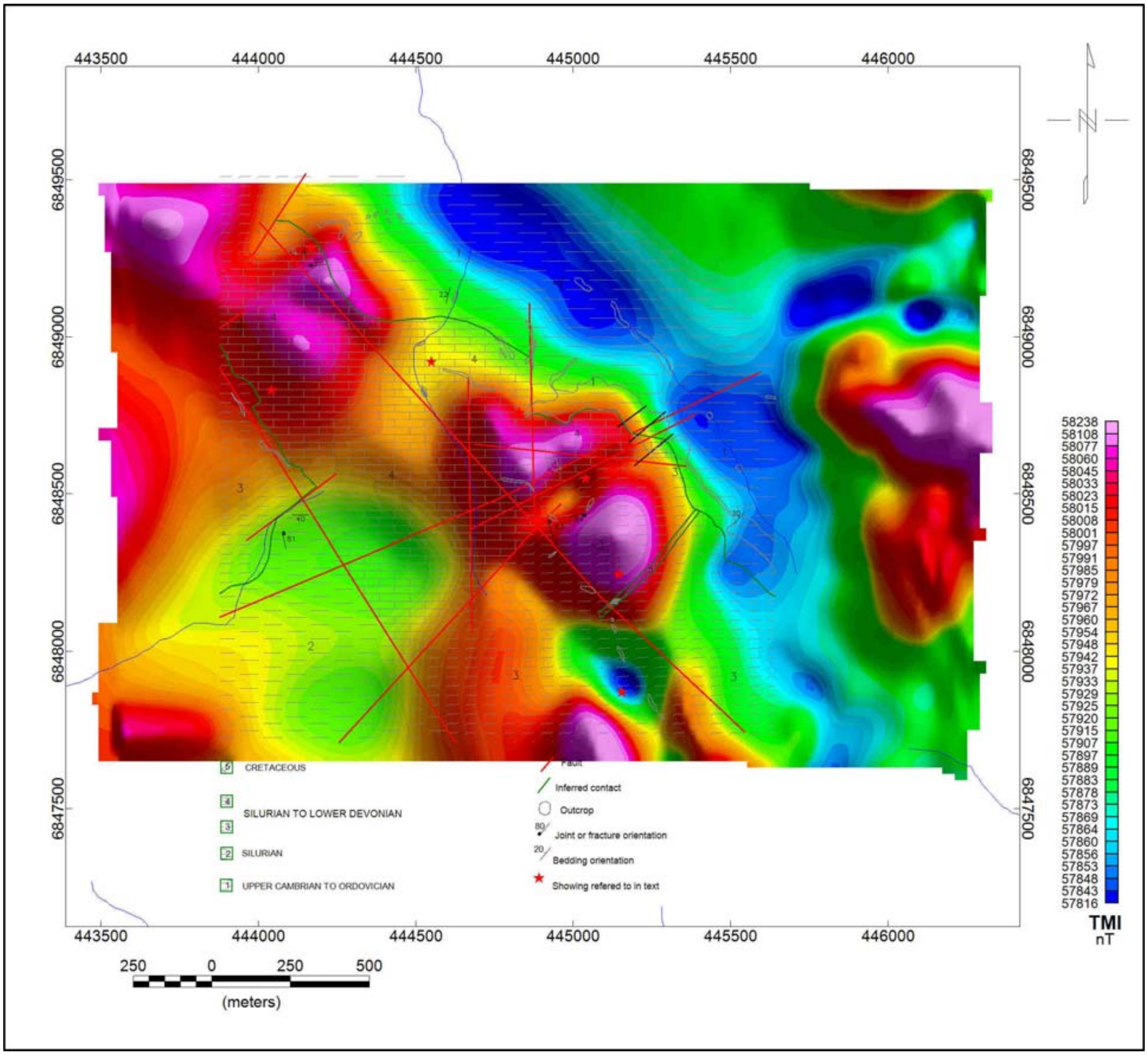



**Fig. 5a TMI image of the JAKE Property.**

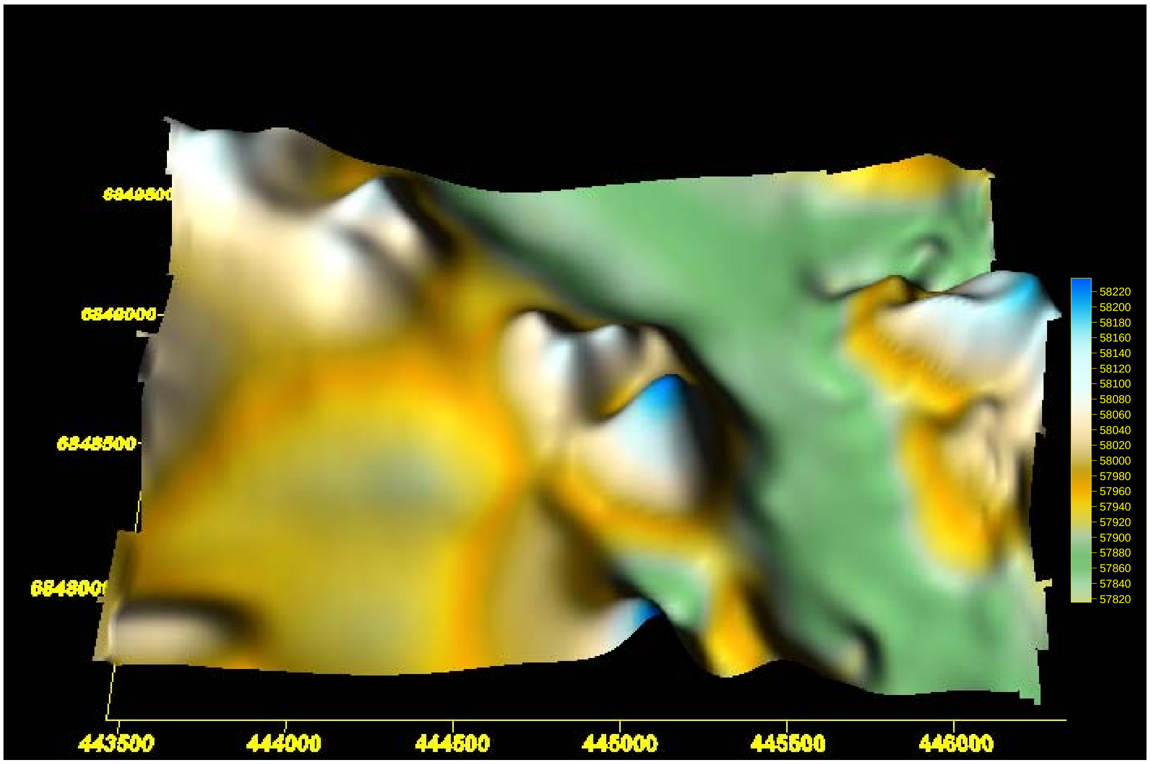



**Fig. 5b Perspective view of the magnetic relief of the JAKE Property. The map clearly shows NW banding magnetic highs related with intrusive rocks.**

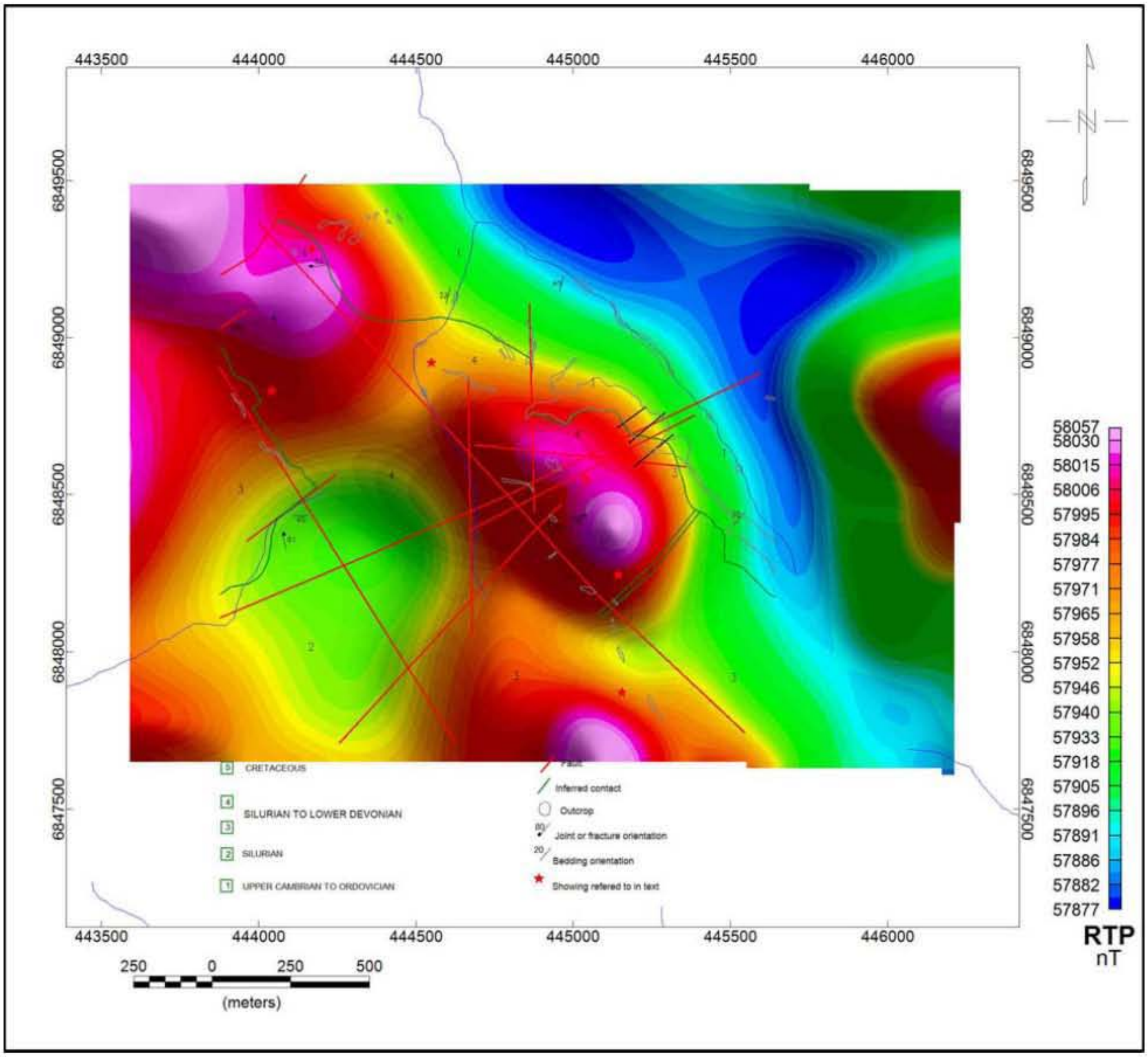



**Fig.6 Color shaded relief of reduced to the pole TMI (upward continued to 100m).**

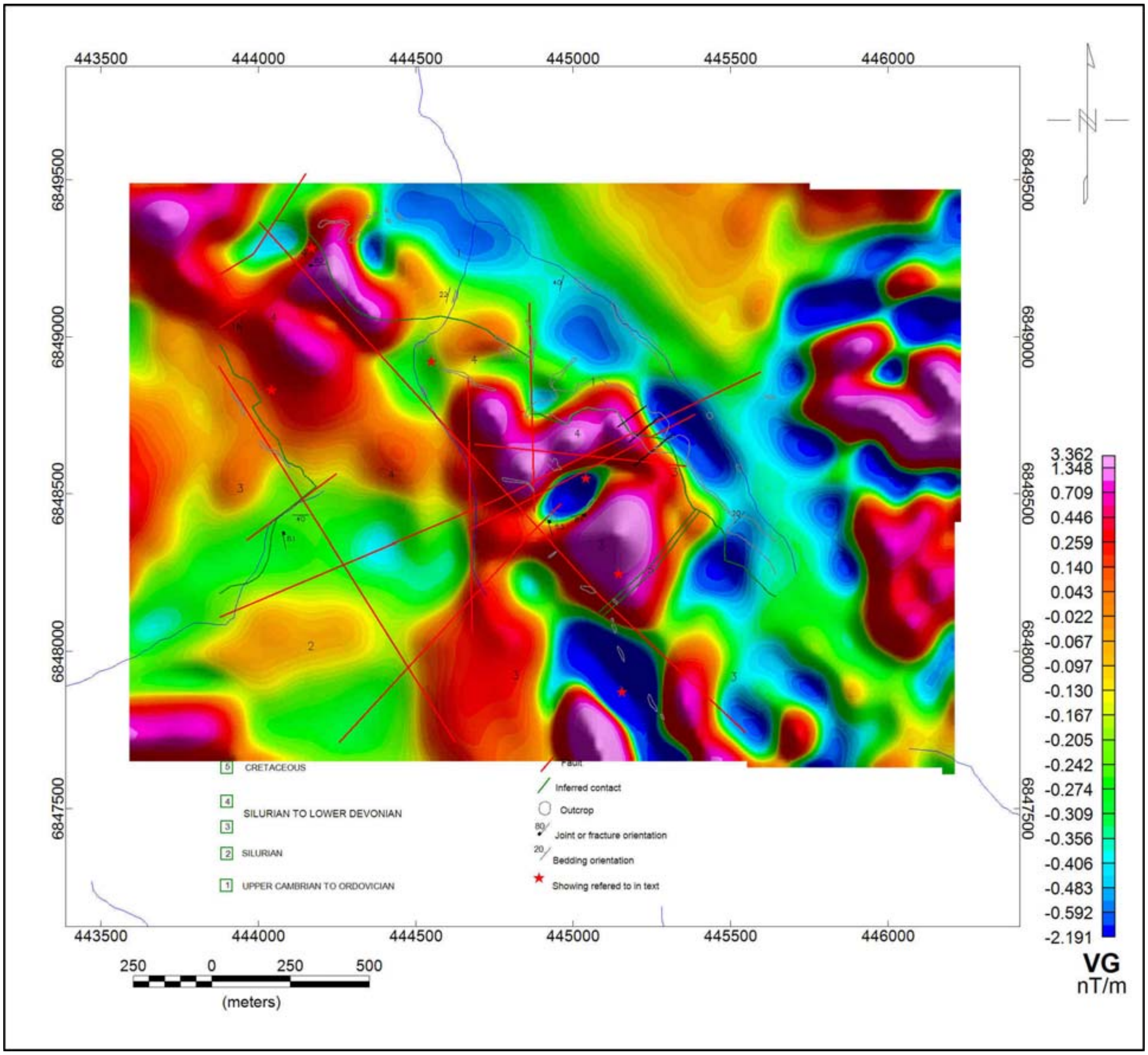



**Fig.7 Color shaded relief of the vertical gradient of the magnetic field.**

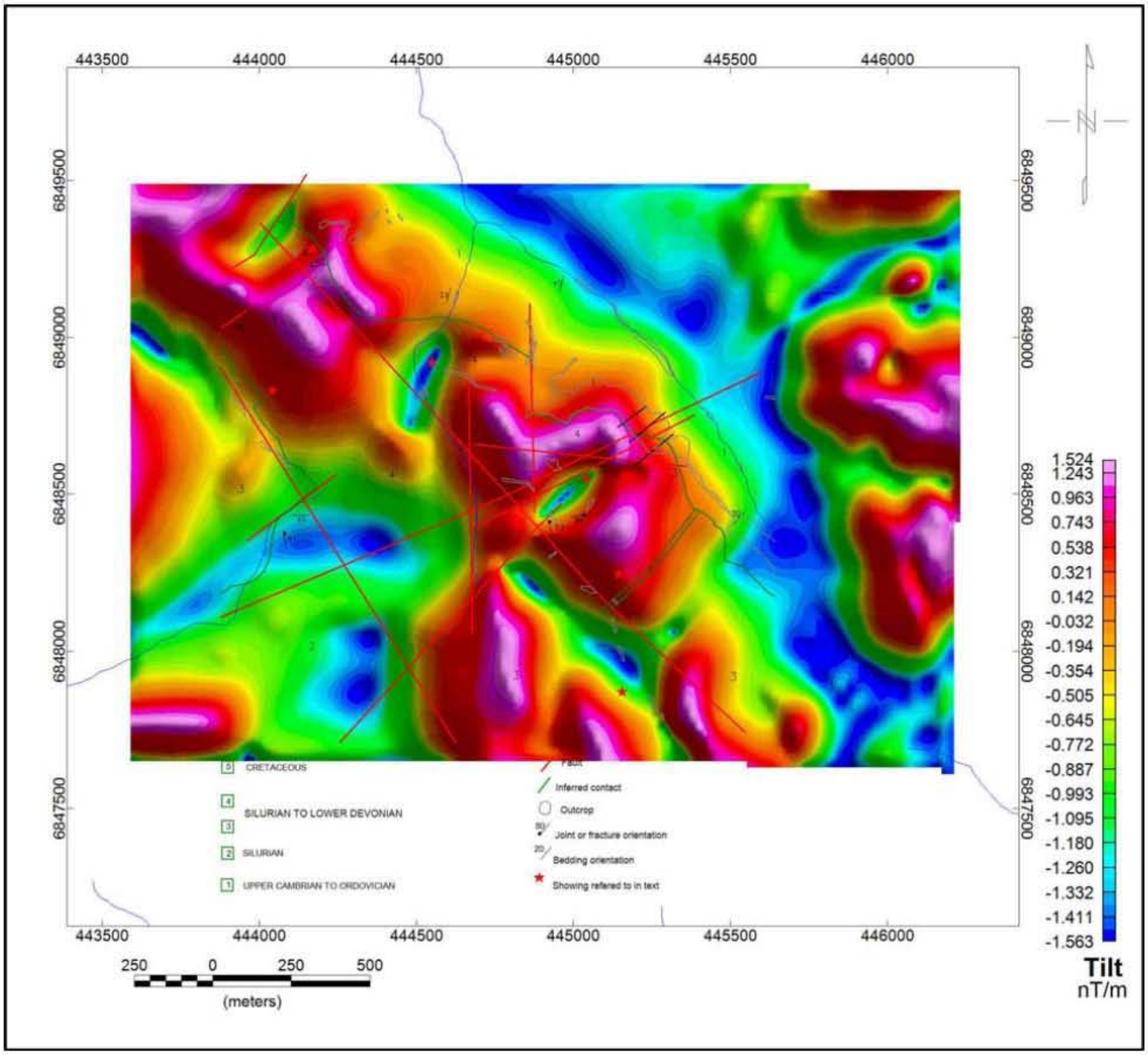



**Fig. 8 Color shaded relief of the tilt derivative.**

### 4.3 Inversion of the magnetic data

Several computer-based techniques can be used to automatically detect magnetic sources and yield estimations of their geometrical and physical parameters. These techniques can be either used to gridded data (3D methods) or to profiles (2D methods). Euler deconvolution is a well established technique, allowing a rapid interpretation of a large amount of magnetic data. This method is mainly aimed to delineate magnetic sources boundaries and to estimate their depths.

Fig. 9 shows the results obtained with the Euler deconvolution inversion using a structural index of 1, a depth tolerance of 10% and a square deconvolution window with a size of 400 × 400 metres. Euler solutions have been plotted on the total gradient (analytic signal) map for a better illustration. The peaks of the total gradient are also used to locate and delineate magnetic sources boundaries. The advantage of the total gradient (analytic signal) is that the location and delineation of magnetic bodies is independent of the magnetization and the inducing magnetic field direction.

The map shows that Euler solutions are mostly aligned in the NW direction indicating major trend of the magnetic structures. The solutions are directly located on the peaks of the total gradient (Fig. 9) and are associated with intrusive formations and faults. The shallowest sources are lees than 50m and are observed in the centre and east of the block. Deeper solutions are observed in the north of the block. Results obtained with the Euler deconvolution confirm the qualitative analysis conducted with the reduced maps and can be efficiently used for the structural mapping of the area.

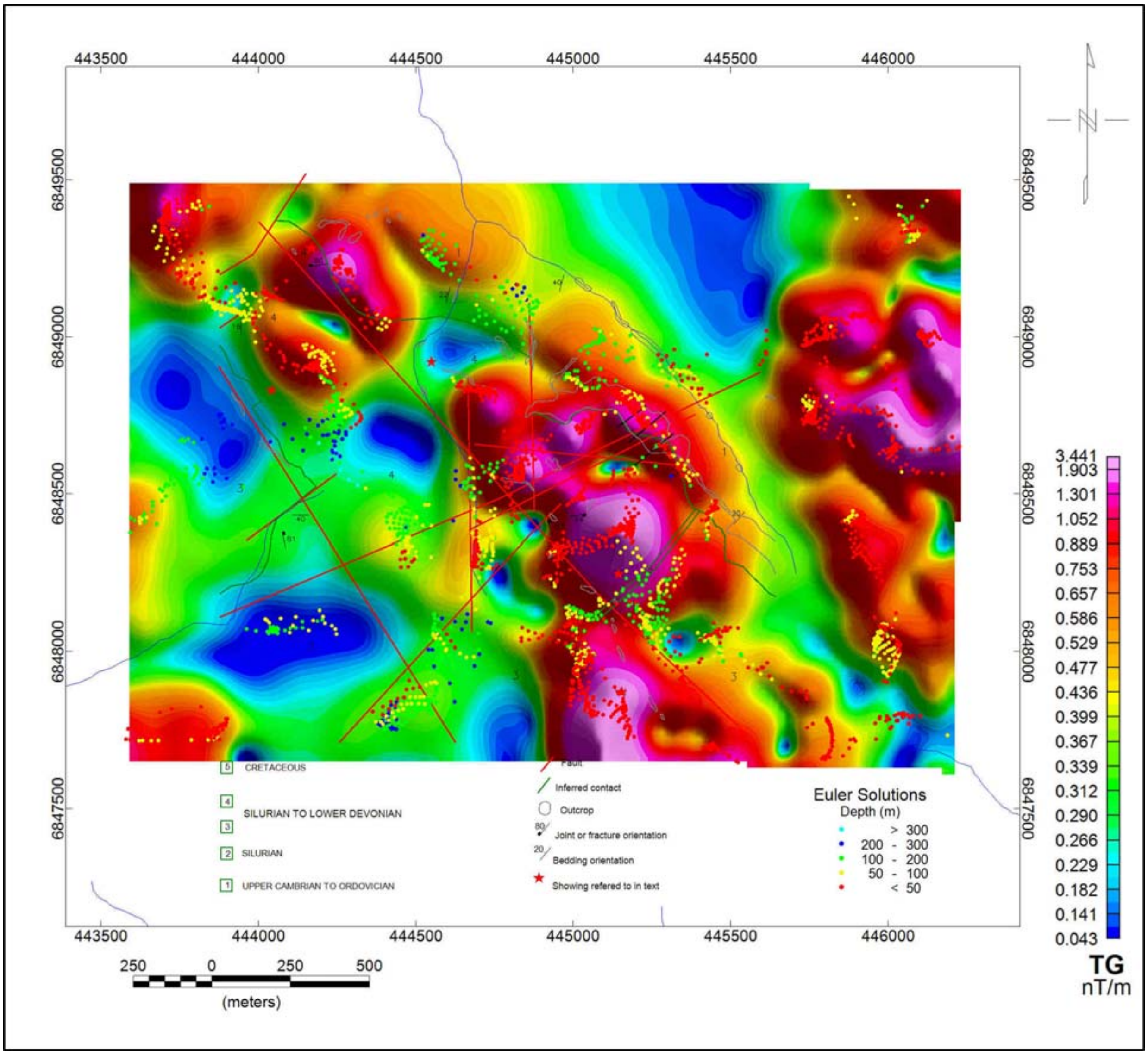



**Fig. 9 Euler deconvolution solutions plotted on the total gradient image.**

# 5. INTERPRETATION of the VTEM DATA

## 5.1 Introduction

Transient electromagnetic surveys have proven to be a very efficient tool in mineral exploration by detecting hidden deposits characterized by higher conductivities than the medium in which they are embedded. Because Time domain systems have a much greater depth penetration compared to the Frequency domain systems, these systems are considered as a tool of choice in the mining exploration. The Geotech Helicopter VTEM system, operating in the Time domain, uses concentric-loop geometry with the receiver mounted in the centre of a larger transmitter loop. Both loops are oriented in the vertical plane. This configuration has a number of advantages, as a maximum coupling, sharper anomalies by comparison to airborne fixed wing systems, and the shape of the anomalies in independent of the flight path orientation. Furthermore, the high moment transmitter combined with the lower terrain clearance yields stronger secondary field signals in most conductors when compared to other systems. The actual VTEM systems measure both the electromagnetic induction field B and its time derivative dB/dt. This system specificity has a lot of advantages, as the dB/dt better resolves the shallow conductive sources while the B-field exhibits a better resolution for deep conductors.

## 5.2 VTEM anomalies shape

For concentric-loop geometry systems when both loops are oriented in the Z-axis (VTEM system) thick dipping or horizontal conductors exhibit a characteristic single peak, while steeply dipping and thin conductors manifest a double peak. The minimum indicates the location of the top of the thin conductor, and the major peak indicates the side towards which the conductor is dipping. Synthetic models anomalies were generated for the plate type conductors are provided in the Appendix A to better understand the shape of the VTEM anomalies

## *5.3 Analysis of the EM results*

Figures 14 and 15 show the stacked profiles in pseudo-logarithmic scale of the dB/dt and B-field decays, respectively. Both maps indicate the existence of NS trending anomalous zone in the west of the property.

