APPENDIX 6

SGC Report —VTEM Survey: Interpretation & Logistics Report, January 2008

Liontown Resources Ltd

MT WINDSOR VOLCANICS PROJECT

VTEM Survey: Interpretation & Logistics Report

January 2008

A. MORRELL

SOUTHERN GEOSCIENCE CONSULTANTS

SGC Report No. 1780

PROJECT NAME	*MT WINDSOR VOLCANICS*
CLIENT	*LIONTOWN RESOURCES LIMITED*
COUNTRY	*AUSTRALIA*
PROVINCE / STATE	*QLD*
METHOD KEYWORDS	*VTEM*
COMMODITY	*COPPER; LEAD; ZINC*
1:100 000 MAP SHEET	*HOMESTEAD (8057); CHARTERS TOWERS (8157); RAVENSWOOD (8257)*
1:250 000 MAP SHEET	*CHARTERS TOWERS (SF5502)*

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SUMMARY

A heliborne VTEM (Versatile Time Domain Electromagnetic) survey was completed across the Mt Windsor Volcanics project by Geotech Airborne Limited between May 28th and June 12th 2007 on behalf of Liontown Resources Limited. A total of 1662.6 line kilometres comprising 301 survey lines (200 m line spacing) were flown between the Liontown and Bullseye areas giving ~330 km^2 of coverage. The survey was designed to identify discrete, bedrock conductors associated with base metal or possibly copper-gold mineralisation, map lithologies, and delineate areas of thick or more conductive cover that may limit the efficacy of ground geophysical methods.

The survey identified 127 anomalies across the project area. Only 26 of these have been interpreted as potential bedrock conductors of interest. Non-bedrock conductive sources that comprise 80% of the identified anomalies are attributed to lobe effects on conductor margins, artefacts due to negative polarisation of conductive cover or cultural anomalies (buildings, powerlines, pipelines). From the 26 anomalies, 15 conductors have been interpreted and ranked for exploration priority based on anomaly quality. Four moderate to strong conductors are considered Priority 1 targets.

A drillhole targeting one of the Priority 1 targets intersected no significant mineralisation or obvious source conductor. It is recommended that DHEM be completed on the hole to detect a possible off-hole conductor.

Drillholes targeting the other Priority 1 conductors have been designed, but it is recommended that field checking and surface TEM surveying be carried out first to better delineate the conductors.

Priority 2-4 targets should be further investigated with all other available geological and geochemical data. Favourable targets should be modelled from the VTEM data and surface TEM surveys planned to better refine models for drill testing.

The lack of strong, discrete EM anomalies identified in this survey may indicate the absence of conductive mineralisation in the survey area or the masking of responses due to conductive cover, the extent of which has been mapped out from the VTEM surveying. The use of alternative geophysical methods for exploration in the area should be considered, in particular IP and/or MMR.

1. INTRODUCTION

This report documents recent VTEM surveying that has been completed at the Mt Windsor Volcanics project which is situated approximately 40 km south of Charters Towers, north Queensland (Figure 1).

A VTEM survey was carried out at the Mt Windsor Volcanics project by Geotech Airborne Limited between May 28th and June 12th 2007 on behalf of Liontown Resources Limited (Job No. A215). A total of 1662.6 line kilometres, comprising 301 survey lines and covering ~330 km^2, were flown between the Liontown and Bullseye areas, with coverage extending over the Blenheim, Kagara, Gregory, Britannia and Britannia Extended areas.

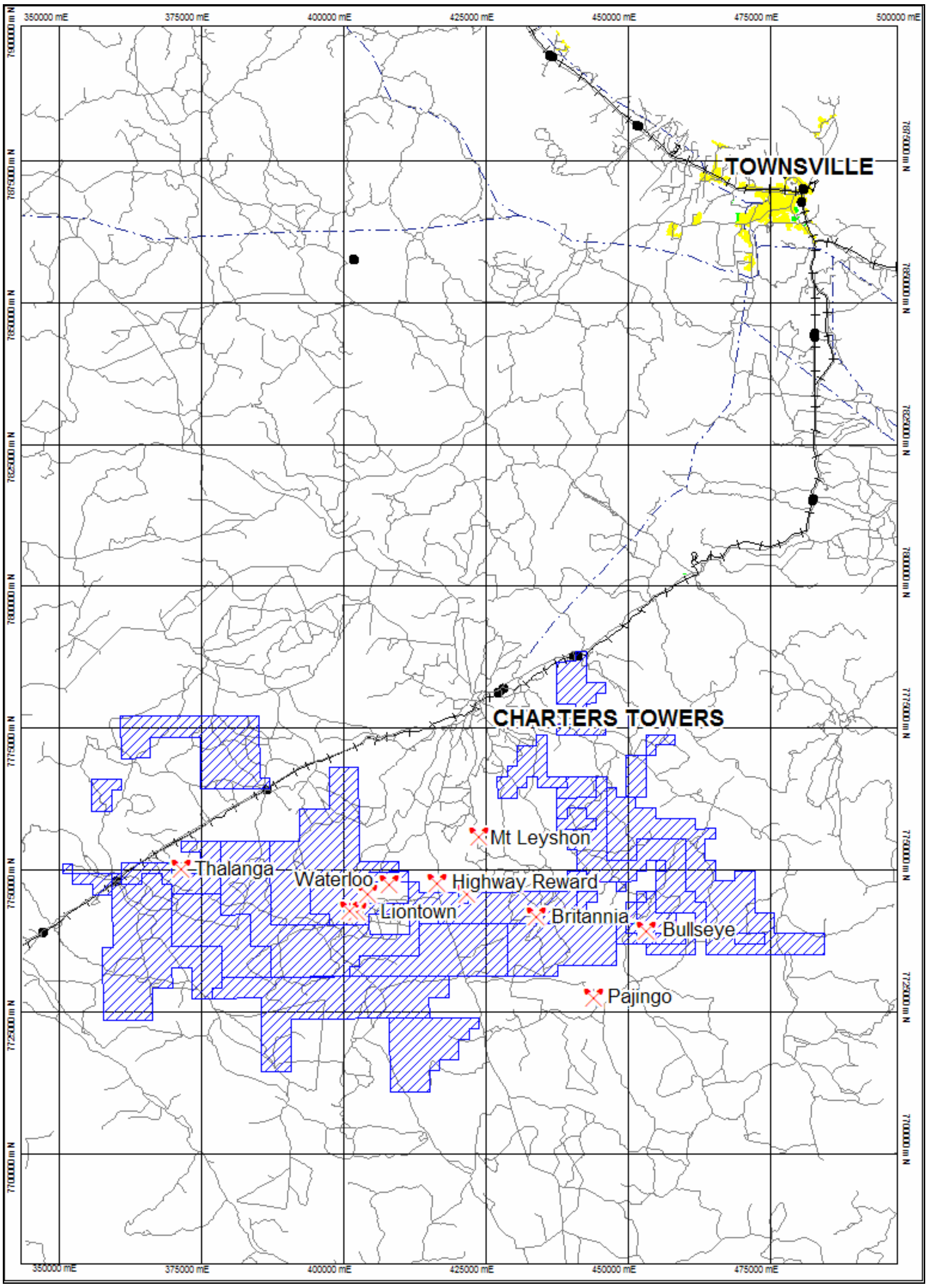


Figure 1. Regional location of Liontown's Mt Windsor Volcanics tenements (blue).

2. Geological Setting

The Mt Windsor Volcanics is a Cambro-Ordivician sequence within the approximately east-west trending Seventy Mile Range Group located south of Charters Towers, north Queensland. The belt dips sub-vertically and extends 165 km as discontinuous outcrop. Overlying the Cambro-Ordivician sequences are Tertiary-Quaternary sediments of the Campaspe Formation.

The Mt Windsor Volcanics hosts VHMS style base metal mineralisation such as the Thalanga (Zn-Cu-Pb) and Highway Reward (Cu-Au) deposits as well massive to semi-massive Zn-Pb-Cu-Au mineralisation at Liontown. Significant mesothermal (Charters Towers, Mt Leyshon) and epithermal (Pajingo) gold deposits also occur in the district (Figure 1).

3. Survey Details

VTEM surveying at the Mt Windsor Volcanics project was carried out during late May to mid June 2007. All data were acquired with standard VTEM equipment working at a base frequency of 25 Hz. Flight line locations are shown in Figure 2.

The aims of the VTEM survey were to:

- Identify bedrock conductors that might represent possible base metal (or copper-gold) mineralised massive sulphide accumulations. Although Liontown itself is a poor conductor and has no known TEM response, the aim of this survey is to identify conductive zinc or copper mineralisation, e.g. Hellyer, Thalanga, Jaguar or Reward style deposits, and not necessarily more Liontown style mineralisation;
- Map lithologies, on the basis of relative conductivity and relative weathering response, in the volcano-sedimentary pile, particularly since the sequence does not have good definition in magnetic data. In addition, the VTEM should map the depth of cover well; and
- Identify areas of thick or more conductive cover where ground based geophysics may not be suitable for testing targets.

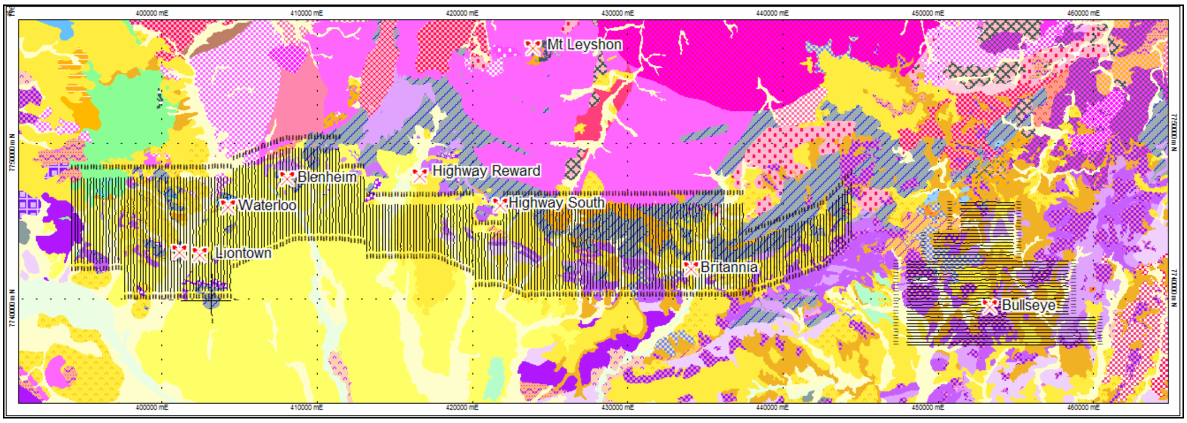


Figure 2. Local plan of the VTEM survey lines with prospects and mapped geology.

The VTEM system was powered by a large 26 m diameter transmitter loop with four turns and a peak current of 157 A, providing a peak dipole moment of 333,557 NIA. The VTEM system is a symmetric, inloop-type system with concentric Rx/Tx geometry.

3.1 Personnel

Client Supervision (Liontown Resources):	John McIntyre
Consulting Geophysicist (SGC):	Bill Peters / Anne Morrell
Contractor:	Geotech Airborne Limited
Contractor Supervisor:	Keith Fisk / Matt Trevenen
Contractor Geophysicist:	Rafael Coyoli
Contractor Operator:	Kim Bignell / Mikhail Maslennikof
Contractor Pilot (Heli-Aust):	Martin Gambril
Contractor Processing:	Rafael Coyoli (prelim); Willem Botha (final, reporting)

3.2 Equipment

Aircraft:	AS350-B3 helicopter, registration VH-OUF (owned and operated by Heli-Aust)
Transmitter:	VTEM 03
Receiver:	VTEM 03
Receiver Coil Area:	113.1 m^2 (1.2 m diameter, 100 turns)
Window Channel File:	27 channel (130 μs to 8900 μs)
Magnetometer:	Geometrics G823A - Cesium Vapour

3.3 Survey Specifications

Line Spacing:	200 m
Station Spacing:	~2 m
Transmitter Loop Size:	26 m diameter (4 turns)
Coordinate System:	GDA94/MGA55
Base Frequency:	25 Hz
Duty Cycle:	48.8%
Nominal Terrain Clearance:	~80 m
EM Loop Clearance:	~30 m
Magnetometer Clearance:	~70 m
Recording Sample:	10 samples per second
Waveform:	Trapezoid
Peak Current:	157 A
Peak Dipole Moment:	333,557 NIA

3.4 Survey Coverage

A total of 1662.6 line kilometres of VTEM were flown (301 survey lines; ~328.58 km^2) between the Liontown and Bullseye areas. Details of the survey coverage are provided below in Table 1.

Table 1. VTEM survey coverage.

Blocks	Line Spacing (m)	Area (km^2)	Line Distance (km)	Flight Direction	Line Number
Liontown (all)	200	252.04	1271.55	N-S	L10020 – L12530, 19000
Bullseye	200	76.96	391.05	E-W	L20010 – L20470

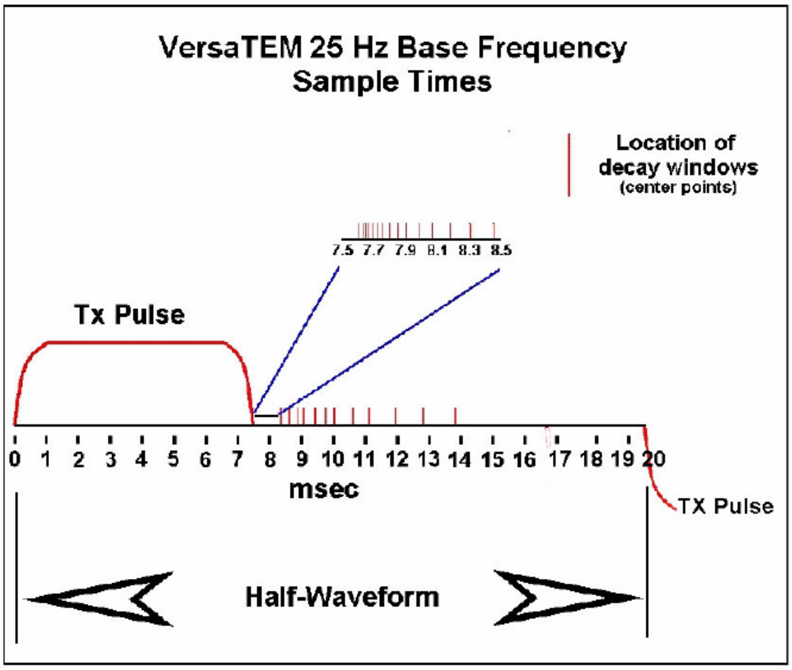


Figure 3. Details of the VTEM waveform.

3.5 Data Presentation and Processing

All final, processed VTEM data from Southern Geoscience Consultants (SGC) are provided in AMIRA format ASCII text files suitable for relevant software packages (Appendix 1). These files are suitable for use with Maxwell (EM software used), other EM processing/modelling packages and for Mines Department reporting. Geotech Airborne Limited supplied final VTEM located data in Geosoft database format and also included a final magnetic grid and custom Geosoft maps.

Final processing by SGC has also provided the following VTEM products included in Appendix 1:

- Contours for VTEM Channels 1, 5, 10, 15, 20, 25 and 30 (MapInfo Format)
- Geotiffs for all VTEM channels - Linear and Non Linear (MapInfo Format)
- Profiles for VTEM Channels 1, 5, 10, 15, 20, 25 and 30 (MapInfo Format)
- Movie files for all VTEM Channels - Linear and Non Linear (WMV Format)
- Contours of VTEM CDIs – 20m, 40m, 60m, 80m, 100m, 120m, 140m, 160m, 180m, 240m
- Geotiffs of VTEM CDIs – 20m, 40m, 60m, 80m, 100m, 120m, 140m, 160m, 180m, 240m

Standard logarithmic profile plots of all VTEM data and CDIs were created and are included (Appendix 2). The final VTEM report and other associated information supplied by Geotech Airborne Limited are included as Appendix 4.

4. Interpretation and Targets

The surficial geology of the Mt Windsor Volcanics project area is dominated by highly conductive Tertiary sediments of the Campaspe Formation which have historically limited the success of EM methods. For this reason, final VTEM data were interpreted line-by-line from profiles to identify all subtle anomalies. A total of 127 anomalies were picked and are reported in Appendix 3. Of these, only 26 anomalies (20%) representing 15 interpreted conductors are interpreted as potential bedrock conductors of interest. Non-bedrock conductive sources that comprise 80% of the identified anomalies are attributed to lobe effects on conductor margins, artefacts due to negative polarisation of conductive cover or cultural anomalies (buildings, powerlines, pipelines). The extent of highly conductive cover has been delineated and is presented in the VTEM interpretation (Figure 19).

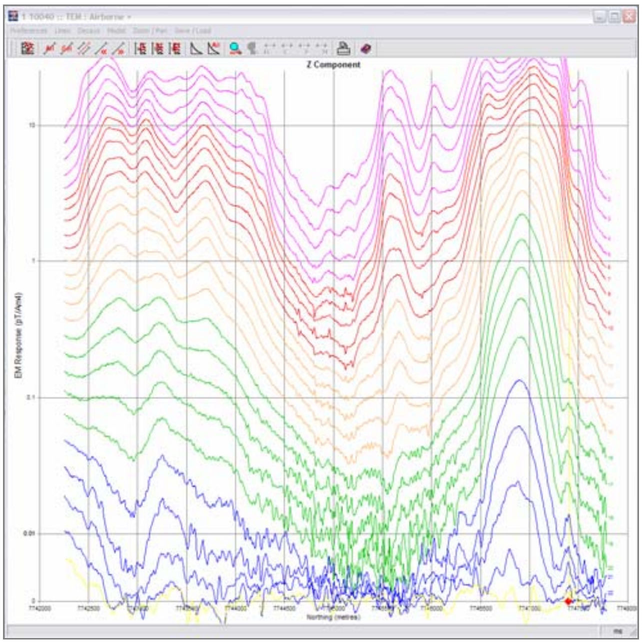
All potential conductors of interest are discussed below, summarised in Table 2, and presented in Figure 19. Each of these should be assessed from a geological perspective to determine whether they of potential exploration interest.

Table 2. Summary table of interpreted VTEM conductors.

Conductor	Associated Anomaly(s)	Easting	Northing	Quality	Comments	Priority
[redacted]	[redacted]	[redacted]	[redacted]	Moderate to good discrete conductor	Single line anomaly	2
[redacted]	[redacted]	[redacted]	[redacted]	Possible discrete conductor	Single line anomaly	3
[redacted]	[redacted]	[redacted]	[redacted]	Possible discrete conductor	Broad, single line anomaly	3
[redacted]	[redacted]	[redacted]	[redacted]	Possible discrete conductor	Single line anomaly	3
[redacted]	[redacted]	[redacted]	[redacted]	Doubtful bedrock conductor beneath conductive cover	Single line anomaly	4
[redacted]	[redacted]	[redacted]	[redacted]	Possible discrete conductor	Single line anomaly	3
[redacted]	[redacted]	[redacted]	[redacted]	Moderate to good discrete conductor	Strike length of 400m with strongest peak on LTEM-23 weakening to the east.	1
[redacted]	[redacted]	[redacted]	[redacted]	Possible discrete conductor	Broad, single line anomaly	3
[redacted]	[redacted]	[redacted]	[redacted]	Possible discrete conductor	Single line anomaly	3
MWE-10	BREM-2 BREM-3 BREM-4 BREM-6	426392	7742602	Possible to good discrete conductor	~600m str ke length; north-dipping; continuous across four survey lines.	1
MWE-11	BREM-9 BREM-10 BREM-11 BREM-13 BREM-15	427700	7742500	Possible to good discrete conductor	~800m str ke length; south-dipping; continuous across five survey lines.	1
[redacted]	[redacted]	[redacted]	[redacted]	Doubtful bedrock conductor beneath conductive cover	Single line anomaly	4
[redacted]	[redacted]	[redacted]	[redacted]	Poss ble bedrock conductor beneath conductive cover	Single line anomaly	3
[redacted]	[redacted]	[redacted]	[redacted]	Poss ble discrete conductor	Single line anomaly	3
[redacted]	[redacted]	[redacted]	[redacted]	Poss ble bedrock conductor beneath conductive cover	~400m str ke length	2

[redacted]

[redacted]



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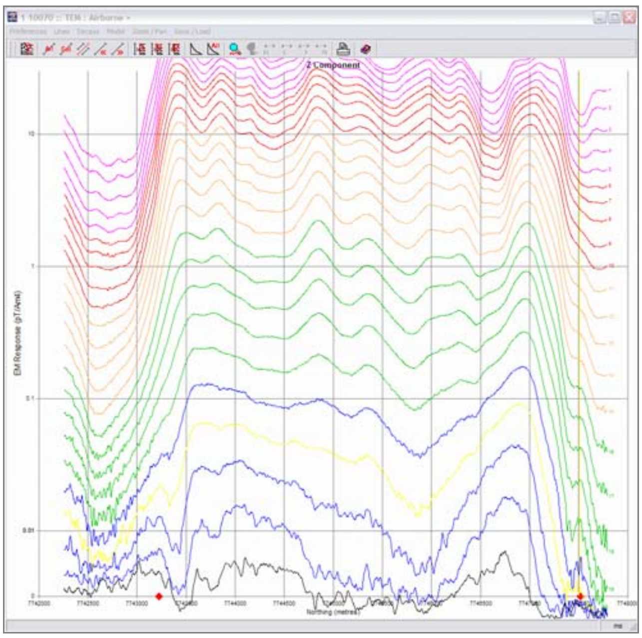

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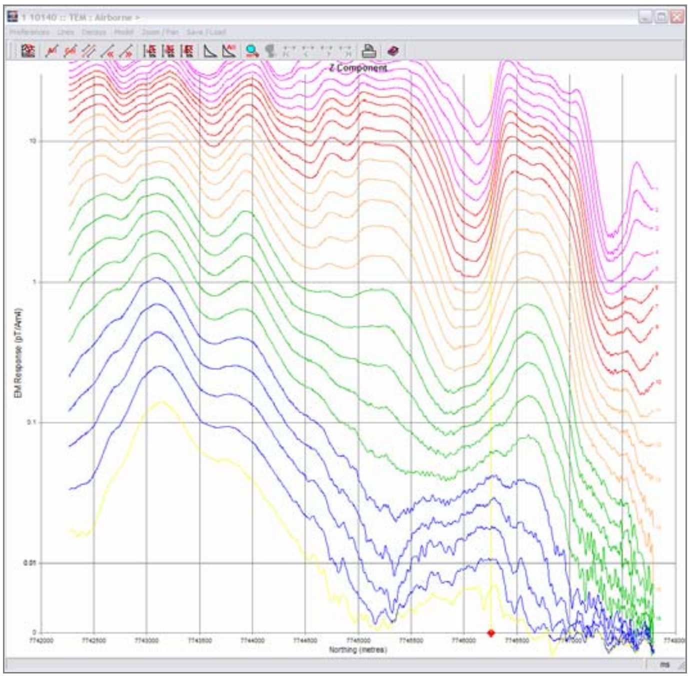

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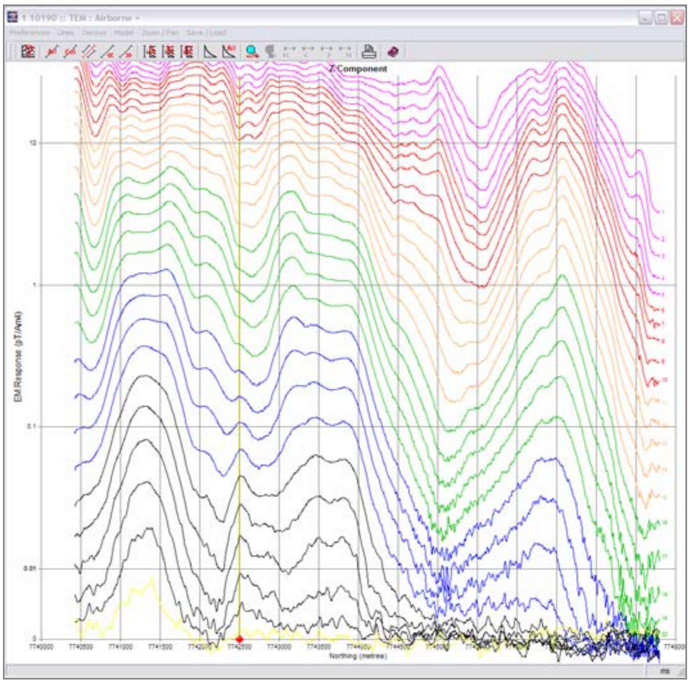

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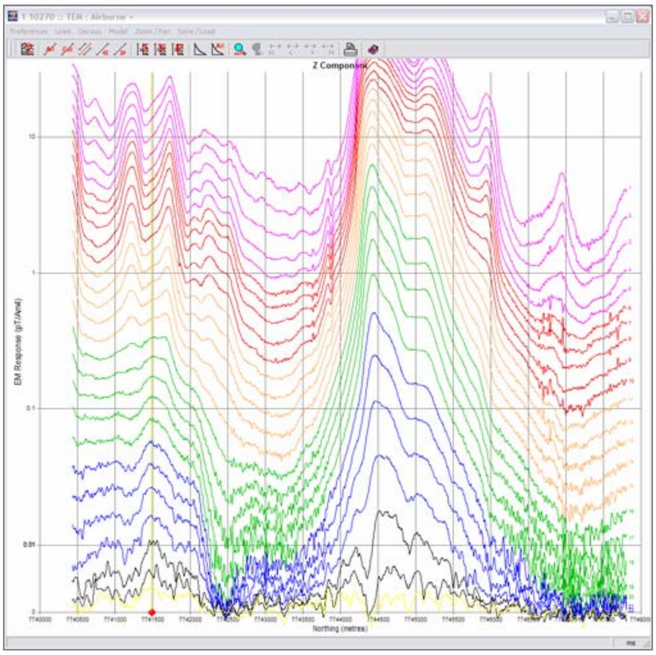

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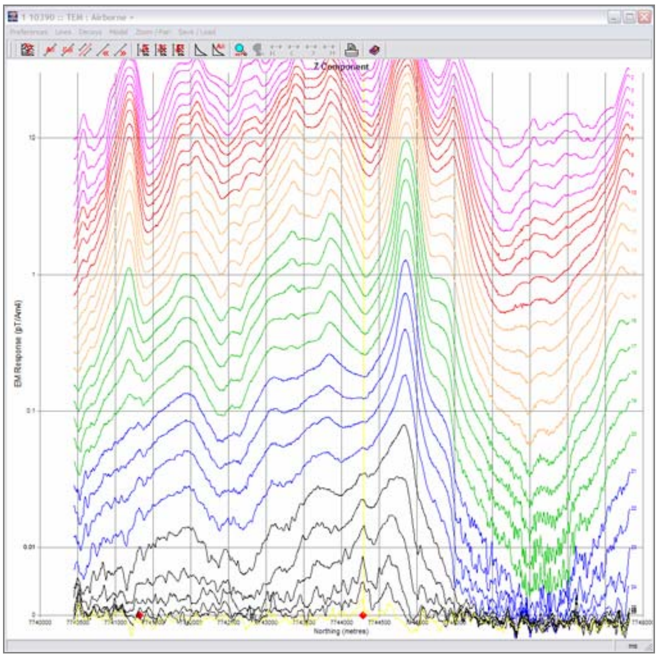

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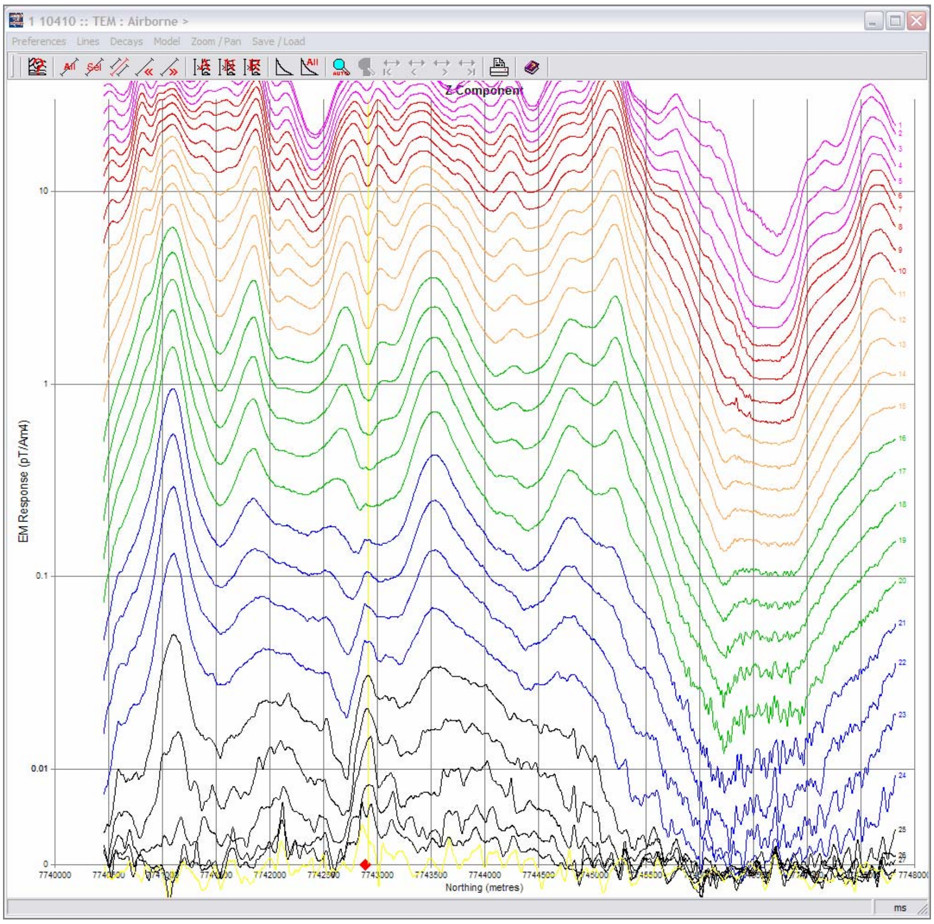

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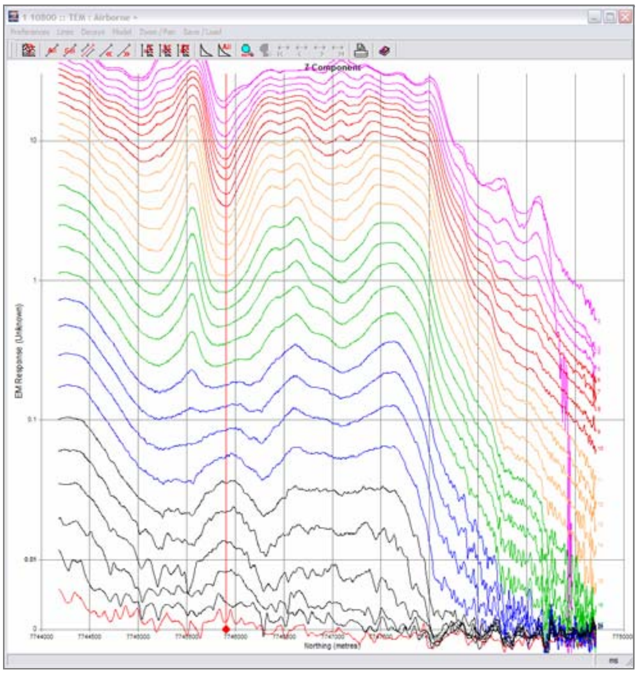

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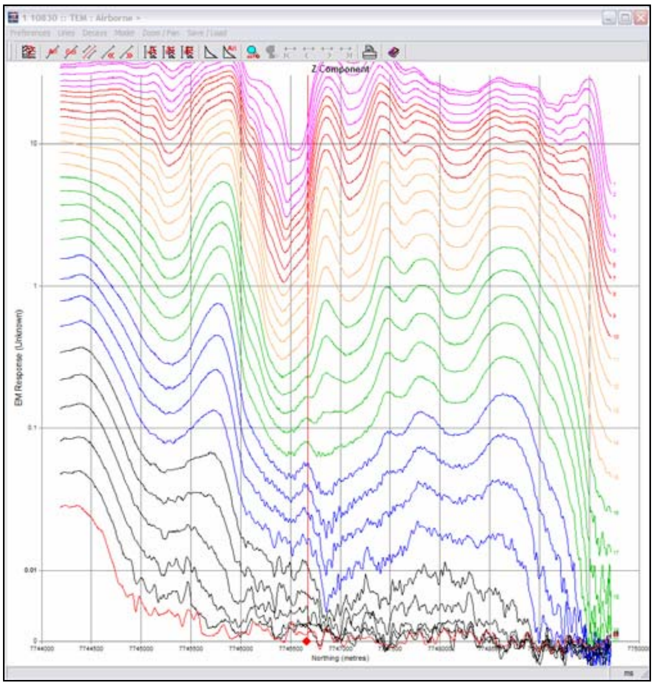

[redacted]

4.10 MWE-10 (426392E / 7742602N)

MWE-10 is defined by four moderate to strong anomalies (BREM-2 – BREM-6) with a strike length of ~650 m. It occurs within thin? Tertiary sediments northwest along strike from outcropping Trooper Creek sediments and dacitic volcanics. The anomaly is moderately broad, discrete and late-time (>ch30) and strongest on line 11630 (Figure 13). MWE-10 is a definite bedrock conductor and one of the strongest targets defined in this survey.

Modelling of MWE-10 indicates the source is a relatively large (~700 x 1000 m), low conductance (~30S) conductor dipping shallowly to the southwest (Figures 25-29). A drillhole targeting the modelled conductor has been designed and the hole details are reported in Table 3.