The zone is observed over the Silurian to Lower Devonian sediments composed mainly of calcareous, graphitic siltstone and graphitic shale and the Silurian dolomitic siltstone. The observed decays are broad and relatively strong, however there are mostly associated with shallowly to moderately dipping conductive bedrocks (Fig. 10-13). It is worth mentioning that the identified mineralized showings occur at the eastern extents of the anomalous zone.

The interpretation of the EM profiles was performed using in-house built software for automatically picking the anomalies along the profiles and yielding estimates of the conductance and the decay constant (tau) of isolated anomalies. The picked EM anomalies were posted on the late time EM channel. Figures 16 and 17 illustrate the results of the picked anomalies superimposed on the dB/dt, and B-field late time channel (6.578 ms after the current shut off), respectively.

The anomaly maps show mainly the existence of good conductive bedrocks (B1 and B2) in the west of the property.

The NW trending bedrock B1 is characterized by relatively strong conductance values (ranging between 10 S and 24 S) approximately) and moderate decay constants (ranging between 2.5 ms and 4.5 ms). The geological map shows the presence of graphitic siltstone and graphitic shale that may cause the observed anomalies, however the strong decays observed in the centre-west area on lines 11100 and 11110 may be associated with a skarnified zone containing massive sulphides. The north-southerly trending bedrock B2, located in the south-west of the block is characterized by conductance values ranging from 10 S to 18S and decay constants ranging from 2 ms to 4 ms. The estimated conductance values for the southern bedrock S1 are ranging from 15S to 30S approximately; however the calculated decay constants are less than 5ms. It seems from the geological map that this bedrock is associated with faulting contacts.

It is worth mentioning that detected conductive bedrock B1 is controlled by NW trending magnetic lineament indicating possibly an association with a fault as illustrated in Fig. 18.

The interpretation map (Fig. 19) shows the results of the magnetic and electromagnetic analysis superimposed on the total gradient image. The magnetic interpretation suggests the existence of NW and NE trending crosscutting faults. It is worth mentioning that the detected conductive bedrock B1 is associated with NW trending magnetic structure as indicated by Euler solutions, suggesting a possible sulphide nature (association with pyrrhotite and magnetite) of the conductive bedrock.

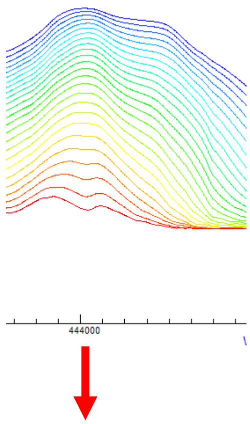



**Fig. 10 EM decays over for the western portion of the line 11050 (NW of the block). The shape of the decays suggests steeply dipping thick conductive bedrock as indicated by the red arrow.**

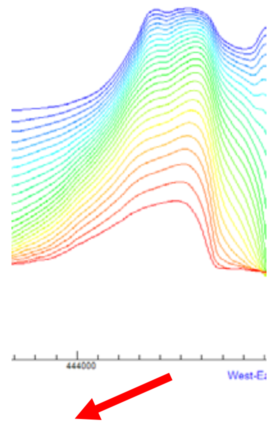



**Fig. 11 EM decays for the northern portion of the Line 11120 (West of the block) indicating a shallowly dipping (SW) conductive conductor as indicated by the red arrow.**

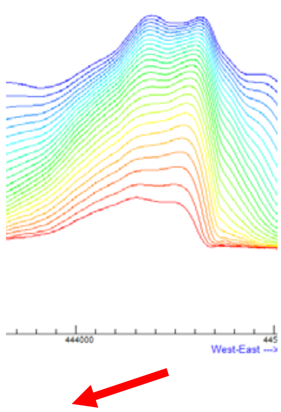



**Fig. 12 EM decays for the northern portion of the Line 11130 (West of the block) indicating a shallowly dipping (SW) conductive conductor as indicated by the red arrow.**

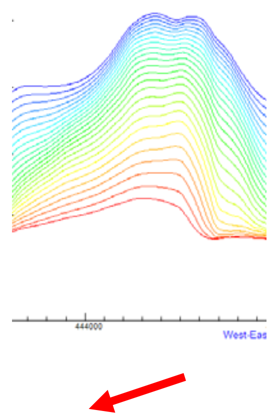



**Fig. 13 EM decays for the northern portion of the Line 11140 (West of the block) indicating a shallowly dipping (SW) conductive conductor as indicated by the red arrow.**

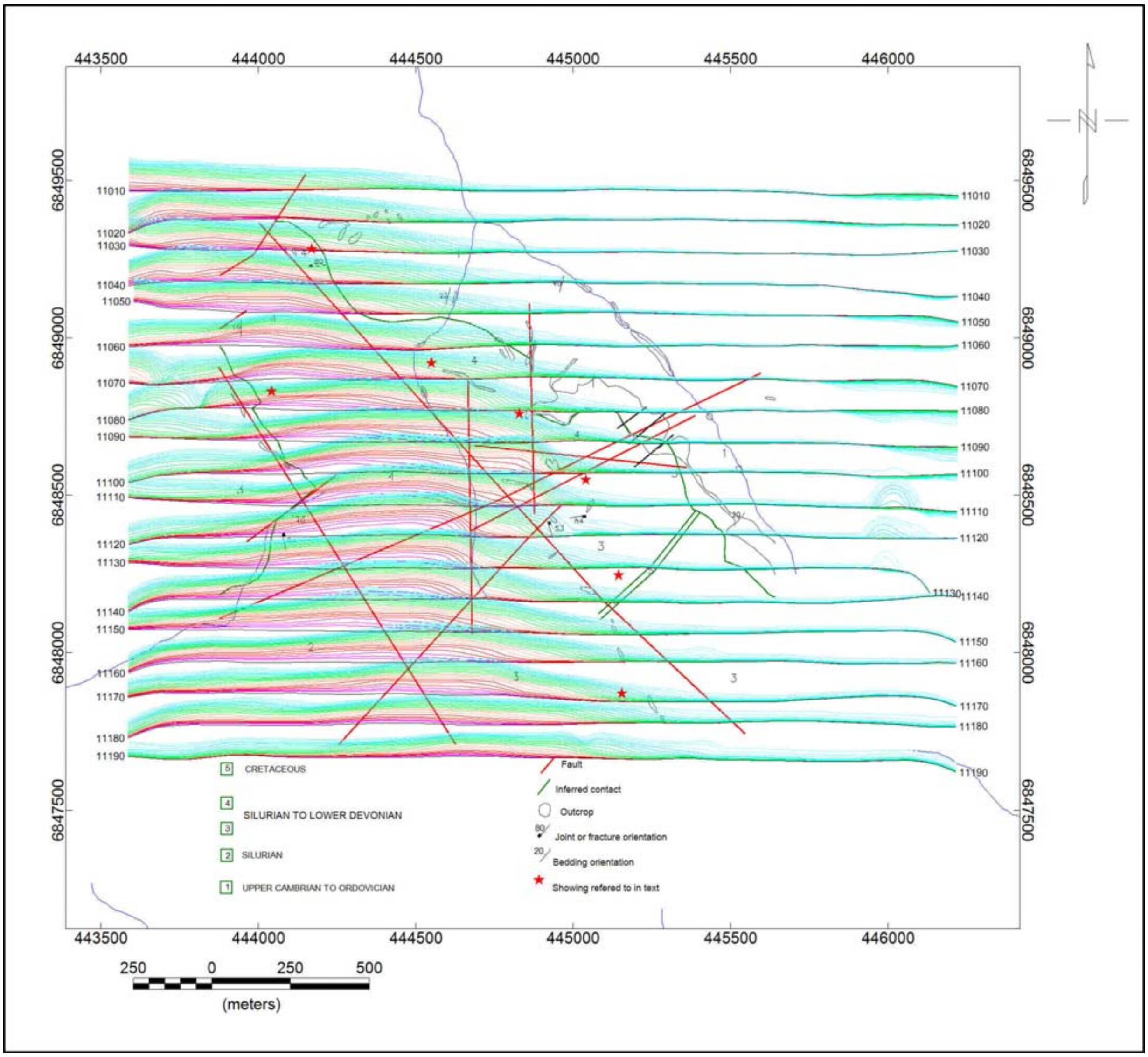



**Fig. 14 EM dB/dt stacked profiles at log-linear scale. Early time decays are in green and late time in red. The map depicts a large NNW trending anomalous zone in the west of the block.**

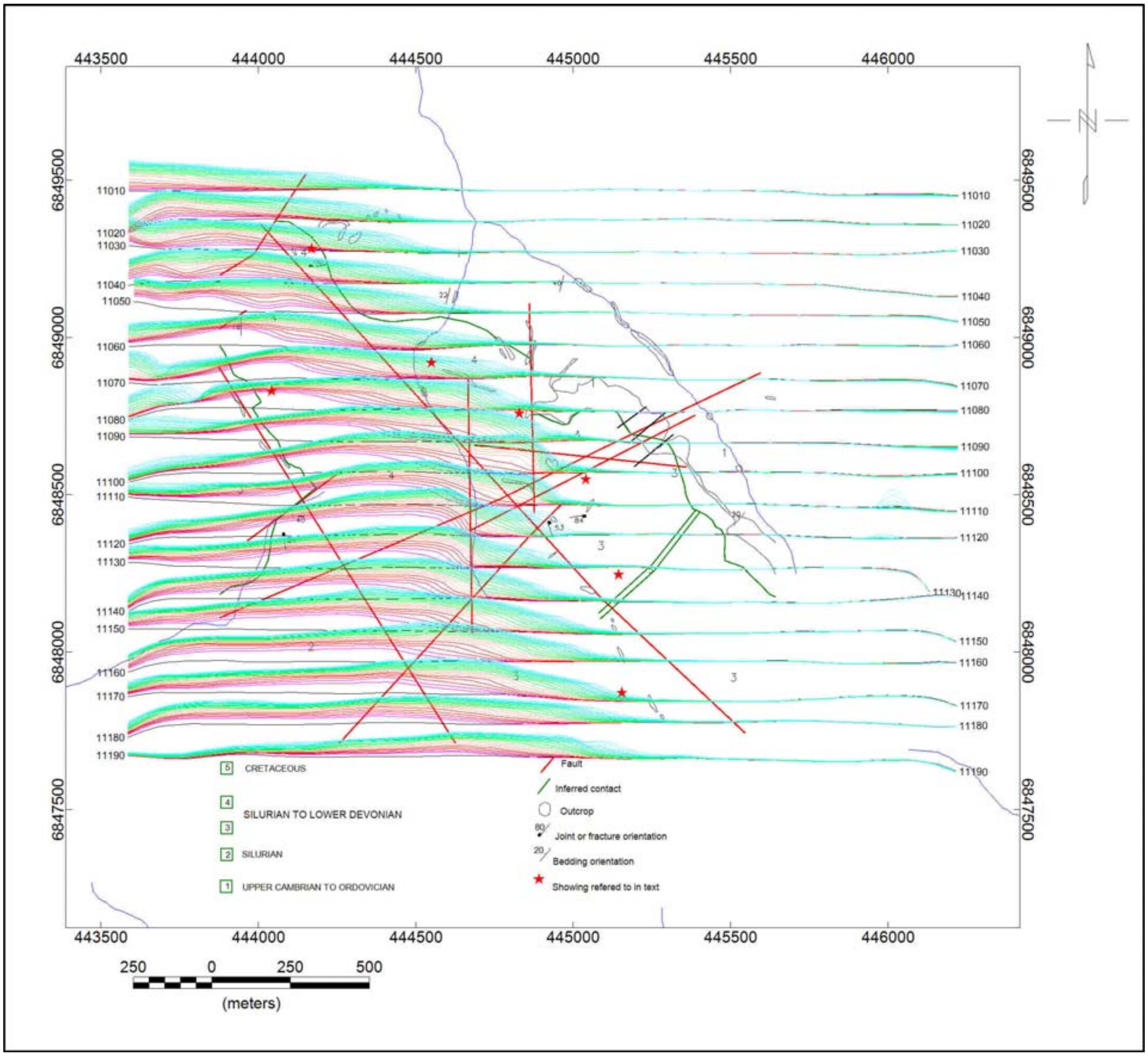



**Fig. 15 EM B-Field stacked profiles at log-linear scale. Early time decays are in green and late time in red. The map depicts a large NNW trending anomalous zone in the west of the block.**

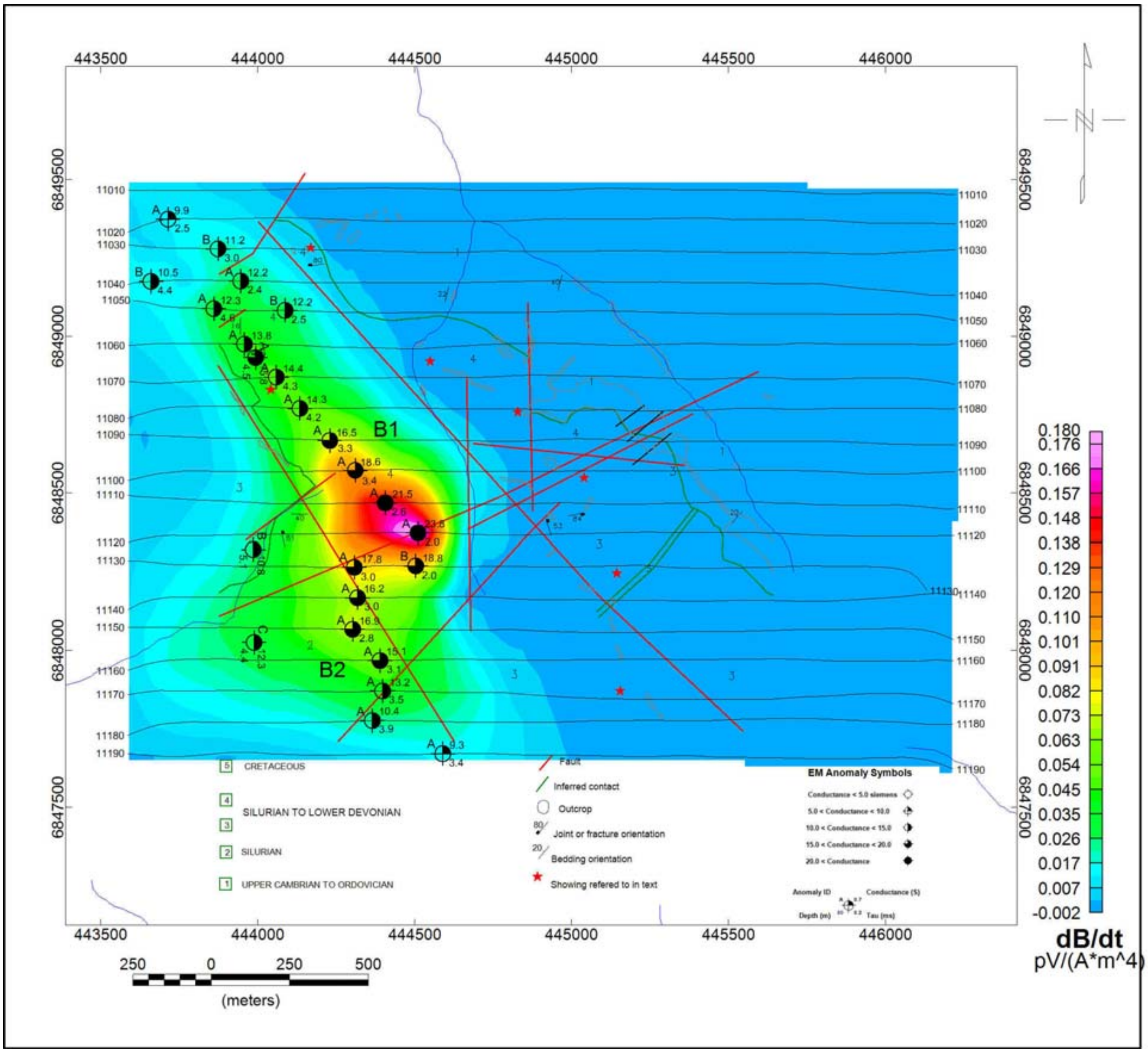


**Fig. 16 EM picked anomalies plotted on the late time dB/dt channel image (6.578 ms after current shut off). The map depicts the existence of NW and NS trending conductive bedrocks in the west of the block.**

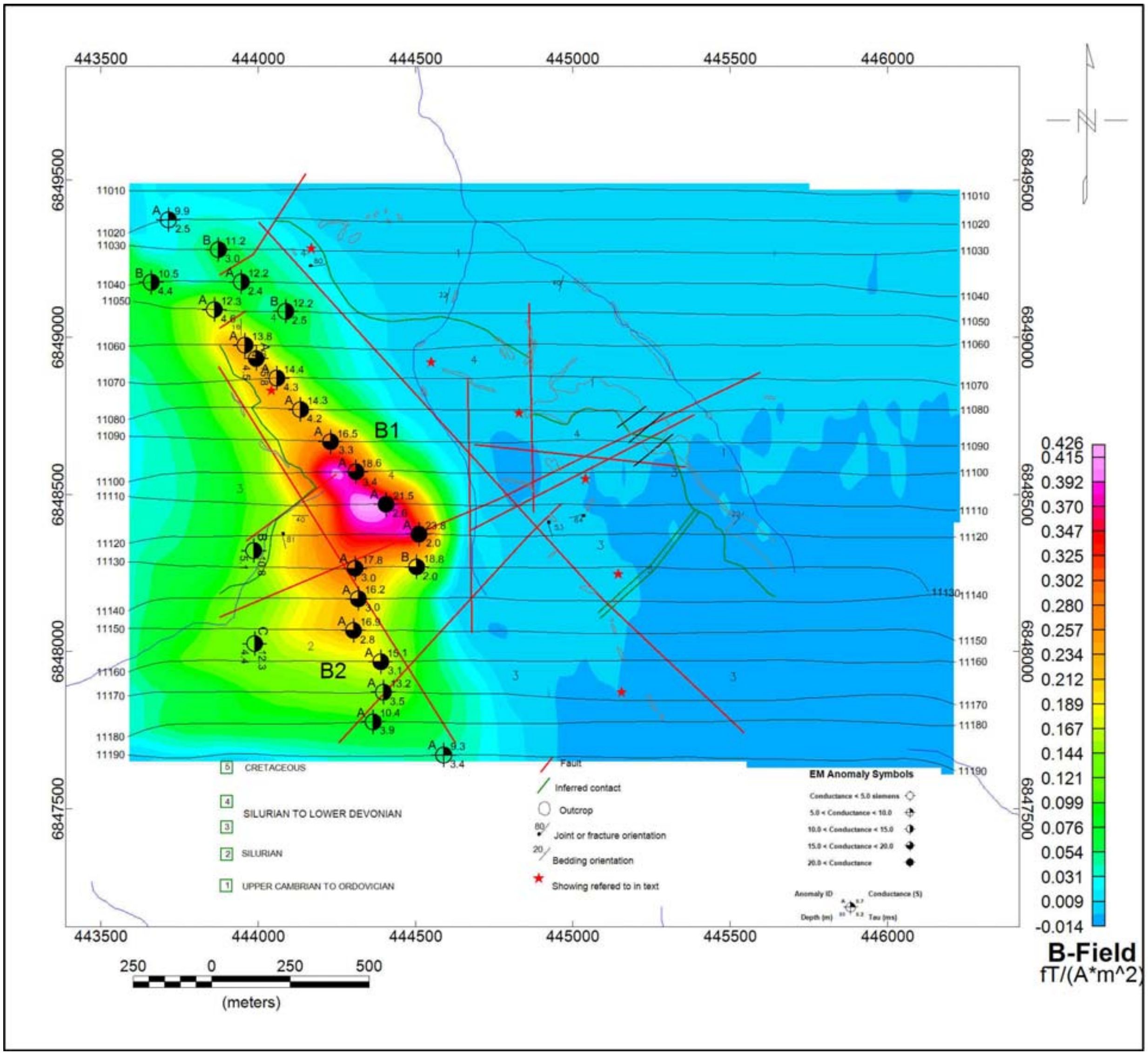



**Fig. 17 EM picked anomalies plotted on the late time dB/dt channel image (6.578 ms after current shut off). The map depicts the existence of NW and NS trending conductive bedrocks in the west of the block.**

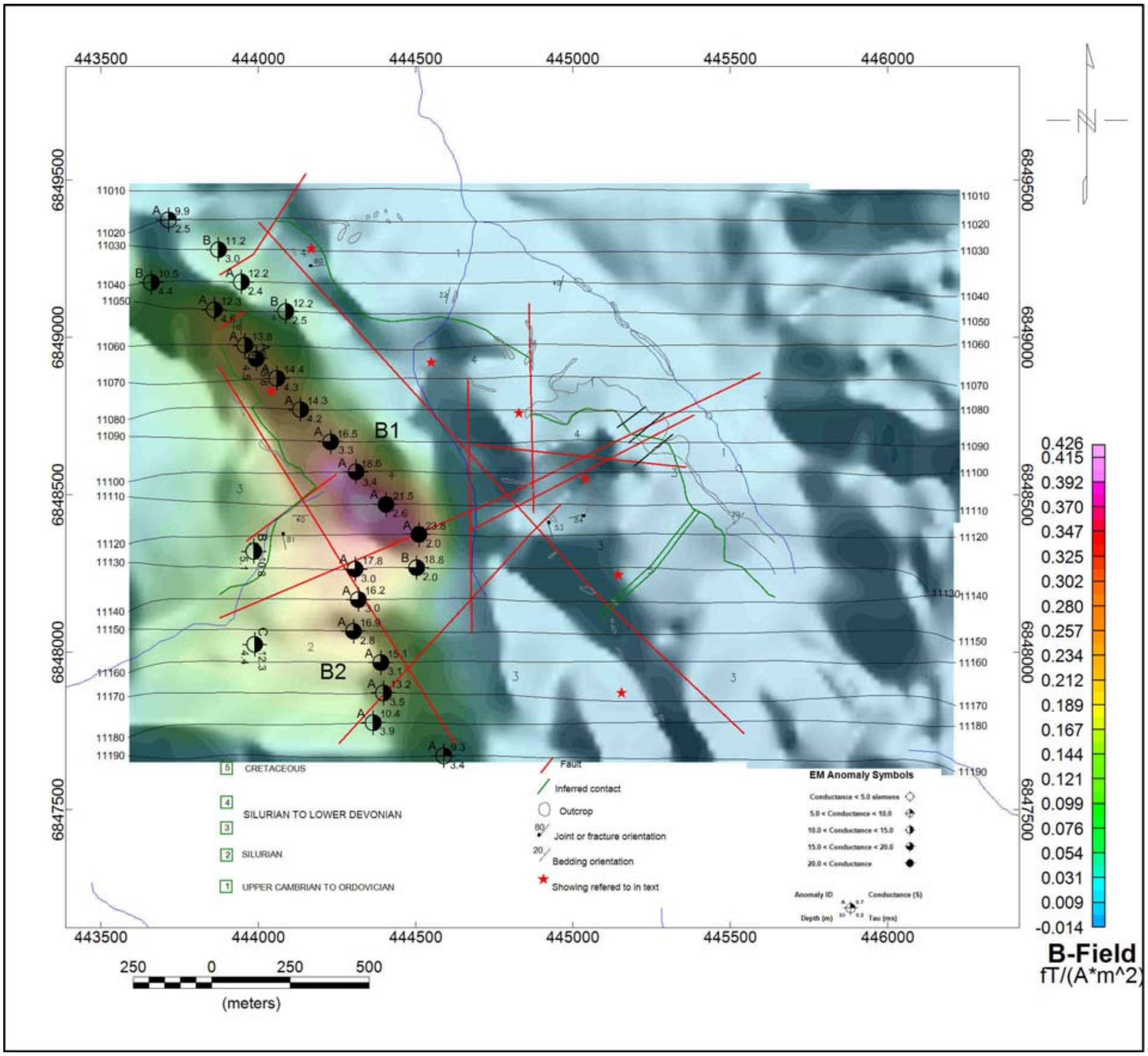



**Fig. 18 Late time B-Field channel image superimposed on the shaded relief of the tilt derivative. The map clearly shows a good correlation of the picked anomalies (bedrock B1) with the NW trending magnetic lineament.**

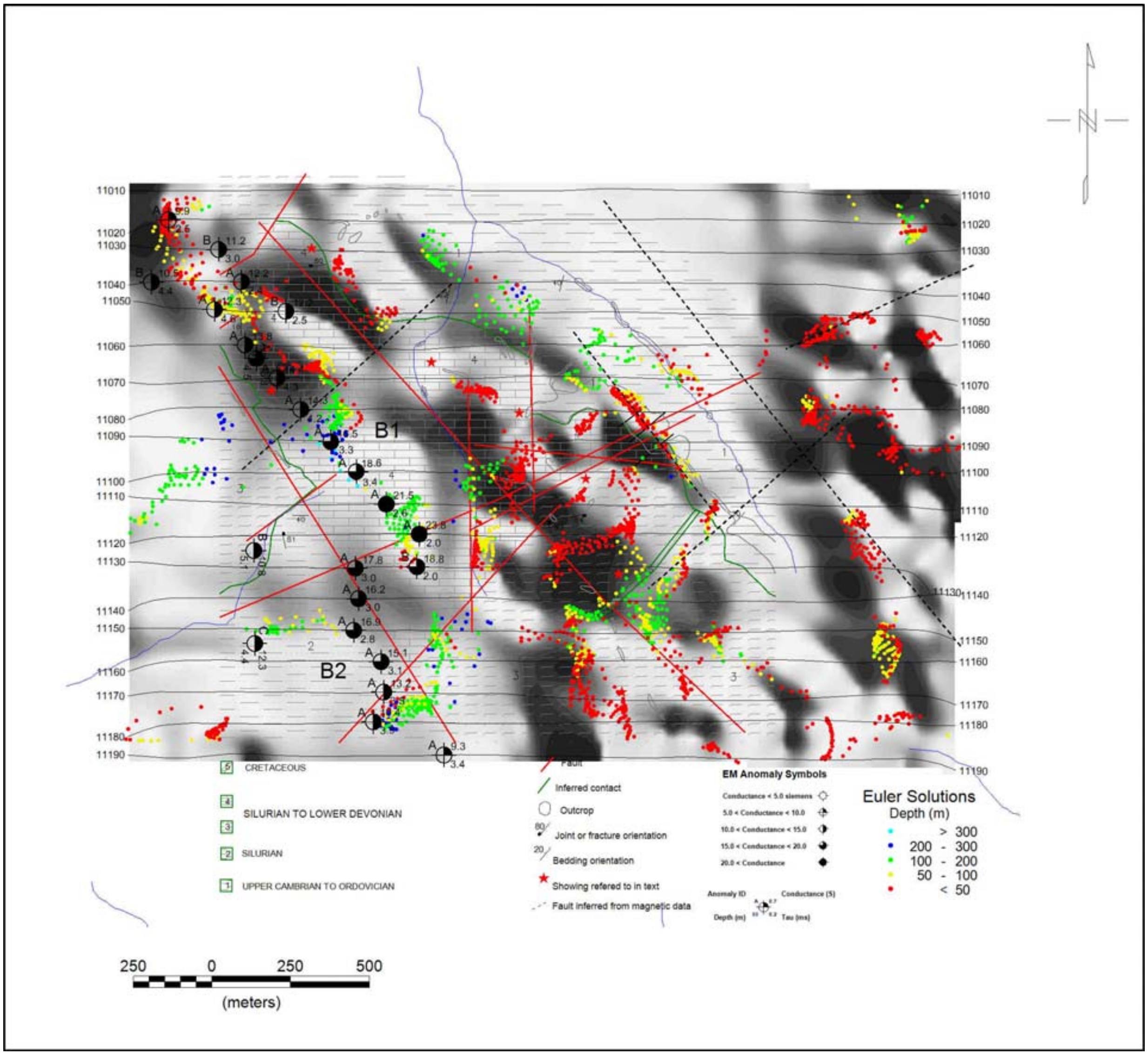



**Fig. 19 Interpretation map showing the results of the magnetic and electromagnetic data analysis. The detected conductive bedrock B1 is associated with deep magnetic sources.**

## 5.4 Selected Anomalies

Several individual anomalies extracted from the described above anomalous zones of interest have been selected for modeling by converting the EM decays into CDIs. The anomalies are located on the following lines: L11050, L11070, L11100, L11110, L11120, L11160 and L11140. The summarized characteristics of the selected anomalies are given in the following table.

| Bedrock /Line | Anomaly ID | Anomaly Type description | Conductor geometry | X- location m | Y- location m | Conductance S | Dip | Dip Azimut | Taumsec |
|---|---|---|---|---|---|---|---|---|---|
| B1/L11050 | A | symmetric broad Double peak | Thick steeply dipping plate | 443860 | 6849089 | 12.3 | SW | NW | 4.6 |
| B1/L11050 | B | symmetric broad Double peak | Thick steeply dipping plate | 444087 | 6849083 | 12.2 | SW | NW | 2.5 |
| B1/L11070 | A | Anti-symmetric broad Single peak | Thick moderately dipping plate | 444058 | 6848870 | 14.4 | SW | NW | 4.3 |
| B1/L11100 | A | Anti-symmetric broad Single peak | Thick moderately dipping plate | 444273 | 6848571 | 18.6 | SW | NW | 3.4 |
| B1/L11110 | A | Anti-symmetric broad Single peak | Thick moderately dipping plate | 444406 | 6848469 | 21.5 | SW | NW | 2.6 |
| B1/L11120 | A | Anti-symmetric broad Single peak | Thick moderately dipping plate | 444510 | 6848374 | 23.8 | SW | NW | 2.0 |
| B2/L11160 | A | Anti-symmetric broad Single peak | Thick moderately dipping plate | 444389 | 6847968 | 15.1 | NS | W | 3.1 |
| B2/L11140 | A | Anti-symmetric broad Single peak | Thick moderately dipping plate | 444317 | 6848168 | 16.2 | NS | W | 3.0 |

Table 1. Summarized results of selected anomalies.

## 5.5 Conductivity Depth Sections

Conductivity depth imaging is considered as one of the important steps in the analysis and interpretation of electromagnetic data. CDI allows providing useful information of the conductivity distribution of the considered cross section. CDIs were performed for the selected lines using the EMflow software (Figs.20a-25b).

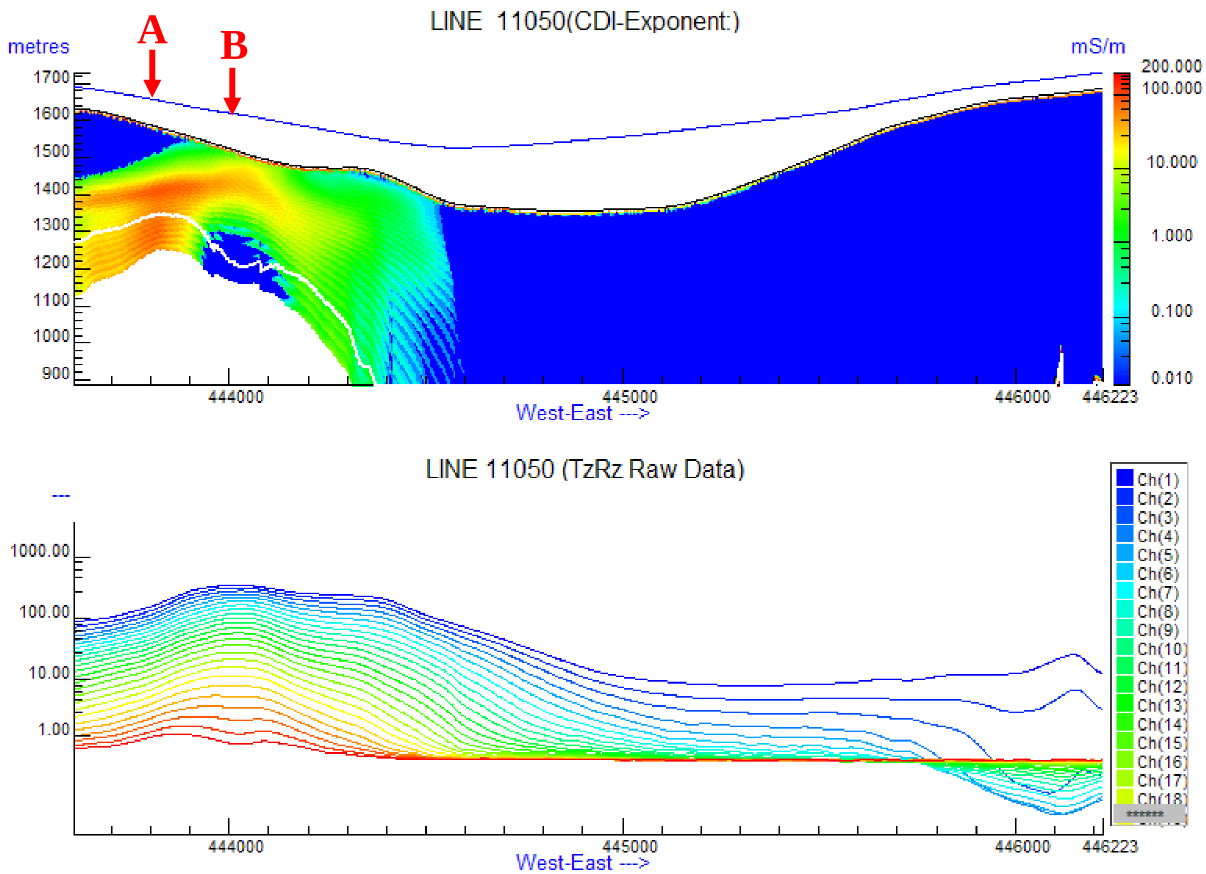
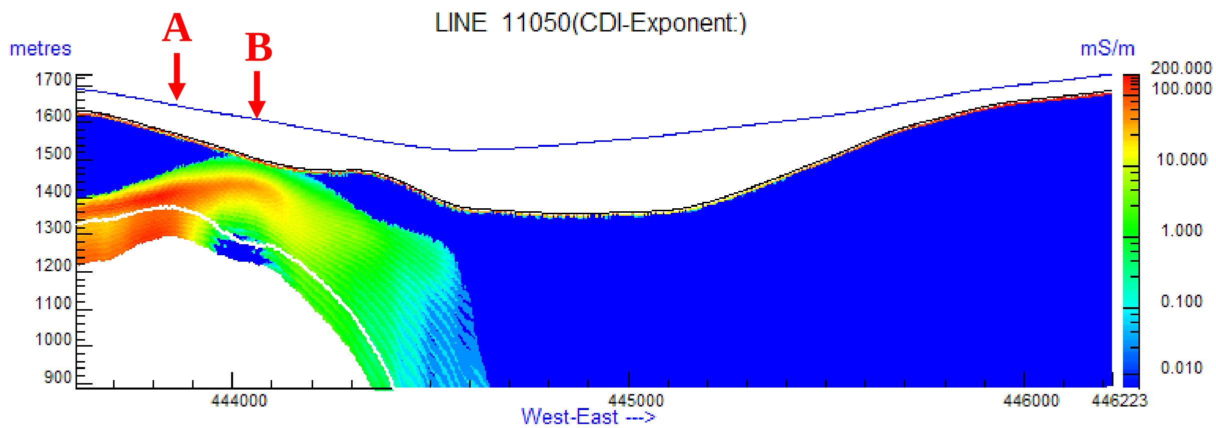



**Fig. 20a shows the CDI section for the line L11050 (dB/dt data). The section indicates the existence of steeply dipping good conductive thick bedrock in the left side of the section. Letters A and B indicate the location of the anomalies on the map.**



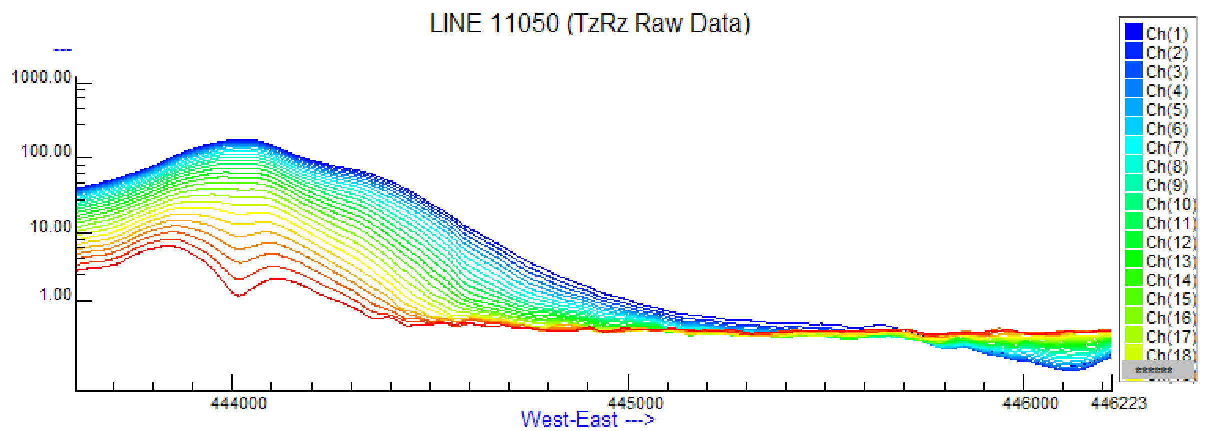
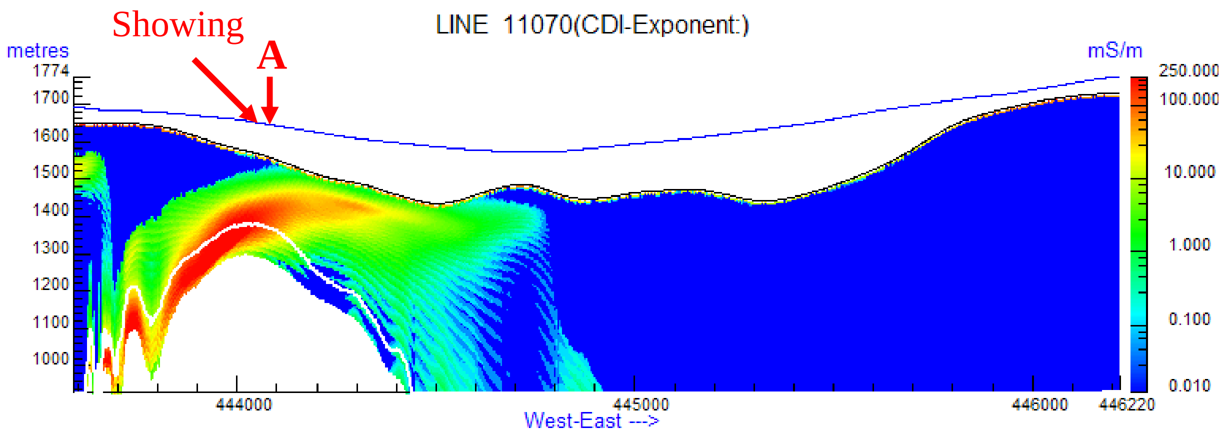




**Fig. 20b shows the CDI section for the line L11050 (B-Field data). The section indicates the existence of steeply dipping good conductive thick bedrock in the left side of the section. Letters A and B indicate the location of the anomalies on the map.**



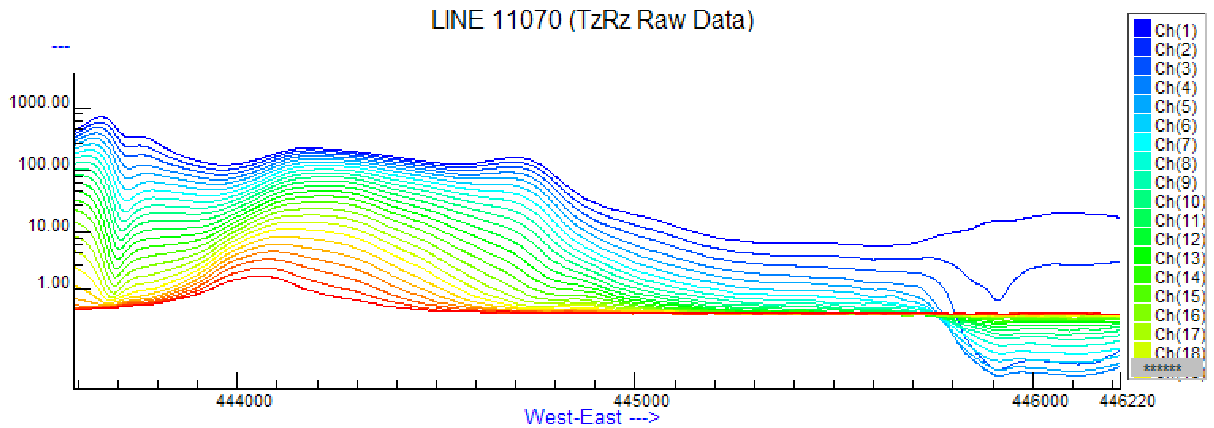




**Fig. 21a shows the CDI section for the line L11070 (dB/dt data). The section depicts the existence of moderately dipping good conductive bedrock in the left side of the section. Note, that the picked anomaly A coincides with the mineralized showing.**

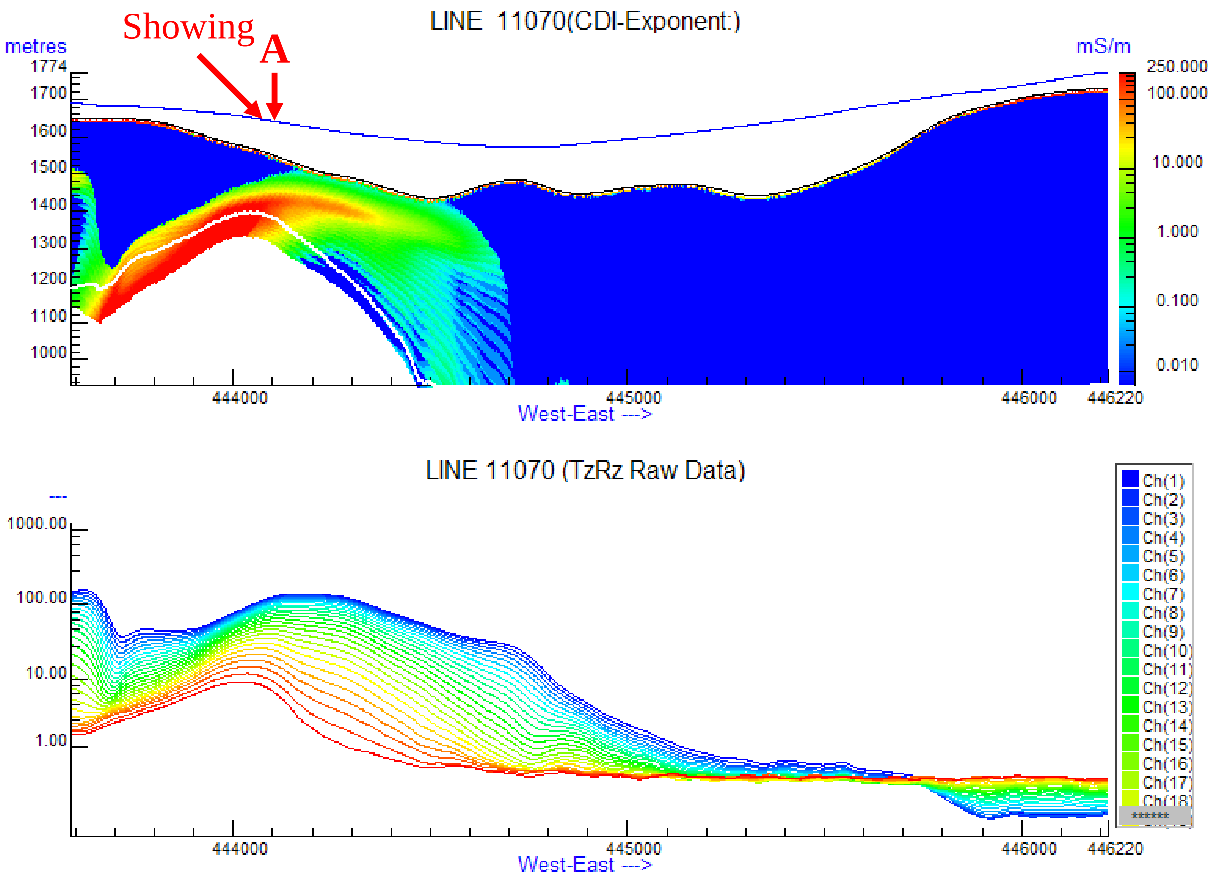



**Fig. 21b shows the CDI section for the line L11070 (B-Field data). The section depicts the existence of moderately dipping good conductive bedrock in the left side of the section. Note, that the picked anomaly A coincides with the mineralized showing.**

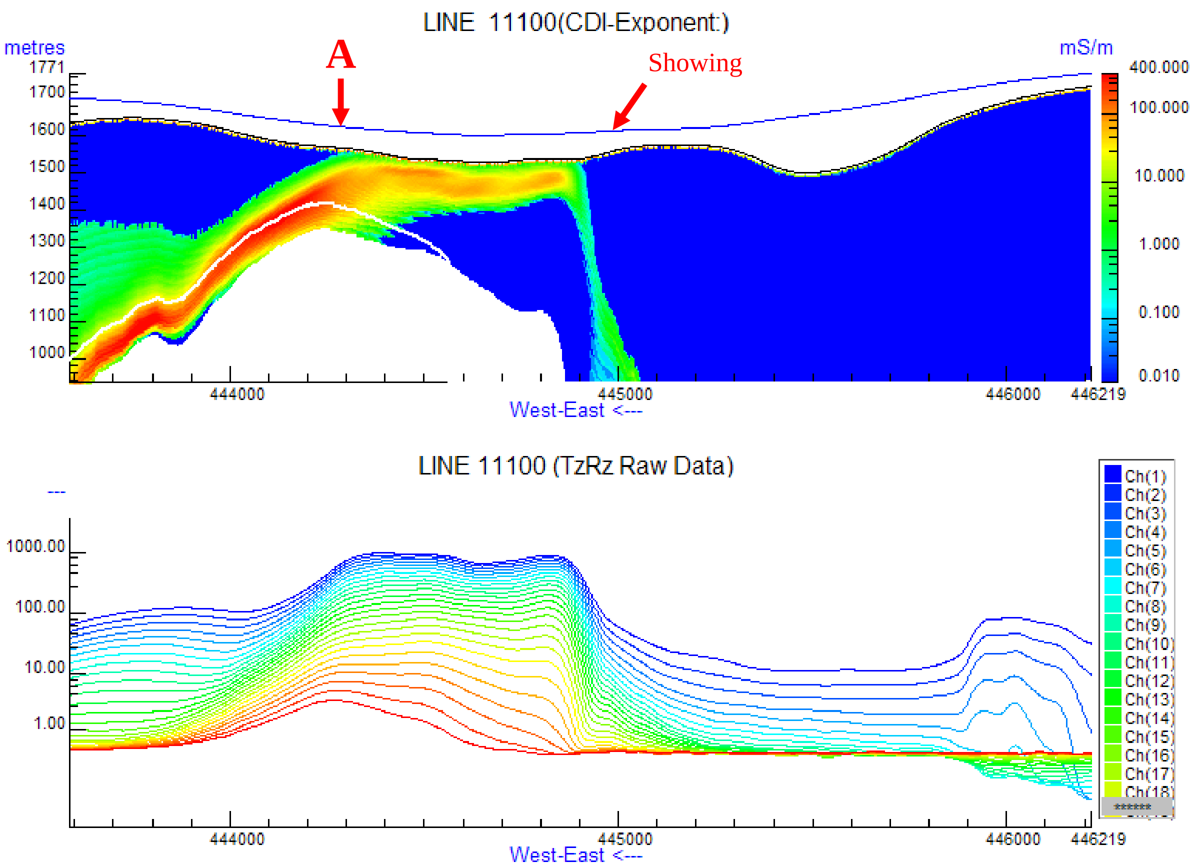



**Fig. 22a shows the CDI section for the line L11100 (dB/dt data). The section highlights the existence of shallowly dipping (centre) and moderately dipping conductive bedrock (to the west). The top of the horizontal portion of the bedrock is at depth less than 100m. Letter A indicates the location of the anomaly on the map. The location of the showing is also indicated.**

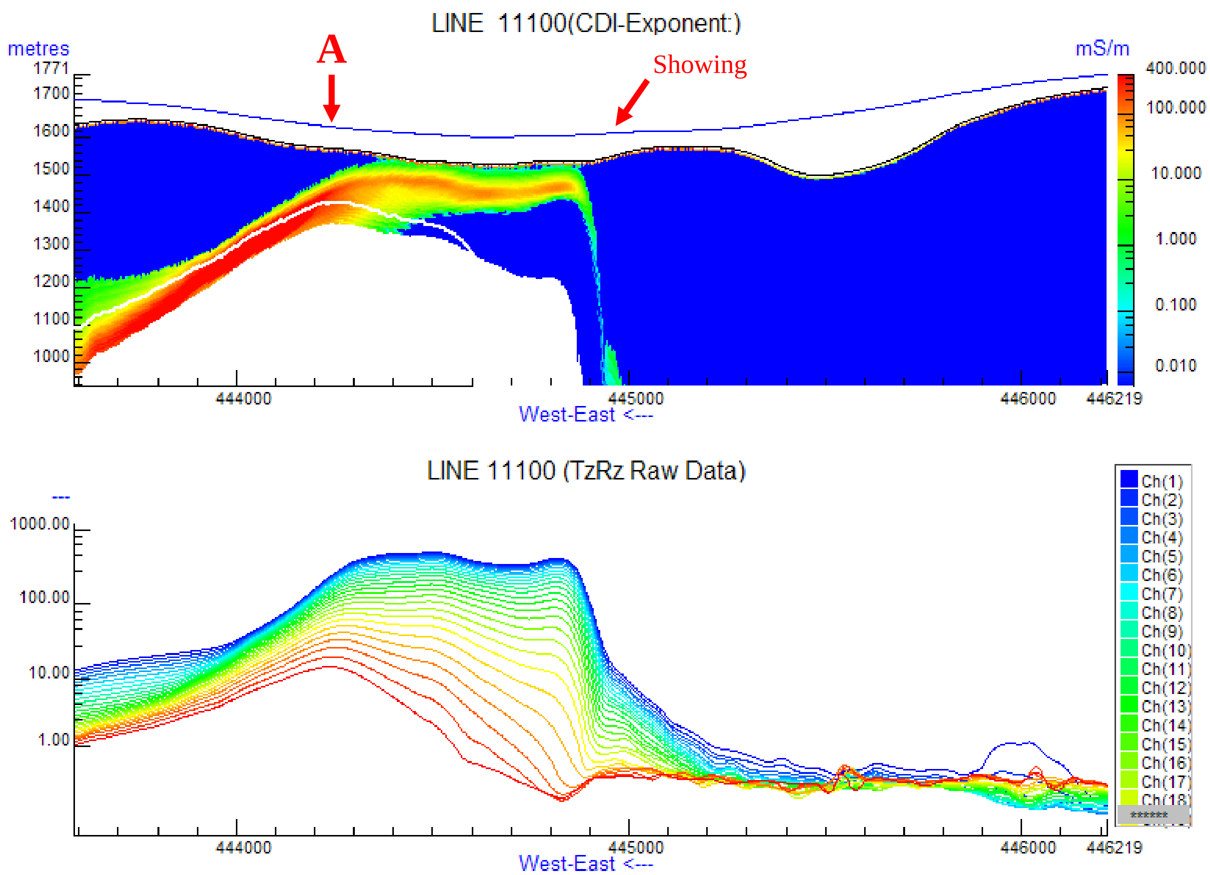
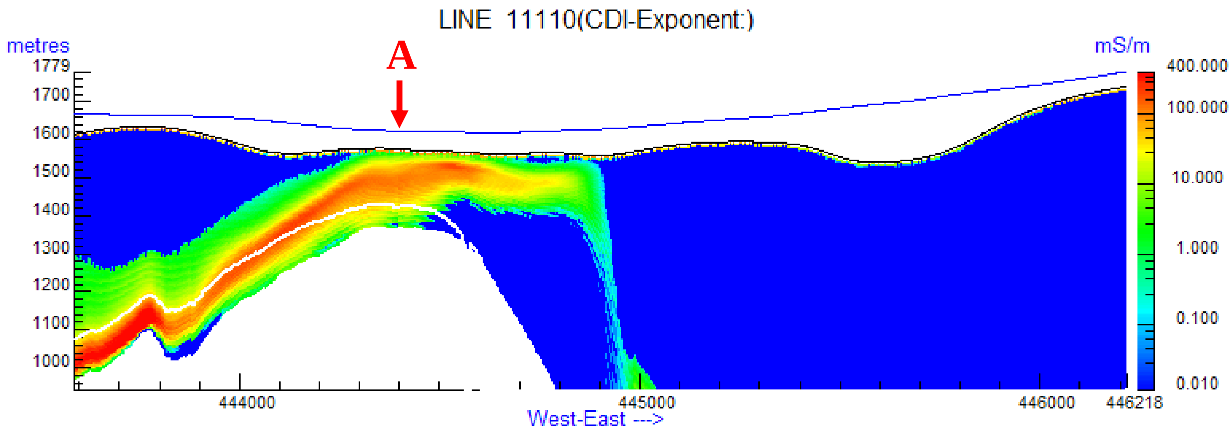