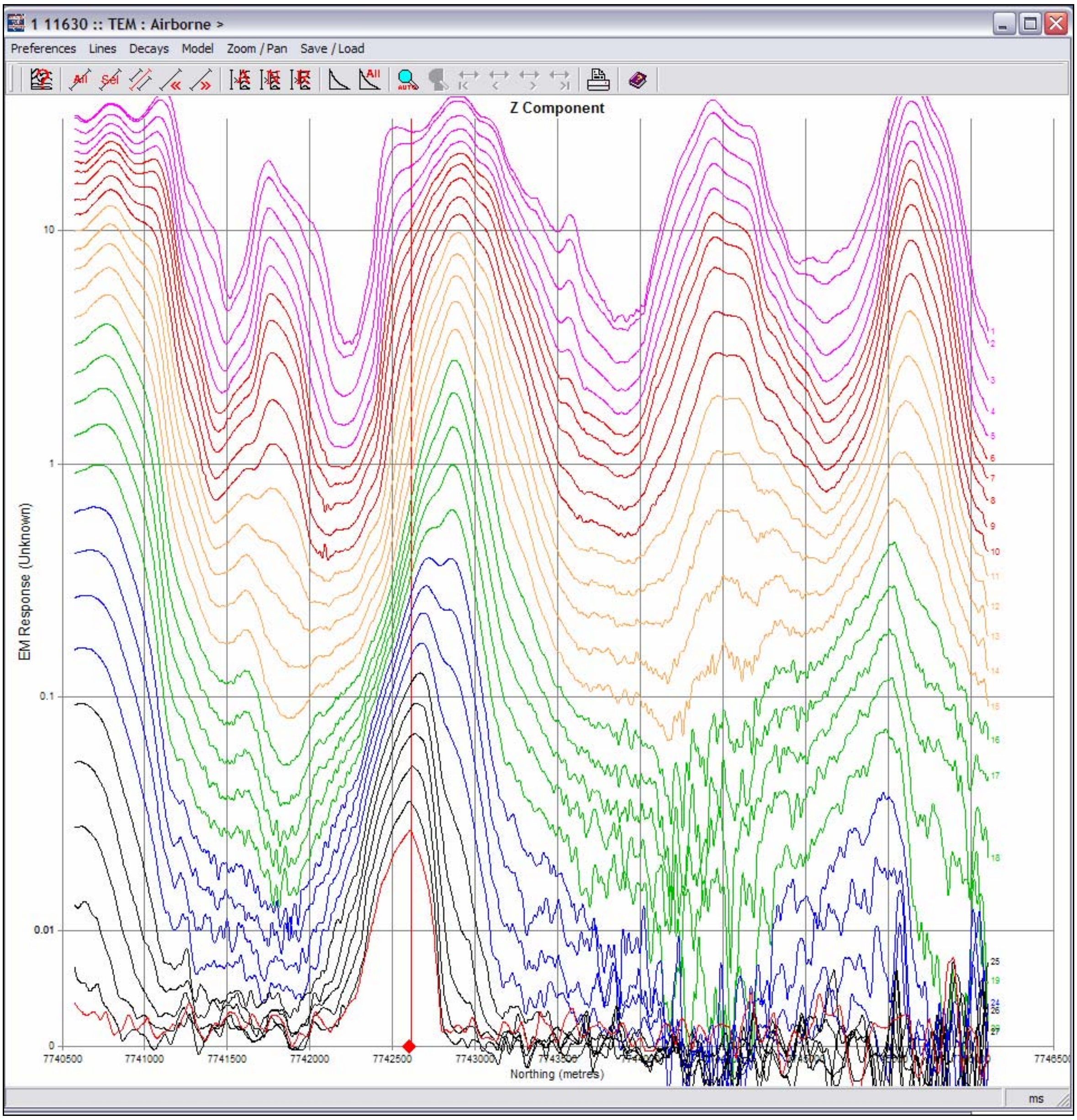

Figure 13. Log profile plot of line 11630 (ch1-30) showing MWE-10 (red marker and line).

4.11 MWE-11 (427764E / 7742499N)

MWE-11 is a moderate to strong early to late time anomaly occurring across five lines defining an E-W strike length of ~800m. It occurs within mapped outcropping mafic intrusives (gabbro, diorite, dolerite). The conductor is strongest on line 11690 (Figure 14) where the anomaly is discrete, relatively narrow and persistent to the latest times (>ch30).

Modelling of the anomaly was achieved with two relatively large (~850x560m; 315x1050m), low conductance, shallow south-dipping (20°) conductors (Figures 30-36). Drillholes targeting these conductors have been designed and the hole details are reported in Table 3.

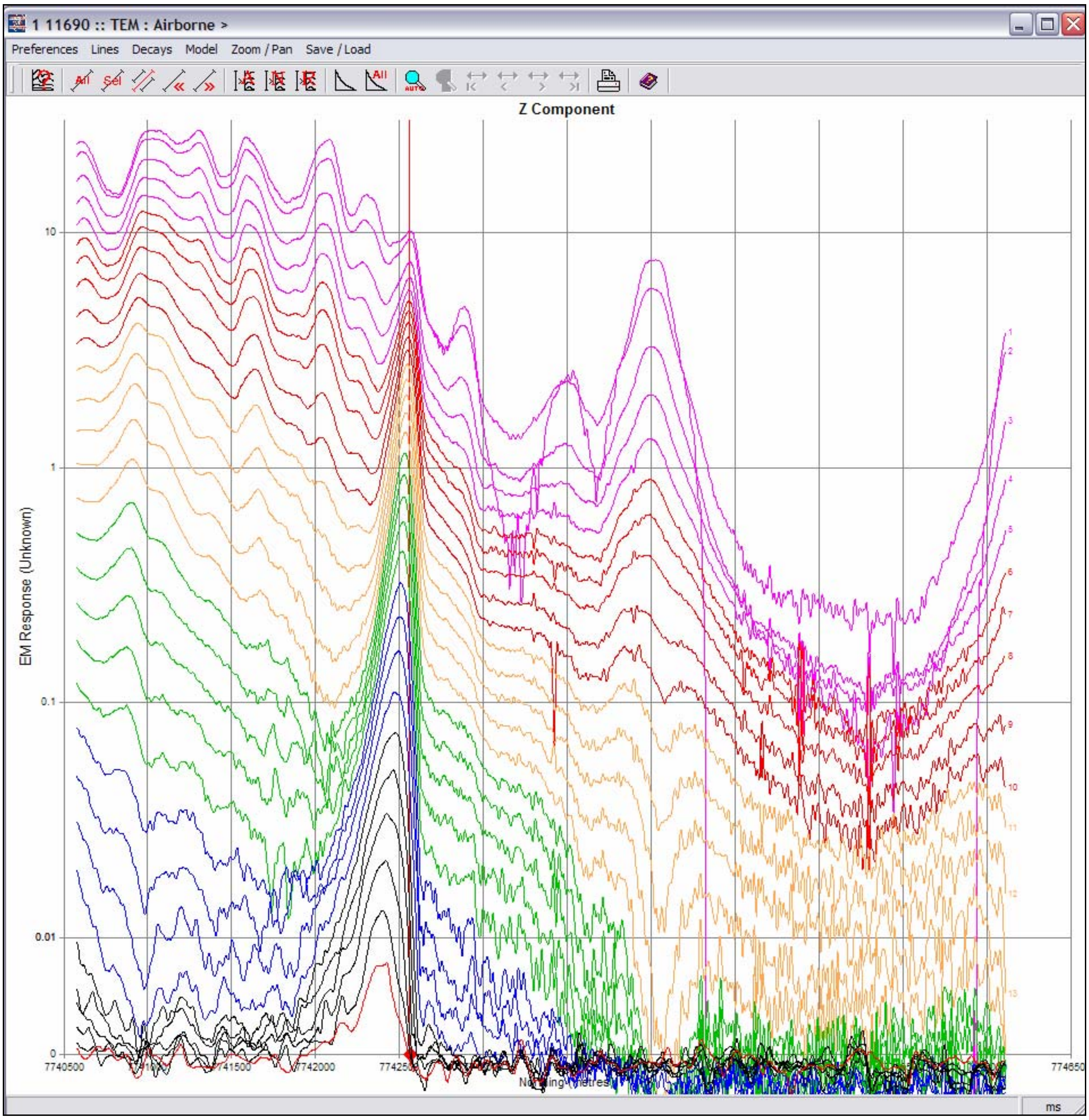

Figure 14. Log profile plot of line 11690 (ch1-30) showing MWE-11 (red marker and line).

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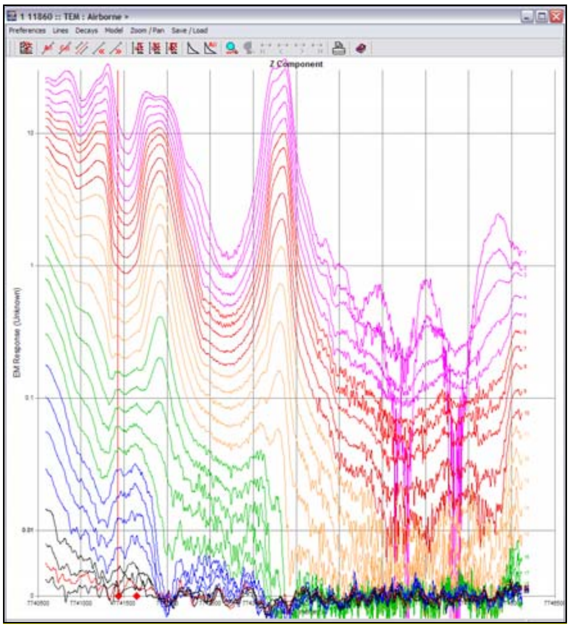

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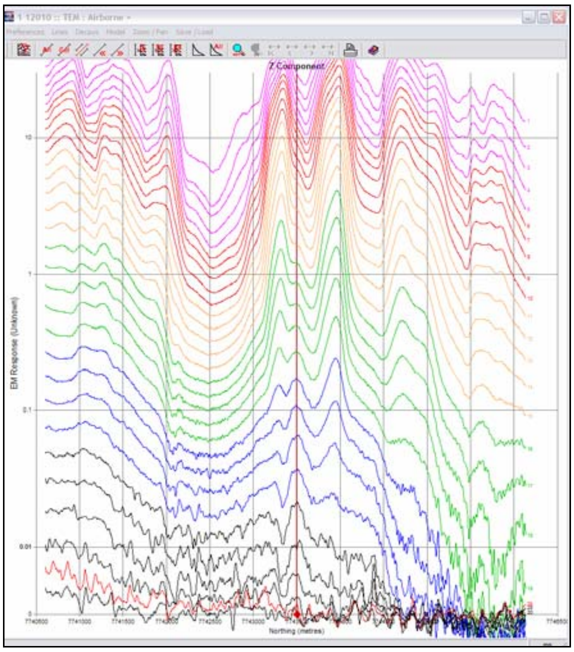

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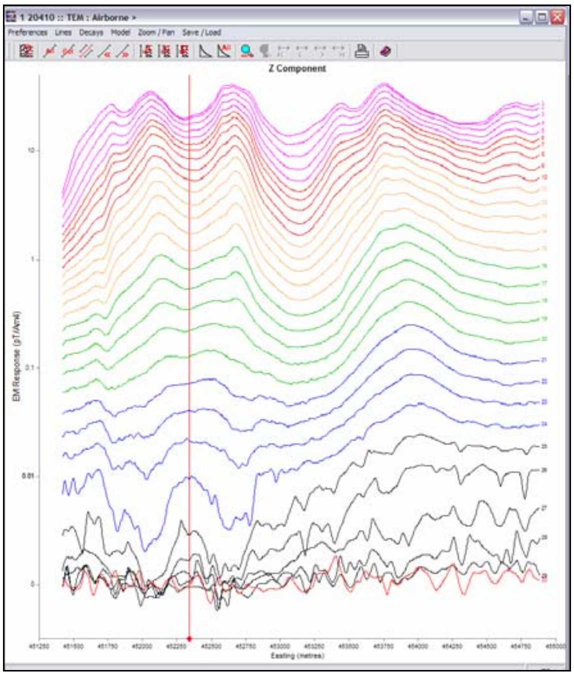

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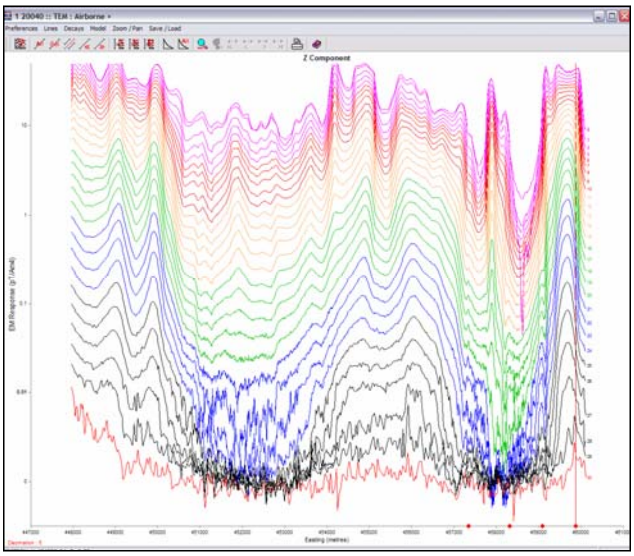


[redacted]

Table 3. Modelled parameters for conductors MWE-7, MWE-10 and MWE-11 with target drillhole specifications.

CONDUCTOR NAME	[redacted]	MWE-10	MWE-11a	MWE-11b
Easting (MGA)	[redacted]	426627	427649	4277991
Northing (MGA)	[redacted]	7742814	7742659	7742699
Depth (to centre top of plate) (m)	[redacted]	116	162	65
Strike length (m)	[redacted]	1051	855	315
Depth extent (m)	[redacted]	680	564	1053
Dip (°)	[redacted]	18	20	20
Dip direction (°)	[redacted]	222	187	167
Plunge (°)	[redacted]	0	0	0
Conductivity-thickness (S)	[redacted]	30	29	41
TARGET DRILLHOLE				
Easting (MGA)	[redacted]	426525	427600	428050
Northing (MGA)	[redacted]	7742725	7742480	7742500
Azimuth (°)	[redacted]	45	0	0
Dip (°)	[redacted]	-60	-60	-60
Target depth (m downhole)	[redacted]	160	220	135
Recommended EOH (m downhole)	[redacted]	190	250	165

5. SUMMARY AND CONCLUSIONS

VTEM surveying was carried out at the Mt Windsor Volcanics project by Geotech Airborne Limited between May 28th and June 12th 2007 on behalf of Liontown Resources Limited. A total of 1662.6 line kilometres, comprising 301 survey lines and covering ~328.58 km^2, were flown between the Liontown and Bullseye areas, with coverage extending over the Blenheim, Kagara, Gregory, Britannia and Britannia Extended areas.

The Tertiary Campaspe Formation cover sequence is highly conductive and limits the depth penetration and hence efficacy of the airborne, and likely surface, EM method. The VTEM surveying has successfully mapped out those areas of high conductivity cover and/or increased thickness of conductive cover over which further surveying with EM methods is unlikely to be successful.

All final VTEM survey data were interpreted on a line-by-line basis to provide a comprehensive full interpretation, maximising the chances of defining potential conductive sources of interest.

A total of 127 anomalies were picked from the VTEM profiles. Approximately 80% of these are attributed to lobe effects on conductor margins, artefacts due to negative polarisation of conductive cover or cultural anomalies (buildings, powerlines, pipelines). The remaining anomalies are interpreted to delineate 15 VTEM conductors that may have a bedrock source. Of these 15 conductors, [redacted] MWE-10 and MWE-11 are the only moderate to strong conductors and are considered the highest priority targets. The remaining conductors have been ranked (Priority 2-4) based on anomaly quality.

[redacted] Modelling of MWE-10 and MWE-11 indicates they are large, shallow-dipping, low conductance sources and are most likely stratigraphic conductors.

Core testing of mineralised and unmineralised samples from the Liontown area prior to VTEM surveying showed the orebody to be a poor conductor (<5 S.m^{-1}). One aim of this VTEM survey was to potentially identify new mineralisation similar to the conductive orebodies at Thalanga and Highway Reward. However, no such conductors have been identified and it withstands that potential mineralisation in the VTEM survey area is insufficiently conductive to generate a VTEM response and/or masked by conductive overburden. Sphalerite-rich orebodies may be very poorly conductive and other geophysical techniques may be required to possibly define/delineate them.

Follow-up work on those weaker conductors defined and discussed here should still be carried out and recommendations are made below.

6. RECOMMENDATIONS

All VTEM conductors (MWE-1 to MWE-15) should be investigated and ranked with all available geological and geochemical information; this should also include field checking. VTEM anomalies ranked lower in this report but occurring within areas of exploration interest should also be investigated for prospectivity.

Any VTEM anomalies highlighted from further investigations as having exploration potential should be modelled from the VTEM data. It is recommended that surface TEM surveys be carried out over VTEM anomalies of interest prior to any drill testing to further refine the modelling. This will optimise targeting should drill testing be warranted.

DHEM surveying is recommended on LTD0041 and all drilled EM targets particularly those which do not intersect mineralisation as the conductive target may occur off-hole.

Surface and downhole MMR and/or IP surveying could also be utilised in prospective geological settings. Core-testing of the Liontown ore shows it to be an average of ~15 times more chargeable than barren samples (1-16 ms vs. 22-389 ms) excluding shale units that have chargeabilities of 115-158 ms.

APPENDIX 1

Digital VTEM Datasets

Final Located Data

SGC final processed data – Full ASCII dataset *.csv

Geotech final processed data and associated information – Geosoft database (*.gdb), Geosoft grid (*.grd), PDFs

Additional Data Products

Contours for VTEM channels 4-30 (MapInfo *.tab)

Geotiffs for all VTEM channels - Linear (MapInfo *.tab)

Profiles for VTEM channels 5, 10, 15, 20, 25 and 30 (MapInfo *.tab)

Movie files for all VTEM channels - Linear (*.wmv)

Geotiffs of VTEM CDIs – 25m, 50m, 75m, 100m, 150m, 200m, 250m, 300m, 350m, 400m (MapInfo *.tab)

Flightpath of VTEM survey lines (MapInfo *.tab)

Interpretation Datasets

Final Interpretation – Anomalies, conductors, trends, conductive zones, conductor axes (MapInfo *.tab)

Modelling Datasets

Model plates – 3D DXF, MapInfo *.tab

Target drillholes – 3D DXF, MapInfo *.tab

** All digital data located on the accompanying DVD in the folder: \Appendix 1 - Digital VTEM Datasets\

APPENDIX 2

VTEM Standard Profiles with CDIs

APPENDIX 3

Table of All Interpreted VTEM Anomalies

Anomaly	Conductor	Easting_MGA55	Northing_MGA55	Anomaly Type	Comments
BREM-1		426205	7741655	A	
BREM-2	MWE-10	426204	7742615	D	Bedrock conductor dipping to the north.
BREM-3	MWE-10	426392	7742602	C	Strong bedrock conductor dipping to the north.
BREM-4	MWE-10	426599	7742466	D	Bedrock conductor dipping to the north.
BREM-5		426595	7744661	A	
BREM-6	MWE-10	426807	7742402	I	
BREM-7		427185	7742415	H	Powerline monitor spike. Powerline or underground pipeline.
BREM-8		427401	7741147	A	
BREM-9	MWE-11	427397	7742574	D	Sou h-dipping stratigraphic conductor.
BREM-10	MWE-11	427590	7742564	C	Strong south-dipping stratigraphic conductor.
BREM-11	MWE-11	427803	7742538	C	Strong south-dipping stratigraphic conductor.
BREM-12		428003	7741431	H	Powerline monitor spike. Underground pipeline.
BREM-13	MWE-11	428001	7742531	D	Sou h-dipping stratigraphic conductor.
BREM-14		428202	7741238	H	Powerline monitor spike. Underground pipeline.
BREM-15	MWE-11	428203	7742453	D	Sou h-dipping stratigraphic conductor.
BREM-16		428607	7743364	A	
BREM-17		428612	7743734	A	
BREM-18		428785	7743358	A	
BREM-19		428797	7743640	A	
BREM-20		429606	7743651	B	
BREM-21		429604	7743977	B	
BREM-22		429996	7741314	G	
BREM-23		430007	7742331	A	
BREM-24		430202	7742285	B	
BREM-25		430405	7742271	A	
BREM-26		430417	7746073	H	
BREM-27	MWE-12	430997	7741439	F	
BREM-28		430996	7741644	B	
BREM-29		431204	7741763	B	
BREM-30		431392	7741856	E	
BREM-31		431400	7743151	B	
BREM-32		431603	7741888	B	
BREM-33		432203	7742691	A	
BREM-34		432200	7742989	G	
BREM-35		[redacted]	[redacted]	A	
BREM-36		432396	7744346	G	
BREM-37		432599	7744935	G	
BREM-38		433007	7745128	G	
BREM-39		433205	7745019	B	
BREM-40		[redacted]	[redacted]	A	
BREM-41		433402	7744665	B	
BREM-42		433402	7745095	B	
BREM-43		[redacted]	[redacted]	G	
BREM-44	MWE-13	[redacted]	[redacted]	I	
BREM-45		[redacted]	[redacted]	A	
BREM-46		435393	7745430	B	
BREM-47		435598	7745401	E	

Anomaly	Conductor	Easting_MGA55	Northing_MGA55	Anomaly Type	Comments
BREM-48		435802	7745368	B	
BREM-49		435998	7745278	B	
BXEM-1		[redacted]	[redacted]	A	
BXEM-2		[redacted]	[redacted]	A	
BXEM-3		441005	7743634	B	
BXEM-4		[redacted]	[redacted]	B	
BXEM-5		[redacted]	[redacted]	G	
BEEM-1	MWE-15	[redacted]	[redacted]	I	Marginal.
BEEM-2	MWE-15	[redacted]	[redacted]	B	
BEEM-3		[redacted]	[redacted]	B	
BEEM-4		[redacted]	[redacted]	B	
BEEM-5		[redacted]	[redacted]	A	
BEEM-6	MWE-15	[redacted]	[redacted]	I	
BEEM-7		[redacted]	[redacted]	G	Broad.
BEEM-8		[redacted]	[redacted]	B	
BEEM-9		[redacted]	[redacted]	A	
BEEM-10		[redacted]	[redacted]	G	
BEEM-11		[redacted]	[redacted]	A	
BEEM-12		[redacted]	[redacted]	B	
BEEM-13		[redacted]	[redacted]	A	
BEEM-14		[redacted]	[redacted]	G	Possible culture?
BEEM-15		[redacted]	[redacted]	B	
BEEM-16		[redacted]	[redacted]	H	Possible culture or noise?
BEEM-17		[redacted]	[redacted]	A	
BEEM-18		[redacted]	[redacted]	H	
BEEM-19		[redacted]	[redacted]	A	
BEEM-20		[redacted]	[redacted]	A	
BEEM-21		[redacted]	[redacted]	H	
BEEM-22	MWE-14	[redacted]	[redacted]	D	
BEEM-23		[redacted]	[redacted]	G	
BEEM-24		[redacted]	[redacted]	B	
GEM-1		[redacted]	[redacted]	G	
GEM-2		419594	7744632	G	
GEM-3		419800	7744505	G	
GEM-4		420996	7744031	B	
GEM-5		421190	7744006	B	
GEM-6		421800	7743416	B	
GEM-7		423006	7743093	G	
GEM-8		422994	7745213	B	
GEM-9		423193	7743135	H	Possible culture.
GEM-10		423403	7742744	G	
GEM-11		423803	7742616	B	
GEM-12		423995	7742492	G	Broad.
GEM-13		424996	7743011	G	
KBEM-1		[redacted]	[redacted]	G	
KBEM-2		[redacted]	[redacted]	G	
KBEM-3		[redacted]	[redacted]	A	

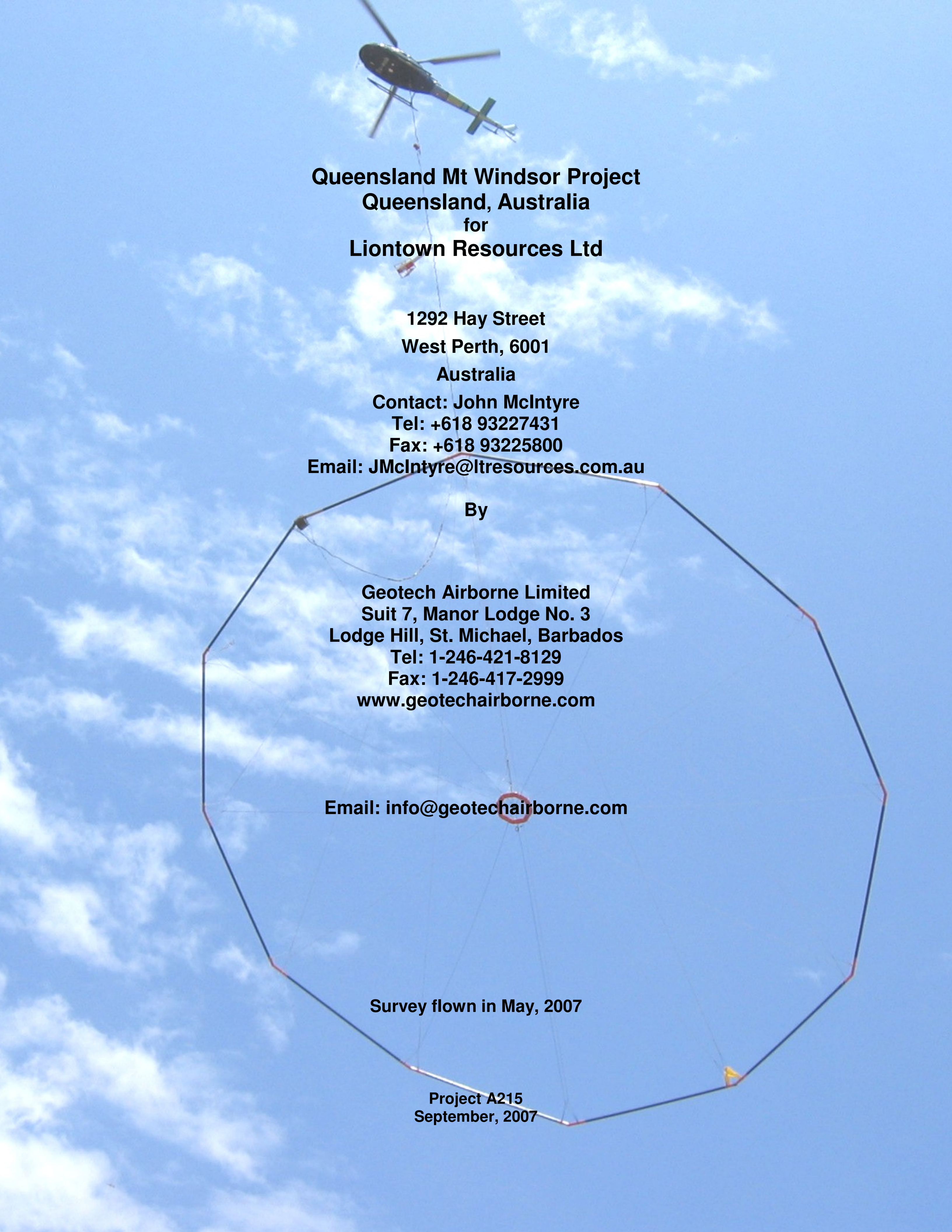
Anomaly	Conductor	Easting_MGA55	Northing_MGA55	Anomaly Type	Comments
KBEM-4		[redacted]	[redacted]	G	
KBEM-5		[redacted]	[redacted]	A	
KBEM-6		[redacted]	[redacted]	A	
KBEM-7	MWE-8	[redacted]	[redacted]	D	Broad.
KBEM-8	MWE-9	[redacted]	[redacted]	D	
LTEM-1		[redacted]	[redacted]	A	
LTEM-2		394209	7746683	B	
LTEM-3	MWE-1	394600	7747396	C	
LTEM-4		[redacted]	[redacted]	A	
LTEM-5		[redacted]	[redacted]	A	
LTEM-6	MWE-2	395194	7747516	D	
LTEM-7		396000	7746368	B	
LTEM-8		396001	7746988	B	
LTEM-9		396203	7746373	B	
LTEM-10		396197	7746917	B	
LTEM-11		[redacted]	[redacted]	A	
LTEM-12	MWE-3	396608	7746257	D	Broad.
LTEM-13	MWE-4	[redacted]	[redacted]	D	
LTEM-14		[redacted]	[redacted]	E	
LTEM-15		[redacted]	[redacted]	E	
LTEM-16		[redacted]	[redacted]	B	
LTEM-17		[redacted]	[redacted]	B	
LTEM-18		[redacted]	[redacted]	A	
LTEM-19	MWE-5	[redacted]	[redacted]	F	
LTEM-20		[redacted]	[redacted]	B	
LTEM-21		[redacted]	[redacted]	G	
LTEM-22	MWE-6	[redacted]	[redacted]	D	
LTEM-23	MWE-7	[redacted]	[redacted]	C	
LTEM-24	MWE-7	[redacted]	[redacted]	G	
LTEM-25	MWE-7	[redacted]	[redacted]	A	
LTEM-26		[redacted]	[redacted]	H	Homestead.
LTEM-27		[redacted]	[redacted]	E	
LTEM-28		[redacted]	[redacted]	A	

KEY

A	Possible lobe peak
B	Possible artefact due to negative polarisa ion at edge of surficial conductive zone
C	Moderate to good discrete, narrow conductor peak
D	Possible discrete, narrow conductor peak
E	Probable artefact due to nega ive polarisation at edge of surficial conductive zone
F	Doubtful bedrock anomaly beneath surficial conduc ive zone
G	Doubtful discrete, narrow conductor peak
H	Cultural anomaly: building, powerline, pipeline
I	Possible bedrock anomaly beneath surficial conductive zone

APPENDIX 4

Contractor Logistics Report – Geotech Airborne Ltd



Queensland Mt Windsor Project
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Survey flown in May, 2007

Project A215
September, 2007

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APPENDICES

REPORT ON A HELICOPTER-BORNE
TIME DOMAIN ELECTROMAGNETIC SURVEY

Queensland Mt Windsor Project, Australia

Executive Summary

As part of the agreement between Geotech Airborne Ltd. and Liontown Resources Ltd., a helicopter borne geophysical survey has been completed over the Queensland Mt Windsor project area of Australia. The survey was carried out during the period from May 28th to June 12th, 2007.

Principal geophysical sensors included Geotech's versatile time domain electromagnetic system (VTEM) and a cesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter. A total of 1662.60 line-km were flown in an area of approximately 328.58 km^2.

In-field data processing involved quality control and compilation of data collected during the acquisition stage, using the in-field processing centre established at Charters Towers, Australia. Final data processing, including generation of final digital data products were done at the office of Geotech Airborne Limited in Johannesburg, South Africa.

The processed survey results are presented as total magnetic field and stacked time domain electromagnetic profiles.

Digital data include all electromagnetic and magnetic products, as well as positional, altitude and raw data.

1. INTRODUCTION

1.1 General Considerations

These services are the result of the agreement signed between Geotech Airborne Ltd. and Liontown Resources Ltd. to perform a helicopter-borne geophysical survey over the Queensland Mt Windsor Project area of Australia.

John McIntyre acted on behalf of Liontown Resources Ltd. during data acquisition phases of this project. The survey blocks are as shown in Appendix A. The crew was based in Charters Towers for the acquisition phase of survey, as shown in Section 2 of this report.

The helicopter was based at Charters Towers for the duration of the survey. Survey flying was completed by June 12th, 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 Johannesburg office of Geotech Airborne Ltd. by October, 2007.

1.2. Survey and System Specifications

The survey was flown at nominal traverse line spacing of 200m in directions N-S for block Liontown_all and E-W for block Bullseyes.
No tie lines were flown. The helicopter maintained a mean terrain clearance of 92.8 metres which translated into an average height of 42.8 metres above ground for the bird-mounted VTEM system and 80.8 metres above ground for the magnetic sensor.

The survey was completed using an AS350-B3 helicopter, registration VH-OUF, operated by Heli-Aust. Details of the survey specifications are 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 Airborne Ltd. Digital databases, grids and maps of final products were presented to Liontown Resources Ltd. The survey report describes the procedures for data acquisition, processing, final image presentation and the specifications for the digital data set.

2. DATA ACQUISITION

2.1. *Survey Area*

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

Blocks	Line spacing (m)	Area (Km^2)	Line Distance (km)	Flight direction	Line number
Liontown all	200	252.04	1271.55	N-S	L10020 – L12530, 19000
Bullseyes	200	76.96	391.05	E-W	L20010 – L20470

Table 1 – Survey blocks

Survey blocks boundary co-ordinates are provided in Appendix B.

2.2. *Survey Operations*

Survey operations were based at Charters Towers for the acquisition phase of the survey.

The following table shows the timing of the survey.

Date	Crew Location	Flight #	Km flown	Comments
29-May-07	Charters Towers	1	128.7	Production
30-May-07	Charters Towers	2, 3, 4	285.3	Production
31-May-07	Charters Towers			Trouble shooting; pilot on mandatory rest
1-June-07	Charters Towers	5, 6, 7	244.4	Production
2- June -07	Charters Towers	8 aborted	0	F08 aborted, equipment repair
3- June -07	Charters Towers	8, 9	116.2	Production; altimeter failure on F09
4- June -07	Charters Towers	10	73.1	Flight stopped due to rain
5- June -07	Charters Towers			Bad weather

6- June -07	Charters Towers			Bad weather
7- June -07	Charters Towers			Bad weather
8- June -07	Charters Towers	11 aborted		Altimeter failure; very strong winds; bad weather
9- June -07	Charters Towers	11, 12, 13	318.4	Production
10- June -07	Charters Towers	14, 15	185.0	Production
11- June -07	Charters Towers	16, 17, 18	290.3	Production
12- June -07	Charters Towers	19	15.4	Production

Table 2 – Survey schedule

2.3. Flight Specifications

The nominal EM sensor terrain clearance was 30 metres (EM bird height above ground, i.e. helicopter is maintained 80 metres above ground). Nominal survey speed was 80 km/hour. The data recording rates of the data acquisition was 0.1 second for electromagnetic 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 camp 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 AS350-B3 helicopter, registration VH-OUF- owned and operated by Heli-Aust was used. Installation of the geophysical and ancillary equipment was carried out by Geotech Airborne Ltd.

2.4.2. Electromagnetic System

The electromagnetic system was Geotech's Versatile Time Domain EM (VTEM) system. The layout is as indicated in Figure 1 below.