**Fig. 22b shows the CDI section for the line L11100 (B-Field data). The section highlights the existence of shallowly dipping (centre) and moderately dipping conductive bedrock (to the west). The top of the horizontal portion of the bedrock is at depth less than 100m. Letter A indicates the location of the anomaly on the map. The location of the showing is also indicated.**



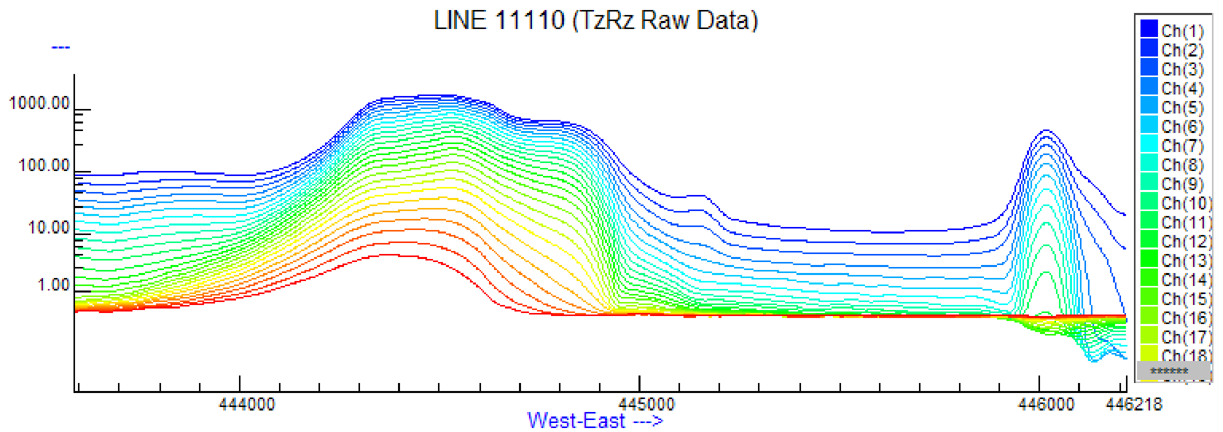




**Fig. 23a shows the CDI section for the line L11110 (dB/dt data). Good conductive bedrock is indicated in the left side of the section (west). The bedrock is moderately dipping (westerly). The top of the conductor is located near the surface (<100m). Letter A indicates the location of the anomaly on the map.**

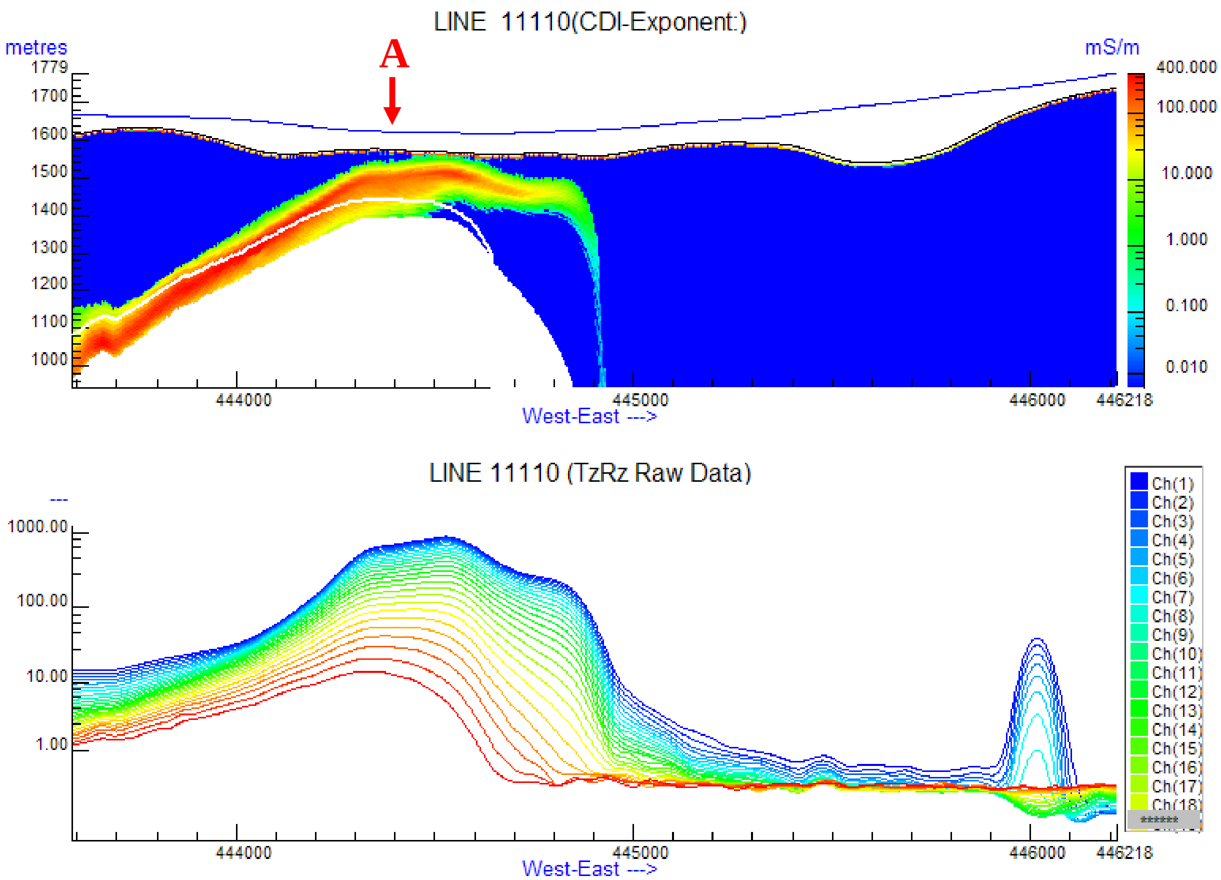



**Fig. 23b shows the CDI section for the line L11110 (B-Field data). Good conductive bedrock is indicated in the left side of the section (west). The bedrock is moderately dipping (westerly). The top of the conductor is located near the surface (<100m). Letter A indicates the location of the anomaly on the map.**

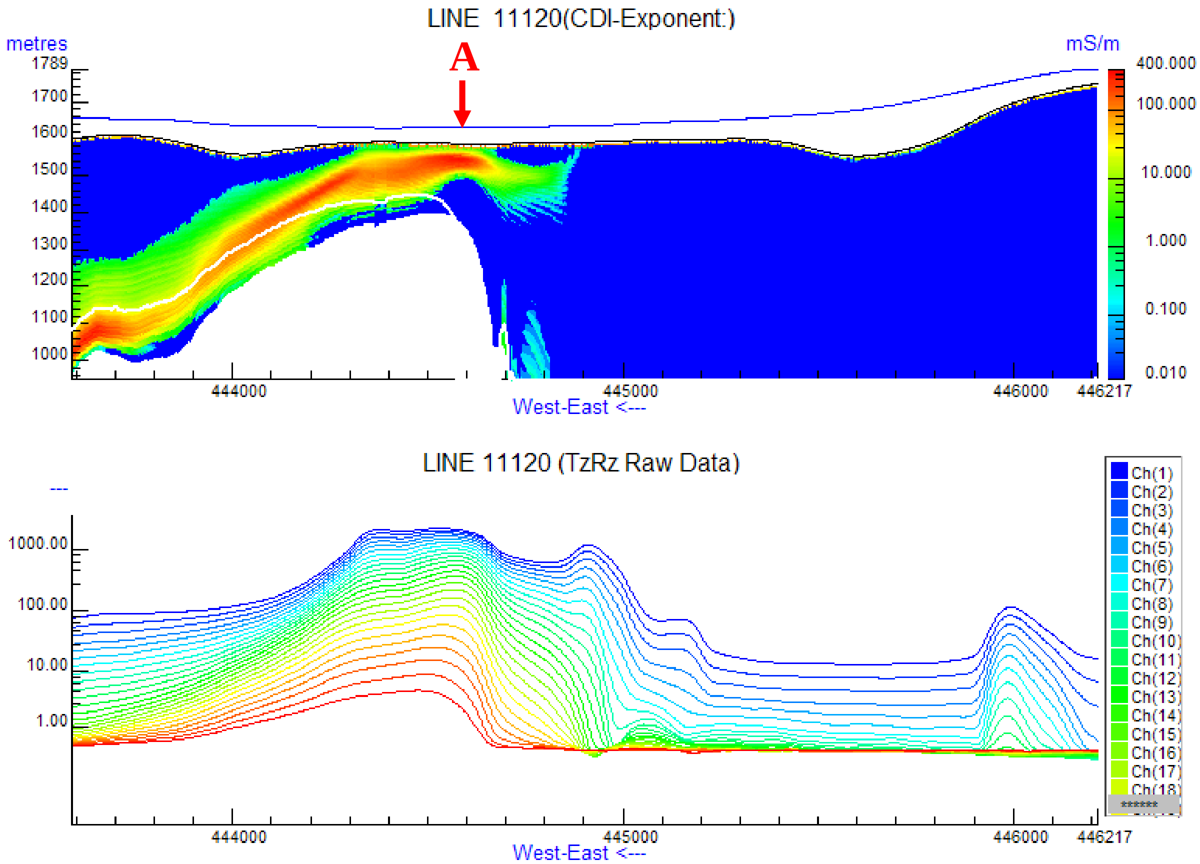



**Fig. 24a shows the CDI section for the line L11120 (dB/dt data). Good conductive bedrock is indicated in the left side of the section (west). The bedrock is moderately dipping (westerly). The top of the conductor is located near the surface (<100m). Letter A indicates the location of the anomaly on the map.**

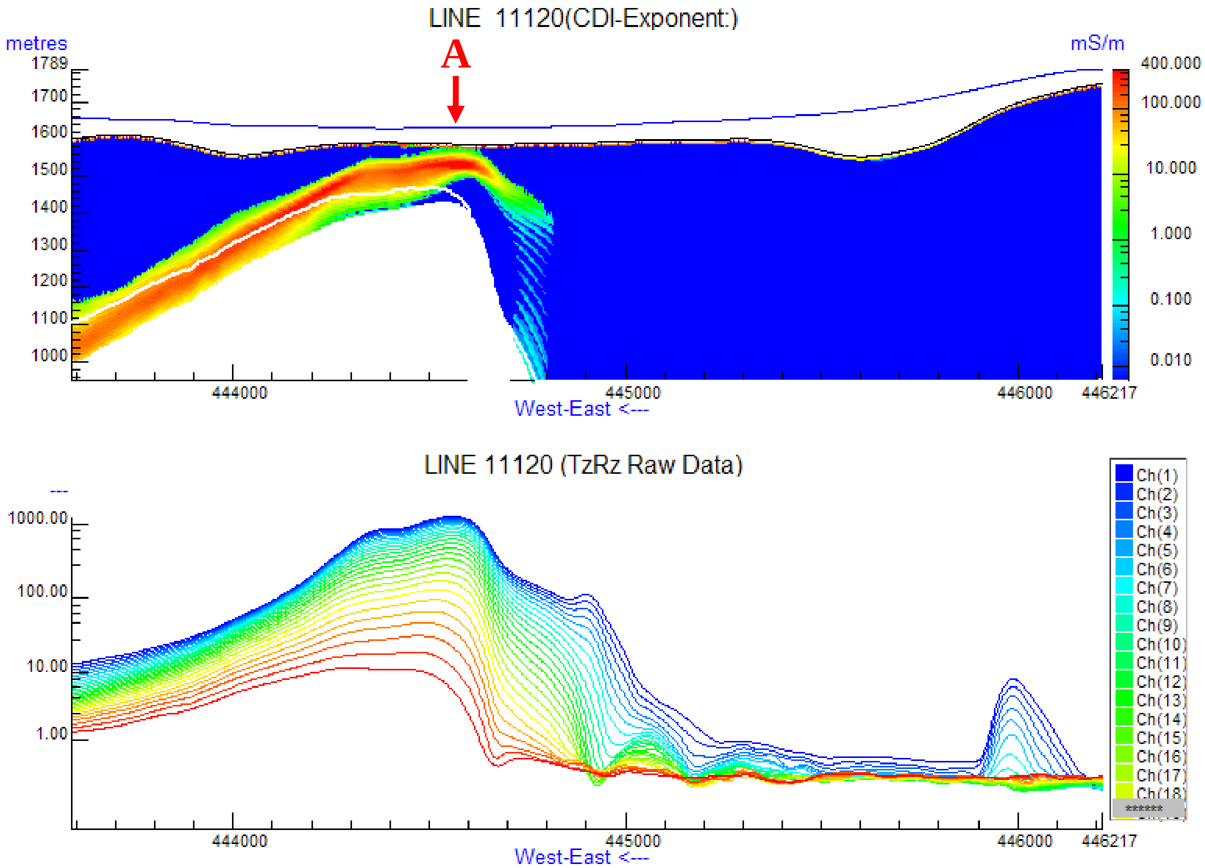



**Fig. 24b shows the CDI section for the line L3200 (B-Field data). Good conductive bedrock is indicated in the left side of the section (west). The bedrock is moderately dipping (westerly). The top of the conductor is located near the surface (<100m). Letter A indicates the location of the anomaly on the map.**

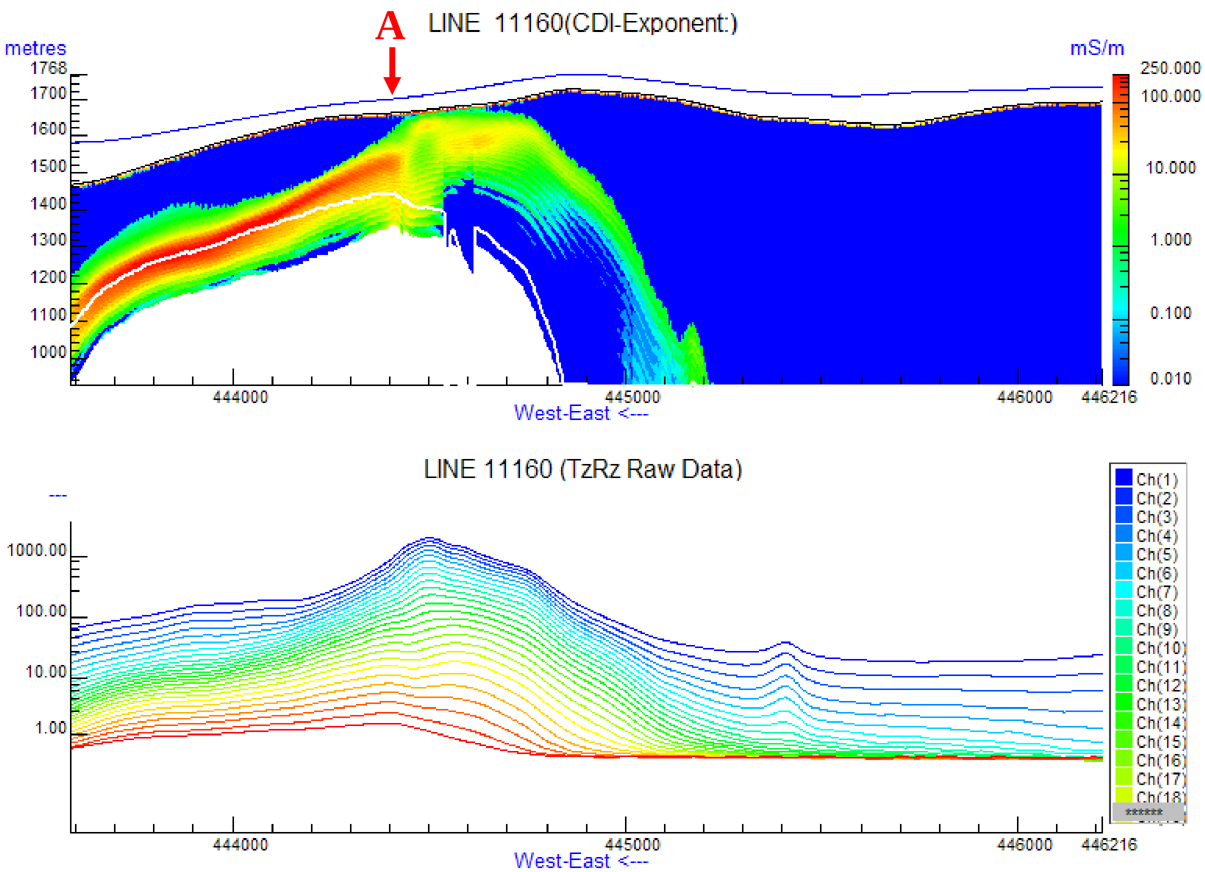



**Fig. 25a shows the CDI section for the line L3180 (dB/dt data). The section highlights the existence of shallowly dipping good conductive bedrock in the left side of the section. Letter A indicates the location of the anomaly of the map.**

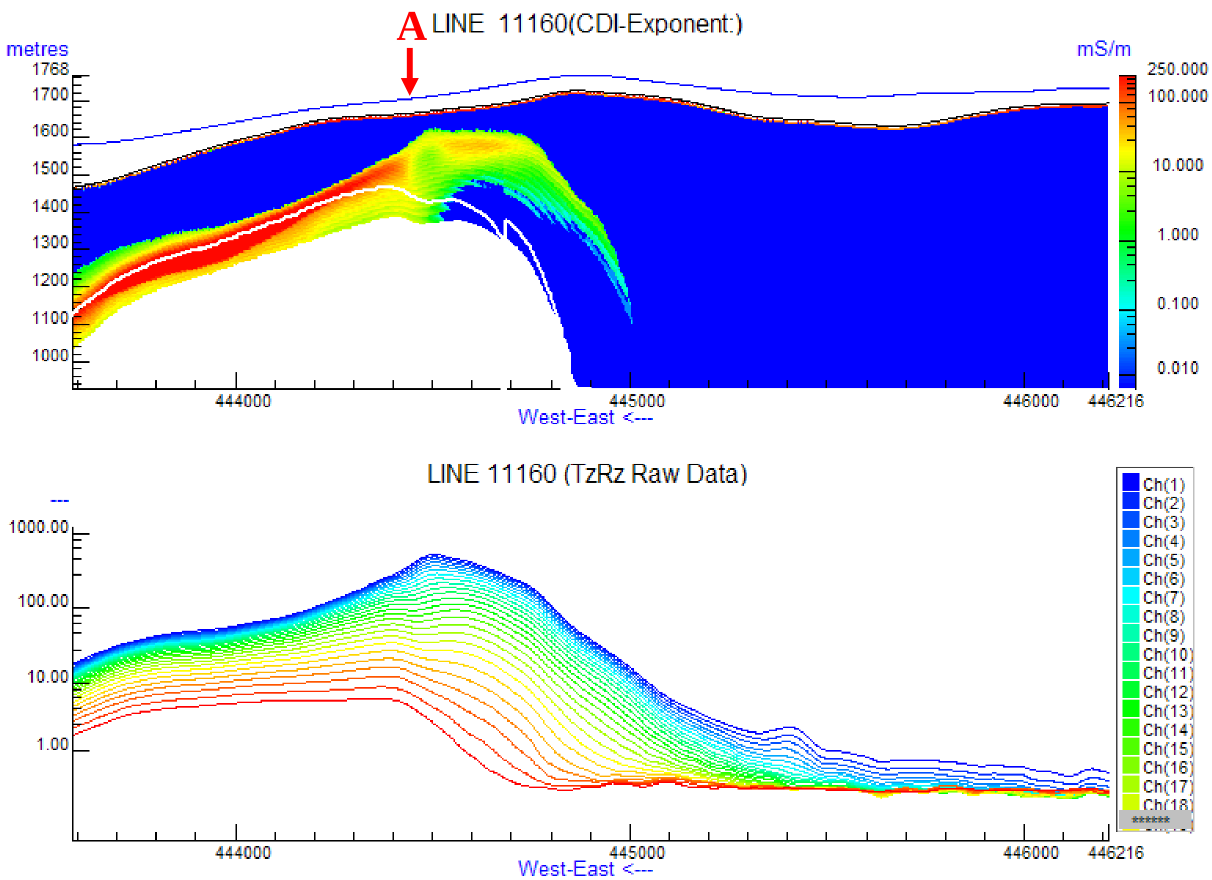



**Fig. 25b shows the CDI section for the line L11160 (B-Field data). The section highlights the existence of shallowly dipping good conductive bedrock in the left side of the section. Letter A indicates the location of the anomaly of the map.**

## *6. CONCLUSIONS AND RECOMMANDATIONS*

The analysis of the magnetic map suggests the existence of northwesterly trending magnetic structures associated with intrusive bodies and controlled by NW trending faulting system. The estimated depths from the Euler deconvolution are mostly ranging from 0 to 200m. The shallowest solutions (<50m) are associated with intrusive bodies outlines and surfacial faults. They are mainly encountered in the centre and east of the block. The magnetic interpretation using different reduced maps suggests the presence of crosscutting (NW and NE) faulting systems.

The VTEM survey reveals the existence of anomalous zone observed in the west of the property over the Silurian and Lower Devonian calcareous and dolomitic formations. Interpretation depicts the existence of NW trending good conductive bedrocks in good correlation with NW trending magnetic sources. CDI sections showed the existing of shallowly to moderately dipping (Southwesterly) of good conductive bedrock at shallow depths (100-200m). It seems from the analysis of data that the most important conductive bedrock is controlled by a NW trending fault with a possible association with graphite or skarnified zone containing massive sulphides mineralization.

The recommendation is therefore to conduct some drilling tests to target potential anomalies particularly those located on the lines 11110 and 11120 to determine the nature of the conductive bedrocks.

Respectfully submitted,

Nasreddine Bournas, PhD, PGeo.
Geotech Ltd.
March, 2008

## 7. REFERENCES

1. J. CHEN, A. RAICHE, AND J. MACNAE, 2000, Inversion of airborne EM data using thin-plate models, SEG 2000 expanded abstracts.

2. STOLZ, E.M.G. AND MACNAE, J.C., 1991 Evaluating EM waveforms by singular-value decomposition of exponential functions. Geophysics, 63, 64-74

3. A.B. REID, J.M. ALLSOP, H. GRANSER, A.J. MILLETT AND I.W. SOMERTON, 1990, Magnetic interpretation in three dimensions using Euler deconvolution, , G*eophysics, 55, 80-91*.

4. Yukon Geological Survey, www.geology.gov.yk.ca

**APPENDIX A**

**VTEM ANOMALY MODELING**

**I. THIN PLATE**

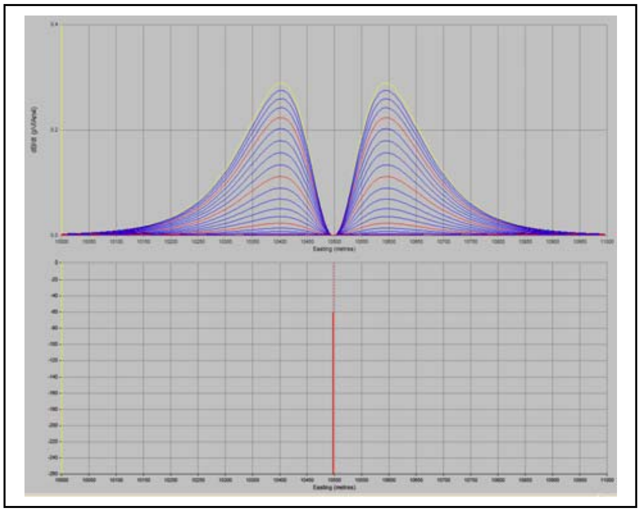


Figure A-1: dB/dt response of a shallow vertical thin plate. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.