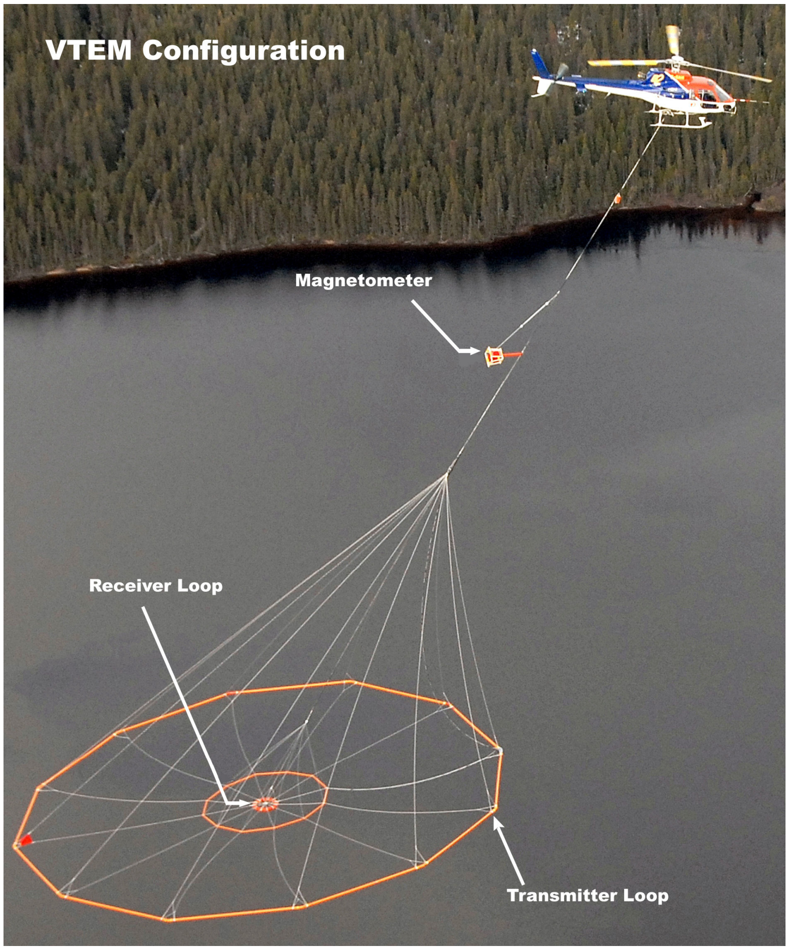


Figure 1 – VTEM configuration

Receiver and transmitter coils are concentric and Z-direction oriented.

The receiver decay recording scheme is shown diagrammatically in Figure 2.

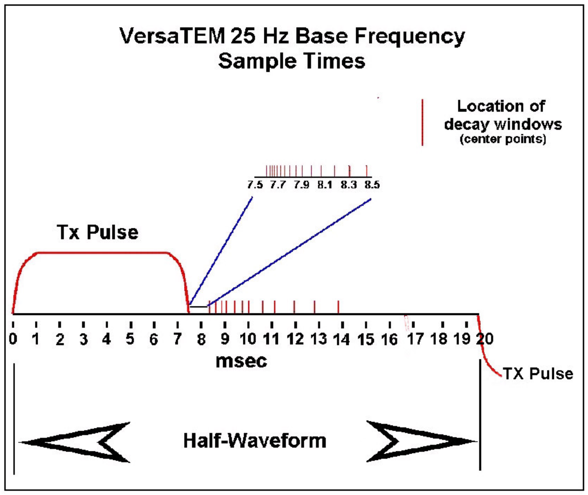


Figure 2 – Sample times

Twenty-seven measurement gates were used in the range from 130 µs to 8900 µs, as shown in the following table.

VTEM Decay Sampling scheme (Microseconds)			
Time gate	**Start**	**End**	**Width**
130	120	140	20
150	140	160	20
170	160	180	20
190	180	205	25
220	205	240	35
260	240	280	40
300	280	325	45
350	325	380	55
410	380	445	65
480	445	525	80
570	525	625	100
680	625	745	120
810	745	885	140
960	885	1045	160
1130	1045	1235	190
1340	1235	1470	235
1600	1470	1750	280
1900	1750	2070	320
2240	2070	2450	380
2660	2450	2920	470
3180	2920	3480	560
3780	3480	4120	640
4460	4120	4880	760
5300	4880	5820	940
6340	5820	6860	1040
7540	6860	8220	1360
8900	8220	9740	1820

Table 3 – VTEM decay sampling scheme.

Transmitter coil diameter was 26 metres; the number of turns was 4.
Transmitter pulse repetition rate was 25 Hz.
Peak current was 157 Amp.
Duty cycle was 48.8%.
Peak dipole moment was 333,557 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 52 metres 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 on a separate bird towed 12 m 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 30 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 navigation 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 blocks 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. Contents and update rates were as follows:

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 combined 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 where the crew was based, 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 personnel were involved in the project

Field Crew Members:

Geophysicist:	Rafael Coyoli
Operators:	Kim Bignell/Mikhail Maslennikof

The survey pilot was employed directly by the helicopter operator – Heli-Aust.

Pilot:	Martin Gambril

Office:

Preliminary Data Processing:	Rafael Coyoli
Final Data Processing / Reporting:	Willem Botha

Final data processing at the office of Geotech Airborne Ltd. In Johannesburg, South Africa was carried out under the supervision of Malcolm Moreton.

Overall management of the survey was carried out from the Johannesburg office of Geotech Airborne Ltd. by Keith Fisk, Managing Partner and Director.

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 GDA94, MGA55S 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 spheric events and to reduce system noise. Local spheric 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 spheric 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 early as well as late gate times, in linear scale on the preliminary maps and on linear/log scale on the final maps.

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

The VTEM output voltage of the receiver coil 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 aero magnetic data was corrected for diurnal variations by subtracting the observed magnetic base station deviations.

The corrected magnetic data from the survey 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.

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 PDF format.

5.2. Gridded Data

Total magnetic field grid is provided to Liontown Resources Ltd in Geosoft GRD format.

Grid cell size of 50 metres was used.

5.3. Digital Data

Two copies of CDs were prepared.

There are two (2) main directories for each block,

Data: contains databases, grids and maps, as described below.

Report: contains a copy of the report and appendixes in PDF format.

- Databases in Geosoft .GDB format containing the following channels, for each survey block:

X:	X positional data (metres –GDA94 Projection :MGA55S)
Y:	Y positional data (metres –GDA94 Projection :MGA55S)
Long:	Longitude (WGS 84)
Lat:	Latitude (WGS 84)
Z:	GPS antenna elevation (metres - ASL)
Gtime1:	GPS time (seconds of the day)
Radar:	Helicopter terrain clearance from radar altimeter (metres)
Radarb:	EM sensor height terrain clearance (metres)
DEM:	Digital elevation model data (metres)
Mag1:	Raw Total Magnetic field data (nT)
Basemag:	Magnetic diurnal variation data (nT)
Mag2:	Total Magnetic field diurnal variation corrected data (nT)

Mag3:	Microlevelled Magnetic data (nT) (Liontown_all block only)
C130f:	Raw 130 microsecond time channel ($pV/A/m^4$)
C150f:	Raw 150 microsecond time channel ($pV/A/m^4$)
C170f:	Raw 170 microsecond time channel ($pV/A/m^4$)
C190f:	Raw 190 microsecond time channel ($pV/A/m^4$)
C220f:	Raw 220 microsecond time channel ($pV/A/m^4$)
C260f:	Raw 260 microsecond time channel ($pV/A/m^4$)
C300f:	Raw 300 microsecond time channel ($pV/A/m^4$)
C350f:	Raw 350 microsecond time channel ($pV/A/m^4$)
C410f:	Raw 410 microsecond time channel ($pV/A/m^4$)
C480f:	Raw 480 microsecond time channel ($pV/A/m^4$)
C570f:	Raw 570 microsecond time channel ($pV/A/m^4$)
C680f:	Raw 680 microsecond time channel ($pV/A/m^4$)
C810f:	Raw 810 microsecond time channel ($pV/A/m^4$)
C960f:	Raw 960 microsecond time channel ($pV/A/m^4$)
C1130f:	Raw 1130 microsecond time channel ($pV/A/m^4$)
C1340f:	Raw 1340 microsecond time channel ($pV/A/m^4$)
C1600f:	Raw 1600 microsecond time channel ($pV/A/m^4$)
C1900f:	Raw 1900 microsecond time channel ($pV/A/m^4$)
C2240f:	Raw 2240 microsecond time channel ($pV/A/m^4$)
C2660f:	Raw 2660 microsecond time channel ($pV/A/m^4$)
C3180f:	Raw 3180 microsecond time channel ($pV/A/m^4$)
C3780f:	Raw 3780 microsecond time channel ($pV/A/m^4$)
C4460f:	Raw 4460 microsecond time channel ($pV/A/m^4$)
C5300f:	Raw 5300 microsecond time channel ($pV/A/m^4$)
C6340f:	Raw 6340 microsecond time channel ($pV/A/m^4$)
C7540f:	Raw 7540 microsecond time channel ($pV/A/m^4$)
C8900f:	Raw 8900 microsecond time channel ($pV/A/m^4$)
PLinef:	Power line monitor

- **Grids in Geosoft .GRD format, as follow,**

Mag2_Bullseyes.grd: Total magnetic intensity (nT) diurnally corrected
Mag3_Liontown all.grd: Total magnetic intensity (nT) diurnally corrected and microlevelled.

A Geosoft .GRD file has a .GI metadata file associated with it, containing grid projection information.

- **Maps in Geosoft .MAP format, as follow,**

A215_Mag_Liontown_all: Total magnetic intensity contours and colour image
A215_Mag_Bullseyes: Total magnetic intensity contours and colour image

A215_EM_Log_Liontown_all: VTEM dB/dt profiles, Time Gates 0.22 - 6.34 ms in linear – logarithmic scale

A215_EM_Log_Bullseyes: VTEM dB/dt profiles, Time Gates 0.22 - 6.34 ms in linear – logarithmic scale

- ASCII file **VTEM_WaveForm.gdb** in Geosoft format contains the following channel:

  Volt: output voltage of the receiver coil
  (Volts, sampling rate 20 microseconds)

  This file is found in the REPORT directory of the CD.

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

6. CONCLUSIONS

A versatile time domain electromagnetic helicopter borne geophysical survey has been completed over the Queensland Mt Windsor Project areas of Australia.

The total area coverage is approximately
Liontown all: 252.04 km^2.
Bullseyes : 76.96 km^2.
Total survey line coverage is
Liontown all: 1271.55 line-km
Bullseyes: 391.05 line-km.
The principal sensors included a Geotech Versatile Time-Domain EM system and a magnetometer. Results have been presented as colour contour total magnetic field maps and stacked EM profiles at a scale of
Liontown all: 1:50,000
Bullseyes: 1:20,000.

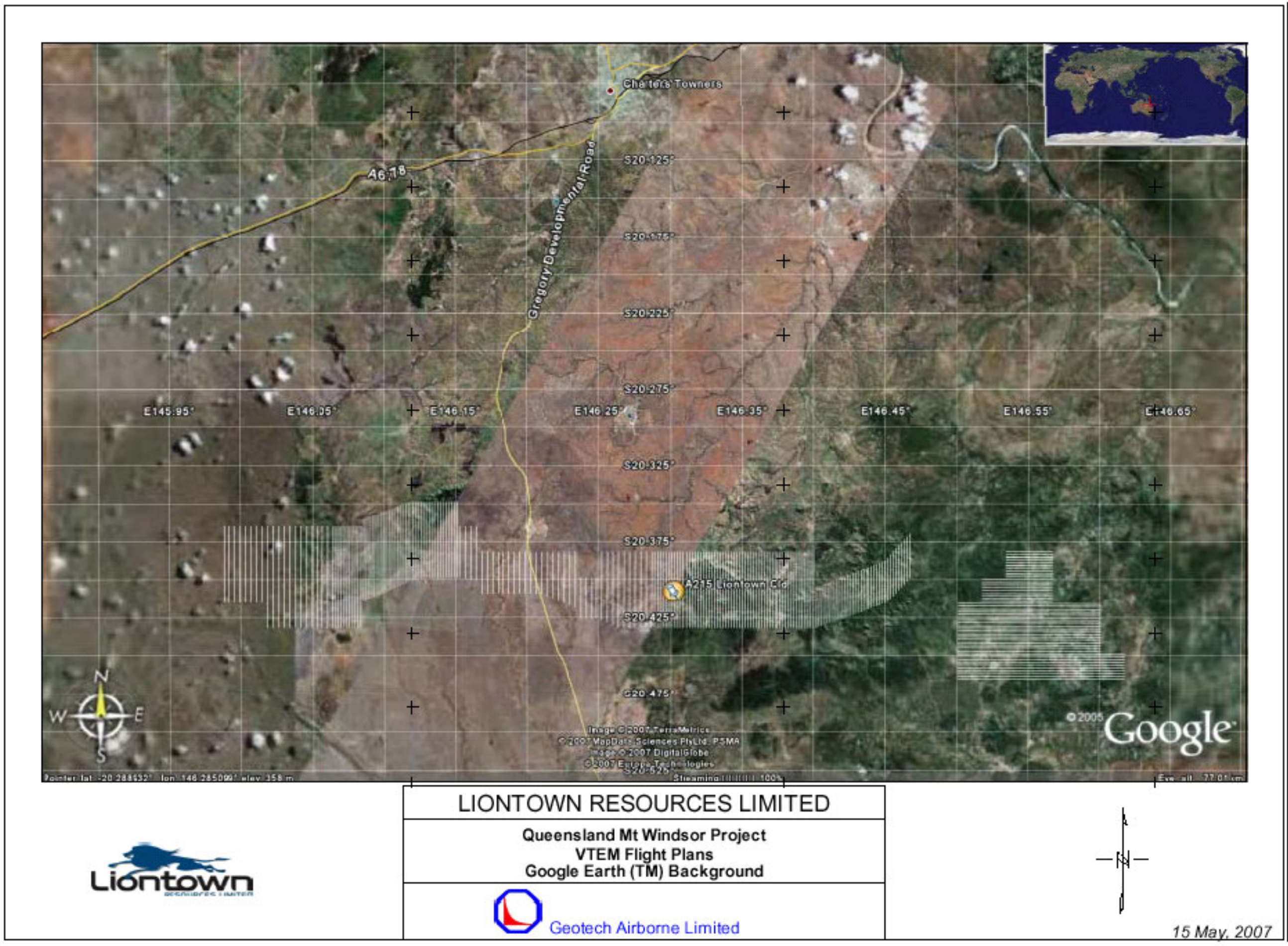
A number of EM anomaly groupings can be identified. Ground follow-up of those anomalies should be carried out if favourably supported by other geoscientific data.

Respectfully submitted,

Willem Botha,
Geotech Airborne Limited

APPENDIX A

SURVEY AREA LOCATION MAP



APPENDIX B

QUEENSLAND MT WINDSOR PROJECT AREA COORDINATES
(GDA94 Projection :MGA55S)

GDA94 Projection :MGA55S	GDA94 Projection :MGA55S
Main Area	
394044.4	7742251.0
394008.6	7747783.6
404446.6	7747845.2
404444.0	7748327.7
407065.5	7749355.9
407958.4	7749710.0
411400.0	7749726.9
411405.3	7747883.6
411405.3	7747883.6
413143.3	7747891.2
413154.2	7746048.0
420109.7	7746080.5
420118.3	7744235.9
421857.5	7744244.0
421850.7	7746089.9
424488.7	7746101.2
437485.9	7746148.8
437512.9	7743575.7
442598.3	7745528.7
444454.2	7747543.0
444466.8	7744333.5
442732.3	7742482.0
437522.5	7740619.3
425640.2	7740570.9
423302.5	7740558.9
423302.5	7740558.9
421747.8	7741227.7
420118.4	7741227.7
420113.6	7741963.1
417585.5	7743054.1
413158.9	7743054.1
413149.2	7743933.7
411432.6	7744196.7
408477.2	7744171.5
404470.7	7742334.6
404491.9	7740472.4
397533.4	7740427.6
397522.4	7742272.2

394044.4	7742251.0
Kagara & Blenheim Infill	
404444.0	7748328.0
407958.0	7749710.0
411400.0	7749727.0
411432.6	7744196.7
408477.2	7744171.5
404470.7	7742334.6
404491.9	7740472.4
402534.8	7740459.8
402571.0	7747834.1
404446.6	7747845.2
Brittania Infill	
437513	7746149
437517	7742465
437522	7740619
425640	7740571
425627	7746105
Brittania Extension Infill	
437513	7743576
442598	7745529
444454	7747543
444467	7744334
442732	7742482
437522	7740619
437513	7743576
Bullseye	
447950	7742500
449688	7742504
449682	7744348
451423	7744355
451416	7746198
454894	7746207
454875	7742549
458382	7742527
458391	7738838
460129	7738843
460135	7736999
447959	7736970
447950	7742500
Liontown Infill (Optional)	
394044	7742251
394009	7747784
402571	7747834
402535	7740460
397533	7740428
397522	7742272
394044	7742251
Gregory Infill (Optional)	
423303	7740559

421748	7741228
420118	7741228
420114	7741963
417585	7743054
413159	7743054
413149	7743934
411433	7744197
411405	7747884
413143	7747891
413154	7746048
420110	7746081
420118	7744236
421857	7744244
421851	7746090
424489	7746101
425627	7746101
425640	7740571
423303	7740559

APPENDIX C

GENERALIZED MODELING RESULTS OF THE VTEM SYSTEM

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 25 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.

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.

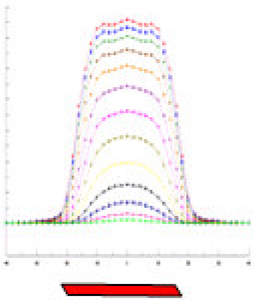
Figure H shows a special case where two plates are positioned to represent a synclinal structure. Note that the main characteristic to remember is the centre amplitudes are higher (approximately double) compared to the high shoulder of a single plate. This model is very representative of tightly folded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

Variation of Prism Depth

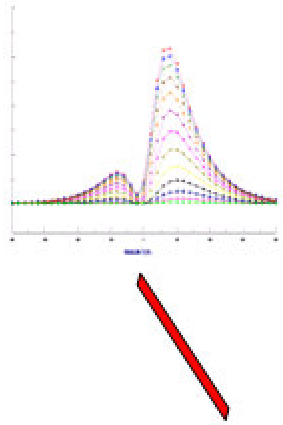
Finally, with prism models, another algorithm is required to represent current on the plate. A plate model is considered to be infinitely thin with respect to thickness and incapable of representing the current in the thickness dimension. A prism model is constructed to deal with this problem, thereby,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

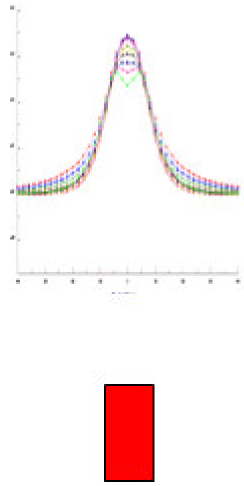
A



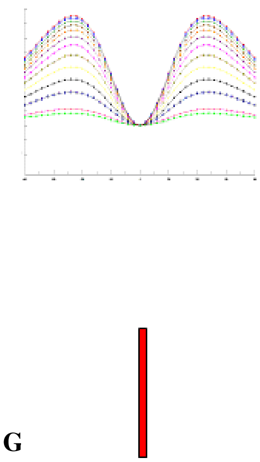
B



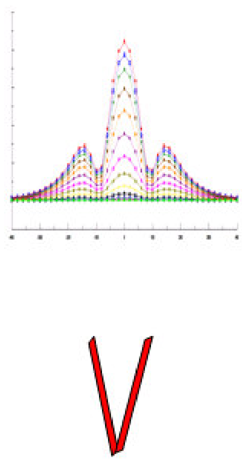
C



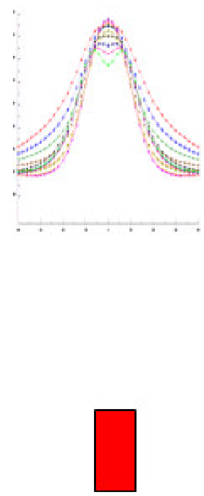
D



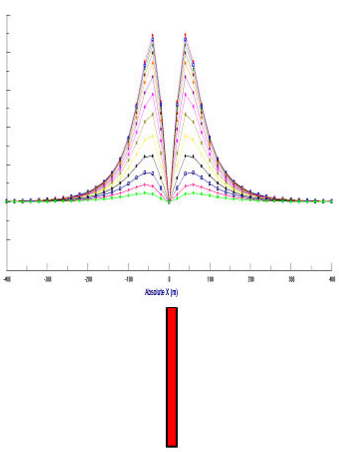
E



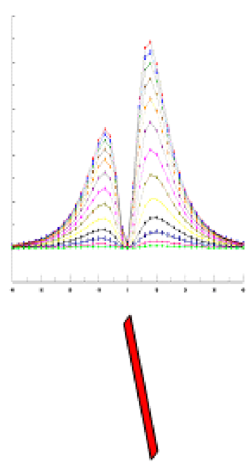
F



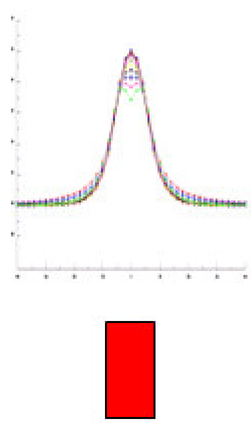
G



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.

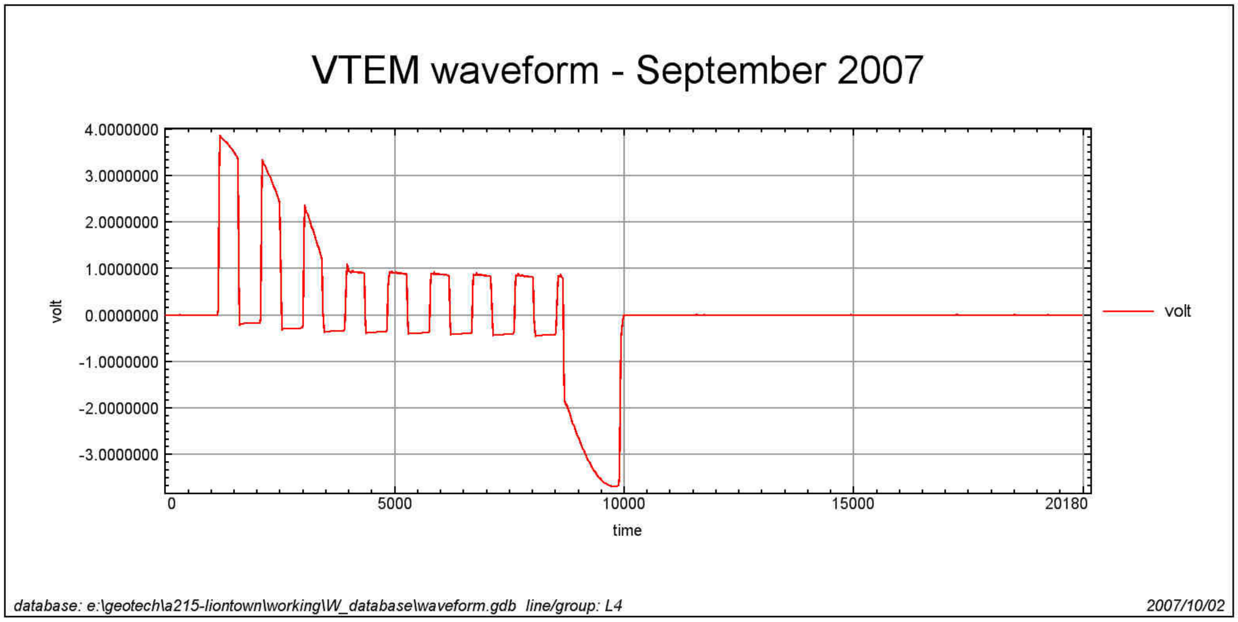
The EM interpretation process used, places considerable emphasis on determining an understanding of the general conductive patterns in the area of interest. Each area has different characteristics and these can effectively guide the detailed process used.

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 waveform - September 2007
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3.0000000
2.0000000
1.0000000
0.0000000
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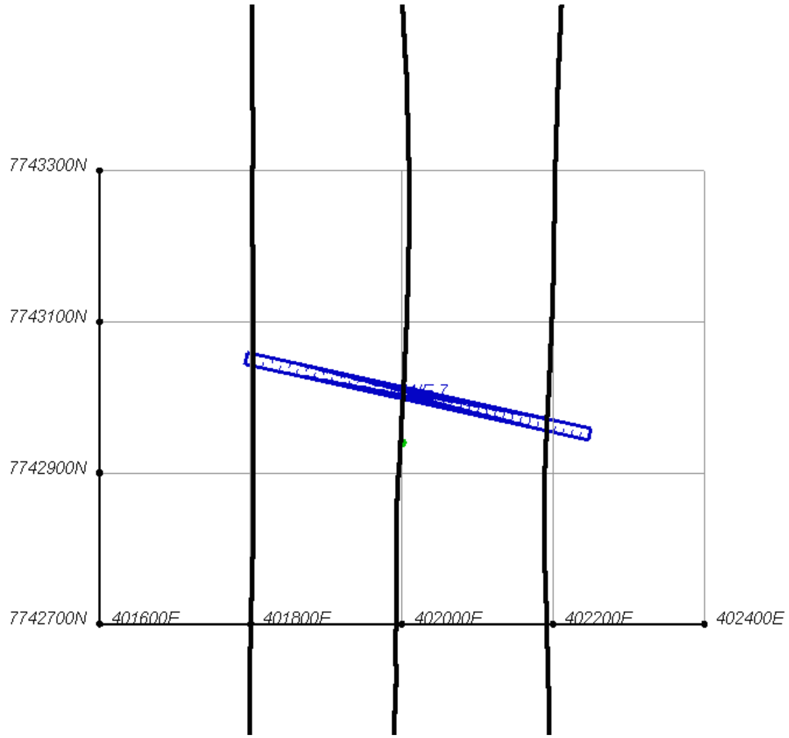
-3.0000000
volt
0
5000
10000
15000
20180
time
volt
database: e:\geotech\a215-liontown\working\W_database\waveform.gdb line/group: L4
2007/10/02

ADDITIONAL FIGURES

Figures 19-36

PLATE PARAMETERS

Name	MWE-7
X	402022.9186
Y	7743008.9619
Z	-81.9778
Length	465.298
Depth Extent	129.1231
Dip	83.0175
Dip Dir.	192.467
Plunge	0
Cond-Th.	106.2635



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Scale 1:10000

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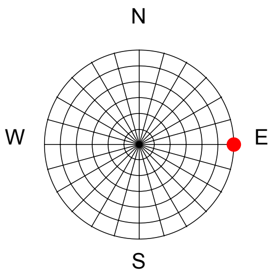
LIONTOWN RESOURCES LTD
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
PLAN VIEW OF MODELLING RESULTS
CONDUCTOR MWE-7
LIONTOWN BLOCK - LINES 10400-10420

Drawn: A. Morrell	Date: December 2007
Scale: 1:10,000	Figure: 19

View Direction



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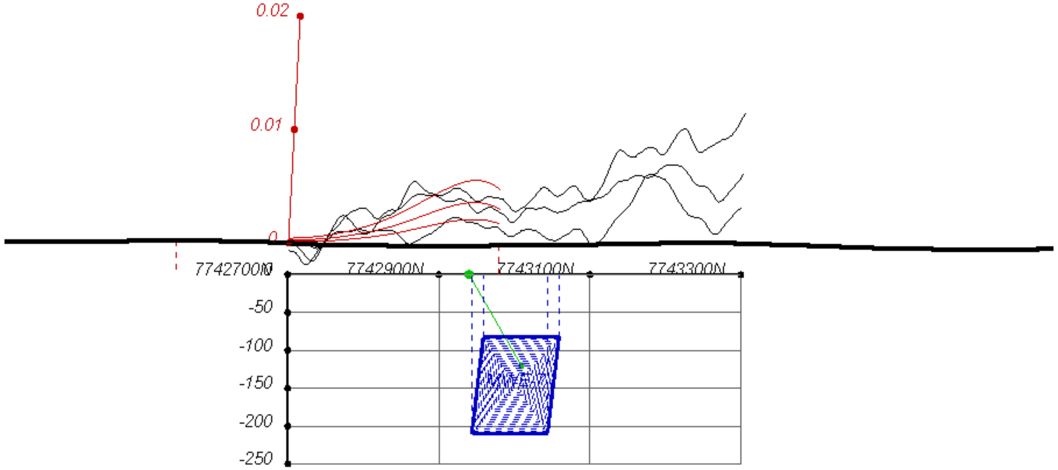

PLATE PARAMETERS

Name	MWE-7
X	402022.9186
Y	7743008.9619
Z	-81.9778
Length	465.298
Depth Extent	129.1231
Dip	83.0175
Dip Dir.	192.467
Plunge	0
Cond-Th.	106.2635

Scale 1:10000

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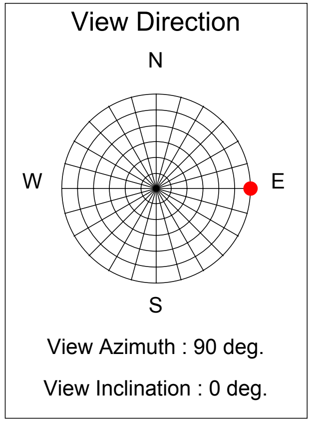
VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTOR MWE-7
LIONTOWN BLOCK - LINE 10400

Drawn: A. Morrell	Date: December 2007
Scale: 1:10,000	Figure: 20



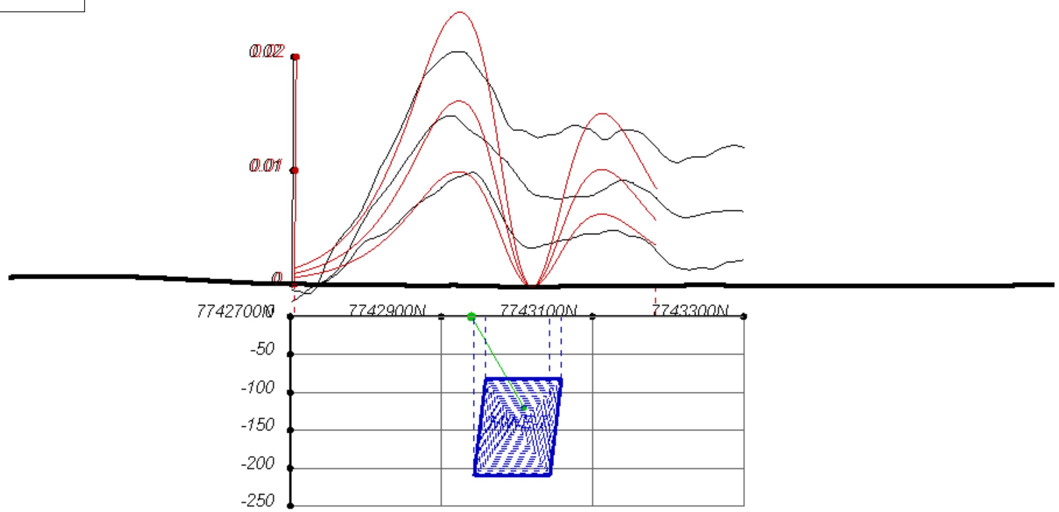


PLATE PARAMETERS

Name	MWE-7
X	402022.9186
Y	7743008.9619
Z	-81.9778
Length	465.298
Depth Extent	129.1231
Dip	83.0175
Dip Dir.	192.467
Plunge	0
Cond-Th.	106.2635

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Scale 1:10000

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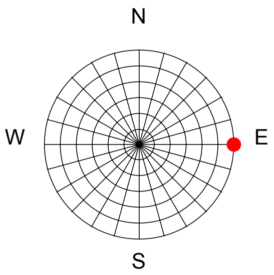
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTOR MWE-7
LIONTOWN BLOCK - LINE 10410

Drawn: A. Morrell	Date: December 2007
Scale: 1:10,000	Figure: 21

View Direction



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View Inclination : 0 deg.