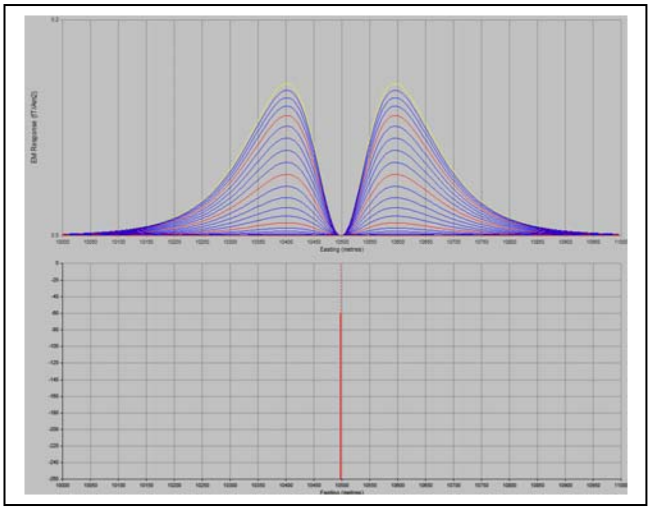


Figure A-2: B-field response of a shallow vertical thin plate. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment.

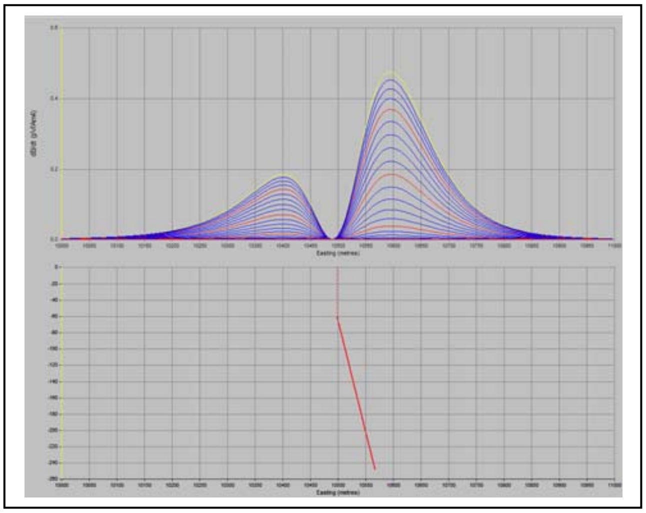


Figure A-3: dB/dt response of a shallow skewed thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.

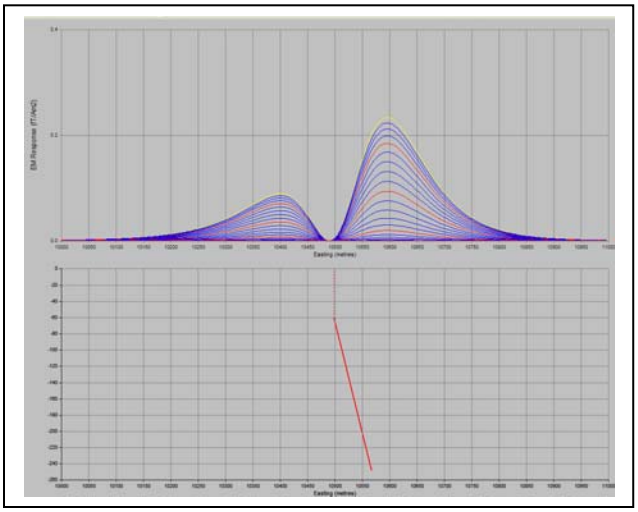


Figure A-4: B-field response of a shallow skewed thin plate. Depth=100 m, CT=20 S.The EM response is normalized by the dipole moment.

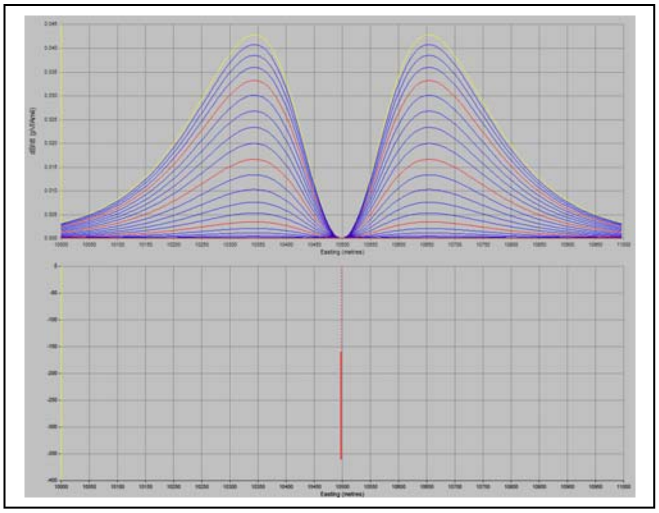


Figure A-5: dB/dt response of a deep vertical thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.

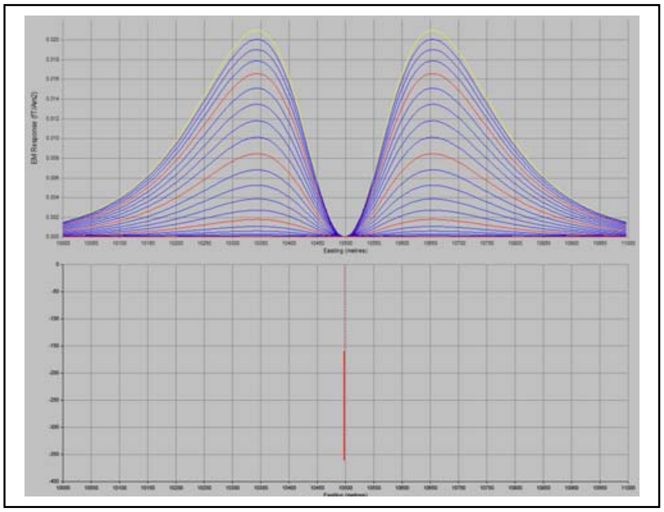


Figure A-6: B-Field response of a deep vertical thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment.

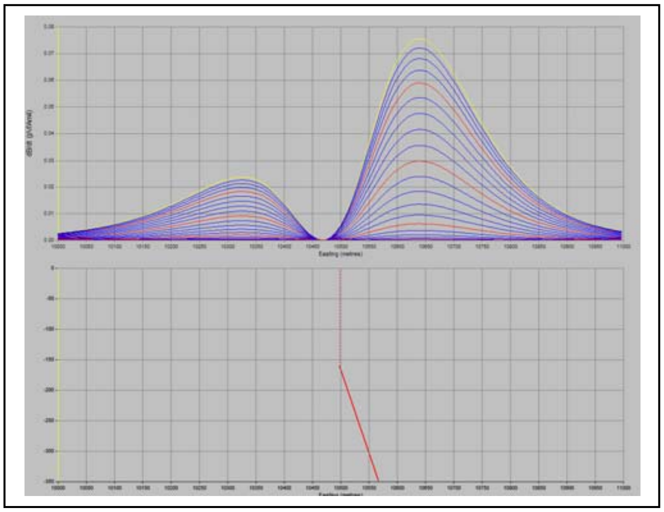


Figure A-7: dB/dt response of a deep skewed thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.

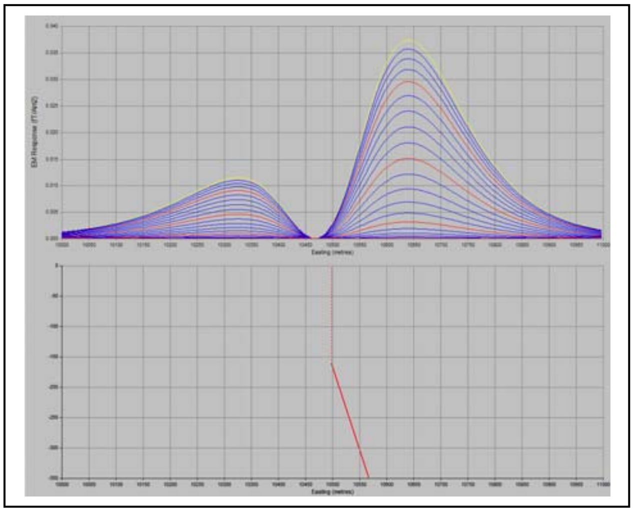


Figure A-8: B-field response of a deep skewed thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment.

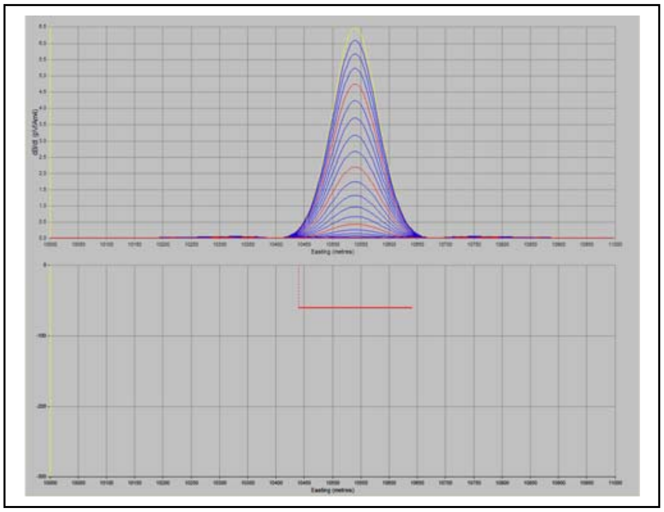


Figure A-9: dB/dt response of a shallow horizontal thin plate. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.

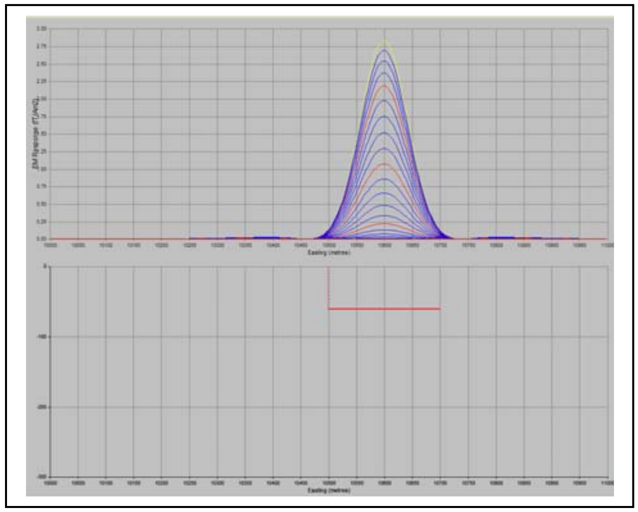


Figure A-10: B-Field response of a shallow horizontal thin plate. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment.

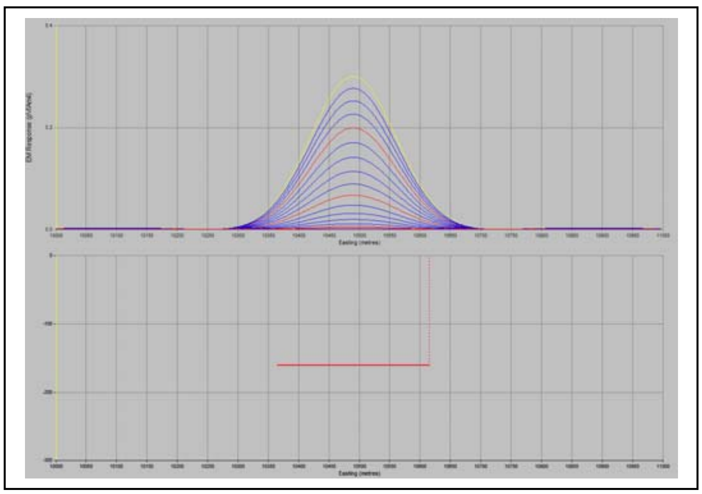


Figure A-11: dB/dt response of a deep horizontal thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.

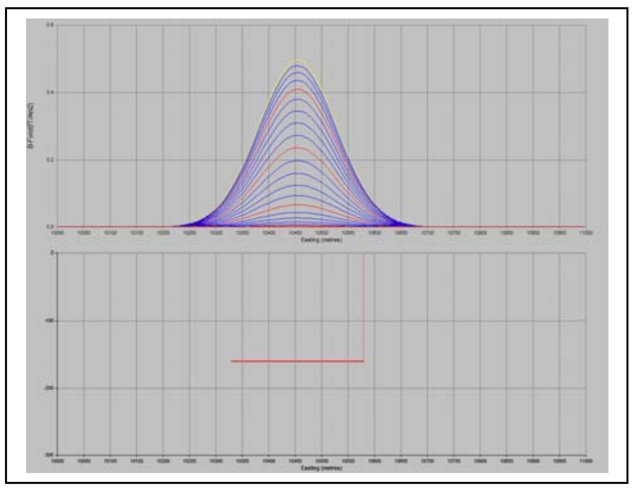


Figure A-12: B-Field response of a deep horizontal thin plate. Depth=200 m, CT=20 S. The EM response is normalized by the dipole moment.

## II. THICK PLATE

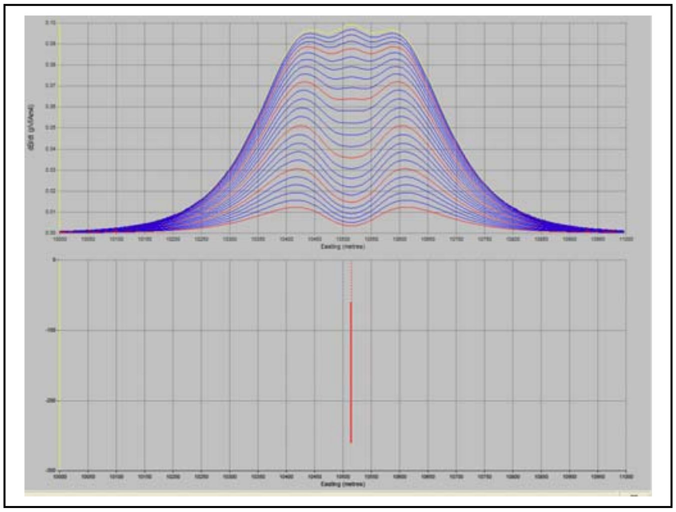


Figure A-13: dB/dt response of a shallow vertical thick plate. Depth=100 m, C=12 S/m, thickness=20 m. The EM response is normalized by the dipole moment and the Rx area.

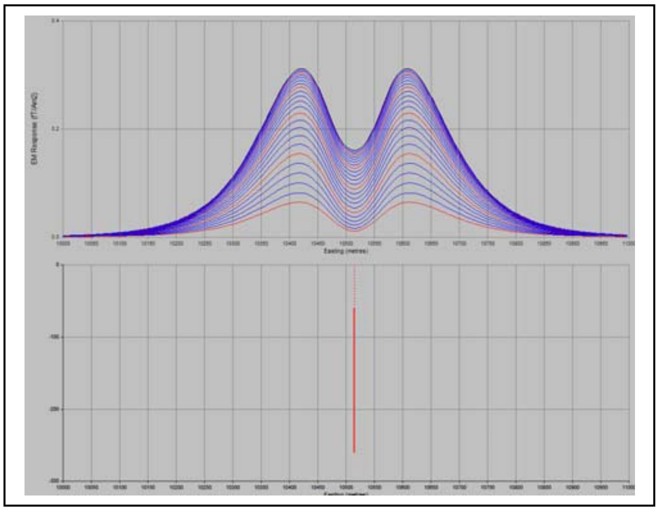


Figure A-14: B-Field response of a shallow vertical thick plate. Depth=100 m, C=12 S/m, thickness= 20 m. The EM response is normalized by the dipole moment.

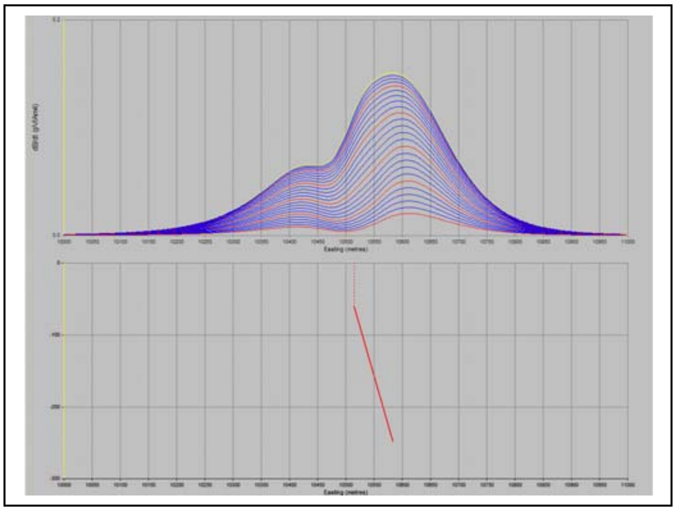


Figure A-15: dB/dt response of a shallow skewed thick plate. Depth=100 m, C=12 S/m, thickness=20 m. The EM response is normalized by the dipole moment and the Rx area.

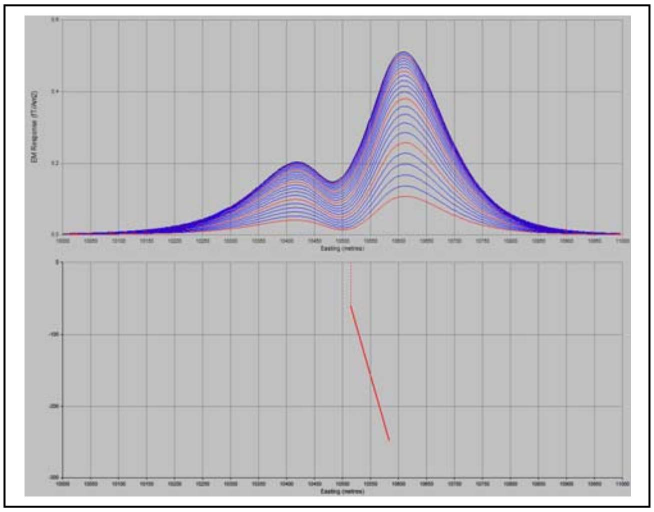


Figure A-16: B-Field response of a shallow skewed thick plate. Depth=100 m, C=12 S/m, thickness=20 m. The EM response is normalized by the dipole moment.

## III. MULTIPLE THIN PLATES

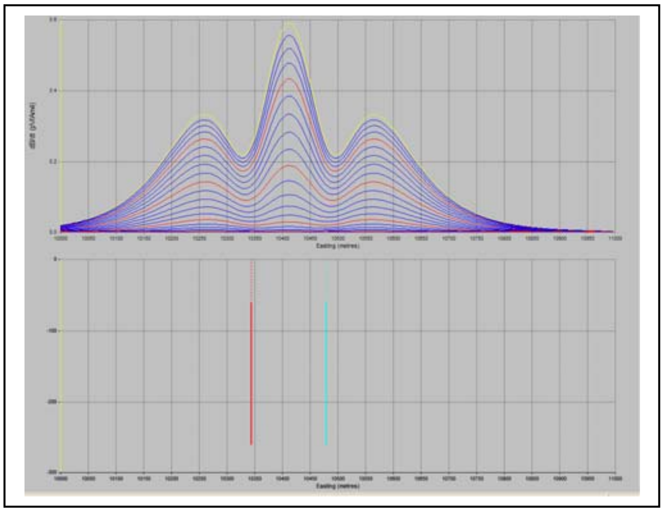


Figure A-17: dB/dt response of two vertical thin plates. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment and the Rx area.

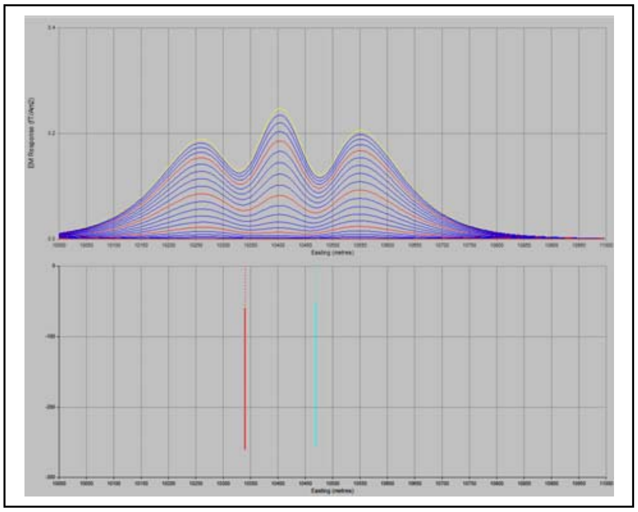


Figure A-18: B-Field response of two vertical thin plates. Depth=100 m, CT=20 S. The EM response is normalized by the dipole moment.

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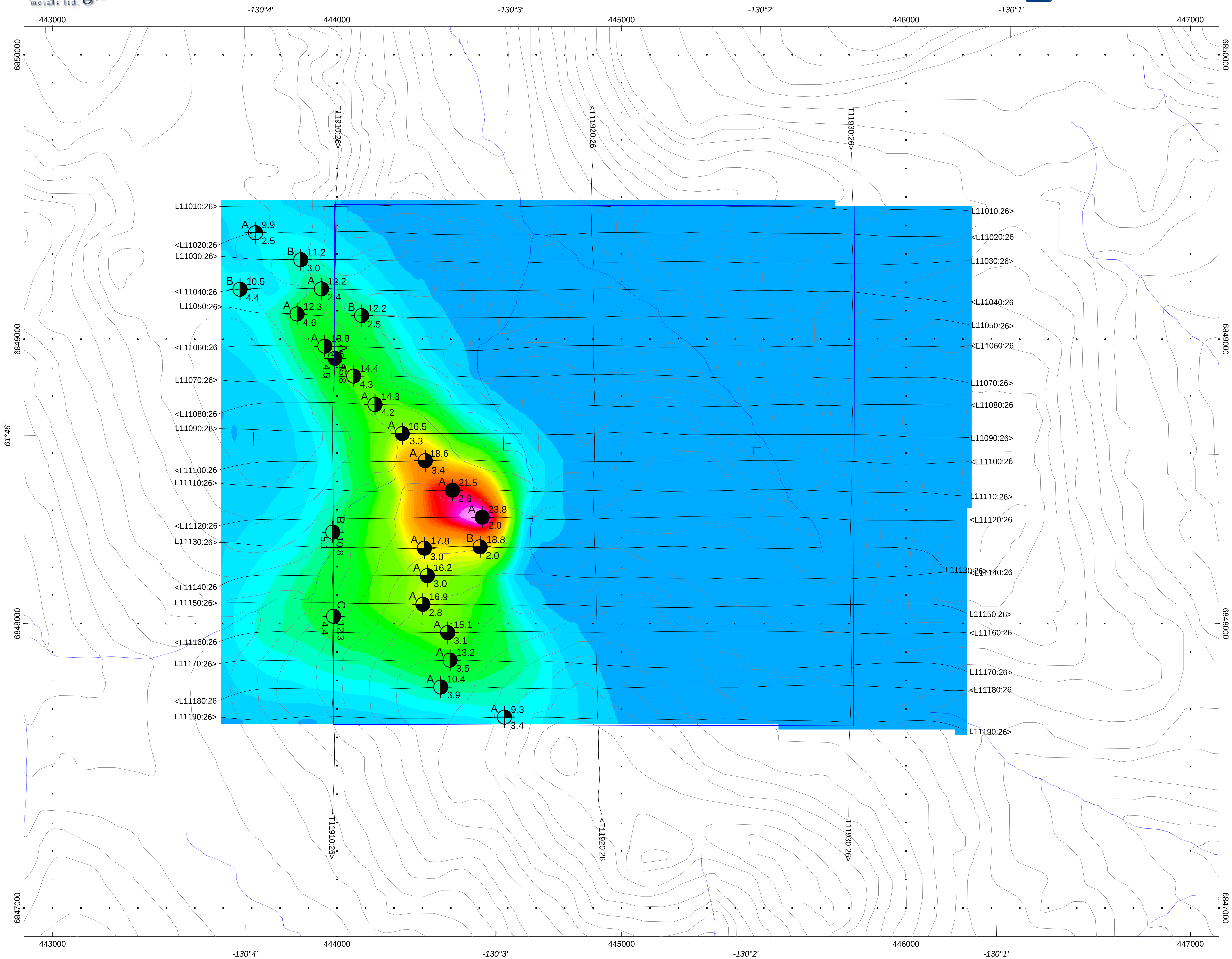


SURVEY SPECIFICATIONS:

Survey date: August 2007
Survey base: Incannu Lodge
Aircraft: AS-350 B3 helicopter, Registration C-GTFX
Nominal Flight Line Spacing: 100 metres
Nominal Flight Line Direction: N 90 E
Nominal Tie Line Spacing: 1000 metres
Nominal Tie Line Direction: N 0 E
Nominal helicopter terrain clearance: 120 metres
EM Loop is 40 metres under helicopter
Magnetic sensor is 15 metres under helicopter

INSTRUMENTS:

Geotech Time Domain Electromagnetic System (VTEM) with concentric Rx/Tx geometry
Transmitter Loop Diameter 26 m, Base Frequency 30 Hz
Dipole Moment: 407,700 NIA
Transmitter Wave Form: Trapezoid, Pulse Width 7.2 ms
Geometrics Optically-pumped,
High Sensitivity Cesium Magnetometer
Magnetometer Resolution 0.02 nT at 10 samples/sec

**Anomaly Symbols**

Conductance < 5.0 siemens
5.0 < Conductance < 10.0
10.0 < Conductance < 15.0
15.0 < Conductance < 20.0
20.0 < Conductance

Anomaly ID — Conductance (S)
Depth (m) — Tau (ms)
Dip (°)

0.180 · 0.176 · 0.171 · 0.166 · 0.162 · 0.157 · 0.152 · 0.148 · 0.143 · 0.138 · 0.134 · 0.129 · 0.124 · 0.120 · 0.115 · 0.110 · 0.105 · 0.101 · 0.096 · 0.091 · 0.087 · 0.082 · 0.077 · 0.073 · 0.068 · 0.063 · 0.059 · 0.054 · 0.049 · 0.045 · 0.040 · 0.035 · 0.031 · 0.026 · 0.021 · 0.017 · 0.012 · 0.007 · 0.003 · -0.002

**6.578 dB/dt Channel**
pV/(A*m^4)

**Legend:**

Topographic contour
Lakes, Rivers

Scale 1:10000

100 0 100 200 300 400 500
(meters)

*WGS 84 / UTM zone 9N*

Strategic Metals Ltd.
Jake Property
Yukon, Canada

Geotech VTEM System
**EM picked anomalies & late Time dB/dt channel (6.578 ms)**

**Flown and processed by Geotech Ltd.**
**245 Industrial Parkway North,**
**Aurora, Ontario, Canada L4G 4C4**
www.geotech.ca

***March 2008***

7067

Strategic Metals Ltd.

Generating Value

GEOTECH LTD.

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INSTRUMENTS:
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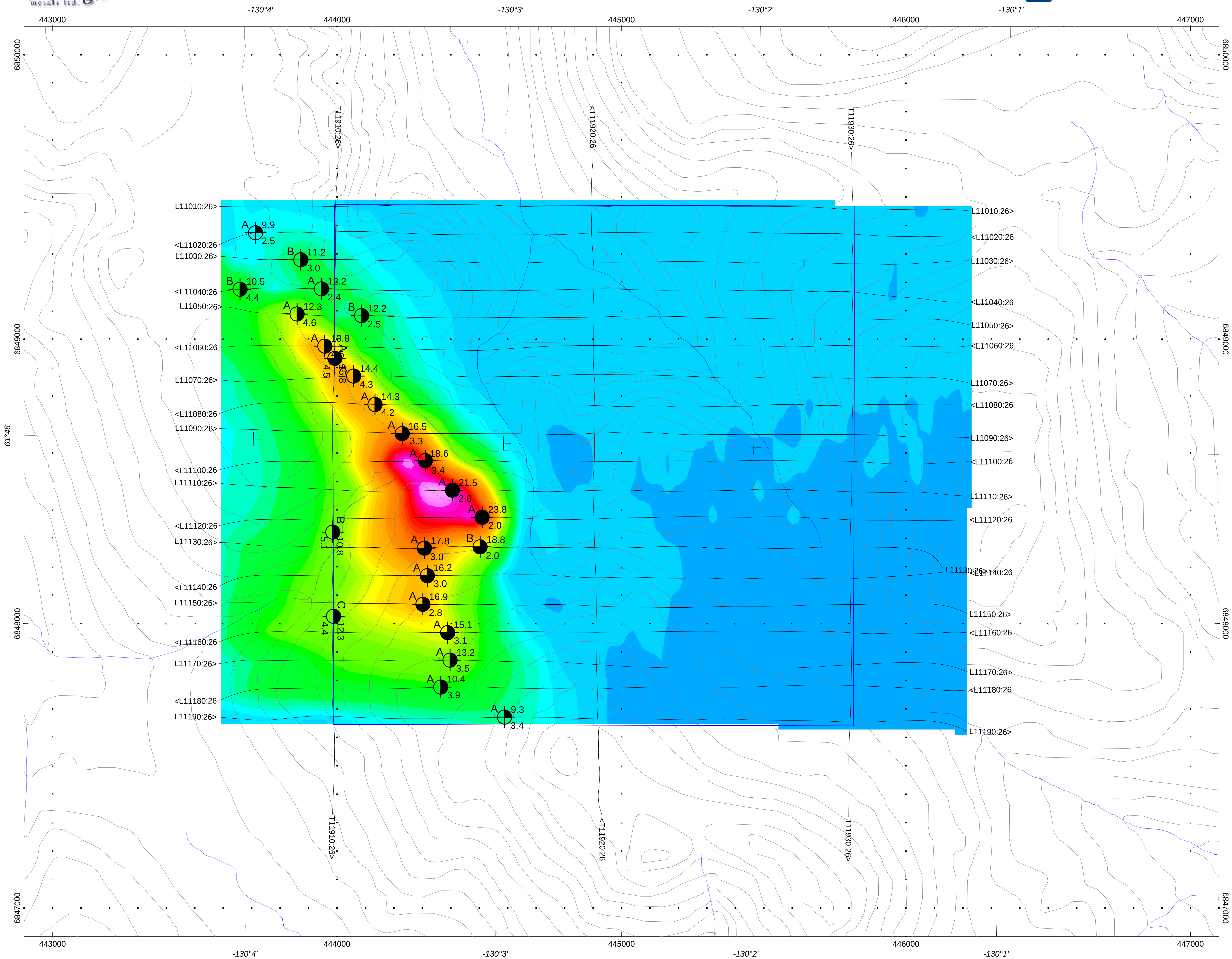
- Dipole Moment: 407,700 NIA
- Transmitter Wave Form: Trapezoid, Pulse Width 7.2 ms
- Geometrics Optically-pumped, High Sensitivity Cesium Magnetometer
- Magnetometer Resolution 0.02 nT at 10 samples/sec




**Anomaly Symbols**

- Conductance < 5.0 siemens
- 5.0 < Conductance < 10.0
- 10.0 < Conductance < 15.0
- 15.0 < Conductance < 20.0
- 20.0 < Conductance

Anomaly ID — Conductance (S) — Depth (m) — Tau (ms) — Dip (°)

0.426, 0.415, 0.404, 0.392, 0.381, 0.370, 0.359, 0.347, 0.336, 0.325, 0.313, 0.302, 0.291, 0.280, 0.268, 0.257, 0.246, 0.234, 0.223, 0.212, 0.200, 0.189, 0.178, 0.167, 0.155, 0.144, 0.133, 0.121, 0.110, 0.099, 0.088, 0.076, 0.065, 0.054, 0.042, 0.031, 0.020, 0.009, -0.003, -0.014

**6.578 B-Field Channel**
fT/(A*m^2)

**Legend:**

Topographic contour
Lakes, Rivers

Scale 1:10000

100 0 100 200 300 400 500
(meters)

*WGS 84 / UTM zone 9N*

# Strategic Metals Ltd.
# Jake Property
# Yukon, Canada

## Geotech VTEM System
## EM picked anomalies & late Time B-field channel (6.578 ms)

**Flown and processed by Geotech Ltd.**
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www.geotech.ca

***March 2008***

7067

Generating Value

GEOTECH LTD.

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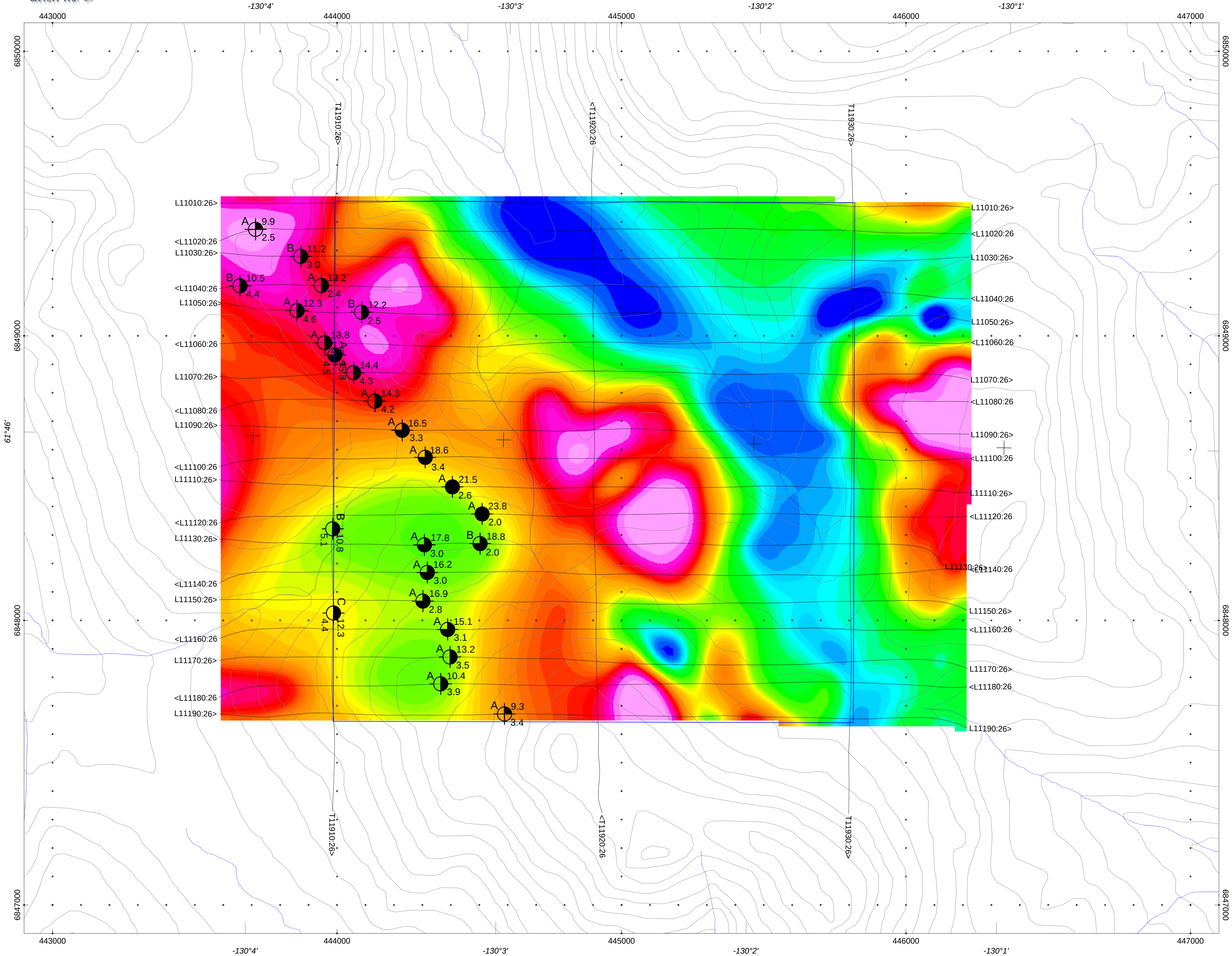
Dipole Moment: 407,700 NIA
Transmitter Wave Form: Trapezoid, Pulse Width 7.2 ms
Geometrics Optically-pumped, High Sensitivity Cesium Magnetometer
Magnetometer Resolution 0.02 nT at 10 samples/sec




**Anomaly Symbols**

Conductance < 5.0 siemens
5.0 < Conductance < 10.0
10.0 < Conductance < 15.0
15.0 < Conductance < 20.0
20.0 < Conductance

Anomaly ID
Conductance (S)
Depth (m)
Tau (ms)
Dip (°)

Vertical gradient
nT/m

**Legend:**

Topographic contour
Lakes, Rivers

Scale 1:10000

(meters)

WGS 84 / UTM zone 9N

Strategic Metals Ltd.
Jake BlocK
Yukon, Canada

Geotech VTEM System
**Vertical gradient of TMI**

**Flown and processed by Geotech Ltd.**
**245 Industrial Parkway North,**
**Aurora, Ontario, Canada L4G 4C4**
www.geotech.ca

***March 2008***

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Strategic Metals Ltd.

Generating Value

GEOTECH LTD.

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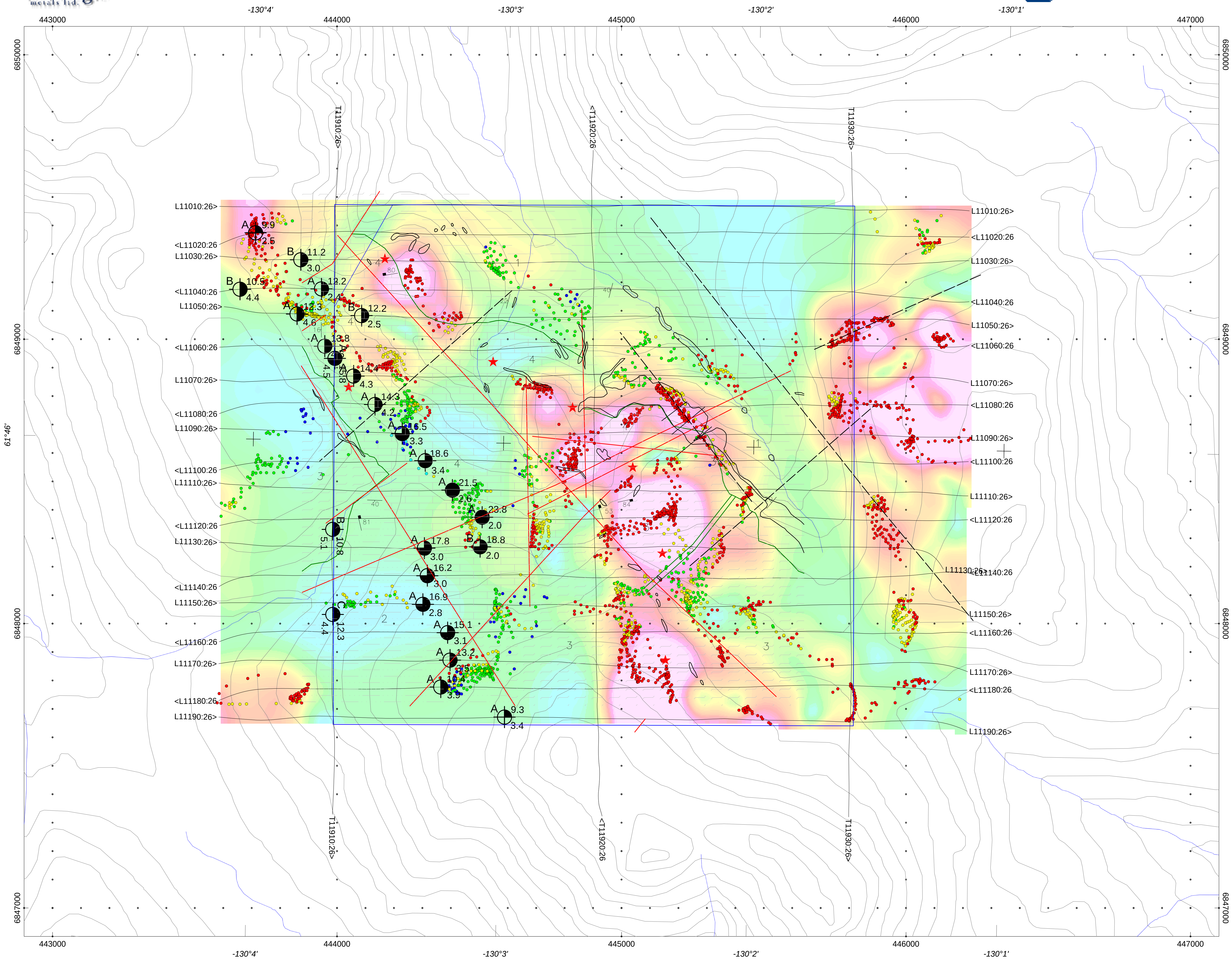
- Geometrics Optically-pumped, High Sensitivity Cesium Magnetometer
- Magnetometer Resolution 0.02 nT at 10 samples/sec




TG nT/m: 3.441, 1.504, 1.259, 1.113, 1.013, 0.930, 0.856, 0.782, 0.719, 0.658, 0.599, 0.533, 0.474, 0.412, 0.347, 0.270, 0.192, 0.102, -0.010, -0.196, 0.043

Euler Solutions
Depth (m)
- > 300
- 200 - 300
- 100 - 200
- 50 - 100
- < 50

Depth Histogram

EM Anomaly Symbols
- Conductance < 5.0 siemens
- 5.0 < Conductance < 10.0
- 10.0 < Conductance < 15.0
- 15.0 < Conductance < 20.0
- 20.0 < Conductance

Anomaly ID, Conductance (S), Depth (m), Tau (ms), Dip (°)

CRETACEOUS
- 5 Felsic to intermediate and quartz-feldspar dykes

SILURIAN TO LOWER DEVONIAN
- 4 Calcareous to dolomitic, graphitic siltstone, graphitic shale/slate, laminated mudstone, sucrosic dolostone, dolomitized calc-arenite, silty and sandy dolostone, orthoquartzite
- 3 Laminated to sucrosic dolostone, shaly siltstone and assorted pelitic and impure quartzitic sediments

SILURIAN
- 2 Dolomitic siltstone and silty dolostone, shaly siltstone and assorted pelitic and impure quartzitic sediments

1 UPPER CAMBRIAN TO ORDOVICIAN
Orange-brown to grey weathering slate, phyllite, siliceous shale, calcareous to dolomitic phyllite, chert, greywacke

- Fault
- Inferred contact
- Outcrop
- 80 Joint or fracture orientation
- 20 Bedding orientation
- Showing
- Fault inferred from magnetic data

Scale 1:10000
100 0 100 200 300 400 500
(meters)
WGS 84 / UTM zone 9N

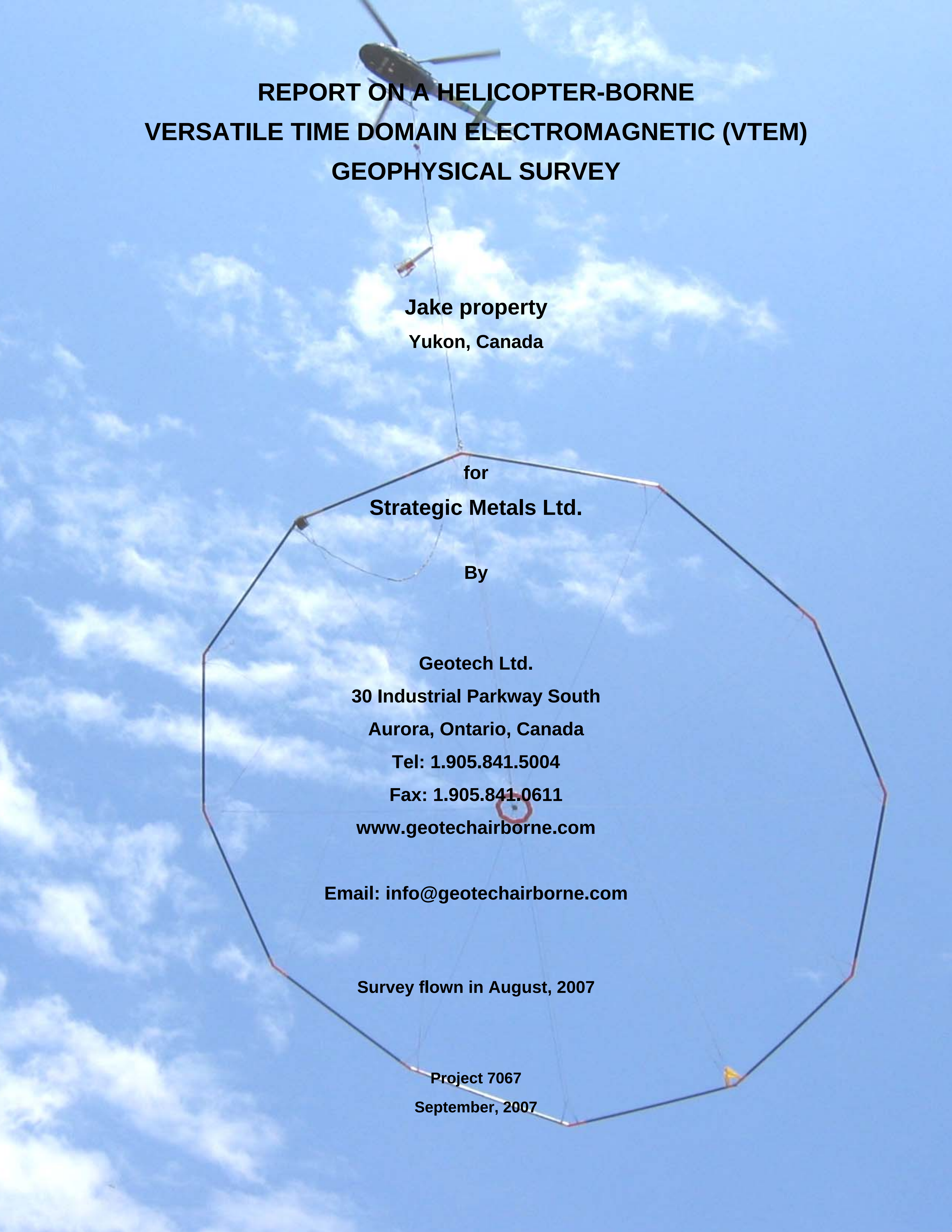
# Strategic Metals Ltd.
# Jake BlocK
# Yukon, Canada

Geotech VTEM System
## INTERPRETATION MAP

**Flown and processed by Geotech Ltd.**
**245 Industrial Parkway North,**
**Aurora, Ontario, Canada L4G 4C4**
www.geotech.ca

***March 2008***

7067



# REPORT ON A HELICOPTER-BORNE VERSATILE TIME DOMAIN ELECTROMAGNETIC (VTEM) GEOPHYSICAL SURVEY

**Jake property**

**Yukon, Canada**

**for**

**Strategic Metals Ltd.**

**By**


**Geotech Ltd.**

**30 Industrial Parkway South**

**Aurora, Ontario, Canada**

**Tel: 1.905.841.5004**

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**Survey flown in August, 2007**

**Project 7067**

**September, 2007**

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**APPENDICES**

REPORT ON A HELICOPTER-BORNE
VERSATILE TIME DOMAIN ELECTROMAGNETIC SURVEY

Jake property, Yukon, Canada

## Executive Summary

On August 7th, 2007, Geotech Ltd. carried out a helicopter-borne geophysical survey for Strategic Metals Ltd. over one block in Yukon, Canada.

Principal geophysical sensors included a versatile time domain electromagnetic (VTEM) system and a cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter. A total of 46 line-km were flown.

In-field data processing involved quality control and compilation of data collected during the acquisition stage, using the in-field processing centre established in Incannu Lodge, Yukon. Preliminary and final data processing, including generation of final digital data products were done at the office of Geotech Ltd. in Aurora, Ontario.

The processed survey results are presented as electromagnetic stacked profiles and total magnetic intensity grid.

Digital data includes all electromagnetic and magnetic products plus positional, altitude and raw data.

# 1. INTRODUCTION

## 1.1 General Considerations

These services are the result of the Agreement made between Geotech Ltd. and Archer Cathro & Associates to perform a helicopter-borne geophysical survey over one block located in Yukon, Canada.

66 line-km of geophysical data were acquired during the survey.

Bill Wengzynowski, acted on behalf of Strategic Metals Ltd. during data acquisition and data processing phases of this project.

The survey block is as shown in Appendix A.

The crew was based in Incannu Lodge, Yukon for the acquisition phase of the survey, as shown in Section 2 of this report.

The helicopter was based at the Incannu Lodge for the duration of the survey. Survey flying was completed on August 7$^{th}$, 2007. Preliminary data processing was carried out daily during the acquisition phase of the project. Final data presentation and data archiving was completed in the Aurora office of Geotech Ltd. in September, 2007.

## 1.2. Survey and System Specifications

The survey block was flown at nominal traverse line spacing of 100 metres, at east to west direction. Tie lines were flown perpendicular to traverse lines.

Where possible, the helicopter maintained a mean terrain clearance of 120 metres, which translated into an average height of 85 metres above ground for the bird-mounted VTEM system and 105 metres for the magnetic sensor.

The survey was flown using an Astar B3 helicopter, registration C-GTFX. The helicopter was operated by TRK helicopters. Details of the survey specifications may be found in Section 2 of this report.

### *1.3. Data Processing and Final Products*

Data compilation and processing were carried out by the application of Geosoft OASIS Montaj and programs proprietary to Geotech Ltd.

A database, grids and maps of final products were presented to Strategic Metals Ltd.

The survey report describes the procedures for data acquisition, processing, final image presentation and the specifications for the digital data set.

### *1.4. Topographic Relief and cultural features*

The survey block is located in Yukon, approximately 200 kilometres north west of the town of Watson Lake.

Topographically, the survey area exhibits a challenging terrain, with elevation range from 1290 metres to 1840 metres above sea level.

A power line signal is detected along the western part of the block. Hence, special care is recommended in identifying such cultural features that might be detected in the data.

# 2. DATA ACQUISITION

## 2.1. *Survey Area*

The survey block (see location map, Appendix A) and general flight specifications are as follows:

| Survey block | Line spacing (m) | Area (Km2) | Line-km | Flight direction | Line number |
|---|---|---|---|---|---|
| JAKE | 100 | 4.0 | 46 | N 90 E | L11010 - L11190 |
| | 1000 | | 6 | N 0 E | T11910 - T11930 |

Table 1 - Survey block

Survey block boundaries co-ordinates are provided in Appendix B.

## 2.2. *Survey Operations*

Survey operations were based in Haines Junction, Yukon for the acquisition phase of the survey.