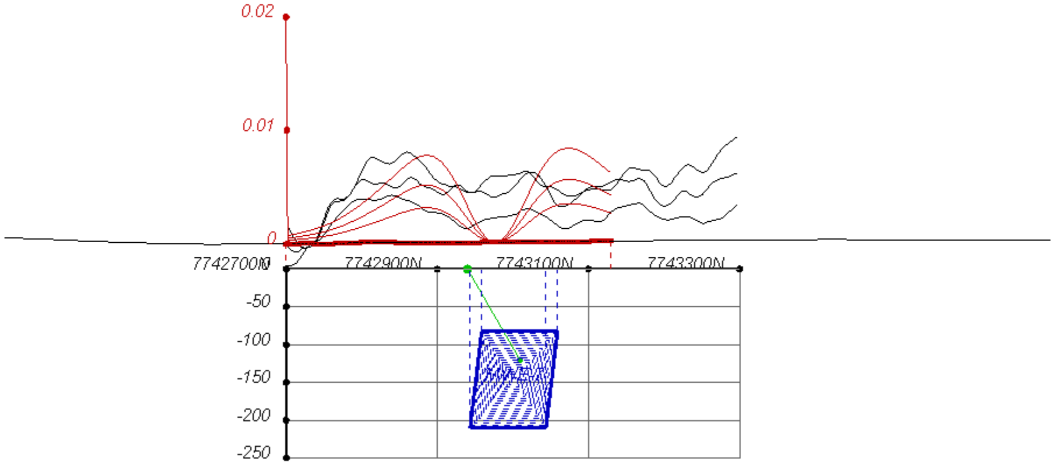
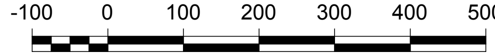


PLATE PARAMETERS

Name	MWE-7
X	402022.9186
Y	7743008.9619
Z	-81.9778
Length	465.298
Depth Extent	129.1231
Dip	83.0175
Dip Dir.	192.467
Plunge	0
Cond-Th.	106.2635



Scale 1:10000

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MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTOR MWE-7
LIONTOWN BLOCK - LINE 10420

Drawn: A. Morrell	Date: December 2007
Scale: 1:10,000	Figure: 22

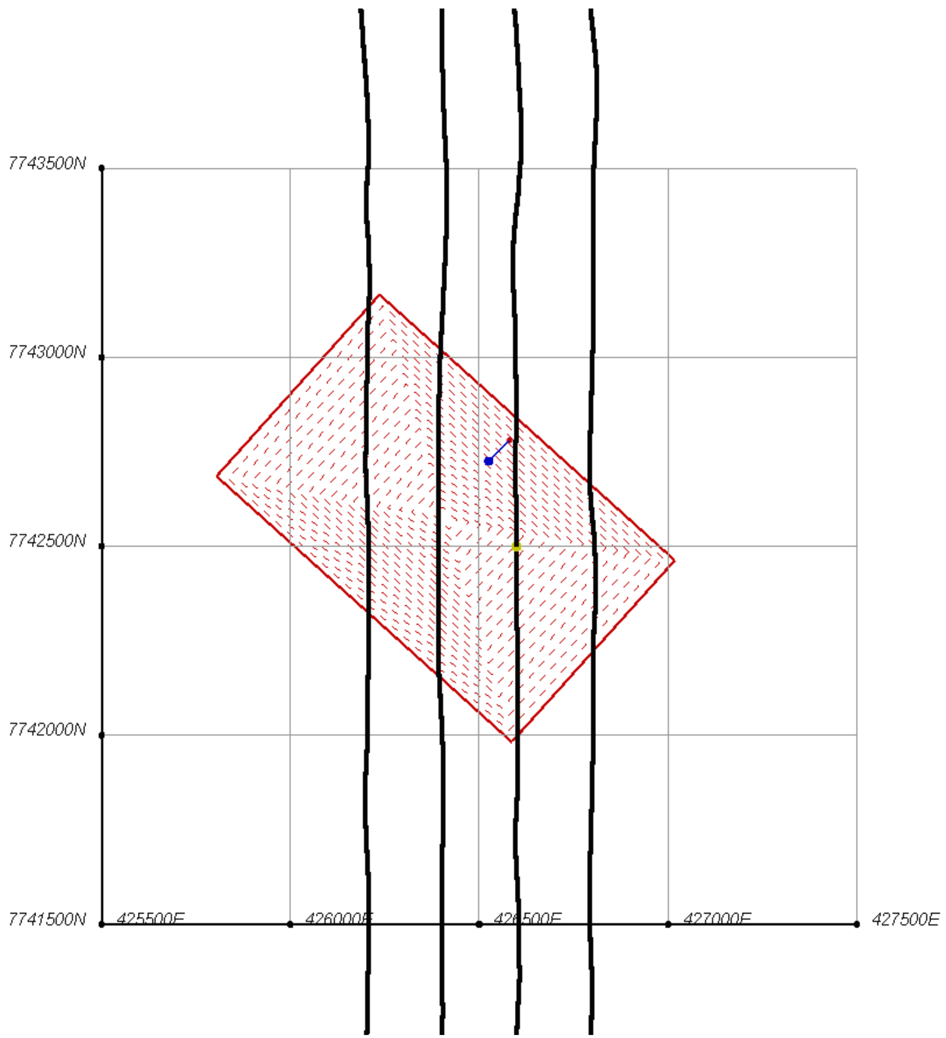

PLATE PARAMETERS

Name	MWE-10
X	426627.0038
Y	7742814.2
Z	-116.274
Length	1051.325
Depth Extent	679.942
Dip	18.2418
Dip Dir.	221.9467
Plunge	0
Cond-Th.	29.9171

-200 0 200 400 600 800 1000

Scale 1:20000

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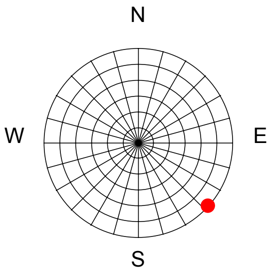
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
PLAN VIEW OF MODELLING RESULTS
MWE-10 CONDUCTOR
BRITANNIA BLOCK - LINES 11620-11650

Drawn: A. Morrell	Date: December 2007
Scale: 1:20,000	Figure: 23

View Direction



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View Inclination : 0 deg.

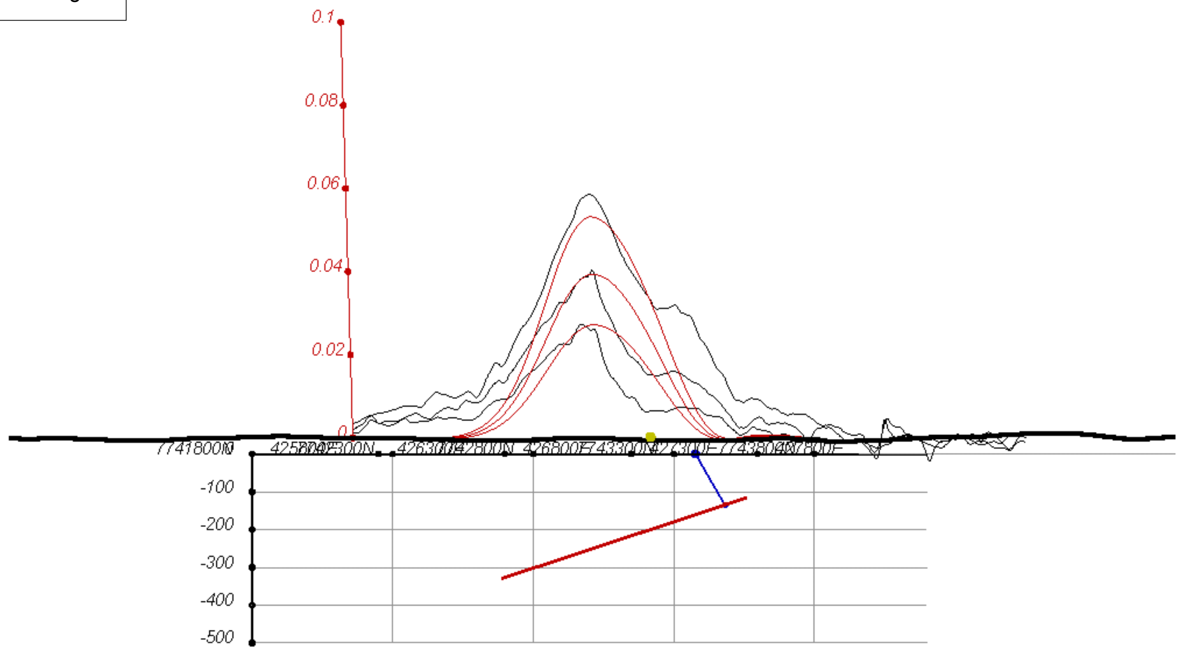

PLATE PARAMETERS

Name	MWE-10
X	426627.0038
Y	7742814.2
Z	-116.274
Length	1051.325
Depth Extent	679.942
Dip	18.2418
Dip Dir.	221.9467
Plunge	0
Cond-Th.	29.9171

-200 0 200 400 600 800 1000

Scale 1:20000

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LIONTOWN RESOURCES LTD

MT WINDSOR VOLCANICS PROJECT

VTEM SURVEY

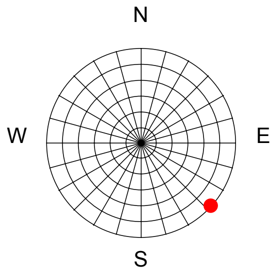
X-SECTION OF MODELLING RESULTS

MWE-10 CONDUCTOR

BRITANNIA BLOCK - LINE 11620

Drawn: A. Morrell	Date: December 2007
Scale: 1:20,000	Figure: 24

View Direction



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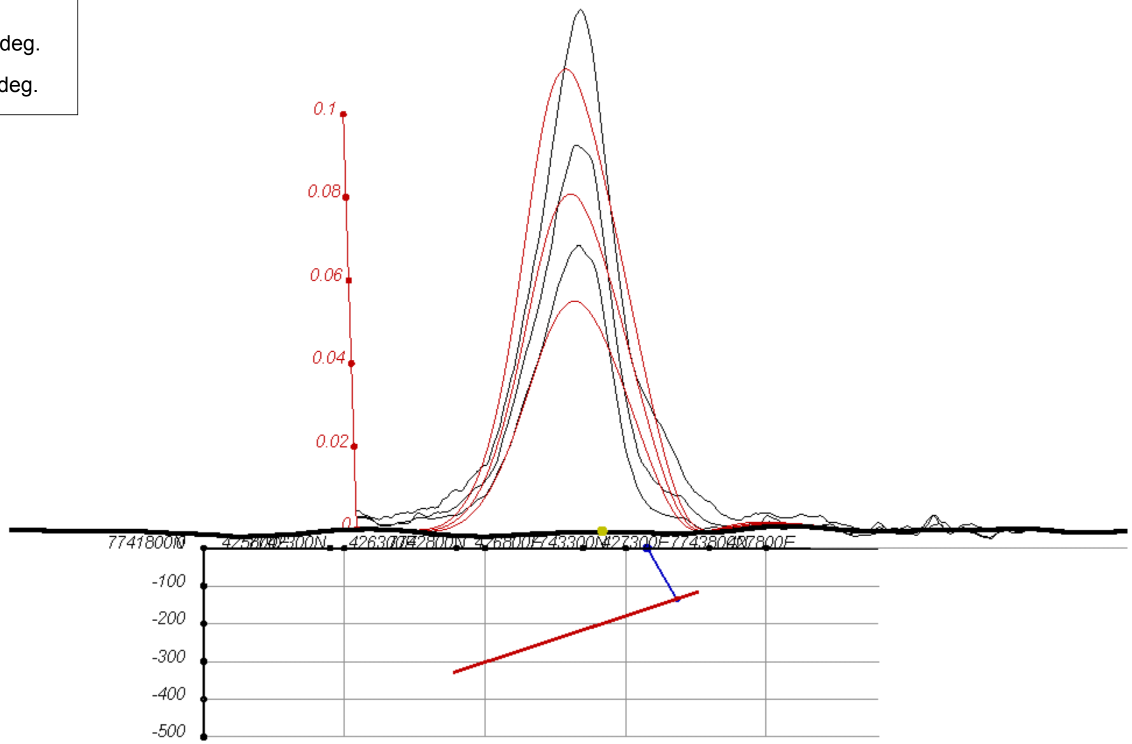

PLATE PARAMETERS

Name	MWE-10
X	426627.0038
Y	7742814.2
Z	-116.274
Length	1051.325
Depth Extent	679.942
Dip	18.2418
Dip Dir.	221.9467
Plunge	0
Cond-Th.	29.9171

Scale 1:20000

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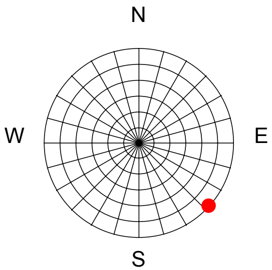
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
X-SECTION OF MODELLING RESULTS
MWE-10 CONDUCTOR
BRITANNIA BLOCK - LINE 11630

Drawn: A. Morrell	Date: December 2007
Scale: 1:20,000	Figure: 25

View Direction



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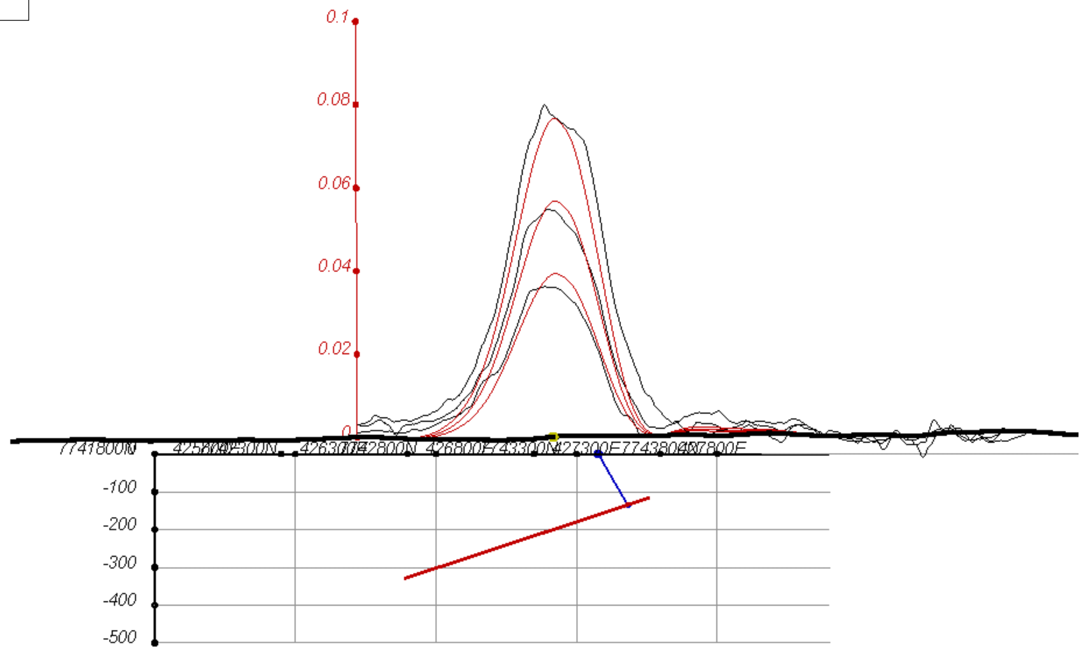
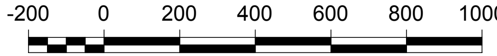


PLATE PARAMETERS

Name	MWE-10
X	426627.0038
Y	7742814.2
Z	-116.274
Length	1051.325
Depth Extent	679.942
Dip	18.2418
Dip Dir.	221.9467
Plunge	0
Cond-Th.	29.9171



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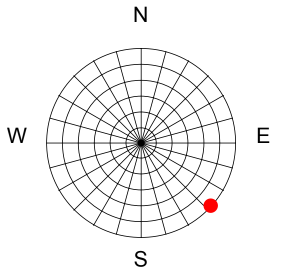
LIONTOWN RESOURCES LTD
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
X-SECTION OF MODELLING RESULTS
MWE-10 CONDUCTOR
BRITANNIA BLOCK - LINE 11640

Drawn: A. Morrell	Date: December 2007
Scale: 1:20,000	Figure: 26

View Direction



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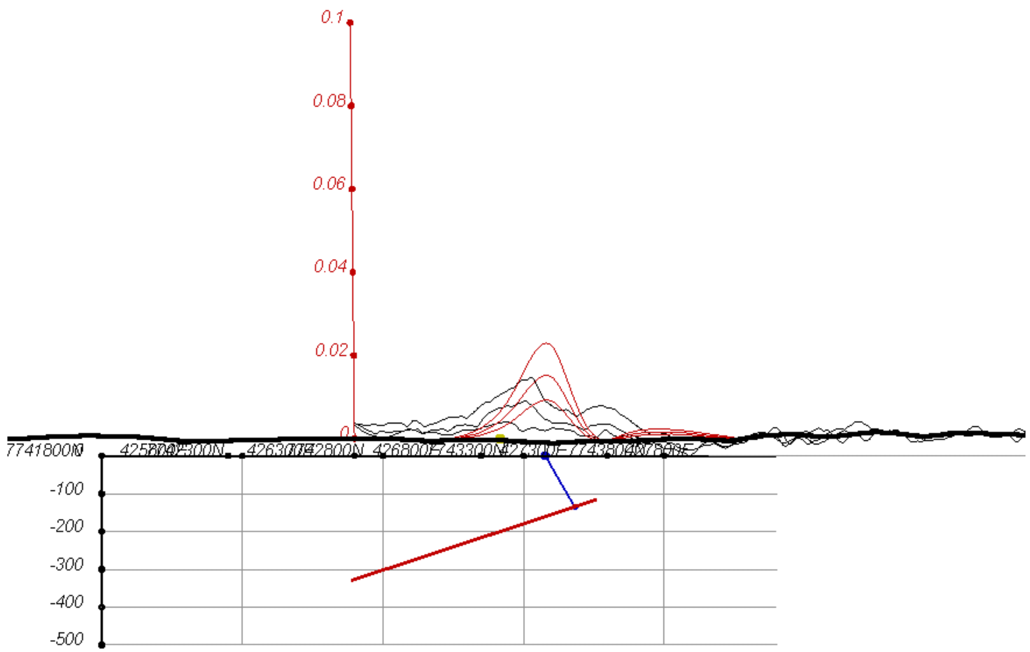
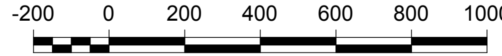


PLATE PARAMETERS

Name	MWE-10
X	426627.0038
Y	7742814.2
Z	-116.274
Length	1051.325
Depth Extent	679.942
Dip	18.2418
Dip Dir.	221.9467
Plunge	0
Cond-Th.	29.9171



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LIONTOWN RESOURCES LTD
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
X-SECTION OF MODELLING RESULTS
MWE-10 CONDUCTOR
BRITANNIA BLOCK - LINE 11650

Drawn: A. Morrell	Date: December 2007
Scale: 1:20,000	Figure: 27

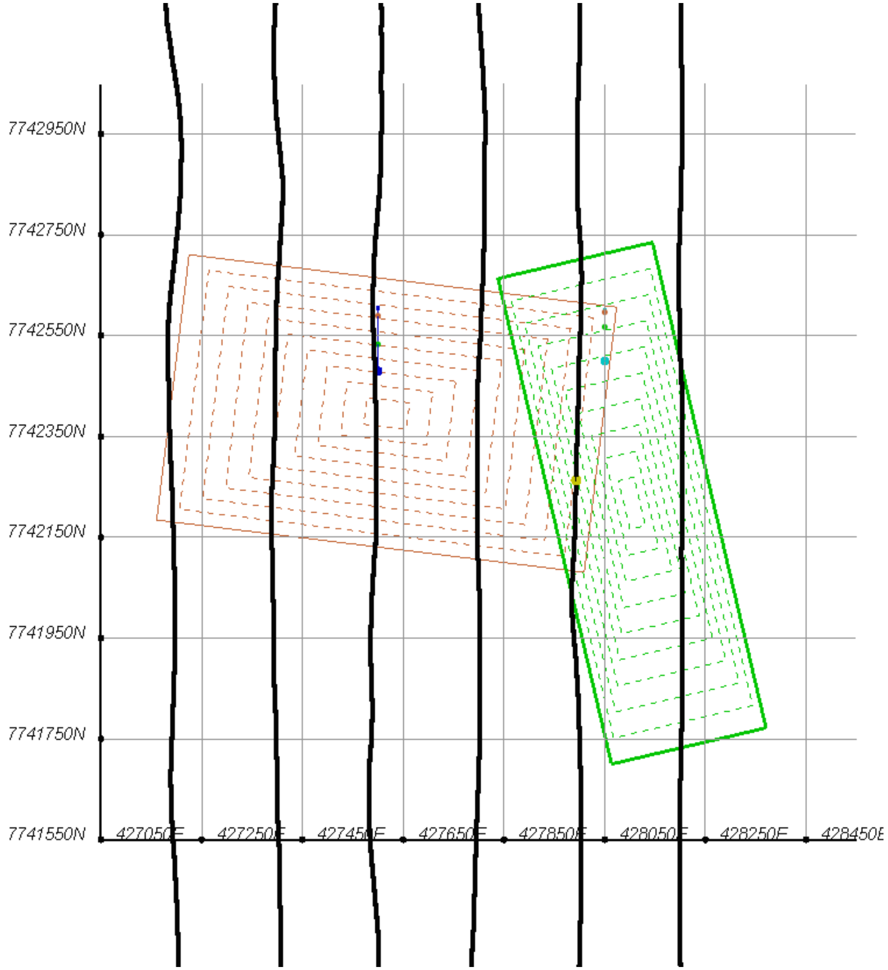

PLATE PARAMETERS

Name	MWE-11a	MWE-11b
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Y	7742658.6095	7742699.0659
Z	-162.3124	-65
Length	854.8974	314.906
Depth Extent	564.2399	1052.6916
Dip	20	20
Dip Dir.	186.9759	166.829
Plunge	0	0
Cond-Th.	29.0598	41.2438

-200 0 200 400 600

Scale 1:15000

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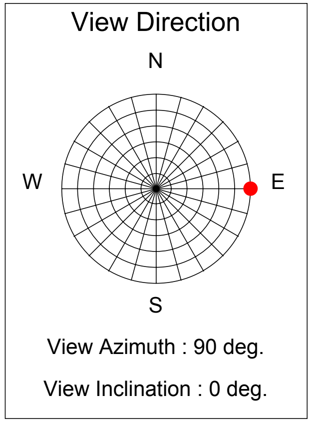
LIONTOWN RESOURCES LTD
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
PLAN VIEW OF MODELLING RESULTS
CONDUCTORS MWE-11a & 11b
BRITANNIA BLOCK - LINES 11670-11721

Drawn: A. Morrell	Date: December 2007
Scale: 1:15,000	Figure: 28



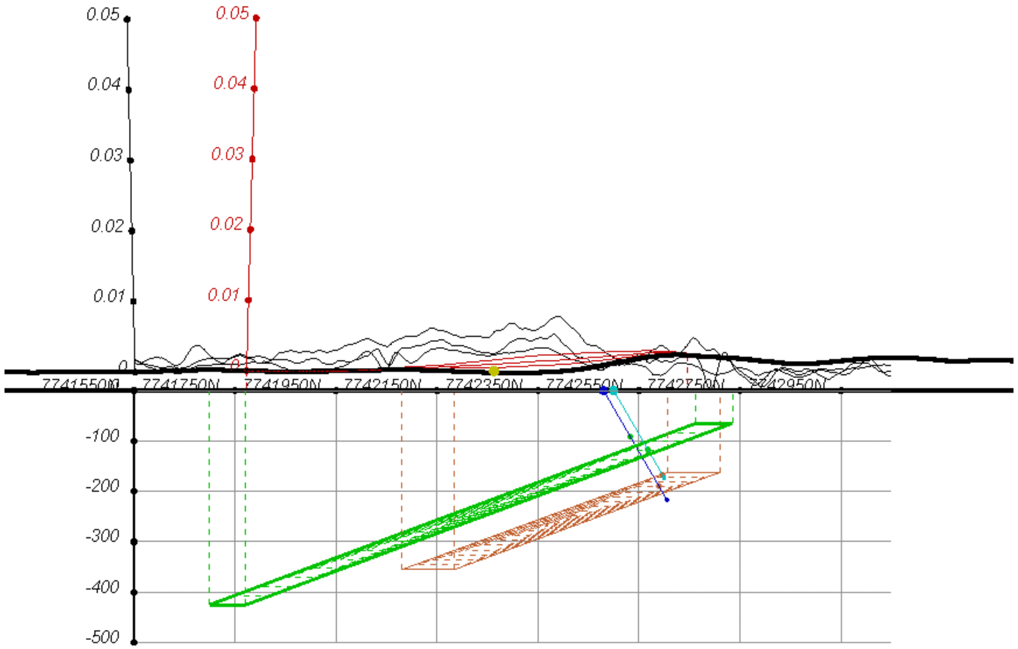


PLATE PARAMETERS

Name	MWE-11a	MWE-11b
X	427649.366	427991.4688
Y	7742658.6095	7742699.0659
Z	-162.3124	-65
Length	854.8974	314.906
Depth Extent	564.2399	1052.6916
Dip	20	20
Dip Dir.	186.9759	166.829
Plunge	0	0
Cond-Th.	29.0598	41.2438

SOUTHERN GEOSCIENCE CONSULTANTS

Scale 1:15000

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ACN 067 552 461

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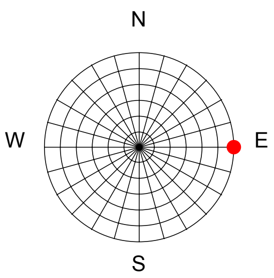
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTORS MWE-11a & 11b
BRITANNIA BLOCK - LINES 11670

Drawn: A. Morrell	Date: December 2007
Scale: 1:15,000	Figure: 29

View Direction



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View Inclination : 0 deg.

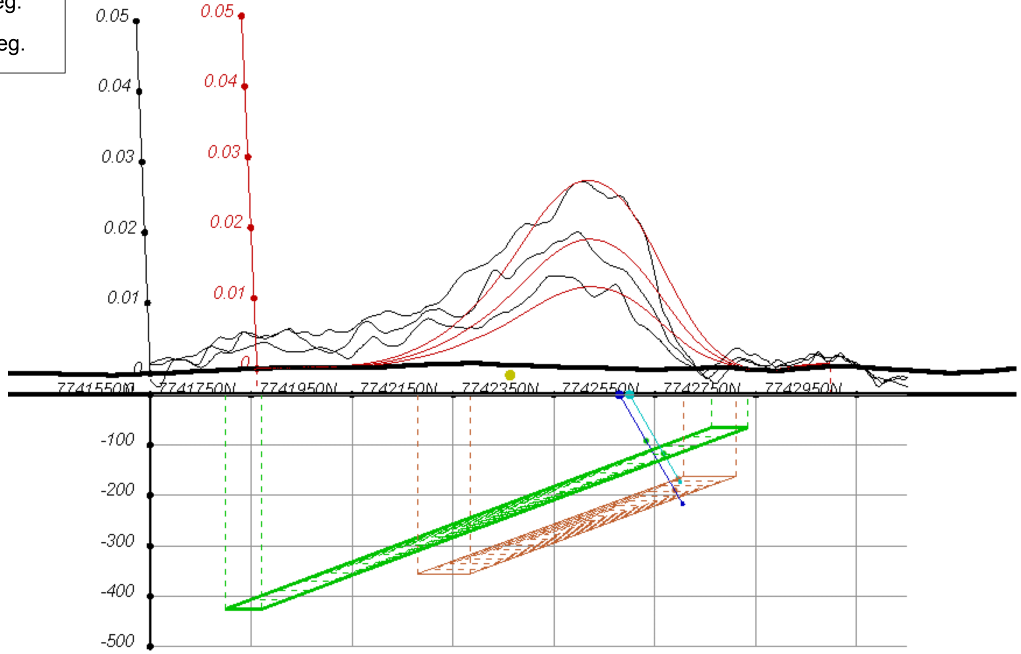

PLATE PARAMETERS

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-200 0 200 400 600

Scale 1:15000

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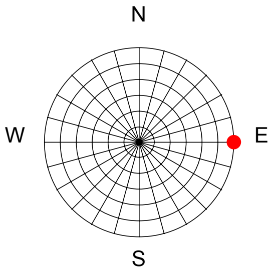
VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTORS MWE-11a & 11b
BRITANNIA BLOCK - LINES 11680

Drawn: A. Morrell	Date: December 2007
Scale: 1:15,000	Figure: 30

View Direction



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View Inclination : 0 deg.

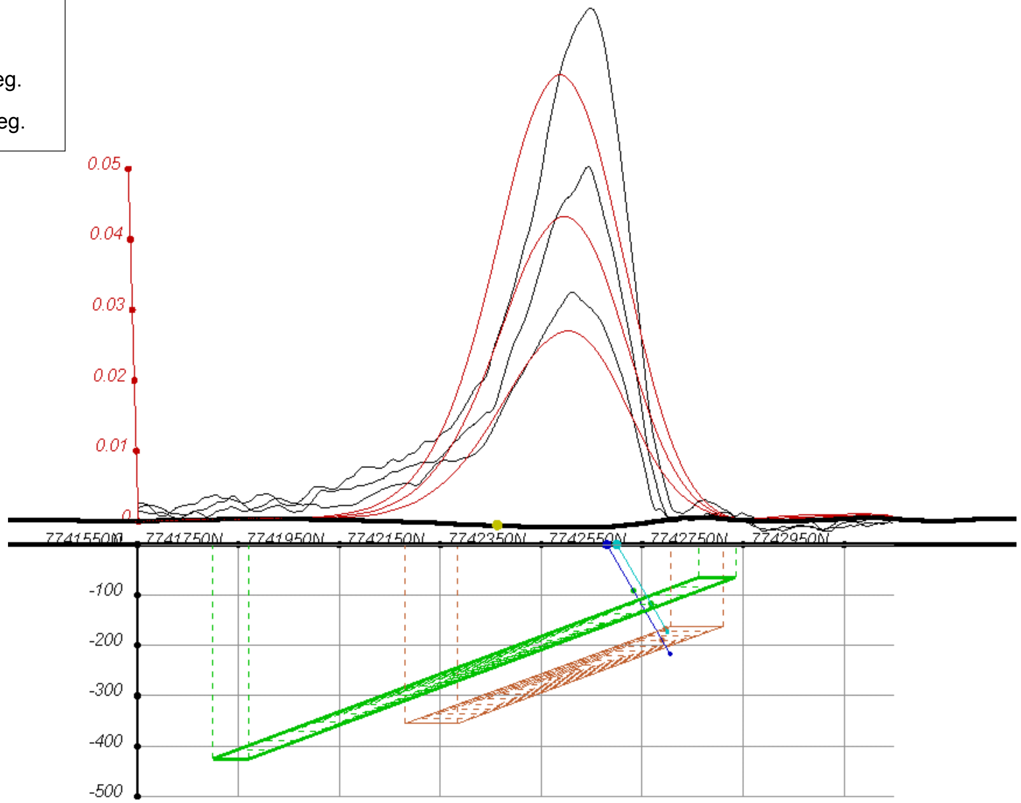

PLATE PARAMETERS

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-200 0 200 400 600

Scale 1:15000

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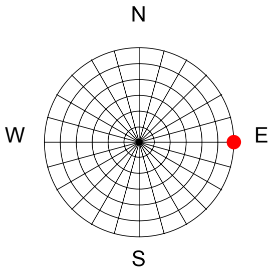
VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTORS MWE-11a & 11b
BRITANNIA BLOCK - LINES 11690

Drawn: A. Morrell	Date: December 2007
Scale: 1:15,000	Figure: 31

View Direction



View Azimuth : 90 deg.

View Inclination : 0 deg.

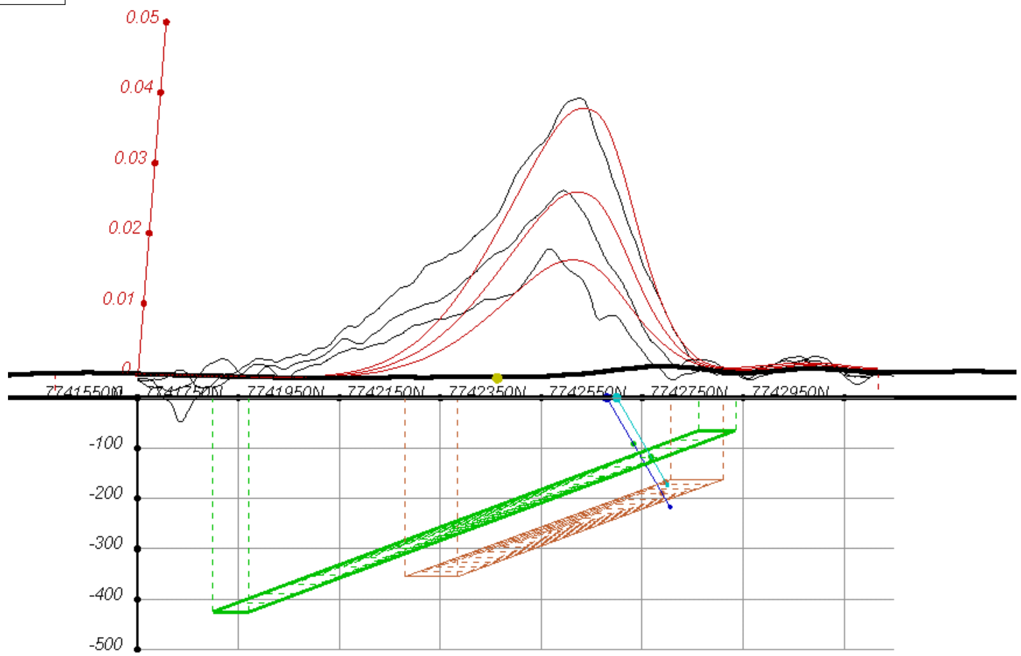


PLATE PARAMETERS

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-200 0 200 400 600

Scale 1:15000

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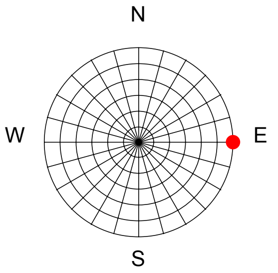
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTORS MWE-11a & 11b
BRITANNIA BLOCK - LINES 11700

Drawn: A. Morrell	Date: December 2007
Scale: 1:15,000	Figure: 32

View Direction



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View Inclination : 0 deg.

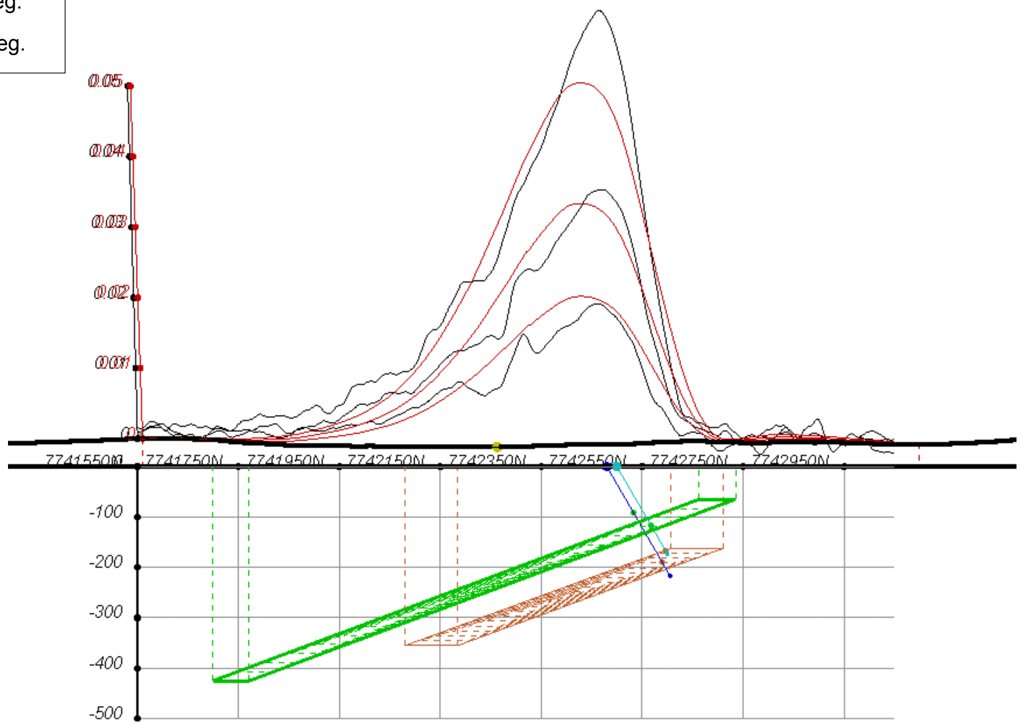

PLATE PARAMETERS

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-200 0 200 400 600

Scale 1:15000

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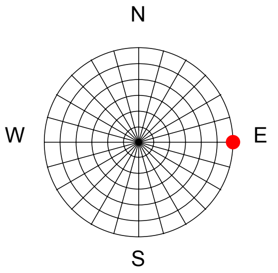
MT WINDSOR VOLCANICS PROJECT
VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTORS MWE-11a & 11b
BRITANNIA BLOCK - LINES 11710

Drawn: A. Morrell	Date: December 2007
Scale: 1:15,000	Figure: 33

View Direction



View Azimuth : 90 deg.