The following table shows the timing of the flying.

| Date | Flight # | Flown KM | Block | Crew Location | Comments |
|---|---|---|---|---|---|
| 7-Aug-07 | 26 | 52 | JAKE | Incannu Lodge, Yukon | Mobilization and Production Block complete |

Table 2 - Survey schedule

## 2.3. Flight Specifications

The nominal EM sensor terrain clearance was 85 m (EM bird height above ground, i.e. helicopter is maintained 120 m above ground) due to rough terrain and helicopter crew safety. Nominal survey speed was 80 km/hour. The data recording rates of the data acquisition was 0.1 second for electromagnetics and magnetometer, 0.2 second for altimeter and GPS. This translates to a geophysical reading about every 2 metres along flight track. Navigation was assisted by a GPS receiver and data acquisition system, which reports GPS co-ordinates as latitude/longitude and directs the pilot over a pre-programmed survey grid.

The operator was responsible for monitoring of the system integrity. He also maintained a detailed flight log during the survey, tracking the times of the flight as well as any unusual geophysical or topographic feature.

On return of the aircrew to the base the survey data was transferred from a compact flash card (PCMCIA) to the data processing computer.

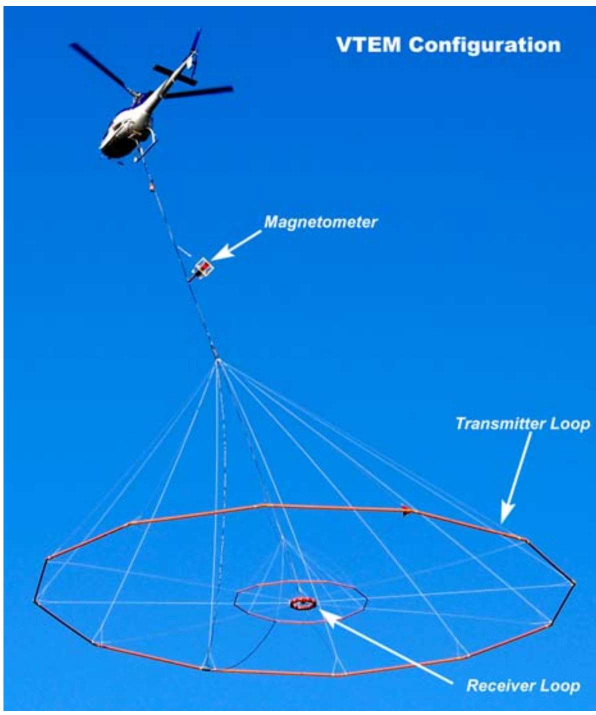
## 2.4. *Aircraft and Equipment*

### 2.4.1. Survey Aircraft

An Astar B3 helicopter, registration C-GTFX - owned and operated by TRK Helicopters Ltd. - was used for the survey. Installation of the geophysical and ancillary equipment was carried out by Geotech Ltd.

### 2.4.2. Electromagnetic System

The electromagnetic system was a Geotech Time Domain EM (VTEM) system. The configuration is as indicated in Figure 1 below.



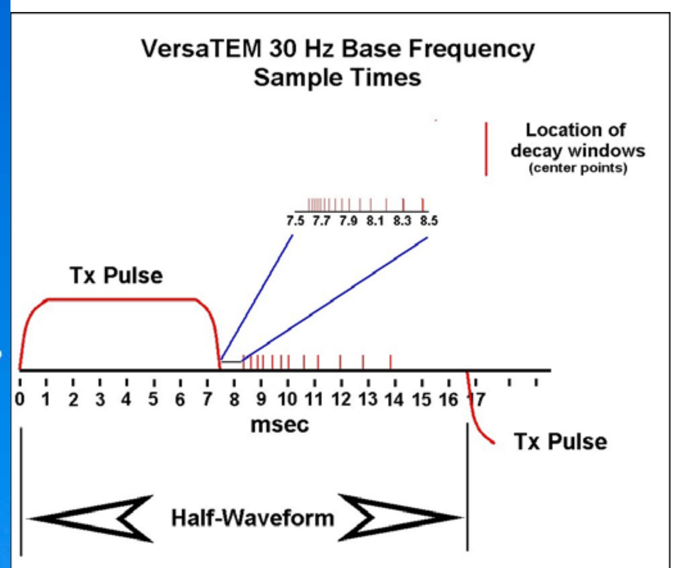




Figure 1 – VTEM configuration

Figure 2 – Sample times

Receiver and transmitter coils are concentric and Z-direction oriented.
The receiver decay recording scheme is shown diagrammatically in Figure 2.

Twenty-four measurement gates were used in the range from 120 µs to 6578 µs, as shown in Table 3.

| VTEM Decay Sampling scheme | | | | |
|---|---|---|---|---|
| Array | ( Microseconds ) | | | |
| Index | Time Gate | Start | End | Width |
| 10 | 120 | 110 | 131 | 21 |
| 11 | 141 | 131 | 154 | 24 |
| 12 | 167 | 154 | 183 | 29 |
| 13 | 198 | 183 | 216 | 34 |
| 14 | 234 | 216 | 258 | 42 |
| 15 | 281 | 258 | 310 | 53 |
| 16 | 339 | 310 | 373 | 63 |
| 17 | 406 | 373 | 445 | 73 |
| 18 | 484 | 445 | 529 | 84 |
| 19 | 573 | 529 | 628 | 99 |
| 20 | 682 | 628 | 750 | 123 |
| 21 | 818 | 750 | 896 | 146 |
| 22 | 974 | 896 | 1063 | 167 |
| 23 | 1151 | 1063 | 1261 | 198 |
| 24 | 1370 | 1261 | 1506 | 245 |
| 25 | 1641 | 1506 | 1797 | 292 |
| 26 | 1953 | 1797 | 2130 | 333 |
| 27 | 2307 | 2130 | 2526 | 396 |
| 28 | 2745 | 2526 | 3016 | 490 |
| 29 | 3286 | 3016 | 3599 | 583 |
| 30 | 3911 | 3599 | 4266 | 667 |
| 31 | 4620 | 4266 | 5058 | 792 |
| 32 | 5495 | 5058 | 6037 | 979 |
| 33 | 6578 | 6037 | 7203 | 1167 |

Table 3 - VTEM decay sampling scheme

Transmitter coil diameter was 26 metres, the number of turns was 4.
Transmitter pulse repetition rate was 30 Hz.
Peak current was 192 Amp.
Pulse width was 7.2 ms
Duty cycle was 43%.
Peak dipole moment was 407,700 NIA.

Receiver coil diameter was 1.2 metre, the number of turns was 100.
Receiver effective area was 113.1 $m^2$
Wave form – trapezoid.
Recording sampling rate was 10 samples per second.

The EM bird was towed 42 m below the helicopter.

### 2.4.3. Airborne magnetometer

The magnetic sensor utilized for the survey was a Geometrics optically pumped cesium vapour magnetic field sensor, mounted in a separated bird, towed 15 metres below the helicopter, as shown on figure 1. The sensitivity of the magnetic sensor is 0.02 nanoTesla (nT) at a sampling interval of 0.1 seconds. The magnetometer sends the measured magnetic field strength as nanoTeslas to the data acquisition system via the RS-232 port.

### 2.4.4. Ancillary Systems

#### 2.4.4.1. Radar Altimeter

A Terra TRA 3000/TRI 40 radar altimeter was used to record terrain clearance. The antenna was mounted beneath the bubble of the helicopter cockpit.

#### 2.4.4.2. GPS Navigation System

The navigation system used was a Geotech PC based navigation system utilizing a NovAtel's WAAS enable OEM4-G2-3151W GPS receiver, Geotech navigate software, a full screen display with controls in front of the pilot to direct the flight and an NovAtel GPS antenna mounted on the helicopter tail.
The co-ordinates of the block were set-up prior to the survey and the information was fed into the airborne navigation system.

#### 2.4.4.3. Digital Acquisition System

A Geotech data acquisition system recorded the digital survey data on an internal compact flash card. Data is displayed on an LCD screen as traces to allow the operator to monitor the integrity of the system. The data type and sampling interval as provided in table 4.

| DATA TYPE | SAMPLING |
|---|---|
| TDEM | 0.1 sec |
| Magnetometer | 0.1 sec |
| GPS Position | 0.2 sec |
| Radar Altimeter | 0.2 sec |

Table 4 - Sampling Rates

### 2.4.5. Base Station

A combine magnetometer/GPS base station was utilized on this project. A Geometrics Cesium vapour magnetometer was used as a magnetic sensor with a sensitivity of 0.001 nT. The base station was recording the magnetic field together with the GPS time at 1 Hz on a base station computer.

The base station magnetometer sensor was installed 100 metres from the airport in Haines Junction, away from electric transmission lines and moving ferrous objects such as motor vehicles.

The magnetometer base station's data was backed-up to the data processing computer at the end of each survey day.

# 3. PERSONNEL

The following Geotech Ltd. personnel were involved in the project.

Field

| | |
|---|---|
| Project Manager: | Harish Kumar |
| Operator: | Ioan Serbu |
| Crew chief / QC Geophysicist: | Sean Hayes |

The survey pilot and the mechanic engineer were employed directly by the helicopter operator – TRK Helicopters Ltd.

| | |
|---|---|
| Pilot: | Pierre Forand |
| Engineer: | Darren Shipman |

Office

| | |
|---|---|
| Data Processing / Reporting: | Nick Venter |
| Data Technician: | Maria Jagodkin |

Data acquisition and processing phases were carried out under the supervision of Andrei Bagrianski, Surveys Manager. Overall management of the project was undertaken by Edward Morrison, President, Geotech Ltd.

# 4. DATA PROCESSING AND PRESENTATION

## *4.1. Flight Path*

The flight path, recorded by the acquisition program as WGS 84 latitude/longitude, was converted into the UTM coordinate system in Oasis Montaj.

The flight path was drawn using linear interpolation between x, y positions from the navigation system. Positions are updated every second and expressed as UTM eastings (x) and UTM northings (y).

## *4.2. Electromagnetic Data*

A three stage digital filtering process was used to reject major sferic events and to 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 filter used was a 16 point non-linear filter.

The signal to noise ratio was further improved by the application of a low pass linear 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 1 second or 20 metres. This filter is a symmetrical 1 sec linear filter.

The results are presented as stacked profiles of EM voltages for the time gates, in linear - logarithmic scale for both B-field and dB/dt response.

Generalized modeling results of the VTEM system, written by Geophysicist Roger Barlow, are shown in Appendix C.

Graphical representation of the VTEM output voltage of the receiver coil and the transmitter current is shown in Appendix D.

### 4.3. Magnetic Data

The processing of the magnetic data involved the correction for diurnal variations by using the digitally recorded ground base station magnetic values. The base station magnetometer data was edited and merged into the Geosoft GDB database on a daily basis. The aeromagnetic data was corrected for diurnal variations by subtracting the observed magnetic base station deviations.

A micro-levelling procedure was applied to remove persistent low-amplitude components of flight-line noise remaining in the data. Where Tie lines were available, Tie line levelling was carried out by adjusting intersection points along the traverse lines.

The corrected magnetic data was interpolated between survey lines using a random point gridding method to yield x-y grid values for a standard grid cell size of approximately 0.2 cm at the mapping scale. The Minimum Curvature algorithm was used to interpolate values onto a rectangular regular spaced grid.

The survey area shows a moderate magnetic activity. Maximum values of 58300 nT are observed in the middle part of the block. Average of 57950 nT is detected in the survey area.

# 5. DELIVERABLES

## 5.1. Survey Report

The survey report describes the data acquisition, processing, and final presentation of the survey results.

The survey report is provided in two paper copies and digitally in PDF format.

## 5.2. Maps

Final maps were produced at a scale of 1:10,000. The coordinate/projection system used was the WGS84, UTM zone 9N. All maps show the flight path trace and topographic data. Latitude and longitude are also noted on maps.

The following maps are presented on paper,

- dB/dt profiles, Time Gates 0.234 – 6.578 ms in linear - logarithmic scale
- B-field profiles, Time Gates 0.234 – 6.578 ms in linear - logarithmic scale
- Total Magnetic intensity contours and colour image

## 5.3. Digital Data

Two copies of DVDs were prepared.

There are two (2) main directories,

**Data** contains a database, grids and maps, as described below.

**Report** contains a copy of the report and appendices in PDF format.

a kmz file containing flightpath of the JAKE property.
A free version of Google Earth software can be downloaded from, http://earth.google.com/download-earth.html

- Database in Geosoft GDB format, containing the following channels:
  7067_JAKE_final

| | |
|---|---|
| Lines: | Line number |
| X: | X positional data (metres – WGS84, utm zone 9 north) |
| Y: | Y positional data (metres – WGS84, utm zone 9 north) |
| Z: | GPS antenna elevation (metres - ASL) |
| Radar: | Helicopter terrain clearance from radar altimeter (metres - AGL) |
| Radarb: | EM Loop terrain clearance (metres – AGL) |
| DEM: | Digital elevation model (metres) |
| Gtime1: | GPS time (seconds of the day) |
| Mag1: | Raw Total Magnetic field data (nT) |
| Basemag: | Magnetic diurnal variation data (nT) |
| Mag2: | Total Magnetic field diurnal variation corrected data (nT) |
| Mag3: | Leveled Total Magnetic field data (nT) |
| SF[10]: | dB/dt 120 microsecond time channel ($pV/A/m^4$) |
| SF[11]: | dB/dt 141 microsecond time channel ($pV/A/m^4$) |
| SF[12]: | dB/dt 167 microsecond time channel ($pV/A/m^4$) |
| SF[13]: | dB/dt 198 microsecond time channel ($pV/A/m^4$) |
| SF[14]: | dB/dt 234 microsecond time channel ($pV/A/m^4$) |
| SF[15]: | dB/dt 281 microsecond time channel ($pV/A/m^4$) |
| SF[16]: | dB/dt 339 microsecond time channel ($pV/A/m^4$) |
| SF[17]: | dB/dt 406 microsecond time channel ($pV/A/m^4$) |
| SF[18]: | dB/dt 484 microsecond time channel ($pV/A/m^4$) |
| SF[19]: | dB/dt 573 microsecond time channel ($pV/A/m^4$) |
| SF[20]: | dB/dt 682 microsecond time channel ($pV/A/m^4$) |
| SF[21]: | dB/dt 818 microsecond time channel ($pV/A/m^4$) |
| SF[22]: | dB/dt 974 microsecond time channel ($pV/A/m^4$) |
| SF[23]: | dB/dt 1151 microsecond time channel ($pV/A/m^4$) |
| SF[24]: | dB/dt 1370 microsecond time channel ($pV/A/m^4$) |
| SF[25]: | dB/dt 1641 microsecond time channel ($pV/A/m^4$) |
| SF[26]: | dB/dt 1953 microsecond time channel ($pV/A/m^4$) |
| SF[27]: | dB/dt 2307 microsecond time channel ($pV/A/m^4$) |
| SF[28]: | dB/dt 2745 microsecond time channel ($pV/A/m^4$) |
| SF[29]: | dB/dt 3286 microsecond time channel ($pV/A/m^4$) |
| SF[30]: | dB/dt 3911 microsecond time channel ($pV/A/m^4$) |
| SF[31]: | dB/dt 4620 microsecond time channel ($pV/A/m^4$) |
| SF[32]: | dB/dt 5495 microsecond time channel ($pV/A/m^4$) |
| SF[33]: | dB/dt 6578 microsecond time channel ($pV/A/m^4$) |
| BF[10]: | B-field 120 microsecond time channel (pV*ms)/(A*m4) |
| BF[11]: | B-field 141 microsecond time channel (pV*ms)/(A*m4) |
| BF[12]: | B-field 167 microsecond time channel (pV*ms)/(A*m4) |
| BF[13]: | B-field 198 microsecond time channel(pV*ms)/(A*m4) |

| | |
|---|---|
| BF[14]: | B-field 234 microsecond time channel (pV*ms)/(A*m4) |
| BF[15]: | B-field 281 microsecond time channel (pV*ms)/(A*m4) |
| BF[16]: | B-field 339 microsecond time channel (pV*ms)/(A*m4) |
| BF[17]: | B-field 406 microsecond time channel (pV*ms)/(A*m4) |
| BF[18]: | B-field 484 microsecond time channel (pV*ms)/(A*m4) |
| BF[19]: | B-field 573 microsecond time channel (pV*ms)/(A*m4) |
| BF[20]: | B-field 682 microsecond time channel (pV*ms)/(A*m4) |
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| BF[32]: | B-field 5495 microsecond time channel (pV*ms)/(A*m4) |
| BF[33]: | B-field 6578 microsecond time channel (pV*ms)/(A*m4) |
| PLM: | Power line monitor |

Electromagnetic B-field and dB/dt data is found in array channel format between indexes 10 – 33, as described above.

- Database jake_wform.gdb in Geosoft GDB format, containing the following channels:

| | |
|---|---|
| Time: | Sampling rate interval, 10.416 microseconds |
| Volt: | output voltage of the receiver coil (volt) |

- Grids in Geosoft GRD format, as follow,

| | |
|---|---|
| mag_jake: | Total magnetic intensity (nT) |
| dem_jake: | Digital elevation model (m) |

A Geosoft .GRD file has a .GI metadata file associated with it, containing grid projection information.
Grid cell size of 25 metres was used.

- Maps at 1:10,000 scale in Geosoft MAP format, as follow,

| | |
|---|---|
| mag_jake: | Total magnetic intensity contours and colour image |
| dB/dt_jake: | VTEM dB/dt profiles, Time Gates 0.234 – 6.578 ms in linear - logarithmic scale |
| Bfield_jake: | VTEM B-field profiles, Time Gates 0.234 – 6.578 ms in linear - logarithmic scale |

- A *readme.txt* file describing the content of digital data, as described above.

# 6. CONCLUSIONS

A helicopter-borne versatile time domain electromagnetic (VTEM) geophysical survey has been completed over the Jake property, located in Yukon, Canada.

The total area coverage is 4.0 $km^2$. Total survey line coverage is 46 line kilometres. The principal sensors included a Time Domain EM system and a magnetometer. Results have been presented as stacked profiles and contour colour images at a scale of 1:10,000.

Final data processing at the office of Geotech Ltd. in Aurora, Ontario was carried out under the supervision of Andrei Bagrianski, Surveys Manager.

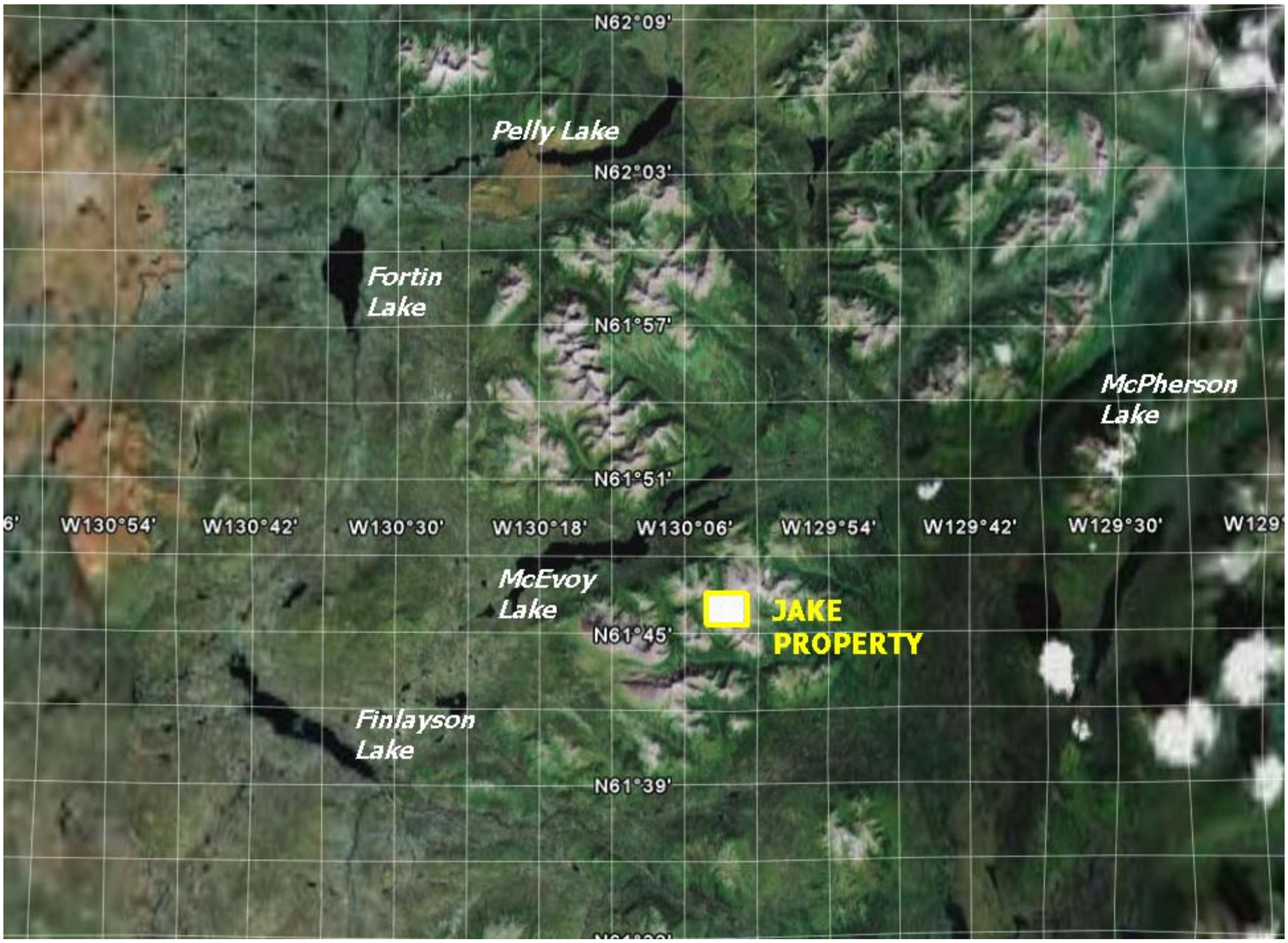
A number of EM anomaly groupings were identified. Ground follow-up of those anomalies should be carried out if favourably supported by other geoscientific data.

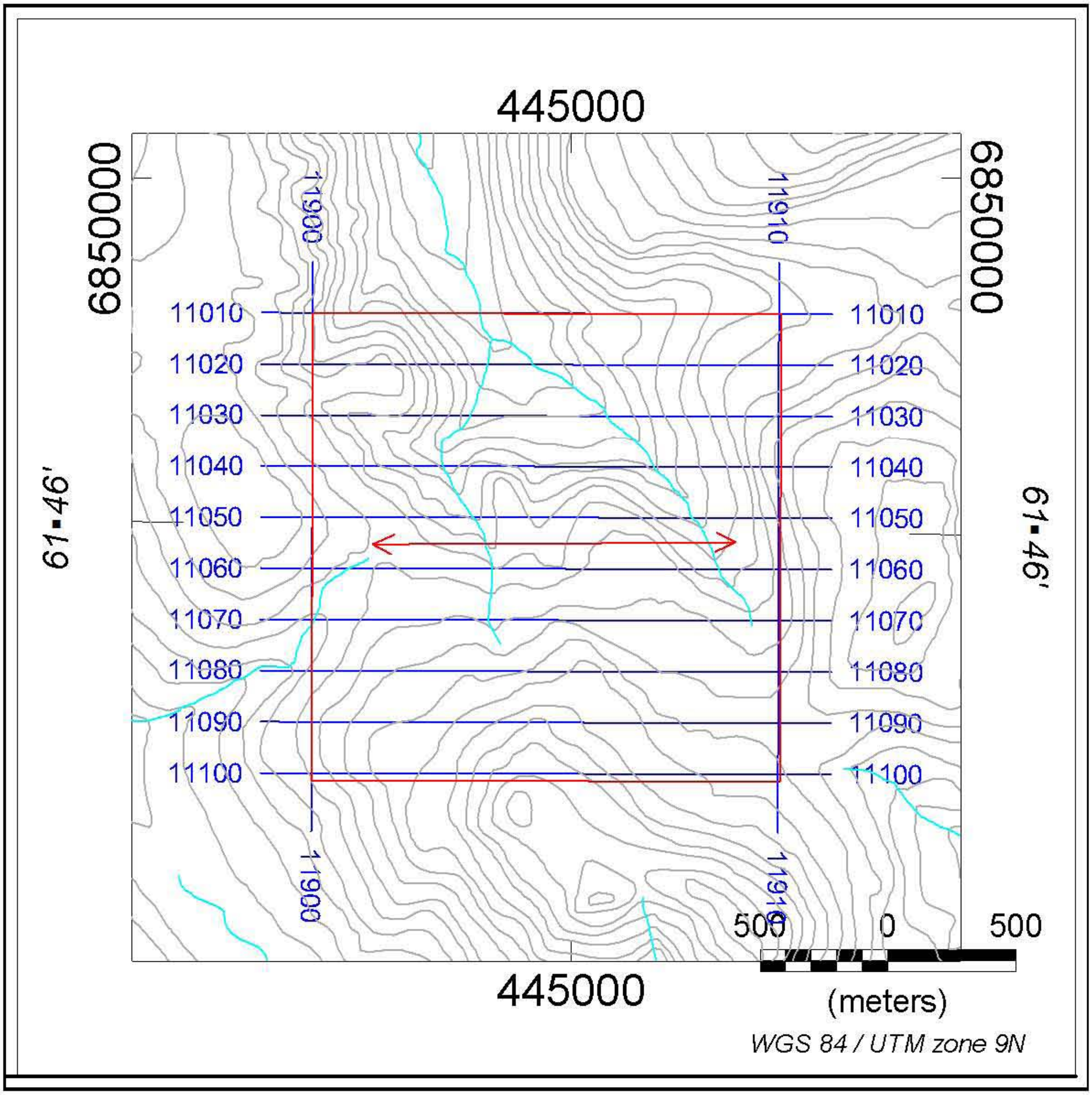
Respectfully submitted,

Nick Venter
**Geotech Ltd.**
September, 2007

## APPENDIX A

## SURVEY BLOCK LOCATION MAP





445000
6850000
6850000
11900
11910
11010
11020
11030
11040
11050
11060
11070
11080
11090
11100
61°46'
61°46'
500
0
500
(meters)
445000
WGS 84 / UTM zone 9N

# APPENDIX B

## SURVEY BLOCK COORDINATES
(NAD83, UTM zone 9 north)

### Jake property

| X | Y |
|---|---|
| 445819.905 | 6849468.39 |
| 445814.801 | 6847640.37 |
| 443986.532 | 6847645.53 |
| 443991.584 | 6849473.49 |

# APPENDIX C

# MODELING VTEM DATA

# MODELING VTEM DATA

## Introduction

The VTEM system is based on a concentric or central loop design, whereby, the receiver is positioned at the centre of a 26.1 meters diameter transmitter loop that produces a dipole moment up to 625,000 NIA at peak current. The wave form is a bi-polar, modified square wave with a turn-on and turn-off at each end. With a base frequency of 30 Hz, the duration of each pulse is approximately 7.5 milliseconds followed by an off time where no primary field is present.