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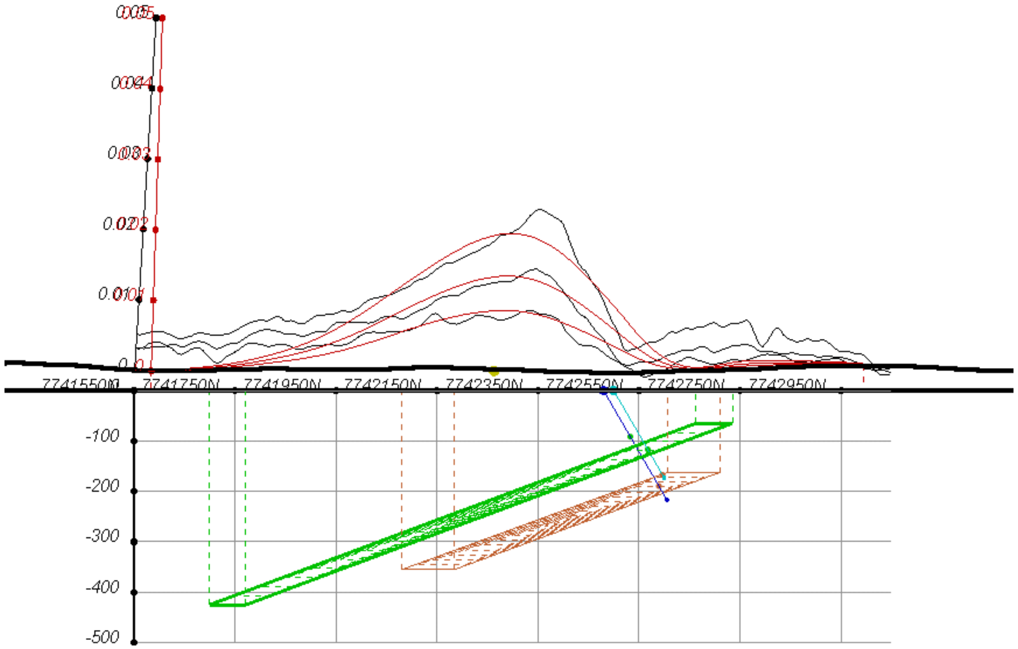

PLATE PARAMETERS

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Y	7742658.6095	7742699.0659
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Scale 1:15000

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VTEM SURVEY
VIEW FROM EAST OF MODELLING
CONDUCTORS MWE-11a & 11b
BRITANNIA BLOCK - LINES 11721

Drawn: A. Morrell	Date: December 2007
Scale: 1:15,000	Figure: 34


N

LEGEND

- Moderate to good discrete, narrow conductor peak
- Possible discrete, narrow conductor peak
- Doubtful discrete, narrow conductor peak
- Possible lobe peak
- Possible bedrock anomaly beneath surficial conductive zone
- Doubtful bedrock anomaly beneath surficial conductive zone
- Probable artefact due to negative polarisation at edge of surficial conductive zone
- Possible artefact due to negative polarisation at edge of surficial conductive zone
- Cultural anomaly: building, powerline, pipeline
- Interpreted possible or poorly defined conductor axis or trend
- Interpreted conductor axis
- Possible conductor trend interpreted from magnetics
- Zone of conductive cover (Campaspe Formation)
- Zone of highly conductive cover (Campaspe Formation)
- Early to mid-time (surficial) conductive trend
- Inferred dip
- MWE-1 Conductor identifier
- VTEM block outline
- Tenement boundary
- Modelled VTEM conductor

GEOLOGY LEGEND

Qha	Qha-QLD	ALLUVIUM
Qa	Qa-QLD	ALLUVIUM
Ql	Ql-QLD	MUD
Qr	Qr-QLD	COLLUVIUM
Qr,TQc	Qr-QLD,Campaspe Formation	COLLUVIUM
Qr>TQc	Qr-QLD>Campaspe Formation	COLLUVIUM
Qr>TQc?	Qr-QLD>Campaspe Formation?	COLLUVIUM
Qr>EOsw\r	Qr-QLD>Mount Windsor Volcanics\r	COLLUVIUM
Qr>Ost/a	Qr-QLD>Trooper Creek Formation/a	COLLUVIUM
Qpa	Qpa-QLD	ALLUVIUM
TQd\f?	TQd\f?-QLD	FERRICRETE
TQd\f	TQd\f-QLD	FERRICRETE
TQd	TQd-QLD	FERRICRETE
TQc	Campaspe Formation	PELITE
TQc,TQr	Campaspe Formation,TQr-QLD	PELITE
TQc?	Campaspe Formation?	PELITE
TQa	TQa-QLD	POORLY CONSOLIDATED SEDIMENTS
TQr	TQr-QLD	COLLUVIUM
TQr,Qa	TQr-QLD,Qa-QLD	COLLUVIUM
TQr,Td	TQr-QLD,Td-QLD	COLLUVIUM
TQr,TQa	TQr-QLD,TQa-QLD	COLLUVIUM
TQr,TQd\f>TQc	TQr-QLD,TQd\f-QLD>Campaspe Formation	COLLUVIUM
TQr>TQc	TQr-QLD>Campaspe Formation	COLLUVIUM
TQr>Td	TQr-QLD>Td-QLD	COLLUVIUM
TQr>Td,Ts	TQr-QLD>Td-QLD,Ts-SE55	COLLUVIUM
TQr>Ts	TQr-QLD>Ts-SE55	COLLUVIUM
Td?	Td?-QLD	FERRICRETE
Td\f	Td\f-QLD	FERRICRETE
Td\f,TQr	Td\f-QLD,TQr-QLD	FERRICRETE
Td	Td-QLD	FERRICRETE
Ts?	Ts?-SE55	ARENITE-MUDROCK
Ts	Ts-SE55	ARENITE-MUDROCK
Rw/m	Warang Sandstone/m	ARENITE-MUDROCK
Rw/s	Warang Sandstone/s	ARENITE
Pl/bx	Mount Leyshon Complex-bv	FELSITES
CPir	CPir-Kennedy Province	FELSITES
SDg/d	SDg/d-Ravenswood Batholith	DIORITE
SDgr	Brittania Granodiorite	GRANITOID
SDgr?	Brittania Granodiorite?	GRANITOID
SDgf	Flora Creek Trondhjemite	GRANITOID
SDgml	Merriland Tonalite	GRANITOID
SDgmd?	Molly Darling Granodiorite?	GRANITOID
SDg/a	SDg/a-Ravenswood Batholith	GRANITOID
SDg?	SDg?-Ravenswood Batholith	GRANITOID
SDg	SDg-Ravenswood Batholith	GRANITOID
Oir	Oir-8157	FELSITES
Ogbe	Bend Granodiorite	GRANITOID
Ogbe?	Bend Granodiorite?	GRANITOID
Og/a	Og/a-Ravenswood Batholith	GRANITOID
Og?	Og?-8057	GRANITOID
Og	Og-Ravenswood Batholith	GRANITOID
Osr	Rollston Range Formation	ARENITE-MUDROCK
Ost	Trooper Creek Formation	MIXED SEDIMENTARY ROCKS AND MAFITES
Ost/a	Trooper Creek Formation/a	MIXED SEDIMENTARY ROCKS AND MAFITES
Ost/a?	Trooper Creek Formation/a?	MIXED SEDIMENTARY ROCKS AND MAFITES
Ost/af	Trooper Creek Formation/af	MAFITES
Ost/d	Trooper Creek Formation/d	FELSITES
Ost/d?	Trooper Creek Formation/d?	FELSITES
Ost/j	Trooper Creek Formation/j	CHERT
Ost/r	Trooper Creek Formation/r	FELSITES
Ost/rf	Trooper Creek Formation/rf	FELSITES
Ost/s	Trooper Creek Formation/s	ARENITE-MUDROCK
Ost/s?	Trooper Creek Formation/s?	ARENITE-MUDROCK
Ost/vcl	Trooper Creek Formation/vcl	MIXED SEDIMENTARY ROCKS AND MAFITES
Ost?	Trooper Creek Formation?	MIXED SEDIMENTARY ROCKS AND MAFITES
EOsw	Mount Windsor Volcanics	MIXED MAFITES AND FELSITES
EOsw/a	Mount Windsor Volcanics/a	MAFITES
EOsw/b	Mount Windsor Volcanics/b	MAFITES
EOsw/d	Mount Windsor Volcanics/d	FELSITES
EOsw/d?	Mount Windsor Volcanics/d?	FELSITES
EOsw/dp	Mount Windsor Volcanics/dp	FELSITES
EOsw/r	Mount Windsor Volcanics/r	FELSITES
EOsw/r?	Mount Windsor Volcanics/r?	FELSITES
EOsw/rp	Mount Windsor Volcanics/rp	FELSITES
EOsw/vcl	Mount Windsor Volcanics/vcl	FELSITES
EOsw/vf	Mount Windsor Volcanics/vf	FELSITES
EOsw?	Mount Windsor Volcanics?	MIXED MAFITES AND FELSITES
Esp	Puddler Creek Formation	ARENITE-MUDROCK
Esp?	Puddler Creek Formation?	ARENITE-MUDROCK
EOg/b	EOg/b-8157	GABBROID

N

0 2,500 5,000
meters

SCALE 1:50 000

DATUM: GDA94
ELLIPSOID: GRS80
GRID: MGA ZONE 55

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LIONTOWN RESOURCES LTD
MT WINDSOR VOLCANICS PROJECT
2007 VTEM SURVEY
SUMMARY & INTERPRETATION WITH SURFACE GEOLOGY

SCALE: 1:50 000	GEO: A. MORRELL
DATE: 20-12-2007	GIS: A. MORRELL
Plan/Fig: 36	Filename:

APPENDIX 10

Lithos-X Mineral Exploration Consultants Report — Geological Interpretation of the detailed aeromagnetic and radiometric data, 2007

Mt Windsor Volcanics Project
Liontown Prospect Area

Geological Interpretation of the Detailed Aeromagnetic and Radiometric Data

Interim Report

Author: John McIntyre,
Lithos-X Mineral Exploration Consultants

Date: 29th August 2007

Executive Summary

Lithos-X was requested by Liontown Resources Limited ("LTR")to complete a geological interpretation of detailed magnetic and radiometric data collected over LTR's Liontown Prospect area. The interpretation was designed support the interpretation of VTEM airborne TEM data collected in 2007 (to be documented in a separate report).

The interpretation has created a solid geology model through the Mt Windsor Volcanics around Liontown. The four regionally mapped formations within the Seventy Mile Range Group have been identified, and the Thalanga, Waterloo and Liontown horizons, favourable horizons for the development of VHMS mineralisation, have been mapped.

A series of cover units have been identified from the radiometric interpretation, including both modern drainage and Campaspe Formation.

The Thalanga horizon is defined as the Mt Windsor Volcanics- Trooper Creek Formation contact, and is mapped across the survey area. Anomalism and alteration at Esso's Waterloo prospect is correlated with this position. Potassic alteration is recorded in areas to the west, with no reported soil sampling.

The Waterloo horizon is defined as an interval within the Trooper Creek Formation, and at Waterloo associated with volcaniclastics within an andesitic unit. Equivalent positions have been identified, including the Oakvale anomaly.

The Liontown horizon, located near the top of the Trooper Creek Formation, has been mapped to the west and east. Several target areas have been identified.

A series of possible Carbo- Permian intrusions and related alteration zones have been identified, and represent high priority gold exploration targets. A series of other alteration zones have also been identified, included both fault controlled magnetite and potassic alteration.

A series of exploration targets have been identified, with the next phase of exploration proposed. Some of these targets include the existing geochemically anomalous areas. 20 VHMS targets, focussed on the three key horizons, have been identified. 9 targets representing Carbo- Permian intrusion related gold targets have been outlined, and 10 targets representing shear or fault hosted gold (or possibly Cu?) identified.

At this stage no detailed work has been completed on the VTEM data. Interpretation of basement conductive sources and calculation of the CDI's and related depth slices has not been completed by the geophysicists, and further interpretation requires these to be completed.

Contents

Figures

Tables

Enclosures

1 INTRODUCTION

Lithos-X has been requested by Liontown Resources Limited ("LTR")to complete a geological interpretation of detailed magnetic and radiometric data collected over LTR's Liontown Prospect area (Figure 1). The data was collected in 2006. The interpretation will support the interpretation of VTEM airborne TEM data collected in 2007 (to be documented in a separate report).

This report is an interim report- the interpretation has not been digitised at this stage. Kris Butera in Charters Towers has undertaken to organise this process.

2 WORK COMPLETED

2.1 Data

The following datasets were used for the interpretation:

2.1.1 Airborne Geophysical Data

Liontown Detailed Aeromagnetic Survey Specifications

Flight line spacing	50m
Mean terrain Clearance	35m
Flight line orientation	000- 180 degrees
Sample Interval	0.1 seconds (magnetics)
	1.0 seconds (radiometrics)
Operator	Fugro Airborne Surveys
Client	Liontown Resources Limited
Date	July 2006

2.1.2 Image Specifications

The following images of the geophysical data were used:

- TMI reduced to pole, north AGC shading (10m grid);
- 1VD of RTP TMI, north AGC shading (10m grid);
- Tilt Angle derivative of the RTP TMI, north AGC shading (10m grid);
- Ternary radiometric image, 10m grid; and
- Images of the potassium, thorium and uranium channels, 10m grid.

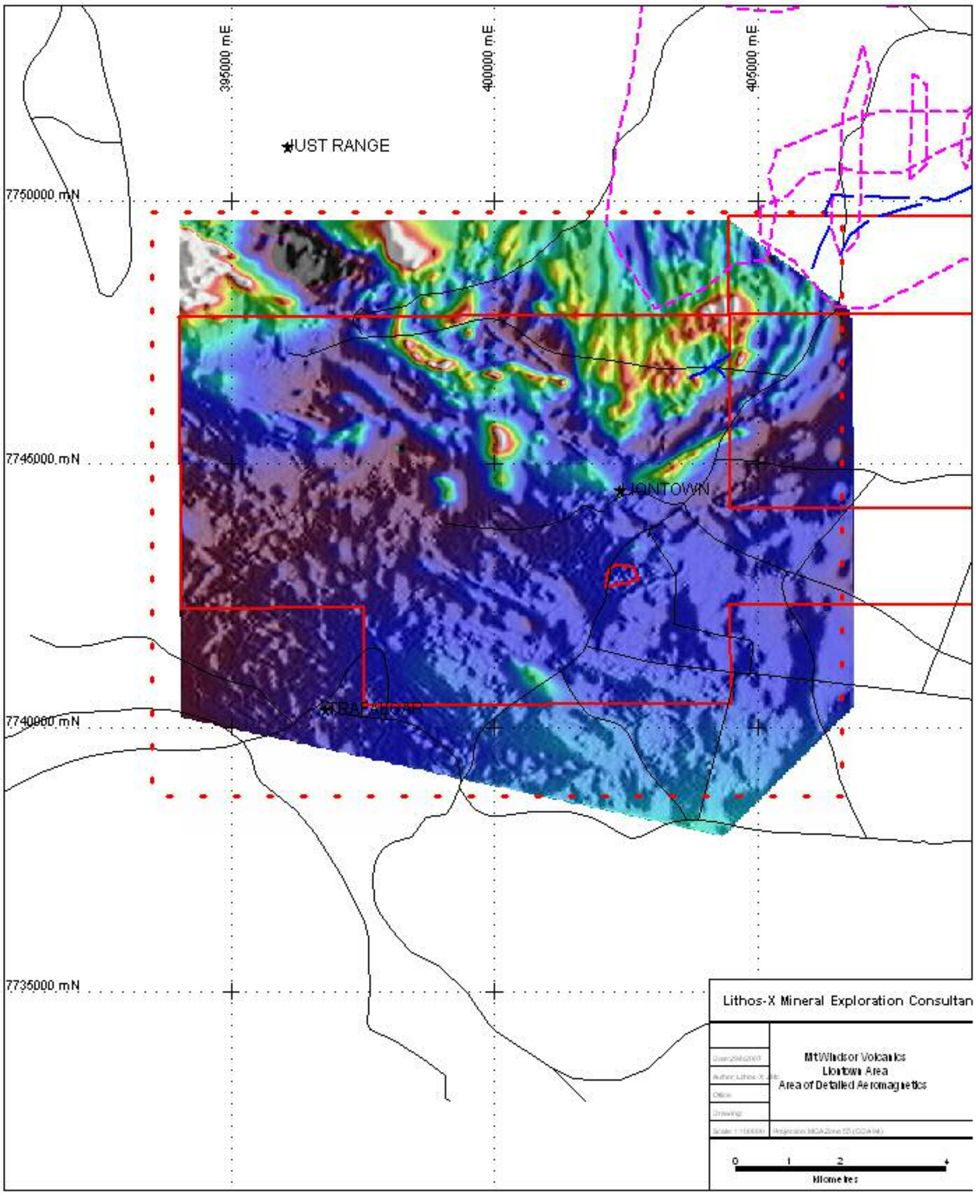

Figure 1. Location of the detailed aeromagnetic survey, Liontown area. Image showing RTP TMI data, with north AGC shading.

The images have not been stitched into Liontown's regional Charters Towers area radiometric stitch. Images from this regional stitch were used for general information along strike from the detailed survey area.

2.1.3 Geological Control

In the immediate Liontown to Waterloo area RGC's detailed geological interpretation, based principally on drill hole information, with some mapping of the limited outcrop, was used as the primary and preferred geological control. LTR has scanned maps, both of hand drawn and computer plotted data.

Regionally the QGS Charters Towers multiclient dataset, geology layers, were used.

In some areas the LTR exploration drillhole database contains digital logging information. This was used locally, but principally repeats the RGC dataset.

2.1.4 Other Information

Drillhole information, soil sample data and stream sediment data from LTR's regional database have been utilised in the interp. Some issues have been identified with some of this data, as listed in the Discussion.

LTR's Ikonos image has been used for control of possible surficial or cultural issues.

2.2 Methods

The interpretation has been completed as follows.

The Radiometric data interpretation comprised:

1. Constructing radiometric source overlays for each channel. Sources have been sorted in generalised nil, weak, moderate and strong sources;
2. The radiometric sources have been compared to the mapped lithologies to identify the most likely lithological source for the radiometric signature;
3. Sources from the cover sequences have been separated from possible bedrock sources, ie, areas of Cambro- Ordovician outcrop have been distinguished from areas of younger cover;
4. For bedrock sources where mapping appears confident and no likely radiometric lithological sources are mapped, and/ or mapped units occur at high angles to the radiometric units, the source of the radiometric units is considered to be related to alteration from either intrusive or hydrothermal sources, and has been plotted as such;

5. Where no outcrop has been mapped, source lithological units are distinguished from alteration associated sources, and correlations used that best match units associated with radiometric anomalies identified in areas of outcrop;
6. All unit breaks in the radiometrics are marked, and considered as either primary or structural in nature. Faults that cannot be extrapolated with confidence are left in the interpretation as unconnected short segments;
7. Units of distinct character that appear repeated, but in an intact stratigraphic package, have been given unique lithological codes; and
8. The radiometric interpretation has been compared against the soild geology interpreted from the magnetic data.

The Magnetic data interpretation comprised:

1. A bedrock source (or "magnetic unit") has been outlined for all magnetic anomalies (both positive and negative) visible in the 1VD image and contour data. Where subtle trends are visible, but not identifiable as a discrete source body, these have been identified as magnetic layering trends. Dips have been estimated qualitatively, and magnetic unit boundaries plotted appropriately, but no quantitative modelling of dip has been completed. Where conflict arises, mapped dips are considered to be more accurate, and therefore no dips have been been plotted on the final interpretations (but these dips are recorded in the working plans);
2. The bedrock sources have been compared to the mapped lithologies to identify the most likely lithological source for the magnetic anomalism. Where magnetic units are parallel to, but offset from mapped units, the magnetic anomalies are assumed to be correctly located (possibly due to distortion in aerial photographs used to compile the mapping). Certainly some features in the QGS data are offset by around 100m from likely sources in the Ikonos data, so a significant error in the regional geological mapping is possible;
3. Where mapping is of low confidence (due to poor outcrop, alteration or weathering), the magnetic stratigraphy is preferred to the mapped material;
4. Where mapping appears confident and no likely magnetic lithologies are mapped, and/ or mapped units occur at high angles to magnetic units, the source of the magnetic units is considered to be related to alteration from either intrusive or hydrothermal sources, and is plotted as such;
5. Where no outcrop is available to constrain the magnetic units, source lithological units are distinguished from alteration associated sources,

and lithological units used that best match units associated with magnetic anomalies identified in areas of outcrop;

6. Units of distinct character that appear repeated, but in an intact stratigraphic package, have been given unique lithological codes;
7. All unit breaks in the magnetics are marked, and considered as either primary or structural in nature. Structural breaks are interpreted in plan and balanced in both plan and section, where data allows. Faults that cannot be extrapolated with confidence are left in the interpretation as unconnected short segments. A structural history is inferred;
8. Mapped geological data that is not visible in magnetics (for example, bedding traces and faults mapped but with no visible mapped or magnetic offsets) are transcribed from the geological mapping to the interpretations where this data improves confidence in the interpretation. In particular, drillhole logging has traced the Liontown Horizon where no magnetic signature has been identified; and
9. The magnetic interpretation has been compared against the outcrop interpreted from the radiometric data.

The target identification methodology comprises:

a) Historically identified deposits and mineralisation styles in the region are identified from the regional mapping or other published sources. Key criteria that are recorded in the interpretation are identified, if possible. A brief summary is included in Section 4.1;

b) LTR’s surface geochemistry has been plotted, and empirical relationships to data in the interpretation the interpretation examined;

c) Conceptual target styles that may be present but not identified in the above datasets are outlined, and key criteria described in the interpretation are identified;

d) Numbered target areas, based on the key criteria outlined above, are outlined on the maps. In this exercise targets are classified as VHMS style (prefixV, with the three main horizons coded VT for the Thalanga Horizon, VW for the Waterloo Horizon, and VL for the Liontown Horizon), Gold, structurally controlled styles (prefix GS), and Carbo- Permian intrusive related mineralisation (prefix GI); and

e) Targets have not been systematically ranked for priority. Due to time constraints in this exercise this ranking has been based on “gut feel”.

2.3 Product

Four map sheets have been produced in hard copy. These comprise:

A. Solid geology interpretation (Enclosure One), based principally on the magnetics, with structural information;

B. Outcrop geology interpretation (Enclosure Two), based principally on the radiometric data, with limited structural information;

C. Alteration sheet (Enclosure Three), showing the identified radiometric or magnetic alteration zones; and

D. Exploration Target sheet (Enclosure Four), showing the interpreted target zones.

Other material includes a spreadsheet of targets, and this report.

The mapping has not been digitised to date. The GIS data derived from this report should include the following layers:

a) Solid geology, derived from the magnetics, attributed with the unique lithostratigraphic code, lithological code and stratigraphic code;

b) Structures, derived from the magnetics, attributed with age and type;

c) Outcrop Geology, derived from the radiometrics, attributed with the unique lithostratigraphic code, lithological code and stratigraphic code;

d) Structures, derived from the radiometrics;

e) Alteration zones, attributed by type; and

f) Targets, linked to the Target spreadsheet.

3 RESULTS AND DISCUSSION

3.1 Regional Geological Framework

The following is based on numerous papers, mainly on the deposits within the Mt Windsor Volcanics, and more regionally on recent papers by Fergusson et al, 2005, Monecke et al., 2006, and Kreuzer, 2005. This is by no means an exhaustive, complete or up to date review of the literature.

The Mt Windsor Volcanics project area is centered on the Seventy Mile Range Group (previously the Mt Windsor Volcanics Group), an east west trending, subvertically dipping Cambro- Ordovician volcanosedimentary sequence, intruded by several later phases of granites, and covered by a series of younger sedimentary and volcano sedimentary sequences. A tectonostratigraphic column is given in Table One.

Table One

Mt Windsor Volcanics Project- Regional Tectonostratigraphic column

Age		Event/Formation		Description
Quat			Recent Alluvials	
Ter			Campaspe Fm	
Tri		Gallilee Basin	Warang Sstn	
297-278Ma		Gold Minz	Mt Leyshon	Breccias and Mineralisation
305Ma		Gold Minz	Mt Wright	Breccias and Mineralisation
342+/-3		Gold Minz	Pajingo	Epithermal Mineralisation
Late Carb-Early Perm.		Kennedy Igneous Province		Felsic plugs, dykes and intrusive breccias and locally felsic volcanics
		D?		Tilting of the Drummond Basin
Late Dev-Carb		**Drummond Basin**		Felsic to mafic lava and tuff, volcaniclastics and fluvial to lacustrine sediments
410-404Ma		D4 and Gold Minz	Charters Towers	
Sil-Dev		Pama Province Granitoids		

		D3		Doming of the Batholith or extension along a N to NE axis Regional D3 normal faulting at Waterloo??
		D2	N compression	NW striking SZ Axial planar cleavage (regional cleavage) at Waterloo??
Mid Ord-Mid Sil		D1	NE to N compression; Strike slip SZ	East west striking sinistral shear zones
Ord		Macrossan Province Granitoids		Generally strained and recrystallised
		Seventy Mile Range Group		
			Rollstone Range Formation	Sandstone and mudstone of mixed volcanic and non volcanic province, generally lacking coherent volcanic units. Maximum apparent thickness 1000m. Late Lancefieldian to Chewtonian in age.
			Trooper Creek Formation	Basaltic to rhyolitic lavas, synvolcanic intrusives and volcaniclastis rocks, plus a thick succession of mudstone and calcareous metasediments. Quartz-hematite and quartz magnetite pods and lenses locally. Thickness ranging from 4000m (central area) to 500m (in the west). Lancefieldian age
			Mt Windsor Volcanics	Massive, coherent and autoclastic rhyolites, minor volcaniclastics and dacitic to andesitic flows. Maximum thickeness 3,500m.
			Puddler Creek Formation	Quartz, lithic, and quartz- feldspar- lithic sandstones and siltstones, minor basalt ito intermediate volcanics in the upper 500- 200m. Up to 9000m in thickness.
?		Basement to the SMRG		Unrecognised

3.2 Aeromagnetic Interpretation and solid geology map

3.2.1 Basement Stratigraphy

Enclosure One shows the interpreted solid geology of the Liontown area. Note the unique radiometric signatures for some units, described in the map legends.

The stratigraphy comprises, from the north and structural base of the sequence:

- Interpreted Ordovician granitoids ("Og"). Five phases are recognised, based on the radiometric and magnetic character. Ages may be different to that indicated. The granites are intruding the base of the Seventy Mile Range Group, either the basal Puddler Creek Formation, or the overlying Mt Windsor Volcanics. This implies significant loss of stratigraphy during granitoid emplacement. The granitoids are partially controlled by faults, eg, the Lion Fault System and the Wolf Fault;
- Puddler Creek Formation ("PCF"). Only small remnants are preserved, with a highly variable magnetic character, possibly due to hornfels alteration around the Og granitoids;
- Mt Windsor Volcanics ("MWV"). Split into two gross units on magnetic and radiometric character. The two units are located in fault bounded blocks, with minor CMr2 developed over extensive CMr1 west of the Lion fault System ("LFS"), and no CMr1, with thick CMr2, developed to the east of the LFS;
- Trooper Creek Formation ("TCF"), with little magnetic character, and a diverse radiometric signature. Much of the internal differentiation is based on RGC logging and interpretation. Some duplication of lithology, interpreted to represent different stratigraphic units, is mapped (CTr3 and CTr4). Top of the TCF is taken as a prominent thin magnetic unit, mapped as part of a coherent dacite. Distribution and thickness of TCF changes across the high angle faults, in particular the Lion, Puma and Jaguar Faults. Note that some outcrop units in the Radiometric interp are misclassified as Rollston Range Formation;
- Rollston Range Formation ("RRF"). All units, included extensive mapped (QGS) rhyolites between the Jaguar and Puma Faults, above the interpreted top of the TCF. Note significant thickness changes between the Jaguar and Puma Faults; and
- Buried or subcropping granitoids (Og or CPg), interpreted as either Ordovician to Devonian in age, or if broadly circular in pattern, Carbo- Permian in age.

3.2.2 Basement Structure

A series of either broadly layer parallel, or broadly high angle, structures are outlined in the interpretation.

The high angle structures, named from west to east the Jaguar ("JF"), Puma ("JF"), Lynx ("JF") and Cougar ("JF") Faults, and the Lion Fault System ("LFS"), control the distribution of Formations within the SMRG and control the distribution of both the Ordovician to Devonian Granites, and possibly some of the Carboniferous intrusives. In addition, inferred thrust faults (some of the layer parallel structures) end on the high angle faults. This suggests the high angle faults have a long history, probably originating as extensional transfers during deposition of the SMRG, and then controlling, or compartmentalising reactivation, during subsequent compressional events.

The layer parallel faults in part rest on the interpretation of stratigraphic repetition in the sequence as thrust related, and not repetition of primary depositional units within the SMRG pile. Either explanation is possible, and both still requiring the high angle structures to act as transfers (in the extensional setting) or tear faults or lateral ramps (in the compressional setting).

Stratigraphic repetition is inferred to have occurred above the Dingo Fault ("DF") and the eastern extension of the Homestead Fault ("HF").

Stratigraphic excision is inferred to have occurred across the Wolf Fault ("WF"), with loss of Puddler Creek on intrusion of Og, and above the Homestead Fault (at the west end). Either excision, or possibly earlier non deposition, is inferred to have occurred above the Thylacine Fault and somewhere in the layer parallel faults above the Dingo Fault. The stratigraphic excision suggests there has been a second extensional deformation post dating the original SMRG deposition, most likely coeval with the Ordovician granitoids.

Numerous small breaks, which cannot be traced through the sequence, have been mapped locally.

3.2.3 Interpreted Tectonostratigraphic History

The stratigraphy and structure interpreted in the Liontown Area suggests the following history, summarised in Table Two. Correlation with the regional deformation history (Table One), and the local history documented at Liontown (steep dips; pervasive shear fabric, slightly oblique to layering, greenschist facies; later cross faults with very low grade alteration) and Waterloo (strong fabric, slightly oblique to layering, interpreted as the axial planar fabric developed during tilting of stratigraphy, correlated with regional D2; ENE trending, steep N dipping normal faults; NNW trending, steeply plunging, gentle to open folding) is difficult, given the various ages and events, each developed in a local domain.

The key relationship that is unclear is the age and mode of generation of the regional fabric developed at Liontown (and nearby Waterloo), and whether it is related to the interpreted extensional or compressional events, and the relationship of these events to the current steep dips of layering and the pervasive foliation. It is possible the compressional event preceded the second extensional event (ie, the event after basin formation).

Table Two

Interpreted tectono-stratigraphic history

Age	Event/ Formation				Description
	Reg.	Loc.			
Carbo-Perm		D_4	Granitoid Emplacement		Regionally along major Kennedy age and orientation structures, locally into reactivated D_{ES} age structures. Probably no regional fabric development.
Dev- Ord		?D_3	Compression	But age uncertain	Small scale offsets at Liontown and Waterloo
	D_3	D_2	Compression		Tilting of S_0 and D_E fabrics and structures, local thrusting, reactivation of D_{ES} structures. Possible development of layer parallel fabrics, historically correlated with the regional fabric.
	D_2	D_1	Granite emplacement		Probably extensional, with reactivation of D_{ES} structures. Stratigraphic excision within the SMRG. Possible development of layer parallel fabrics?

Cambro - Ord		DES	Seventy Mile Range Group Basin development (back arc basin?)		Deposited in a series of sub basins, bounded by high and low angle faults. Thickness and sequence changes across faults.
?			Basement to the SMRG		Now excised

3.3 Radiometric Interpretation and surface geology map

The surface geology is displayed in Enclosure Two. Unit attributes are displayed in the legend. Based on the correlation with the mapped geology, the following broad units, in stratigraphic order from the youngest, are outlined:

1. Qa. Modern drainage, several subdivisions based on relative quantities of potassium and thorium. The source of these sub units is not known. Some tailings contamination from Liontown is also mapped. Unsuitable for soil sampling. The Qa units define broad drainages, including flood plain and over levee bank material, and not just the modern high energy channels. Some care should be taken in defining areas for modern stream sampling;
2. Qr. Radiometric signature suggesting nearly residual material, but unable to define unique lithology. Soil sampling probably warranted;
3. Tf. Mapped ferricrete horizons. Probably not suitable for soil sampling;
4. Tc. Campaspe Formation. Several subdivisions based on relative quantities of uranium, potassium and thorium, but again the source of these variations is not known. Not suitable for soil sampling;
5. Tr. Warang Sandstone. Several subdivisions based on relative quantities of uranium, potassium and thorium, but again the source of these variations is not known. Not suitable for soil sampling; and
6. Outcrop of basement. All units prefixed O and C. Suitable for soil sampling.

3.4 Alteration zones

A series of alteration zones have been interpreted in the radiometric and aeromagnetic data. Although each element is mapped as separate zones, overlapping zones (or in fact concentrically arranged zones) are probably related to a common alteration system. The mapped alteration systems are:

- Uranium anomalies, probably reflecting either the presence of granitic dykes, or feldspar alteration. Both strong and weak zones have been identified;
- Thorium anomalies, again probably reflecting feldspar alteration, although the actual residency of the Th is unknown;
- Potassium anomalies, reflecting addition of potassium minerals. Note that numerous stratiform K units have been outlined, and these may reflect either potassium rich shales, or stratiform alteration zones. These cannot be resolved in the interp, and most should be considered alteration zones. The largest anomalies are associated with the Homestead Fault;
- Radiometric destruction. Several zones of apparent radiometric destruction are outlined. These may reflect unrecognised soil or cover sequence, but in several areas not every element is depleted, and suggests removal of several mineral phases during hydrothermal alteration;
- Magnetic alteration. Numerous zones outlined, with the zones clearly fault related considered priority. Discrete magnetic zones developed in the granites have not been considered as alteration, although they may well be. Note that several reversely polarised magnetic anomalies have been defined, suggestive of Mt Leyshon age alteration; and
- Magnetic destruction. Distinct from reversely polarised magnetic alteration, no zones have been identified in the interpretation, principally because there are no consistent magnetic units mapped, with low zones developed along them. Some mag lows in the granites may represent magnetic destruction zones.

3.5 Exploration Targets

Three broad styles of mineralisation have been recognised in the broader region including the Mt Windsor Volcanics. These are:

1. VHMS style Zn- Pb- Cu- Ag- Au mineralisation, including Thalanga, Liontown, Waterloo, and Magpie. Cambro- Ordovician in age and apparently located at three stratigraphic positions in the MWV, namely the Thalanga Horizon (Trooper Creek- Mt Windsor contact), Waterloo Horizon (within the Trooper Creek), and Liontown Horizon (towards the top of the Trooper Creek). Other stratigraphic horizons may be prospective, particularly at the top of the Trooper Creek Formation. One such target, with a stratiform K alteration assemblage, has been defined, although there is a further 11km of this contact mapped;

2. Devonian age gold mineralisation, related to the system developed at Charters Towers or age equivalents at Hadleigh Castle, ie, alteration related to structures; and
3. Carbo- Permian age gold mineralisation, related to felsic intrusive systems. Examples include the Mt Leyshon and Mt Wright breccia hosted gold systems, and the Pajingo epithermal vein hosted systems.

Other systems include Highway Reward style copper- gold pipes, variously described as VHMS related, or possibly epigenetic; and at Liontown there is evidence of both early base metal mineralisation (stratiform, stratabound and probably distal exhalative mineralisation in the Liontown Lode, and broadly stratabound, stratiform but replacive mineralisation in the Carrington lode, both overprinted by a strong shear fabric), plus shear hosted copper rich lodes, and a possible gold rich shear hosted system.

Exploration targets have been classified by level of development (summarised in Table Three below), and given a priority, at this stage based on a qualitative review. Key criteria for each level are also given in Table Three.

Exploration targets for mineralisation styles 1 and 3 have been outlined (Targets prefixed V and GI respectively), and are tabulated in Tables Four and Five and drawn in Enclosure 4.

Exploration targets for Charters age gold mineralisation have been prefixed GS. These are principally fault controlled alteration systems, and may reflect a range of possible barren or mineralised hydrothermal systems. These are listed in Table Five and drawn in Enclosure 4.

Miscellaneous targets are listed in Table Six.

Table Three

Exploration target development levels

Level of Development	**Criteria-**	
	VHMS styles	**Mt Leyshon styles**
Resource		
Drilling- Economic Intersection		
Drilling- Bedrock alteration system	Footwall alteration systems, vertical and horizontal zonation	Vertically zoned
Drilling- Supergene anomaly	Depletion zones developed at Liontown	?
Geochemical target	Pb, Zn, Cu, Ag, Au anomalism. Any trace element indicators?	Au, but elevated base metals in zoned system
Geophysical target	Potassic alteration, +/- magnetic alteration?	Strong magnetic anomaly, but magnetite alteration related to dolerites / mafic rocks in the country rock. Anomaly at Leyshon and Mt Wright are reversely polarised. Hi K, mod U signature
Geological target	Key Stratigraphic horizon	Carbo- Perm intrusive/ breccia

Table Four

Exploration Targets- VHMS Targets

Target	**Description**
Thalanga Horizon VHMS Targets	
VT_1	Covered target under Warang Sandstone. No reported testing, especially drilling. Depth of cover unknown *Next test program -* Review VTEM. Then either Ground IP/TEM or strat RC drilling. Suspect partial leach will not be effective, and RAB/AC may not be able to penetrate sandstones?
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

	[redacted] [redacted]
[redacted]	[redacted] [redacted] [redacted]
[redacted]	[redacted] [redacted]
Waterloo Horizon VHMS Targets	
[redacted]	[redacted] [redacted]
[redacted]	[redacted]

	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
VW_5	Piece of equivalent strat to G_W_2, but interpreted as part of a thrust stack. Covered by either modern drainage, Campaspe or the edge of the Warang Sandstone. No soil or drilling coverage. There is a strong Zn in stream sediment anomaly immediately to the west. *Next test program -* RAB/AC drilling with GC and PIMA logging.
Liontown Horizon- VHMS Targets	
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

	[redacted]
[redacted]	[redacted] [redacted]
[redacted]	[redacted] [redacted]
[redacted]	[redacted] [redacted]
Other stratigraphic horizons	
[redacted]	[redacted]

	[redacted]

Table Five

Exploration Targets- Gold Targets

Target	Description
Structurally Controlled Alteration Systems	
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
Intrusive Related Alteration Systems	
[redacted]	[redacted] [redacted]
[redacted]	[redacted] [redacted]
[redacted]	[redacted] [redacted]

	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

[redacted]	[redacted] [redacted]
[redacted]	[redacted] [redacted]

Table Six

Exploration Targets- Miscellaneous alteration zones

Target	Description
GM_1	Thorium depletion zone in Rollston range rocks. *Next test program –* Soil sampling and recon mapping.
GM_2	Large Th, U depletion zone, with a K rich core, in mapped Trooper Creek. *Next test program –* Soil sampling and recon mapping.
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
GM_7	Magnetic alteration zone, under cover. Interpreted Rollston Range host. *Next test program –* Recon mapping then RAB/AC drilling.

3.6 Limitations of the Data Used

The principal limitations on the data used are:

- Magnetic data. 35m flight height, and cover depths up to 100m suggests a minimum spatial resolution of between 25- 75m. Error in the linework at 1:25,000 suggests a further possible 25m of spatial error.
- Radiometric data. Collected at one tenth the resolution of the magnetic data (assuming a uniform, fresh outcrop surface, which is unlikely), the radiometrics will have better lithological discrimination, but a much poorer spatial resolution, than the magnetics. Where ever possible unique lithological units have been defined on the basis of the radiometric signature, and drawn in the outcrop geology map, but the small outcrop windows and partially soil covered surface reduce the confidence in the unit definition and spatial contact resolution. Magnetic contacts are considered more reliable than the radiometric boundaries, and this is reflected in differences in contact location between the solid geology and outcrop geology maps;
- Geology has been controlled principally by digital geology provided in the Queenland Geological Survey's Charters Towers multiclient dataset. The resolution and age of this has not been confirmed, but matching features in the digital data with the Ikonos image suggests that there is at least a 100m error locally, with the Ikonos image considered the more accurate; and
- Targets were checked against the open file soil and stream sediment data in Liontown's digital database. Looking briefly at the stream sediment suggests that samples with no assays have been recorded as numerical values (probably numerical values indicating below detection). The data needs to be reviewed and the original data checked to ensure that below detections and no assays are recorded properly.

4 CONCLUSIONS AND RECOMMENDATIONS

The interpretation has created a solid geology model through the Mt Windsor Volcanics around Liontown. The four regionally mapped formations within the Seventy Mile Range Group have been identified, and the Thalanga, Waterloo and Liontown horizons, favourable horizons for the development of VHMS mineralisation, have been mapped.

The interpretation has identified a series of low- and high- angle faults, bounding domains of varying stratigraphy, and stratigraphic thickness. Locally the low angle structures appear to repeat magnetic stratigraphy. The structures suggest a history including deposition of the Seventy Mile Range Group in an extensional basin, with potentially a second extensional event (possibly coeval with granite emplacement) and a compressional event (folding stratigraphy into the current geometry). Latest movement is at least Carboniferous, in part controlling the location of inferred Carbo- Permian intrusions.

A series of cover units have been identified from the radiometric interpretation, including both modern drainage and Campaspe Formation.

The Thalanga horizon is defined as the Mt Windsor Volcanics- Trooper Creek Formation contact, and is mapped across the survey area. Anomalism and alteration at Esso's Waterloo prospect is correlated with this position. Potassic alteration is recorded in areas to the west, with no reported soil sampling.

The Waterloo horizon is defined as an interval within the Trooper Creek Formation, and at Waterloo associated with volcaniclastics within an andesitic unit. Equivalent positions have been identified, including the Oakvale anomaly.

The Liontown horizon, located near the top of the Trooper Creek Formation, has been mapped to the west and east. Several target areas have been identified.

A series of possible Carbo- Permian intrusions and related alteration zones have been identified, and represent high priority gold exploration targets. A series of other alteration zones have also been identified, included both fault controlled magnetite and potassic alteration.

A series of exploration targets have been identified, with the next phase of exploration proposed. Some of these targets include the existing geochemically anomalous areas. 20 VHMS targets, focussed on the three key horizons, have been identified. 9 targets representing Carbo- Permian intrusion related gold targets have been outlined, and 10 targets representing shear or fault hosted gold (or possibly Cu?) identified.

At this stage no detailed work has been completed on the VTEM data. Interpretation of basement conductive sources and calculation of the CDI's and related depth slices has not been completed by the geophysicists, and further interpretation requires these to be completed.

5 REFERENCES

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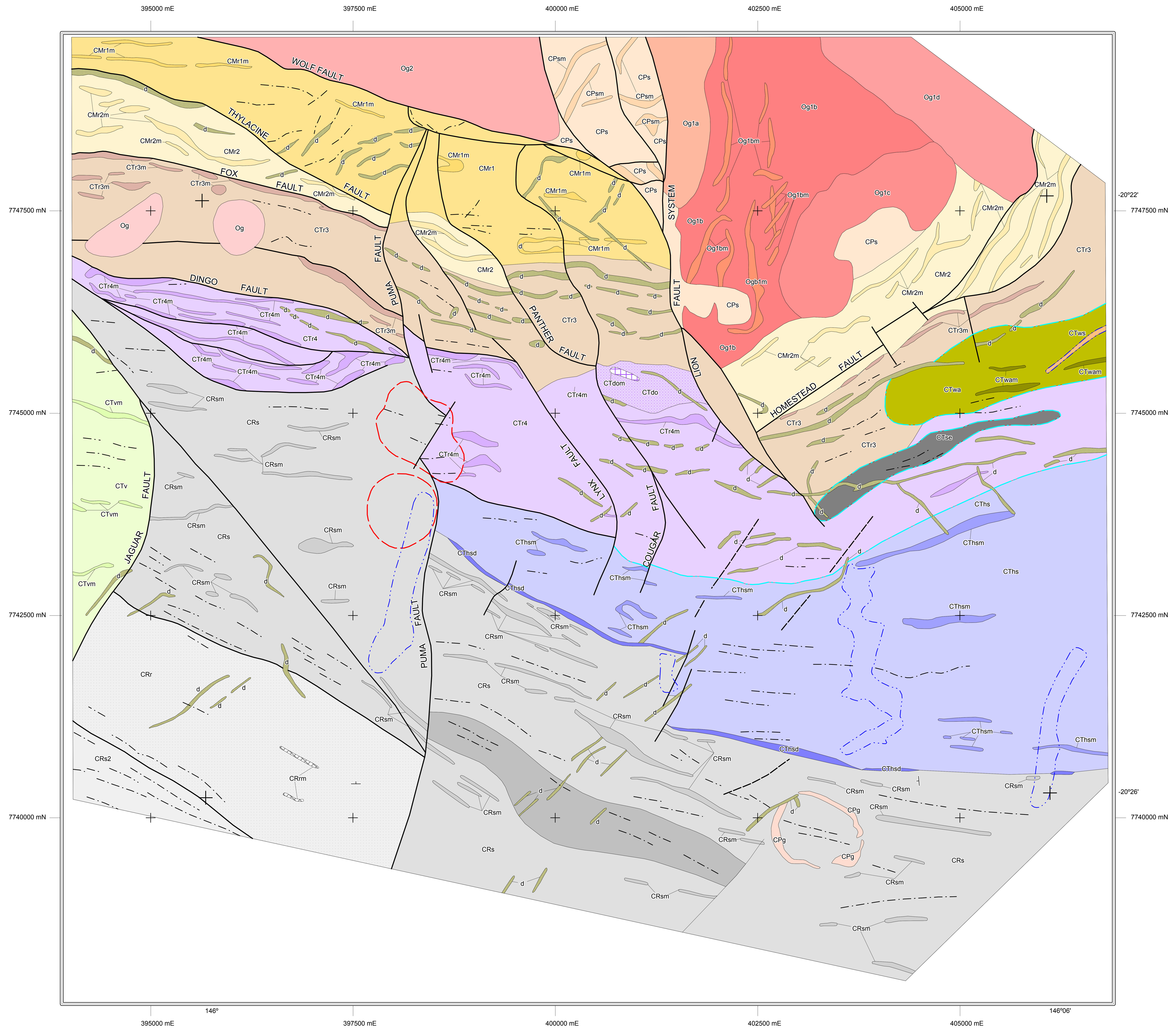

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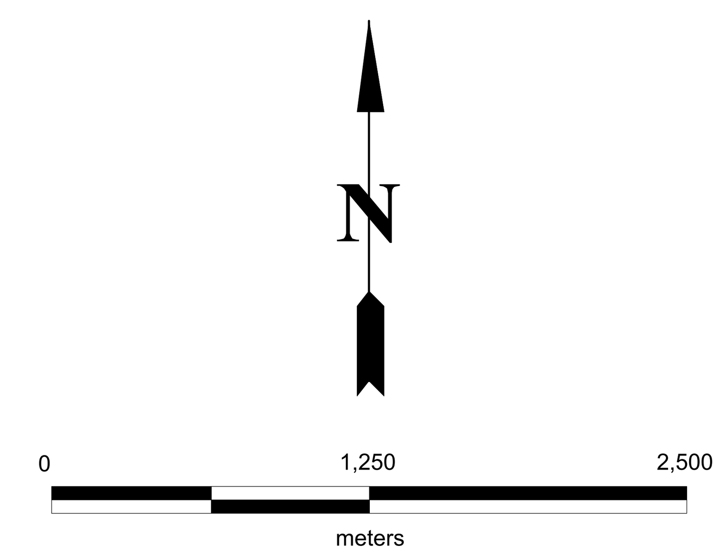
DETAILED AEROMAGNETIC INTERP - LITHOLOGY LEGEND

CP	g	Carbo-Permian Granite. Moderate to highly magnetic.
O		Ordovician to Devonian GRANITES
	g	Undifferentiated
	g2	Radiometrically distinct
	g1d	No radiometric signature; irregular magnetic character
	g1c	No radiometric signature; highly magnetic
	g1b	No radiometric signature; discrete linear highly magnetic zones.
	g1bm	More magnetic phases
	g1a	No radiometric signature; irregular highly magnetic character
CR		ROLLSTON RANGE FORMATION
	s2	Sediments, including abundant potassic shales
	s	Sediments, undifferentiated
	sm	Sediments, magnetic units (discrete)
	sm2	Sediments, low elevated magnetic signature
	rm	Rhyolite, mapped with weak magnetic signiture
	r	Rhyolite, mapped
CT		TROOPER CREEK FORMATION
	hs	Hanging wall sediments - undifferentiated magnetic characte but including extensive dacitic volcaniclastics mapped at Tigertown
	hsm	Hanging wall sediments - magnetic units.
	hsd	Mapped magnetic dacite, feldspar phyric (CThsd)
	v	Mapped basalt, andesite and rhyolite - undifferentiated magnetic character
	vm	Mapped basalt, andesite and rhyolite - magnetic unit
	r4	Mapped rhyolitic volcanics and volcaniclastics - undifferentiated magnetic character. Locally including dacitic volcaniclastics and dacitic pumice breaccia - footwall to Liontown.
	r4m	Mapped rhyolitic volcanics and volcaniclastics - magnetic units
	se	Siltstone logged/mapped at Leopardtown
	do	Mapped dacitic unit (QGS) - differentiated in radiometrics and mapping. Mapped as andesitic in RGC drilling - possibly equivalent to Waterloo position?
	dom	Magnetic unit in do
	wa	Andestic lavas - foot - and hangingwall at Waterloo
	wam	Magnetic units in wa
	ws	Volcaniclastic units at Waterloo - host to mineralisation.
	r3	Mapped rhyolitic volcanics or volcaniclastics - undifferentiated magnetic signature.
	r3m	Mapped rhyolitic volcanics or volcaniclastics - magnetic units.
CM		MT WINDSOR VOLCANICS
	r2	Rhyolitic units - non magnetic
	r2m	Rhyolitic units - magnetic
	r1	Rhyolitic units - non magnetic
	r1m	Rhyolitic units - magnetic
CP		PUDDLER CREEK FORMATION
	s	Sediments, undifferentiated
	sm	Sediments, magnetic - probably hornfels alteration

r2 differentiated from r1 on the basis of radiometric signature and overall magnetic character

- Lithological contact
- Fault/shear contact
- Interpreted subsurface granite; interpreted age indicated by letter
- Lithological contact from RGC interpretation
- Surficial magnetic units
- Magnetic layering
- Magnetic linear features - highs, lows or truncations
- Magnetic dykes



SCALE 1:25000

DATUM: GDA94
ELLIPSOID: GRS80
GRID: MGA ZONE 55S

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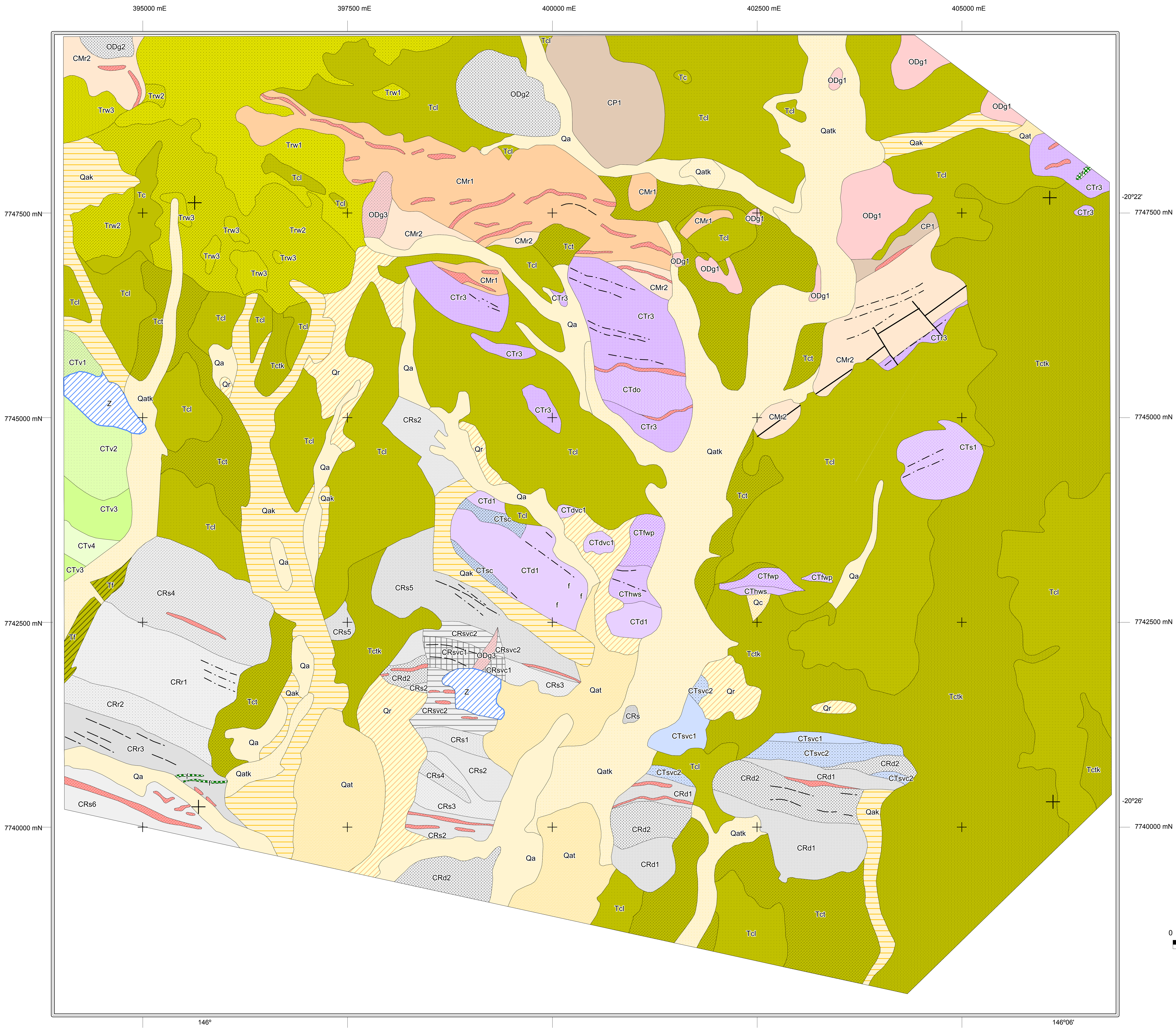
A. C. N. 067 552 461

LIONTOWN RESOURCES LTD
MT WINDSOR VOLCANICS PROJECT
LIONTOWN AREA
MAGNETICS INTERPRETATION

SCALE: 1:25 000	GEO:Lithos-XMineralExplorationConsultants
DATE: 19-12-2007	GIS: T. STOYANOV
Plan/Fig:	Filename:



LEGEND

Q	a	Alluvials, mapped with no radiometric character
	ak	Alluvials, modern drainage with low U, low Th, low-moderate K
	atk	Alluvials, modern drainage with low U, moderate Th, low-moderate K
	at	Alluvials, modern drainage with low U, moderate Th, no K
	c	Culture - tailings from Liontown; moderate U, Th and K
Q	r	Shallow cover or deep residual soils-bedrock; undifferentiated
T	f	Ferricrete - from QGS mapping
	c	Undifferentiated
	cl	No U, Th and K
	ct	Low U, low Th, no K
	ctk	Low U, Th and K
T		WARANG SANDSTONE
	rw1	Mapped with racl sign: low U, high Th, low K
	rw2	Mapped with racl sign: moderate U, high Th, low K
	rw3	Mapped with racl sign: moderate U, high Th, high K
OD		Ordovician to Devonian GRANITES
	g1	Mapped, but no radiometric signature
	g2	High U, Th and K. Locally mapped as Puddler Creek Fm
	g3	High U, high Th and low K. Locally mapped as Puddler Creek Fm
CR		ROLLSTON RANGE FORMATION
	s	Undifferentiated
	s6	Sediments with prominent shale bands
	r3	Mapped QGS: moderate U, high Th, moderate K with minor potassic shales
	r2	Mapped QGS: moderate U, high Th, moderate K
	r1	Mapped QGS: moderate U, high Th, low-moderate K
	s4	Sediments: high U, low Th, low K
	s1	Sediments: low U, moderate Th, no K
	s2	Sediments: low U, moderate Th, low K
	s3	Sediments: low U, low Th, no K
	s5	Sediments; QGS mapping: high U, moderate Th, moderate K
	d2	Dacite, mapped (QGS): high U, high Th, low K
	d1	Dacite, mapped (QGS): low U, low Th, no-low K
	svc2	Volcaniclastics, mapped QGS and RGC: no-low U, low Th, low K
	svc1	Volcaniclastics, mapped QGS and RGC: no-low U, high Th, moderate K
CT		TROOPER CREEK FORMATION QGS mapped. Undifferentiated basalt, andesite, rhyolite, sediments and volcaniclastics. West edge of map sheet.
	v4	Moderate U, moderate Th, high K
	v3	High U, high Th, low K
	v2	High U, high Th, moderate K
	v1	Moderate U, high Th, moderate K
	svc1	Mapped volcaniclastics: no-low U, high Th, moderate K
	svc2	Mapped volcaniclastics: no-low U, low Th, low K
	sc	Sediments
	d1	Dacitic volcaniclastics - RGC
	hws	Shale, silt and sandstone including Liontown horizon at base: low U, no-low Th, low K
	dvc1	Dacitic volcaniclastics. Time equivalent to fwp? No U, no-low Th, low K
	fwp	Dacitic pumice breccia: no U, no Th, low-moderate K (incl. sericite alteration)
	d0	Dacite, mapped (QGS): no U, no Th, low K
	s1	Siltstones at Leopardtown; no-low U, no Th, no K
	r3	Rhyolite and rhyolitic volcaniclastics; no-low U, no Th, no K
CM		MT WINDSOR VOLCANICS
	r2	Rhyolite; moderate U, low Th, low K
	r1	Rhyolite; variable-moderate U, moderate Th, low K
CP		PUDDLER CREEK FORMATION
	1	Metasediments; locally mapped as granites; low U, variable-moderate Th, low K

- Z: Texturally and radiometrically destructive alteration zones - no precursors recognized
- K rich linear unit - interpreted shale, but may represent a stratabound K alteration zone
- Fault / shear contact
- Radiometric layering - any channel
- Mapped contacts - both RGC and QGS maps
- f: Felsic dyke - U, Th ± K rich

N

0 1,250 2,500
meters

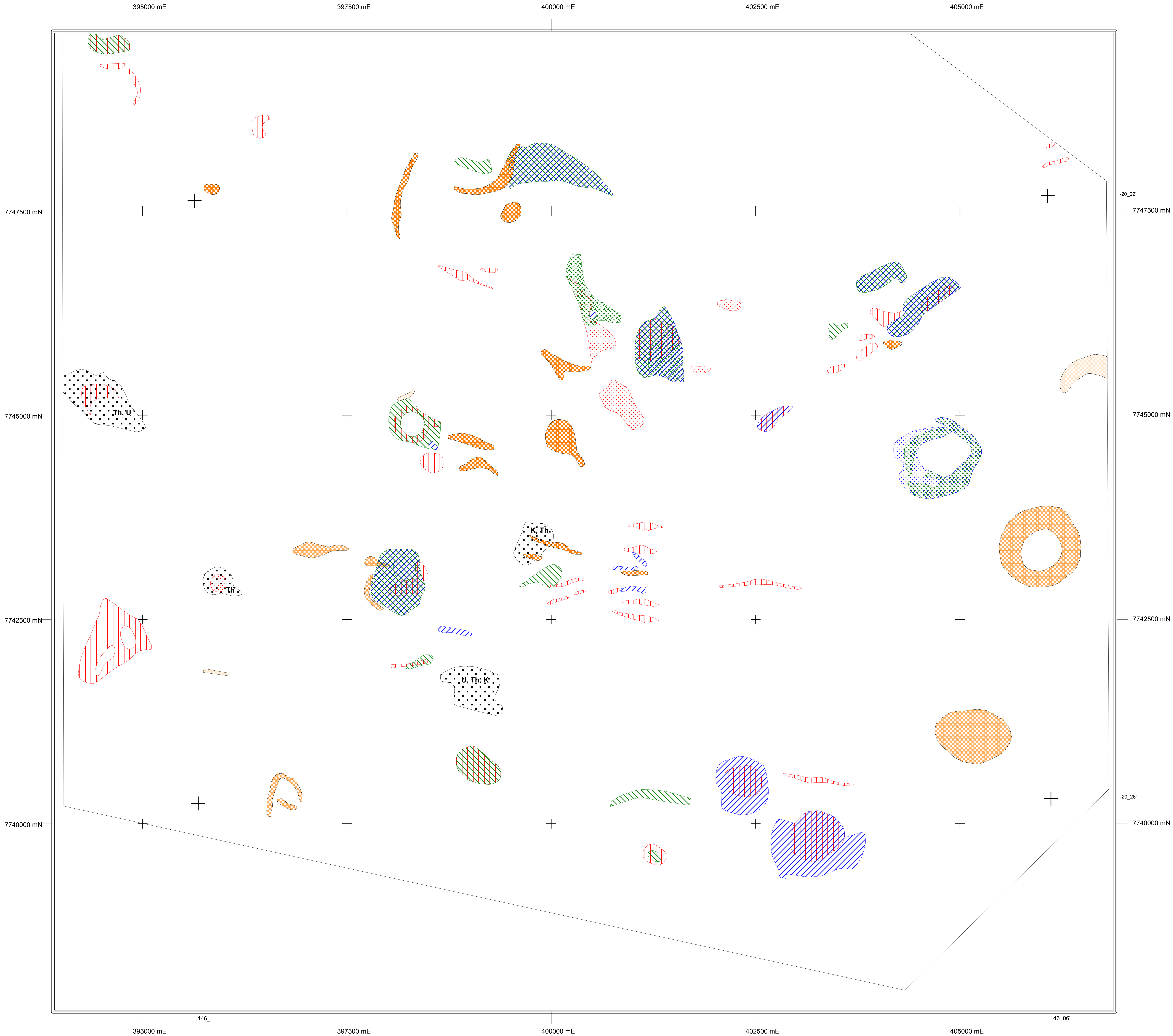
SCALE 1:25000

DATUM: GDA94
ELLIPSOID: GRS80
GRID: MGA ZONE 55S

SOUTHERN GEOSCIENCE CONSULTANTS PTY LTD
A.C.N. 067 552 461

LIONTOWN RESOURCES LTD
MT WINDSOR VOLCANICS PROJECT
LIONTOWN AREA
DETAILED RADIOMETRICS INTERPRETATION
LITHOLOGY SHEET

SCALE: 1:25 000	GEO: Lithos-X Mineral Exploration Consultants
DATE: 19-12-2007	GIS: T. STOYANOV
Plan/Fig:	Filename:



ALTERATION ZONE LEGEND

U — Moderate to strong / Weak

Th — Moderate to strong / Weak

K — Moderate to strong / Weak

NB: Units mapped as shales (see lithology sheet) may also represent potassic alteration zones.

Radiometrically destructive alteration (or unrecognised radiometrically null units). U, Th, K indicate the elements removed

Magnetic alteration - strong

Magnetic alteration - weak

Magnetic alteration - reversly polarised

0 1,250 2,500
meters

SCALE 1:25000

DATUM: GDA94
ELLIPSOID: GRS80
GRID: MGA ZONE 55S

SOUTHERN GEOSCIENCE CONSULTANTS PTY. LTD.
A. C. N. 067 552 461

LIONTOWN RESOURCES LTD
MT WINDSOR PROJECT
LIONTOWN AREA
ALTERATION INTERPRETATION

SCALE: 1:25 000	GEO: Lithos-XMineralExplorationConsultants
DATE: 19-12-2007	GIS: T. STOYANOV
Plan/Fig:	Filename: AltInterp25k.plm

APPENDIX 11

AAMHatch Pty Ltd Report – IKONOS Satellite Imagery

LIONTOWN RESOURCES

LIONTOWN SATELLITE IMAGE 11.07.08

VOLUME 888C0152_Liontown NOB

Summary

Project

Colour IKONOS satellite imagery was captured over the Liontown area on 11 July 2008 and delivered to the client on the 18 November 2008.

Data

The imagery is supplied in 3 Band GeoTiff and ECW with corresponding georeference files.

The processed imagery is georeferenced to GDA94 MGA55.

CONTENTS	**Page Nos.**

ABN 63 106 160 678

152 Wharf Street, Spring Hill QLD 4006

Phone (07) 3620 3111 Fax (07) 3620 3133
Other Offices: Sydney, Melbourne, Perth, Wollongong, Newcastle, Whyalla, Mackay

1. DATA INSTALLATION

Data format	:	GeoTiff, ECW
Number & type of media	:	One 4.7GB DVD-ROM
Number of files on media	:	119x data, 2 x metadata/license, 1 x Readme_888c0152_Liontown NOB.PDF
Data formatted on	:	18.11.2008
Disk volume	:	Readme_888c0152_Liontown NOB
AAMHatch Job Manager	:	Catherine Chee

README FILE

This document (Readme_888c0152_Liontown NOB.PDF) is provided as an Acrobat file in this volume.
To open the file, double click on the PDF file to activate Acrobat Reader Software.
Adobe Acrobat Reader may be downloaded from:
http://www.adobe.com/products/acrobat/readstep2.html

LOADING NOTES

Data may be copied using a file copy utility such as Windows Explorer or similar.

FILE SIZES AND NAMES

Name	Size
ECW	9920 KB
TIFF	12.6 GB
Client_Acceptance Single_Multi User License Agreement.pdf	137 KB
Liontown_metadata.txt	26 KB
Readme_Liontown 888c0152.pdf	979 KB

2. METADATA

DATA CHARACTERISTICS

Characteristic	Description
Format	GeoTiff, ECW
Imagery	0.8m cell size, 8 bit colour

REFERENCE SYSTEMS

	Horizontal	Vertical
Datum	GDA94	N/A
Projection	MGA55	N/A

This data is GDA-compatible

SOURCE DATA

	Source	Description	Ref No	Capture Date
Satellite Imagery	GeoEye	IKONOS	888c0152	11.07.08

EXPECTED ACCURACY

Project specifications and technical processes were designed to achieve accuracies as follows:

	Measured Point	Derived Point	Basis of Estimation
Imagery	~1-3m	N/A	Deductive estimate (excluding terrain)

Notes On Expected Accuracy

- Values shown represent standard error (68% confidence level or 1 sigma), in meters to supplied ground control
- This data has not been field tested for accuracy. Full proof of accuracy achieved requires comparison to independent test points.

USE OF DATA

- Intended use : Planning and mapping
- Intended use : Viewing

3. CONDITIONS OF SUPPLY

The data in this volume has been commissioned by **LIONTOWN RESOURCES**.

The data in this volume is provided by AAMHatch Pty Limited (AAMHatch) to **LIONTOWN RESOURCES** under AAMHatch standard Terms of Engagement and the GeoEye License Agreement for IKONOS products, which provide a license for **LIONTOWN RESOURCES** to access and use the data only for the project and explicit purpose for which it is provided. AAMHatch and GeoEye retain ownership of all Intellectual Property Rights in relation to this data or modifications, enhancements or subsets of this data. The data must not be sold, lent or distributed to any other party; and used subject to the following conditions:

1. This file (Readme_888c0152_Liontown NOB.PDF) is always stored with the unaltered data contained in this volume.

2. The data is not altered in any way without the approval of AAMHatch. The data may be copied from this file to another.

3. The data is not used for purposes beyond that explicitly agreed in the description of the Services provided by AAMHatch.