During turn-on and turn-off, a time varying field is produced (dB/dt) and an electro-motive force (emf) is created as a finite impulse response. A current ring around the transmitter loop moves outward and downward as time progresses. When conductive rocks and mineralization are encountered, a secondary field is created by mutual induction and measured by the receiver at the centre of the transmitter loop.

Measurements are made during the off-time, when only the secondary field (representing the conductive targets encountered in the ground) is present.

Late in 2006, Geotech Ltd. incorporated a B-Field measurement in the VTEM system. The B-Field measurements have the advantage of containing more spectral energy at low spectral frequencies than the dB/dt measurements; hence, greater amplitudes and accuracies when encountering targets with higher conductances (> 500 Siemens). The converse is true at higher spectral frequencies where dB/dt measurements are best applied. The B-field is most widely used in nickel exploration where a small percentage of targets are extremely conductive (> 2500 Siemens) and less resolvable or invisible (below the noise threshold) using dB/dt measurements.

Efficient modeling of the results can be carried out on regularly shaped geometries, thus yielding close approximations to the parameters of the measured targets. The following is a description of a series of common models made for the purpose of promoting a general understanding of the measured results.

## Variation of Plate Depth

Geometries represented by plates of different strike length, depth extent, dip, plunge and depth below surface can be varied with characteristic parameters like conductance of the target, conductance of the host and conductivity/thickness and thickness of the overburden layer.

Diagrammatic models for a vertical plate are shown in figures A and G at two different depths, all other parameters remaining constant. With this transmitter-receiver geometry, the classic **M** shaped response is generated. Figure A shows a plate where the top is near surface. Here, amplitudes of the duel peaks are higher and symmetrical with the zero centre positioned directly above the plate. Most important is the separation distance of the peaks. This distance is small when the plate is near surface and widens with a linear relationship as the plate (depth to top) increases. Figure G shows a much deeper plate where the separation distance of the peaks is much wider and the amplitudes of the channels have decreased.

## Variation of Plate Dip

As the plate dips and departs from the vertical position, the peaks become asymmetrical. Figure B shows a near surface plate dipping 80º. Note that the direction of dip is toward the high shoulder of the response and the top of the plate remains under the centre minimum.

As the dip increases, the aspect ratio (Min/Max) decreases and this aspect ratio can be used as an empirical guide to dip angles from near 90º to about 30º. The method is not sensitive enough where dips are less than about 30º. Figure E shows a plate dipping 45º and, at this angle, the minimum shoulder starts to vanish. In Figure D, a flat lying plate is shown, relatively near surface. Note that the twin peak anomaly has been replaced by a symmetrical shape with large, bell shaped, channel amplitudes which decay relative to the conductance of the plate.

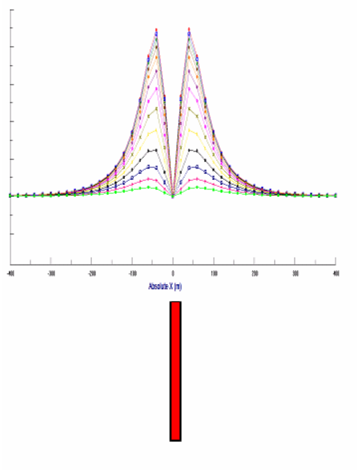
Figure H shows a special case where two plates are positioned to represent a synclinal structure. Note that the main characteristic to remember is the centre amplitudes are higher (approximately double) compared to the high shoulder of a single plate. This model is very representative of tightly folded formations where the conductors where once flat lying.

## Variation of Prism Depth

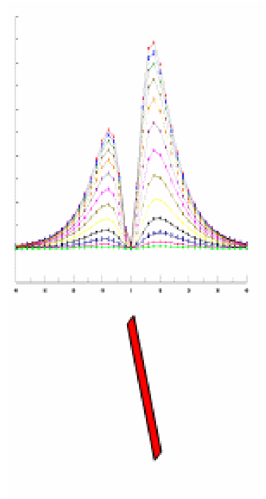
Finally, with prism models, another algorithm is required to represent current on the plate. A plate model is considered to be infinitely thin with respect to thickness and incapable of representing the current in the thickness dimension. A prism model is constructed to deal with this problem, thereby, representing the thickness of the body more accurately.

Figures C, F and I show the same prism at increasing depths. Aside from an expected decrease in amplitude, the side lobes of the anomaly show a widening with deeper prism depths of the bell shaped early time channels.

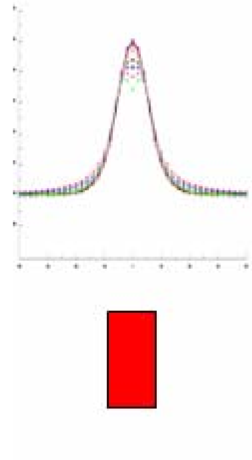
**A**



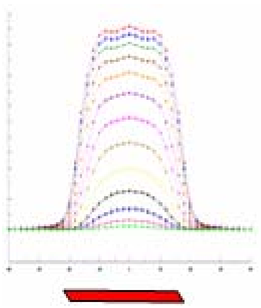
**B**



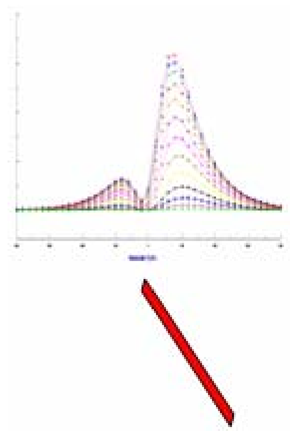
**C**



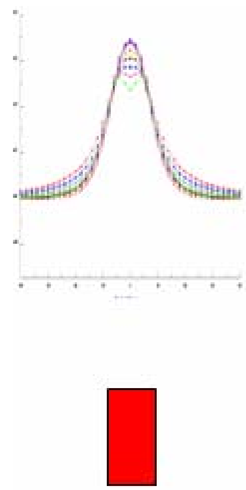
**D**



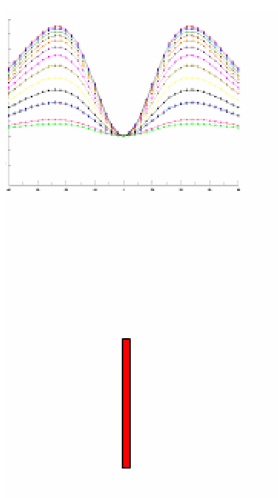
**E**



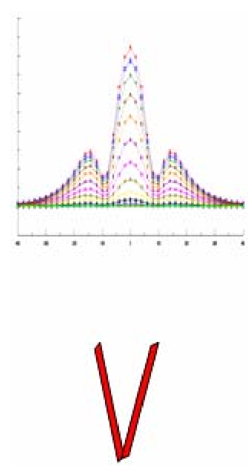
**F**



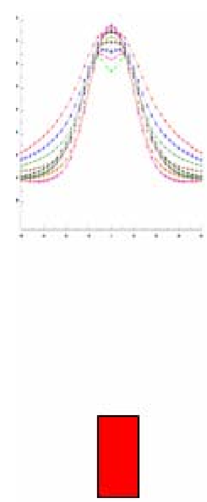
**G**



**H**



**I**



## General Modeling Concepts

A set of models has been produced for the Geotech VTEM® system with explanation notes (see models A to I above). The reader is encouraged to review these models, so as to get a general understanding of the responses as they apply to survey results. While these models do not begin to cover all possibilities, they give a general perspective on the simple and most commonly encountered anomalies.

When producing these models, a few key points were observed and are worth noting as follows:

- For near vertical and vertical plate models, the top of the conductor is always located directly under the centre low point between the two shoulders in the classic **M** shaped response.
- As the plate is positioned at an increasing depth to the top, the shoulders of the **M** shaped response, have a greater separation distance.
- When faced with choosing between a flat lying plate and a prism model to represent the target (broad response) some ambiguity is present and caution should be exercised.
- With the concentric loop system and Z-component receiver coil, virtually all types of conductors and most geometries are most always well coupled and a response is generated (see model H). Only concentric loop systems can map this type of target.

The modelling program used to generate the responses was prepared by PetRos Eikon Inc. and is one of a very few that can model a wide range of targets in a conductive half space.

## General Interpretation Principals

Magnetics

The total magnetic intensity responses reflect major changes in the magnetite and/or other magnetic minerals content in the underlying rocks and unconsolidated overburden. Precambrian rocks have often been subjected to intense heat and pressure during structural and metamorphic events in their history. Original signatures imprinted on these rocks at the time of formation have, it most cases, been modified, resulting in low magnetic susceptibility values.

The amplitude of magnetic anomalies, relative to the regional background, helps to assist in identifying specific magnetic and non-magnetic rock units (and conductors) related to, for example, mafic flows, mafic to ultramafic intrusives, felsic intrusives, felsic volcanics and/or sediments etc. Obviously, several geological sources can produce the same magnetic response. These ambiguities can be reduced considerably if basic geological information on the area is available to the geophysical interpreter.

In addition to simple amplitude variations, the shape of the response expressed in the wave length and the symmetry or asymmetry, is used to estimate the depth, geometric parameters and magnetization of the anomaly. For example, long narrow magnetic linears usually reflect mafic flows or intrusive dyke features. Large areas with complex magnetic patterns may be produced by intrusive bodies with significant magnetization, flat lying magnetic sills or sedimentary iron formation. Local isolated circular magnetic patterns often represent plug-like igneous intrusives such as kimberlites, pegmatites or volcanic vent areas.

Because the total magnetic intensity (TMI) responses may represent two or more closely spaced bodies within a response, the second derivative of the TMI response may be helpful for distinguishing these complexities. The second derivative is most useful in mapping near surface linears and other subtle magnetic structures that are partially masked by nearby higher amplitude magnetic features. The broad zones of higher magnetic amplitude, however, are severely attenuated in the vertical derivative results. These higher amplitude zones reflect rock units having strong magnetic susceptibility signatures. For this reason, both the TMI and the second derivative maps should be evaluated together.

Theoretically, the second derivative, zero contour or colour delineates the contacts or limits of large sources with near vertical dip and shallow depth to the top. The vertical gradient map also aids in determining contact zones between rocks with a susceptibility contrast, however, different, more complicated rules of thumb apply.

## Concentric Loop EM Systems

Concentric systems with horizontal transmitter and receiver antennae produce much larger responses for flat lying conductors as contrasted with vertical plate-like conductors. The amount of current developing on the flat upper surface of targets having a substantial area in this dimension, are the direct result of the effective coupling angle, between the primary magnetic field and the flat surface area. One therefore, must not compare the amplitude/conductance of responses generated from flat lying bodies with those derived from near vertical plates; their ratios will be quite different for similar conductances.

Determining dip angle is very accurate for plates with dip angles greater than 30º. For angles less than 30º to 0º, the sensitivity is low and dips can not be distinguished accurately in the presence of normal survey noise levels.

A plate like body that has near vertical position will display a two shoulder, classic **M** shaped response with a distinctive separation distance between peaks for a given depth to top.

It is sometimes difficult to distinguish between responses associated with the edge effects of flat lying conductors and poorly conductive bedrock conductors. Poorly conductive bedrock conductors having low dip angles will also exhibit responses that may be interpreted as surfacial overburden conductors. In some situations, the conductive response has line to line continuity and some magnetic correlation providing possible evidence that the response is related to an actual bedrock source.

The EM interpretation process used, places considerable emphasis on determining an understanding of the general conductive patterns in the area of interest. Each area has different characteristics and these can effectively guide the detailed process used.

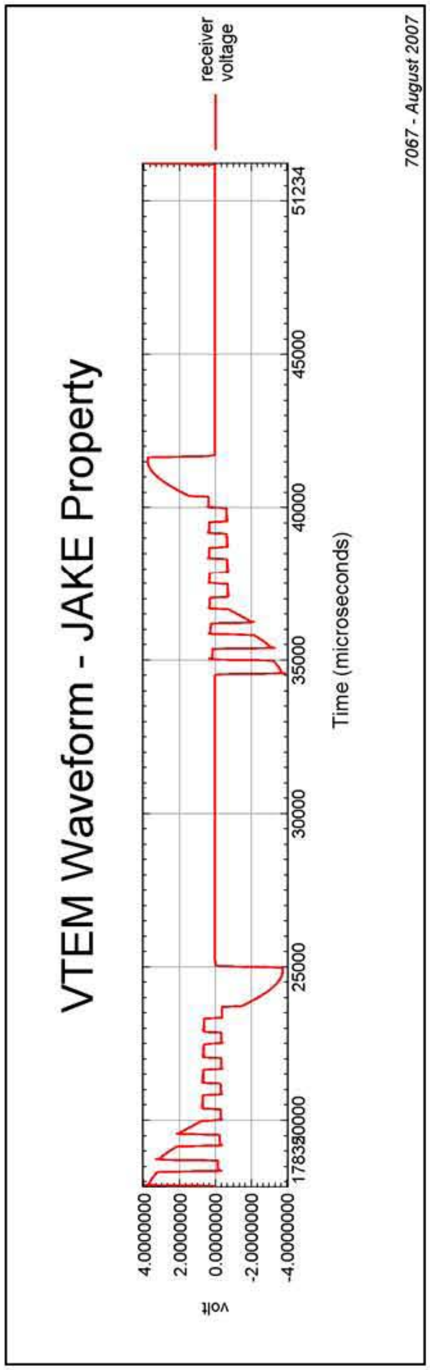
The first stage is to determine which time gates are most descriptive of the overall conductance patterns. Maps of the time gates that represent the range of responses can be very informative.

Next, stacking the relevant channels as profiles on the flight path together with the second vertical derivative of the TMI is very helpful in revealing correlations between the EM and Magnetics.

Next, key lines can be profiled as single lines to emphasize specific characteristics of a conductor or the relationship of one conductor to another on the same line. Resistivity Depth sections can be constructed to show the relationship of conductive overburden or conductive bedrock with the conductive anomaly.

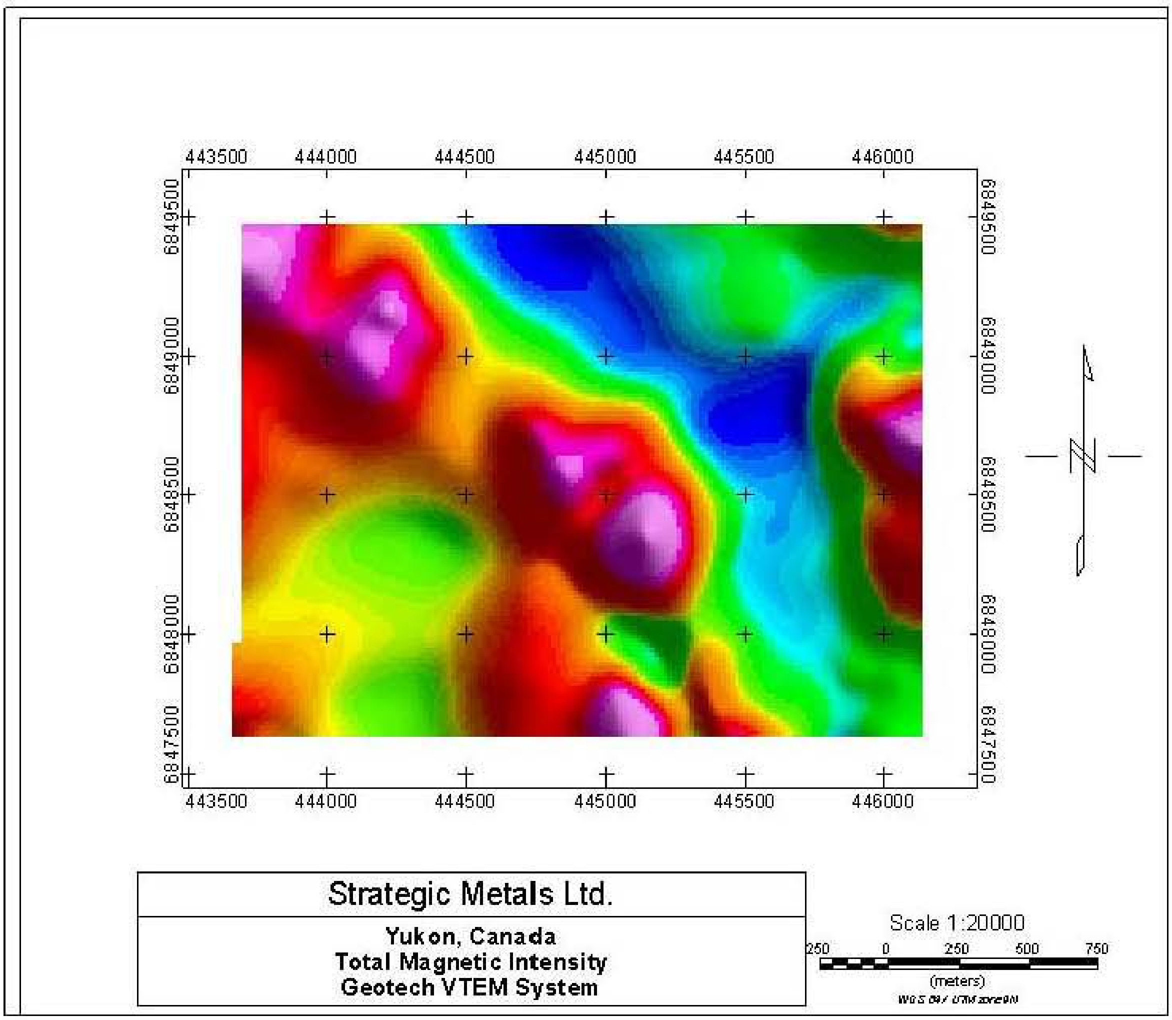
## APPENDIX D

## VTEM WAVE FORM



**APPENDIX E**

**GEOPHYSICAL MAPS**



ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
1016 – 510 West Hastings Street
Vancouver, B.C. V6B 1L8
Telephone: 604-688-2568 Fax: 604-688-2578

## AFFIDAVIT

I, Joan Mariacher, of Vancouver, B.C. make oath and say:

That to the best of my knowledge the attached Statement of Expenditures for exploration work on Jake 1-16 mineral claims on Claim Sheet 105G/16 is accurate.

Joan Mariacher

Sworn before me at Vancouver, B.C.

this 22nd day of February, 2008.

Notary Public, Yukon Territory

Statement of Expenditures
Jake 1-16 Mineral Claims
February 14, 2008

Contract VTEM Survey

| | |
|---|---|
| Geotech Ltd. | $6,971.28 |

# Geotech Ltd.

245 Industrial Parkway North, Aurora ON L4G 4C4

| Bill To |
|---|
| Archer, Cathro & Associates (1981) Limite<br>1016-510 West Hastings Street<br>Vancouver, BC<br>Canada V6B 1L8 |

| Date | Invoice # |
|---|---|
| 1/16/2008 | 991203 |

| Terms | Project |
|---|---|
| Due on receipt | 7067 |

| Description | | Amount |
|---|---|---|
| Helicopter-borne time domain electromagnetic geophysical survey with VTEM system | | |
| Final Billing - Theremaining balance of total survey charge is payable right before delivery of the products | | 214,859.80 |
| Contract ( Yukon and northern BC.) | | |
| Ba urvey charge 5657 line km @ $70.00 | $395,990.00 | |
| 28 blocks @ $2,000.00 per block | $56,000.00 | |
| 65 days @ $6,000.00 per day | $390,000.00 | |
| Helicopter time charges for 227.3 hours @ $1,800.00 per hour | $409,140.00 | |
| Helicopter mob/demob | $10,000.00 | |
| Crew and equipment mob/demob | $7,000.00 | |
| Em anomaly maps 5657km @1.50/km | $8,485.50 | |
| 25 Interpretational reports @$3,000 | $75,000.00 | |
| Fuel 6276 Liters | $8,440.30 | |
| Total Survey charge | $1,360,055.80 | |
| Less Previoius Billing | | |
| Invoice 991034 | ($289,040.00) | |
| Invoice 991078 | ($190,505.00) | |
| Invoice 991107 | ($665,651.00) | |
| Billable Amount | $214,859.80 | |
| Business Number: 110859469 | | |

10742.99

Alle - 7700.65
Burwash - 6649.52
Cabin - 7167.47
Dawson - 5688.18
Fairweather - 6253.58
Hart - 6989.74
Hidden - 3975.84
Highway - 10934.85
Hazelfal - 8199.04
Hopper - 8666.96
Hy - 13152.70
Jake - ~~4308.93~~ $4524.38
Man - 6494.17
Mor - 10130.54
Mt Hinton - 3129.8.60
Nimo (Rich) - 10143.78

Oblivion - 5475.34
Plato - 13526.47
Ranchería (QB) - 8086.24
Ran - 6747.07
Raon - 5224.91
Tes - 10934.85
Tg - 7307.60
Track - 3998.52
Uno - 5803.45

225602.79

Please Remit By Bank Transfer To:
TD CANADA TRUST
16655 YONGE ST., UNIT 1
NEWMARKET, ONTARIO L3X 1V6
TRANSIT#3102
AC UNT#5217874

| | |
|---|---|
| Subtotal | Can$214,859.80 |
| GST | Can$10,742.99 |
| **Total** | Can$225,602.79 |

Tel: 905-841-5004 Fax: 905-841-0611 email: info@geotechairborne.com

# Geotech Ltd.

30 Industrial Parkway South, Aurora ON L4G 3W2

| BILL TO: |
|---|
| Archer, Cathro & Associates (1981) Limite<br>1016-510 West Hastings Street<br>Vancouver, BC<br>Canada V6B 1L8 |

| DATE: | INVOICE: |
|---|---|
| 10/12/2007 | 991107 |

| TERMS: | Project |
|---|---|
| Due on receipt | 7067 |

| Description | | Amount |
|---|---|---|
| Helicopter-borne time domain electromagnetic geophysical survey with VTEM system<br>Interm Billing - 90% of the estimated total charge plus any additional charges, including but not limited to additional line km, standby days, plus GST is payable completion of flying: | | 665,651.00 |
| tract (Yukon and northern BC.) | | |
| Estimated 5690 line km @ $70.00 | $398,300.00 | |
| 29 blocks @ $2,000.00 per block | $58,000.00 | |
| 65 days @ $6,000.00 per day | $390,000.00 | |
| Helicopter time charges for 227.3 hours @ $1,800.00 per hour | $409,140.00 | |
| Helicopter mob/demob | $10,000.00 | |
| Crew and equipment mob/demob | $7,000.00 | |
| Minimum survey charge | $1,272,440.00 | |
| 90% of $1,278,440.00 | $1,145,196.00 | |
| Less Previous Billing | | |
| Invoice 991034 | ($289,040.00) | |
| Invoice 991078 | ($190,505.00) | |
| Total Billable Amount | $665,651.00 | |
| Business Number: 110859469 | | |

| | |
|---|---|
| Subtotal | Can$665,651.00 |
| GST | Can$39,939.06 |
| **TOTAL** | Can$705,590.06 |

✓ Ale - 15740.54
✓ Burwash - 12218.54
✓ Cabin - 33955.98
✓ Dawson - 21969.52
✓ GK - (10408.48)
✓ Fairweather - 26560.49
✓ Gram (Mt Hinton) - 54432.85
✓ Hart - 32515.80
✓ Hidden - 8081.37
✓ Highway - 64498.40
✓ Hopeful - 42331.13
✓ Hopper - 18930.28
✓ Hy - 33868.92
✓ Jake - ~~2308.40~~ $2446.90
✓ Mars - 28580.60
✓ Mor - 42190.87
✓ Rancheria (QB) 17057.74
✓ Rosy - 18204.54
✓ Tart - <26958.33>
✓ Tez - 64498.40
✓ Tog - 35089.32
✓ Iman - 8273.46
✓ Luna - 9441.72
✓ Mt Hinton - 204340.42
✓ Nimo (Rich) - 58082.57
✓ Nimo (Nick) - <55523.83>
✓ Obvious - 20240.71
✓ Plata - 61361.67
✓ Ram - 12552.70
unallocated - 1800.00

856156

Please Remit By Bank Transfer To:
TD CANADA TRUST
16655 YONGE ST., UNIT 1
NEWMARKET, ONTARIO L3X 1V6
TRANSIT # 3102
ACCOUNT #5217874