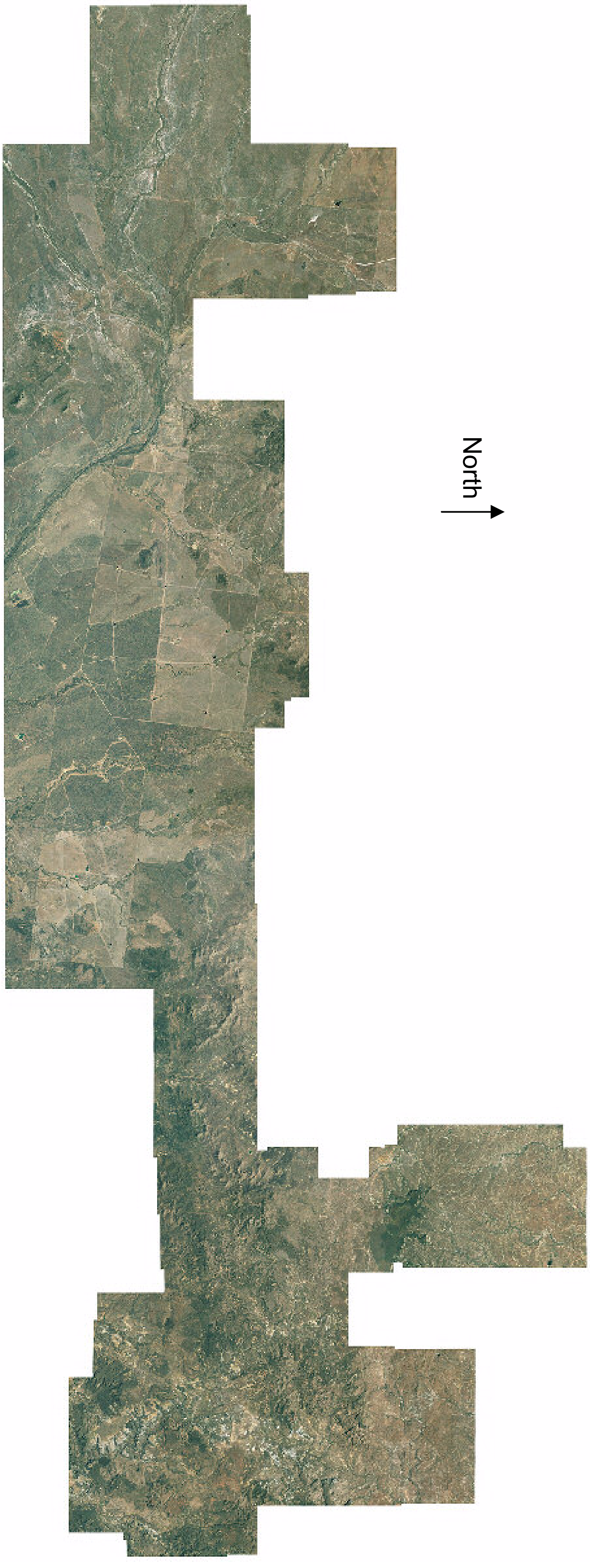
Any breach of these conditions will result in the immediate termination of the license issued by AAMHatch, and **LIONTOWN RESOURCES** will indemnify AAMHatch from all resulting liabilities.

Any problems associated with the information in the data files contained in this volume should be reported to:

AAMHatch Pty Limited

152 Wharf Street,
SPRING HILL QLD 4000
Telephone (07) 3620 3111
Facsimile (07) 3620 3133
Email info@aamhatch.com
Web www.aamhatch.com

4. VALIDATION PLOT



APPENDIX 12

Terra Search Pty Ltd report – Ground Magnetic Survey, 2009

Terra Search Pty Ltd
A.B.N. 59 011 073 939
Specialists in Mineral Exploration:
Geology and Computing

GROUND MAGNETIC SURVEY:
MT WINDSOR VOLCANICS PROJECT
COMPLETED FOR LIONTOWN RESOURCES.
Field data collected December 2008 - January 2009.
Processed by Terra Search Pty Ltd.

Ground Magnetic Operators:
Aaron Lawrence
Bona Aoae
Josh Gander
Data/GIS Processor:
Tim Beams BSc (Hons) Physics

Terra Search Pty Ltd
For **Liontown Resources Ltd**

Townsville
March 2009

Document # LTR2009001
TS Shelf Ref # 2009/010

Townsville
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1. Survey Overview

Client: Liontown Resources

Survey Date: December 2008 – January 2009

Data Processed and Delivered: March 2009

Tenements: EPM14161, EPM15192 (Uranium Equities), EPM17080

Purpose

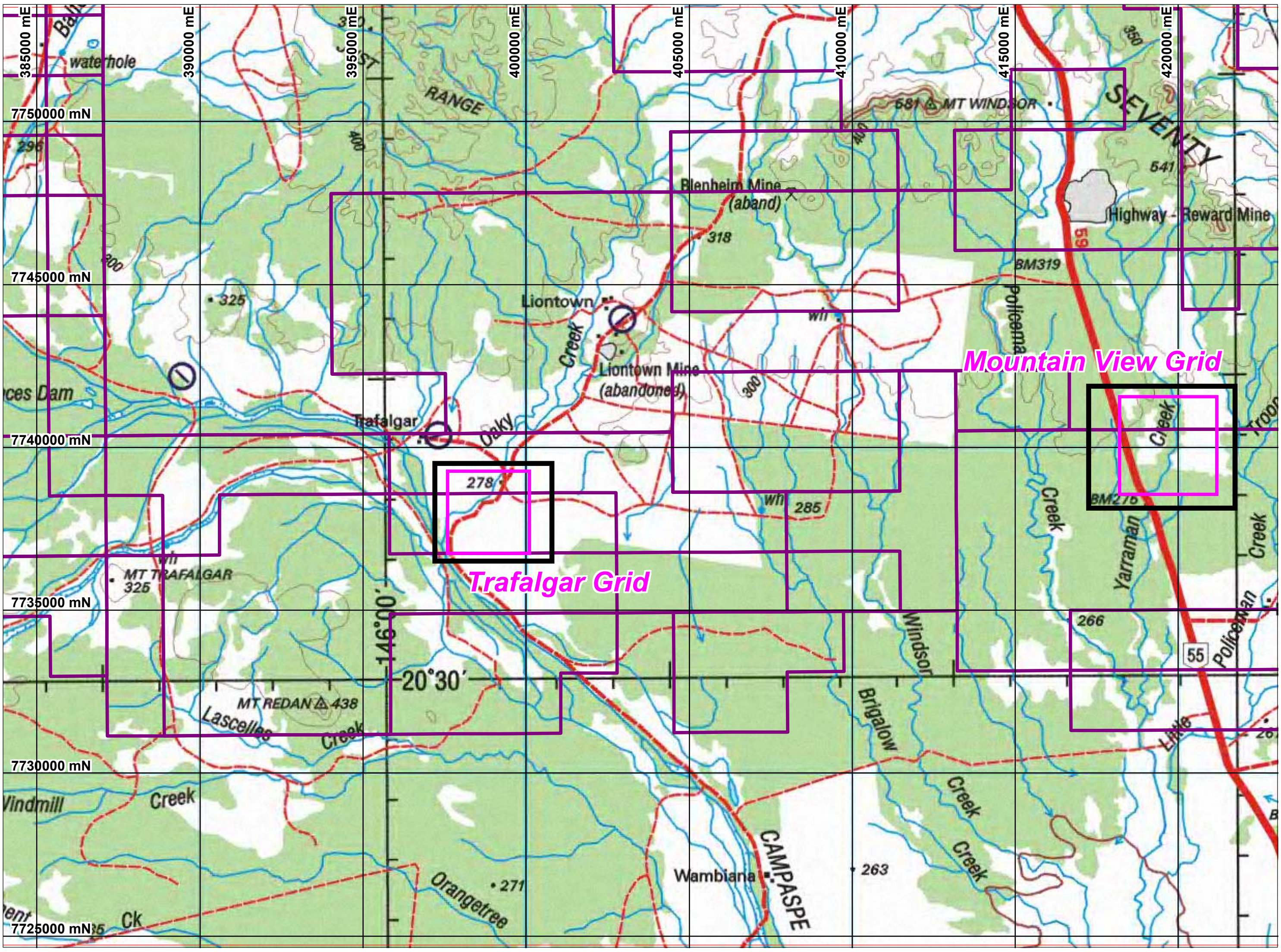
Liontown Resources Ltd contracted Terra Search Pty Ltd to undertake two ground magnetic surveys within their Mt Windsor Volcanics Project suite of tenements in the Charters Towers region of north Queensland. The ground magnetic surveys were conducted during December 2008 – January 2009. This report contains the details of the surveys and the data acquired.

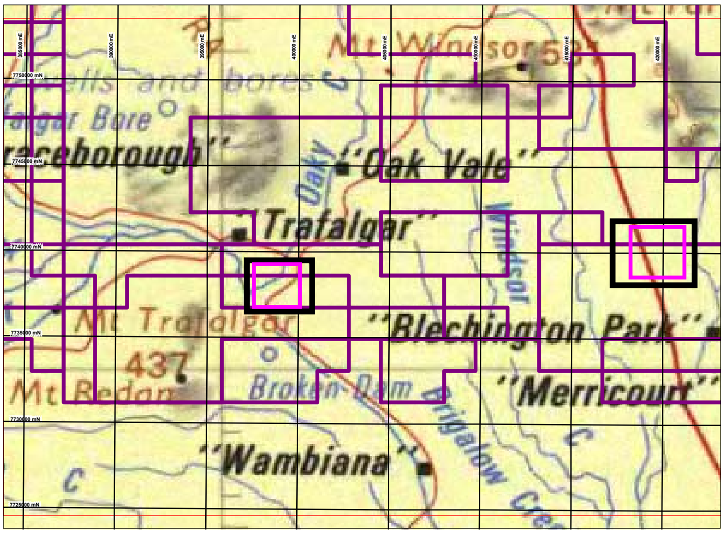
Location

Liontown's Mt Windsor Volcanics Project comprises over 3000km^2 of tenured ground within a significant mineral province south of Charters Towers. A location map is provided in Figure 1. The two magnetic surveys conducted December 2008 – January 2009 are named Trafalgar and Mountainview. These two surveys were originally part of a larger proposed work plan of some 10 survey areas. However, changing economic conditions caused the collection of data for the remainder of these grids to be curtailed. Figure 2 shows the survey area in relation to satellite imagery. The survey areas are located within the Thalanga geological province in the Charters Towers geological region.

Figure 3 shows the regional geology taken from the Townsville hinterland 1:500k scale digital geology dataset. The geology is dominated by Tertiary-Quaternary cover units (Qa, Tqr), with localized outcrops of Cambrian - Ordovician rocks. To the north the cover diminishes and the units of the Charters Towers region are well exposed.

Figure 4 shows a composite regional airborne magnetics image taken from multi-client and statewide regional scale datasets. The exposed rocks of the Charters Towers region to the north show a strong, textured magnetic response. The magnetic response of the Thalanga province in the central region is more subdued, though numerous magnetic linear features penetrate the otherwise benign mag response of the sedimentary cover units. These magnetic linears have a predominant southeast trend. To the south is a large magnetic high anomaly. A region of elevated magnetics extending from this body into the region to the north possibly indicates magnetite enrichment due to hydrothermal activity related to this body.



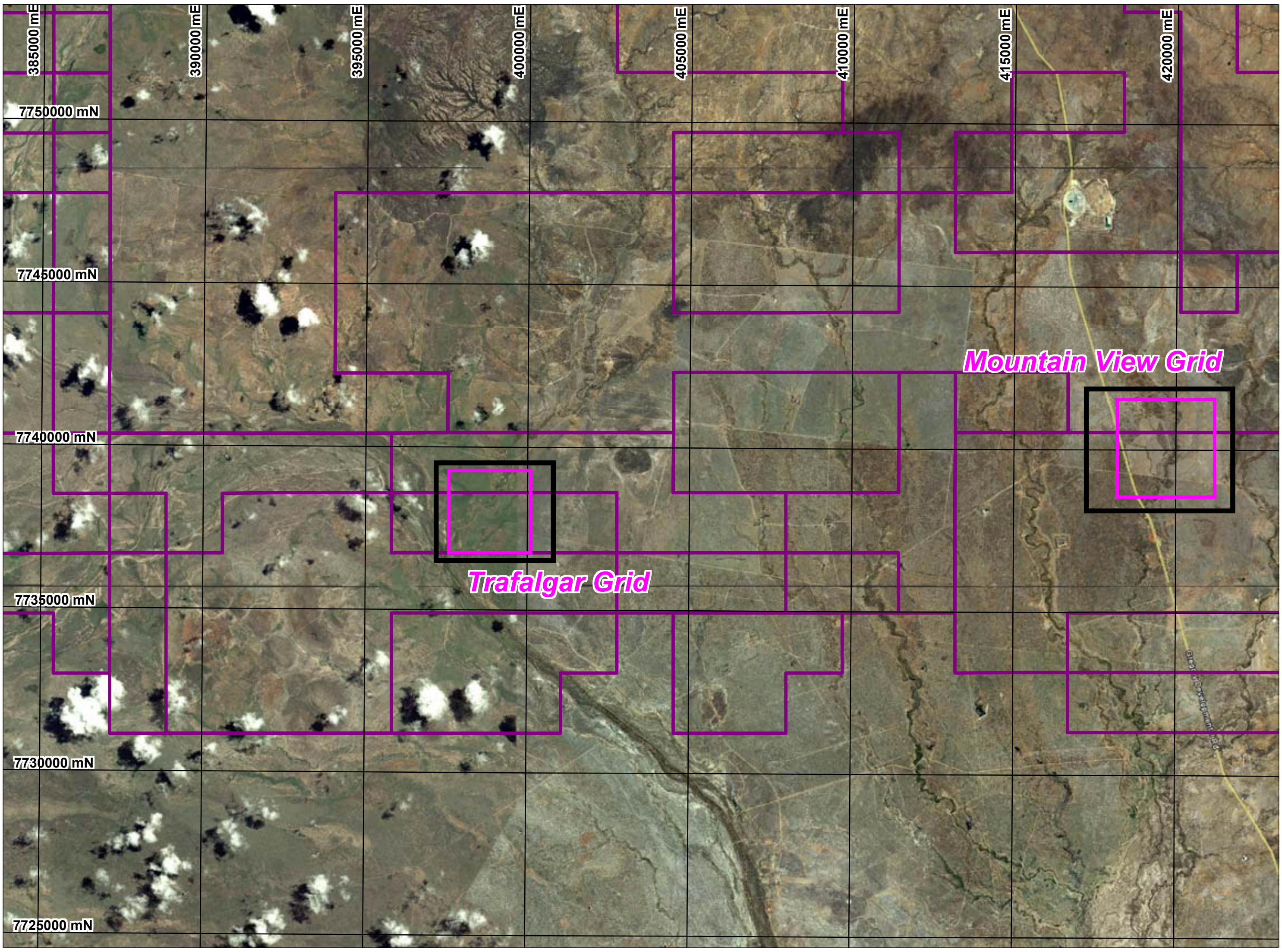


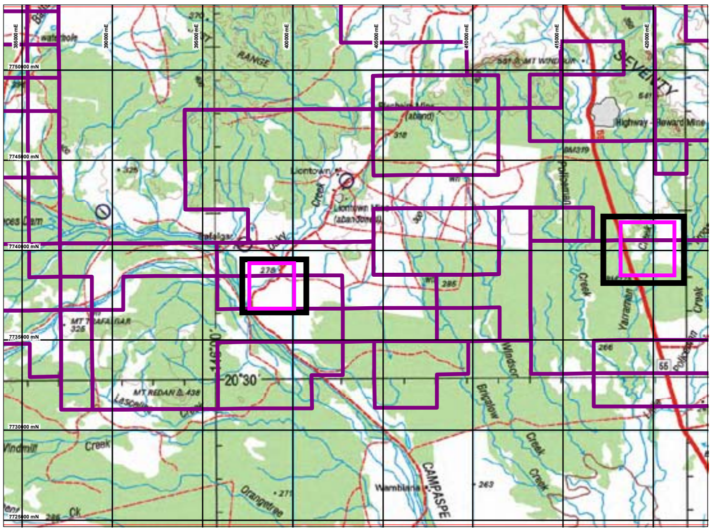
0 5
Kilometers
1:200,000
N

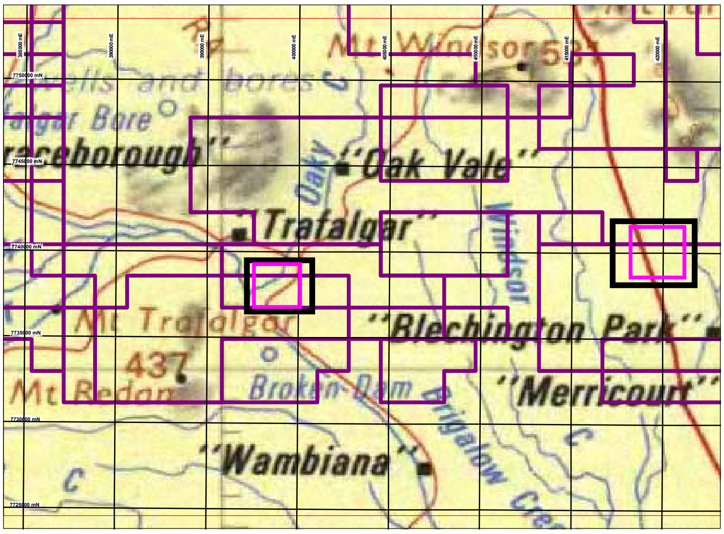
Terra Search Pty Ltd

LTRCXT0001_Location.wor

Date:19/3/2009	**LIONTOWN EXPLORATION**
Author: TJB/AWS	**Charters Towers Region**
Office: Townsville	**Ground Magnetic Survey Location Plan**
Figure 1	**March 2009**
Scale: 1:200000	Projection: MGA Zone 55 (Australia GDA94)



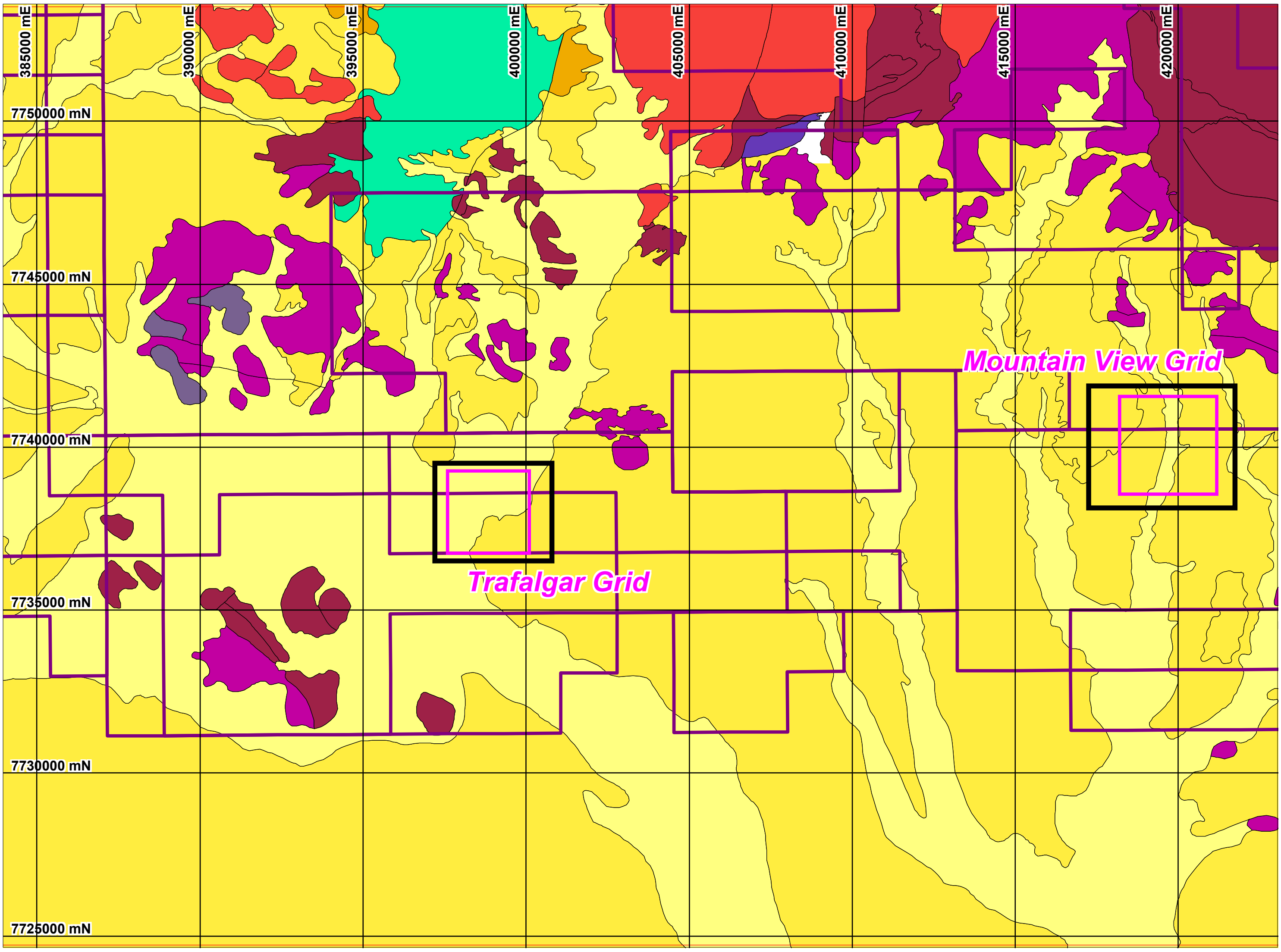


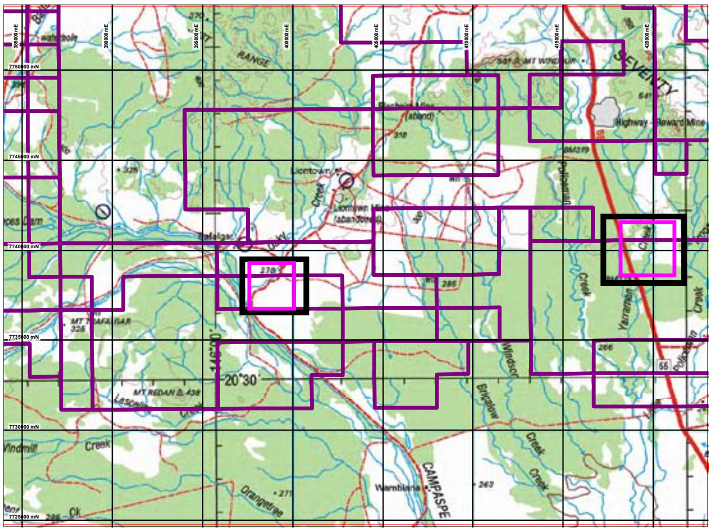


0 5
Kilometers
1:200,000
N

	LIONTOWN EXPLORATION **Charters Towers Region** **Ground Magnetic Survey** **Satellite Imagery** **March 2009**
Date:19/3/2009	
Author: TJB/AWS	
Office: Townsville	
Figure 2	
Scale: 1:200000	Projection: MGA Zone 55 (Australia GDA94)

Terra Search Pty Ltd
LTRCXT0001_Location.wor





GEOLOGY

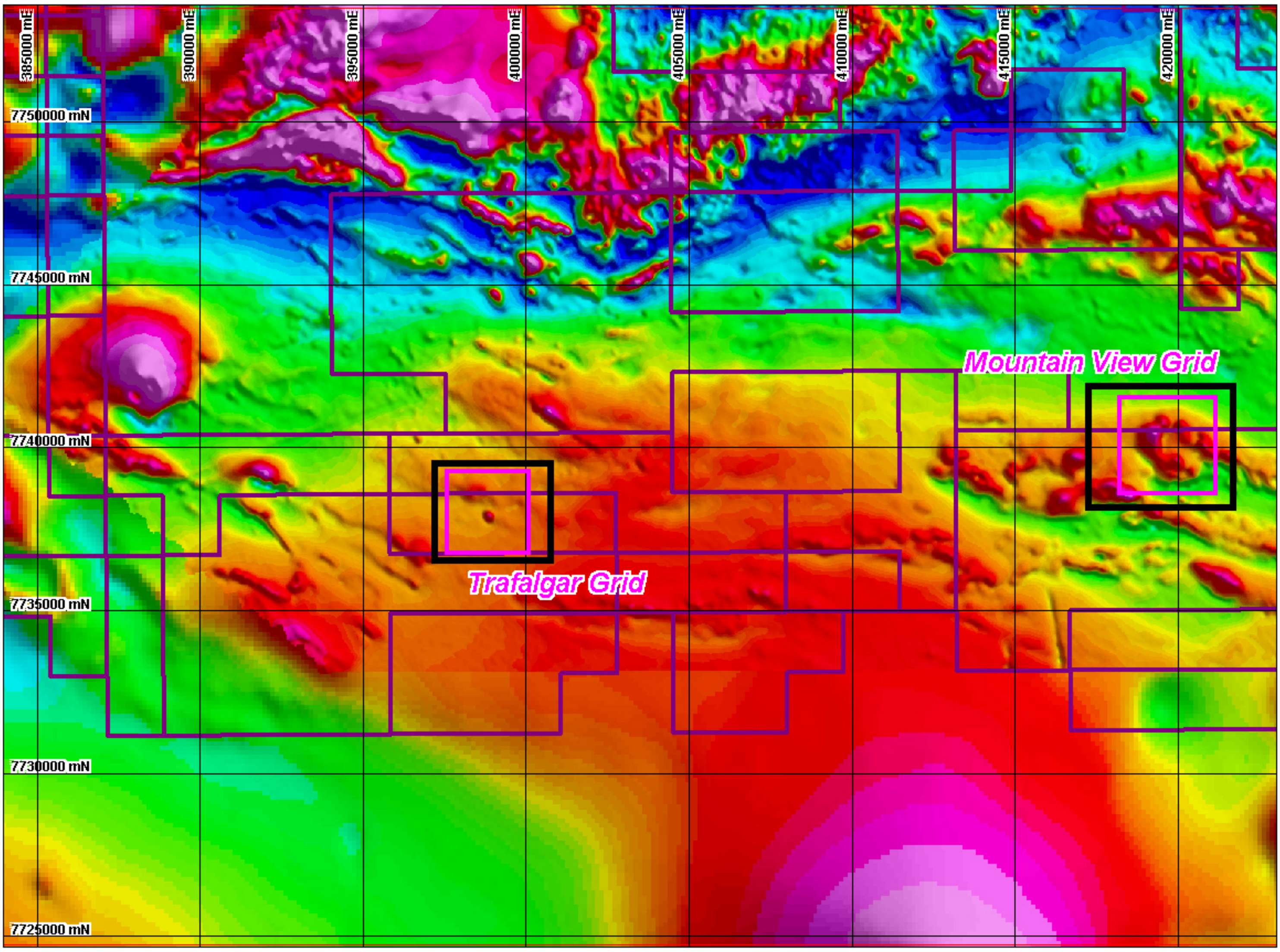
QUATERNARY	Qa	ALLUVIUM
TERTIARY - QUATERNARY	Tqr	COLLUVIUM
TRIASSIC	Rw	ARENITE-RUDITE
ORDOVICIAN - SILURIAN	Ogr	GRANITOID
CAMBRIAN - ORDOVICIAN	EOsw	MIXED MAFITES AND FELSITES (MAINLY VOLCANICS)
CAMBRIAN - ORDOVICIAN	EOgb	GABBROID
EARLY ORDOVICIAN	Ost	MIXED SEDIMENTARY ROCKS AND MAFITES

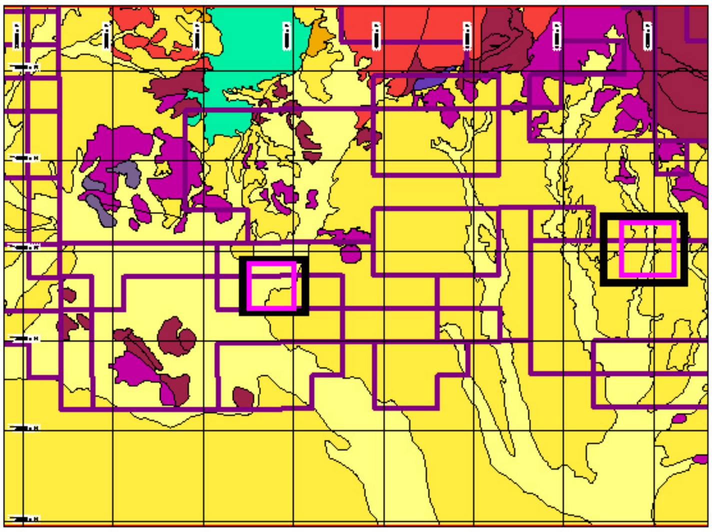
0 5
Kilometers
1:200,000
N

	LIONTOWN EXPLORATION
Date:19/3/2009	**Charters Towers Region**
Author: TJB/AWS	**Ground Magnetic Survey**
Office: Townsville	**Geology**
Figure 3	**March 2009**
Scale: 1:200000	Projection: MGA Zone 55 (Australia GDA94)

Terra Search Pty Ltd

LTRCXT0001_Location.wor





GEOLOGY

QUATERNARY	Qa	ALLUVIUM
TERTIARY - QUATERNARY	Tqr	COLLUVIUM
TRIASSIC	Rw	ARENITE-RUDITE
ORDOVICIAN - SILURIAN	Ogr	GRANITOID
CAMBRIAN - ORDOVICIAN	EOsw	MIXED MAFITES AND FELSITES (MAINLY VOLCANICS)
CAMBRIAN - ORDOVICIAN	EOgb	GABBROID
EARLY ORDOVICIAN	Ost	MIXED SEDIMENTARY ROCKS AND MAFITES

0 5
Kilometers
1:200,000
N

Terra Search Pty Ltd
LTRCXT0001_Location.wor

	LIONTOWN EXPLORATION **Charters Towers Region** **Ground Magnetic Survey** **Aeromagnetics** **March 2009**
Date:19/3/2009	
Author: TJB/AWS	
Office: Townsville	
Figure 4	
Scale: 1:200000	Projection: MGA Zone 55 (Australia GDA94)

2. General Survey Details and Procedure

Field Collection

The ground magnetic survey was undertaken by Terra Search Field Assistants Aaron Lawrence, Josh Gander and Bona Aoae using a GSM-19 Overhauser walking magnetometer. The GSM-19 has onboard GPS receiver and automatic data logging. A magnetic reading was recorded every 2 seconds for this survey. In the GEMSYS system all locations are collected as UTM coordinates in reference to the GDA94 datum, and in the case of this survey, in the MGA Zone 55 projection.

A magnetic base station was established using a Geoinstrument G856 Proton Precession magnetometer cycling every 30 seconds. This allows for the correction of the temporal variation of the Earth's magnetic field caused by variable effects related to such factors as fluctuating solar radiation. The Base Station was set up in a magnetically quiet area away from any obvious magnetic interference, e.g. building, power lines, roads, etc.

While undertaking the survey, surveyors were clean of any material that would cause any magnetic interference. The locations of obvious magnetic cultural features such as fences, old metal drums etc., were recorded while surveying, and reading stations likely to be effected were removed.

Processing

Aaron Lawrence and Josh Gander performed preliminary field processing of the survey data. Final processing, quality control and assurance, and presentation of the data were performed by Tim Beams in Terra Search's Townsville office. The raw field data was diurnally corrected and suspect data points were removed before gridding and imaging.

The levelled magnetic intensity and elevation data was gridded and imaged using Geosoft (Oasis Montaj) software. A reduction to pole filter was applied to the gridded Total Magnetic Intensity (TMI) data to produce a Reduced to Pole (RTP) grid. The Earth's magnetic field is inclined at increasingly low angles as move towards the equator. This has the effect of pushing the anomaly shown in the TMI away from the source. The RTP filter is an attempt to correct for this inclination and place the magnetic anomaly directly above its source. The declination (with respect to grid north) and dip of the prevailing magnetic field in the area are needed as parameters for the reduction to pole filter. These were obtained using the Geomagix program with the 2005 IGRF model and the appropriate survey date and elevation.

Since the survey was performed over magnetic geological units, the resulting data has quite a 'noisy' appearance. However, this is quite typical of ground magnetic surveys over strongly magnetic units, and the apparent 'noise' is often due to geological factors, such as variable distribution of magnetite, magnetic sands in drainages and surficial accumulations of magnetic material e.g. bushfire derived maghemite. In order to smooth out some of this effect and elucidate the underlying structures, an upward continuation (UC) filter was applied to the gridded data. This has the effect of attenuating the short-wavelength, near surface 'noise' and produces a magnetic image as if the survey was conducted at a higher elevation above the surface. A height of 1/5 of the line spacing has been found to remove much of the surface noise without significantly degrading the resolution of the survey.

In addition both a first vertical derivative (1VD) of the UC-RTP data and an analytic signal (AS) filter of the UC-TMI were also applied to the gridded data. The 1VD filter is effective at removing regional gradients and enhancing shallow, near-surface features. It can also enhance resolution of the edges of magnetic features. Since it amplifies the short-wavelength component of the data, it also has the tendency to look 'noisy'. Small incoherent features should therefore be discounted. However, the textures created can often be useful in distinguishing different rock types. The analytic signal filter produces maxima over magnetic contacts regardless of the direction of the magnetization, making it particularly useful in regions of strong remanent magnetism. It can be thought of as a map of magnetization in the ground. However, since the analytic signal marks only a magnetic contrast, the sense of this contrast can be determined only from the original magnetic image.

The Geosoft grids were exported as MapInfo registered raster (.tif) files. The Geosoft grids were also converted to ERMapper format to provide an alternative format for further presentation.

Mountainview

The Mountainview ground magnetic data was collected from the 19th December 2008 – 9th January 2009 (AEST) by Terra Search Magnetic Operators Josh Gander and Aaron Lawrence. The survey consisted of 50m spaced survey lines. The survey lines were oriented north-south. While walking, line guidance was provided by the in-built GPS system of the walking magnetometer. The final survey grid had 61 lines, 3km in length for a total of 183 line-km, over an area of 9km^2.

Figure 15 shows the location of the reading stations in relation to the proposed survey outline. Figure 16 shows the basement geology from the Charters Towers 1:100k sheet (8157) digital geology. The lithological units are the same as for the Trafalgar survey.

Figure 17 shows the digital elevation model (DEM) derived from the onboard GPS of the magnetometer. Figure 18 shows the image of the gridded total magnetic intensity (TMI). Figure 19 shows the upward continuation of the TMI data to a height of 10m (UC10). Figure 20 shows the analytic signal of the UC10 data (UC10 – AS). Figure 21 shows the reduced to pole magnetic intensity, upward continued to a height of 20m (UC10 - RTP). Figure 22 shows the first vertical derivative of the UC10 – RTP data (UC10 – RTP – 1VD). Figure 23 shows a comparison between the ground magnetic UC10 data and the TMI image of the regional aeromagnetic data.

The ground magnetic survey is over a region covered by recent sediments. General features of the magnetic images are summarized below and illustrated in Figure 24:

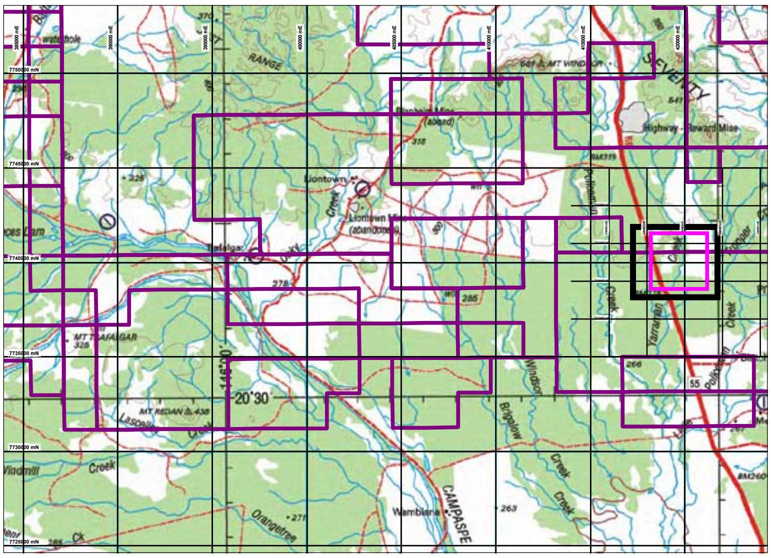
- The 'grainy' appearance is probably due to moderate, variable magnetite content of cover units.

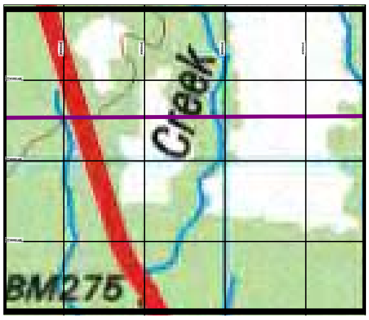
- The image is dominated by a broad, 'U' shaped ring of high magnetics. The western side of the ring is a coherent mag high, whereas the southern and eastern sides show evidence of fairly strongly developed folding and faulting. This ring anomaly surrounds a more moderate mag high anomaly on its eastern, southern and western sides. Both features are truncated to the north by an apparent SE trending feature (fault?).

- The southwest corner of the survey shows the edge of magnetic feature with similar properties to the 'U' shaped anomaly. This feature also seems truncated by a SE trending linear.

Location specifications and reduction to pole parameters for the survey are:

- **Coordinate System: Field Collection:** **Datum:** GDA94 **Projection:** MGA Zone 55
- **Coordinate System: Imaging & Presentation:** **Datum:** GDA94 **Projection:** MGA Zone 55
- **Base Station:** 419300mE / 7742000mN
- **Grid:** 7738550mN – 7741550mN
418200mE – 421200mE
- **Declination:** 7.52112º (MGA Z54 North)
- **Dip:** -50.0594º





Red cross	Fence
Green cross	Terrain feature
Magenta cross	Culture/Metallic
Grey dot	Bad reading
Black dot	Good reading

0 1

Kilometers

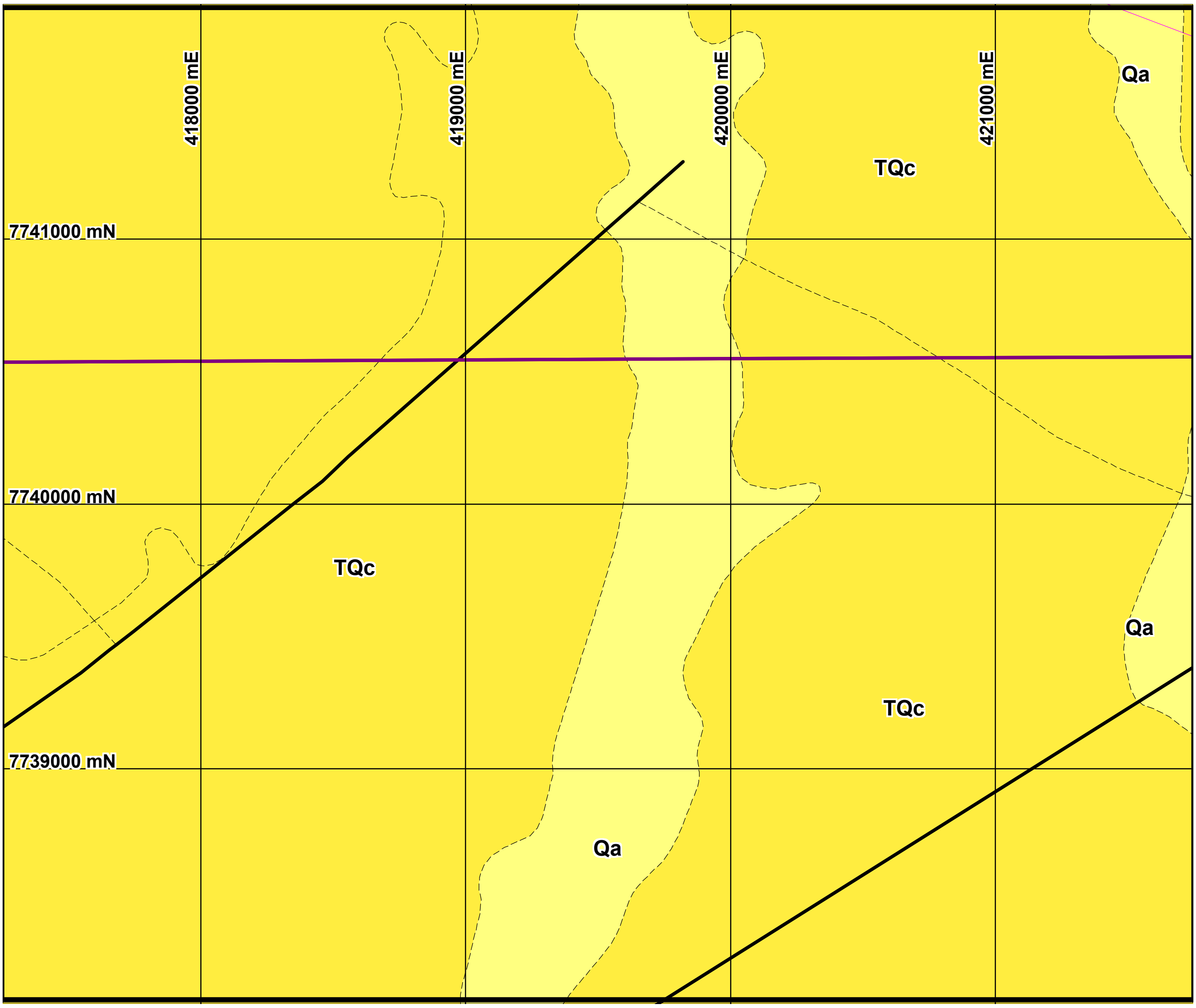
1:25,000

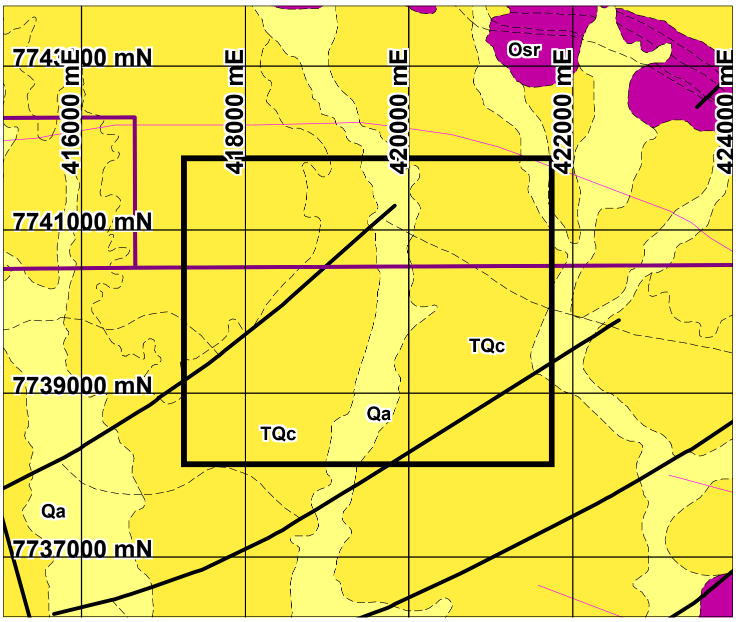
N

Terra Search Pty Ltd

LTRCXT0003_MountainView

Date:19/3/2009	**LIONTOWN EXPLORATION** **Charters Towers Region** **Mountain View** **Ground Magnetic Survey** **Stations** **March 2009**
Author: TJB/AWS	
Office: Townsville	
Figure 15	
Scale: 1:25000	Projection: MGA Zone 55 (Australia GDA94)

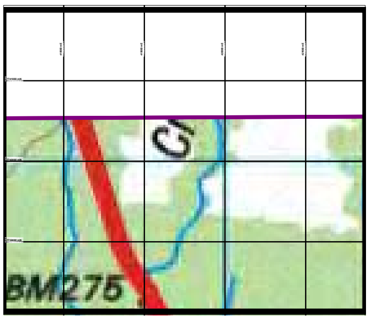




GEOLOGY

HOLOCENE	Qha	ALLUVIUM
QUATERNARY	Qa	ALLUVIUM
LATE TERTIARY	TQc?	PELITE
TERTIARY - QUATERNARY	TQc,TQr	PELITE
ORDOVICIAN	Ost	MIXED SEDIMENTARY ROCKS AND MAFITES

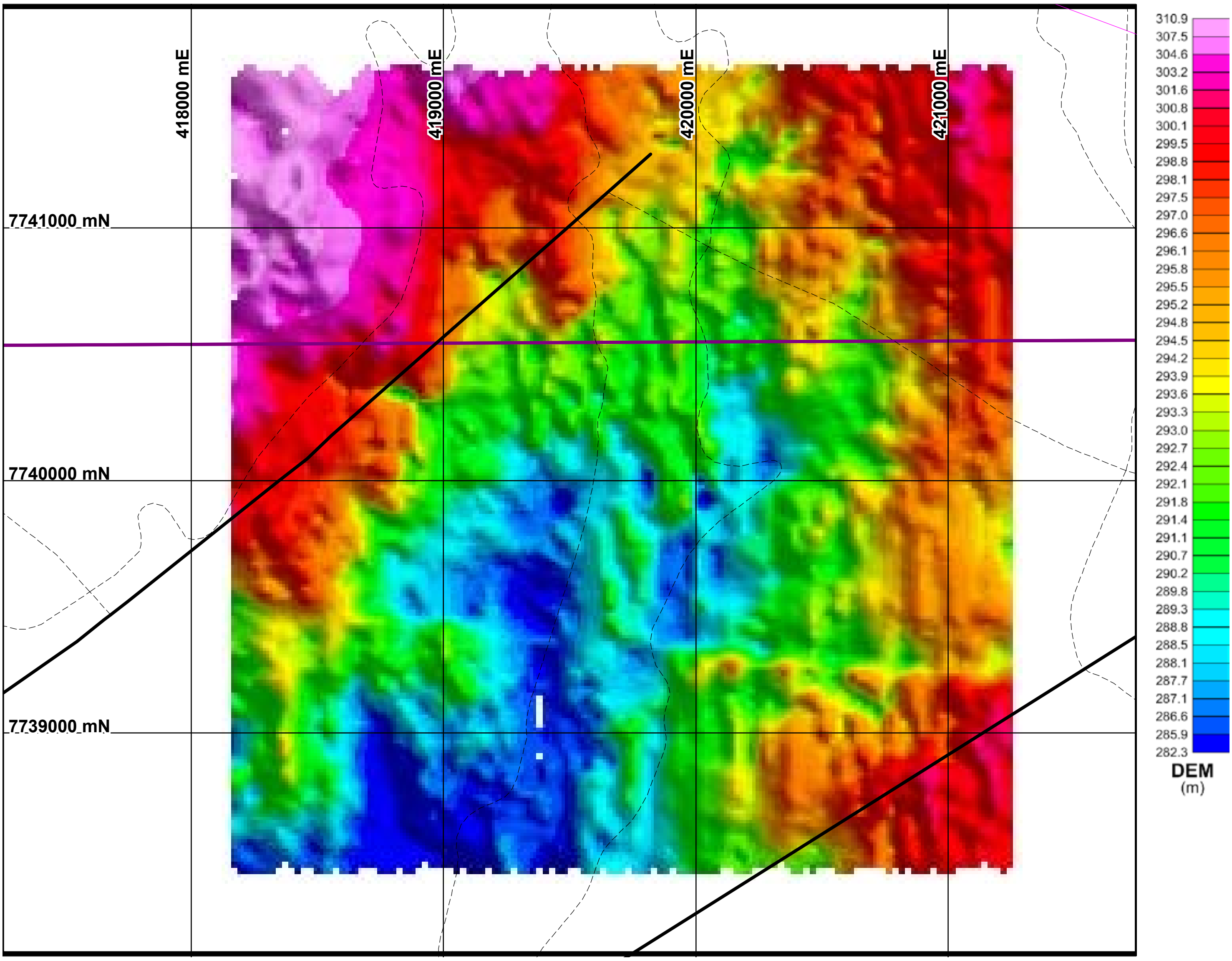
0 1
Kilometers
1:25,000
N

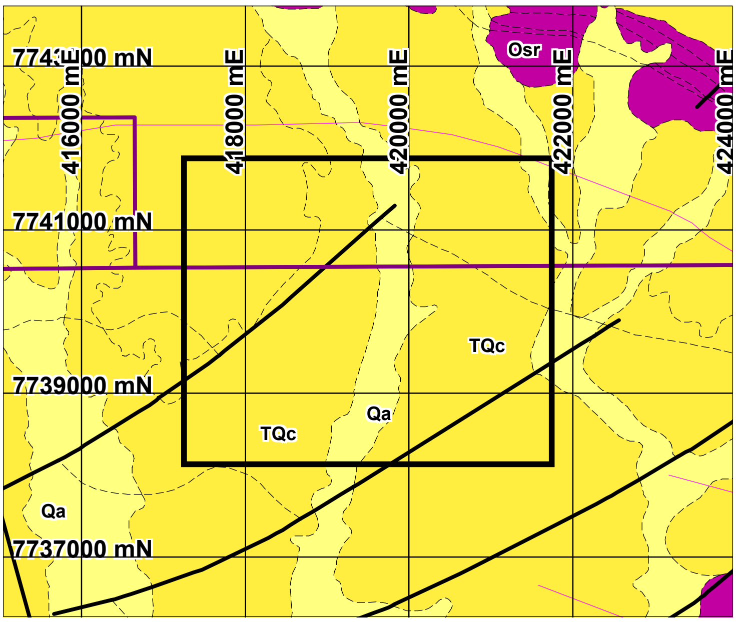


LIONTOWN EXPLORATION
Charters Towers Region
Mountain View
Ground Magnetic Survey
Geology
March 2009

Date:19/3/2009
Author: TJB/AWS
Office: Townsville
Figure 16
Scale: 1:25000
Projection: MGA Zone 55 (Australia GDA94)

Terra Search Pty Ltd
LTRCXT0003_MountainView



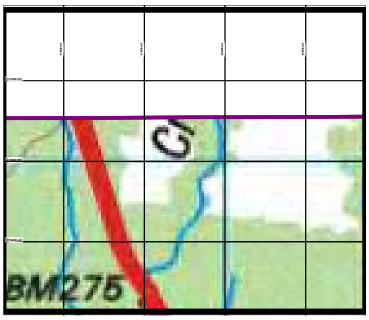


GEOLOGY

HOLOCENE	Qha	ALLUVIUM
QUATERNARY	Qa	ALLUVIUM
LATE TERTIARY	TQc?	PELITE
TERTIARY - QUATERNARY	TQc,TQr	PELITE
ORDOVICIAN	Ost	MIXED SEDIMENTARY ROCKS AND MAFITES

0 1
Kilometers
1:25,000

N



Terra Search Pty Ltd

LTRCXT0003_MountainView

Date:19/3/2009

Author: TJB/AWS

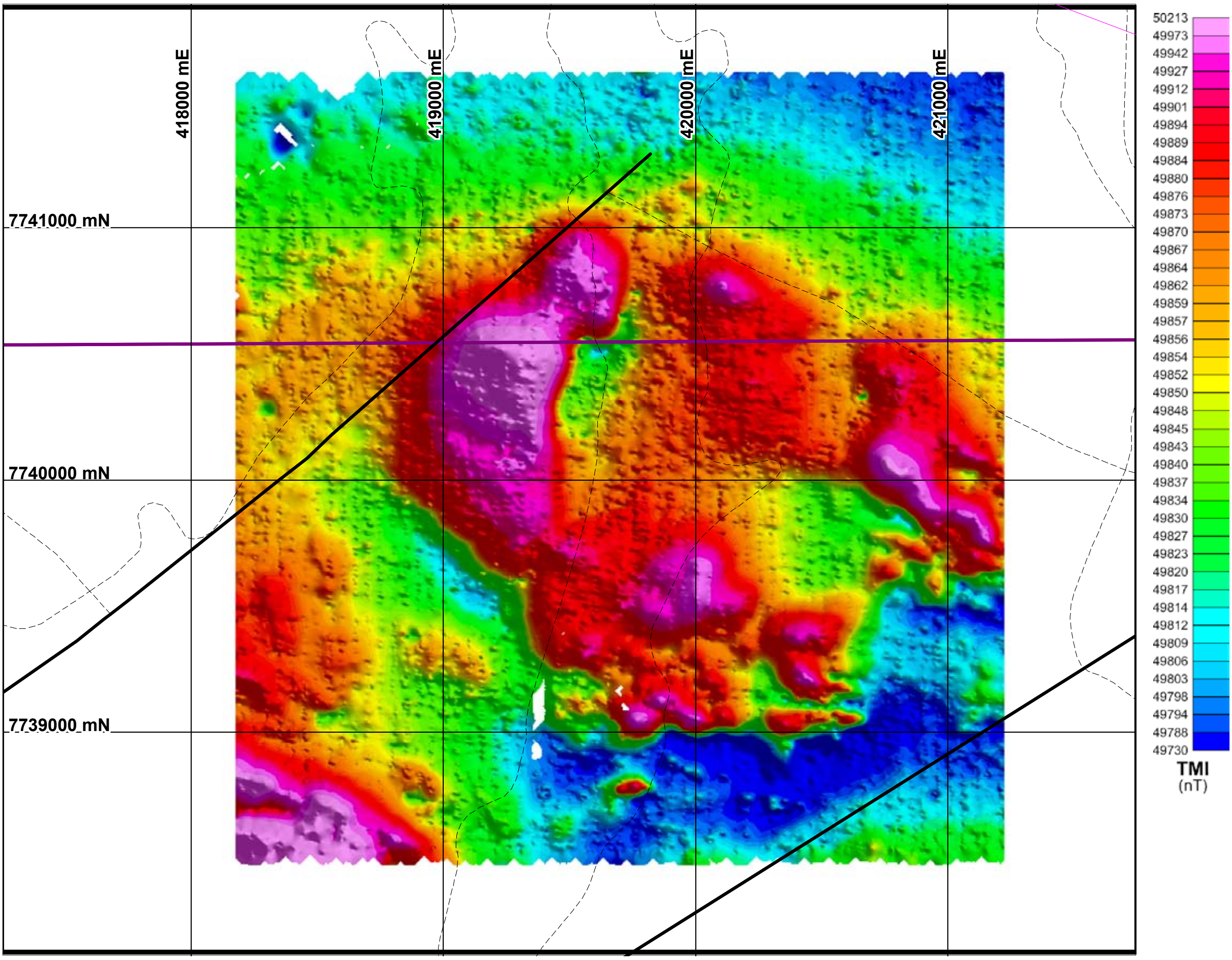
Office: Townsville

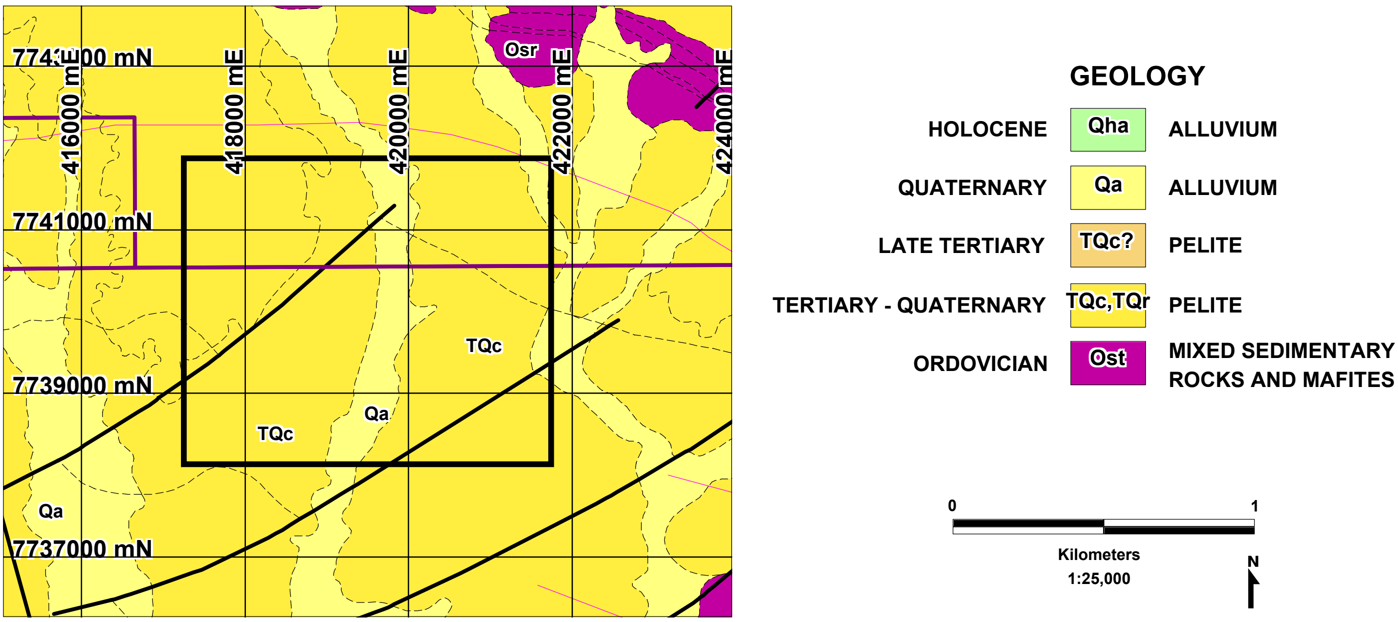
Figure 17

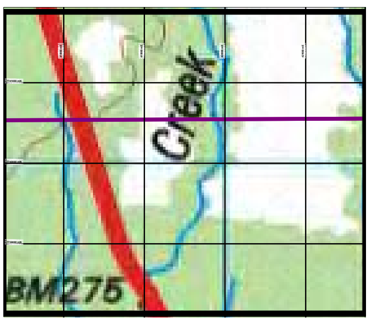
Scale: 1:25000

LIONTOWN EXPLORATION
Charters Towers Region
Mountain View
Ground Magnetic Survey
DEM
March 2009

Projection: MGA Zone 55 (Australia GDA94)



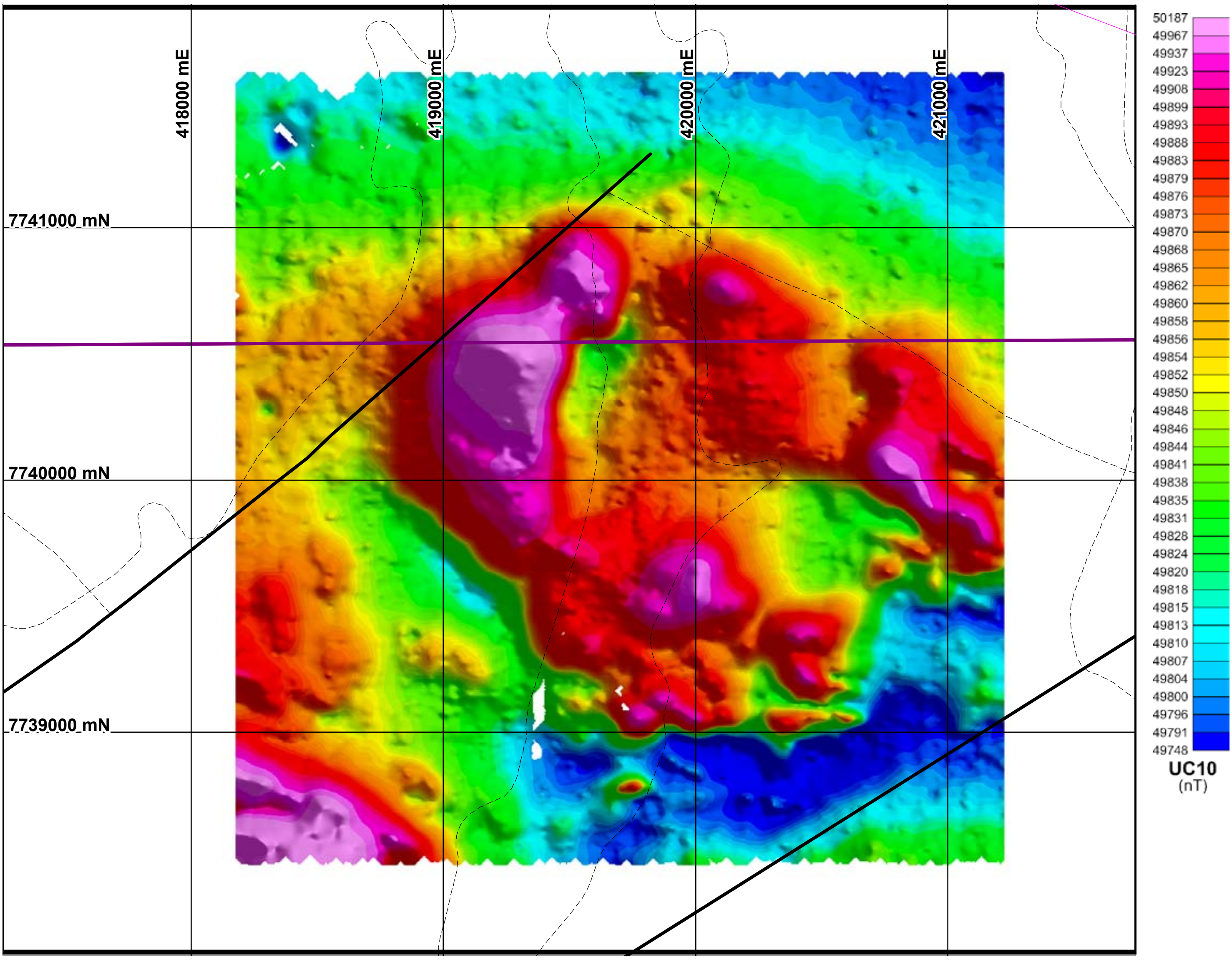


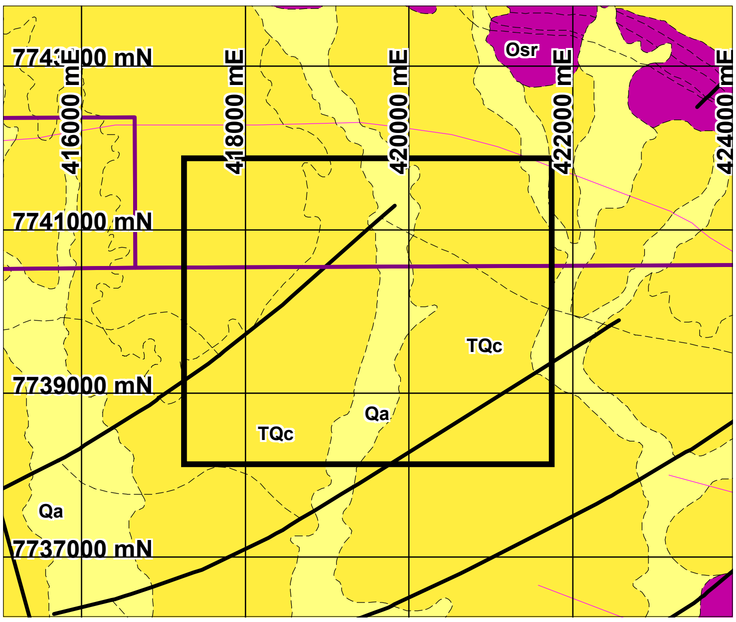


LIONTOWN EXPLORATION
Charters Towers Region
Mountain View
Ground Magnetic Survey
TMI
March 2009

Date:19/3/2009
Author: TJB/AWS
Office: Townsville
Figure 18
Scale: 1:25000
Projection: MGA Zone 55 (Australia GDA94)

Terra Search Pty Ltd
LTRCXT0003_MountainView



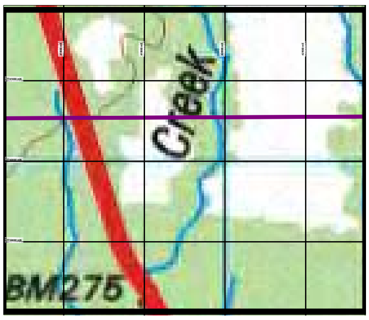


GEOLOGY

HOLOCENE	Qha	ALLUVIUM
QUATERNARY	Qa	ALLUVIUM
LATE TERTIARY	TQc?	PELITE
TERTIARY - QUATERNARY	TQc,TQr	PELITE
ORDOVICIAN	Ost	MIXED SEDIMENTARY ROCKS AND MAFITES

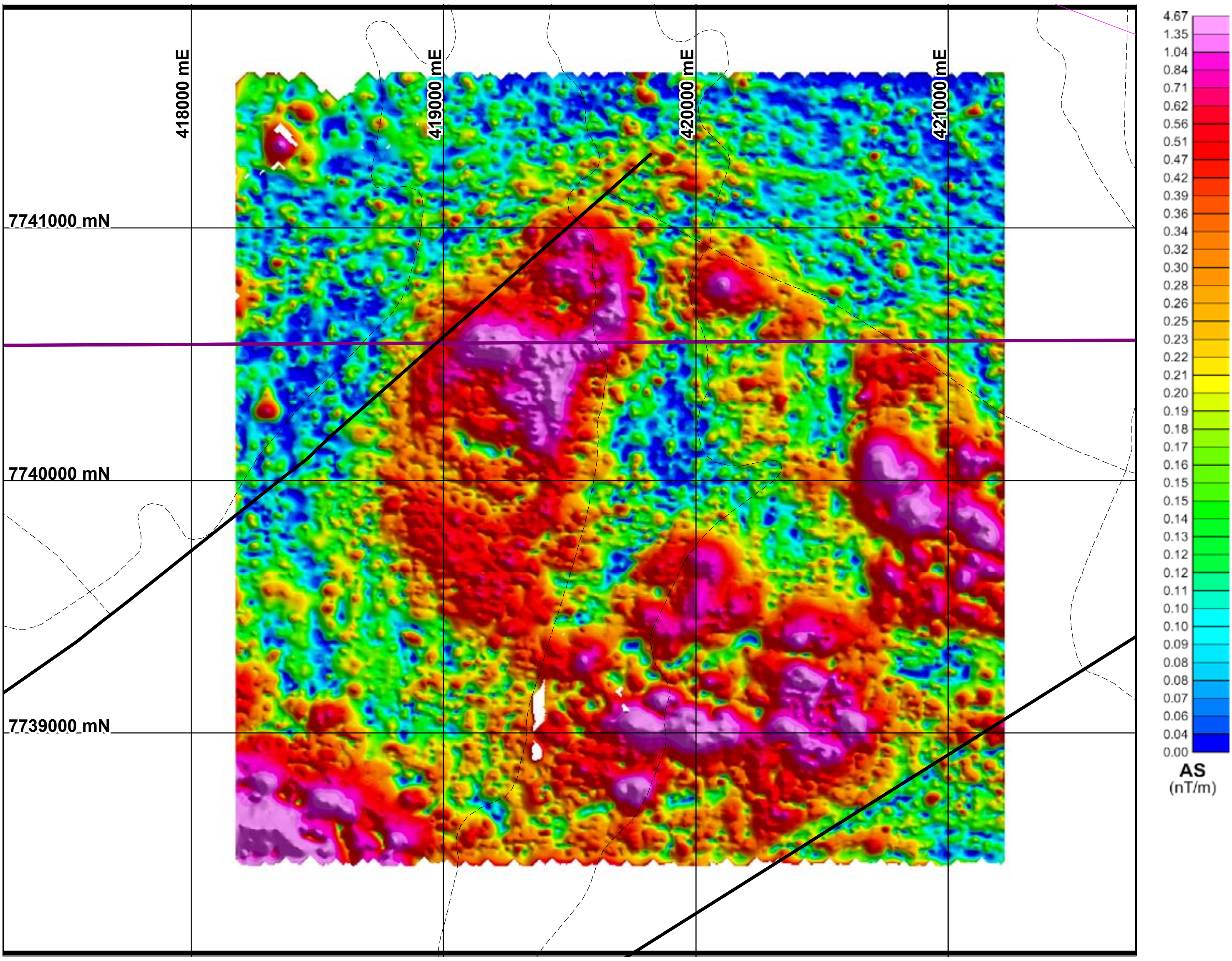
0 1
Kilometers
1:25,000

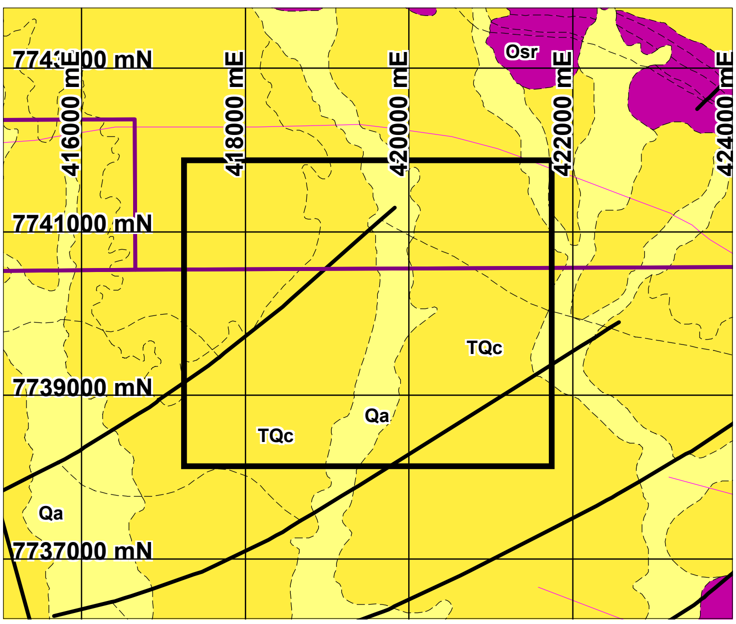
N



Terra Search Pty Ltd
LTRCXT0003_MountainView

Date:19/3/2009	**LIONTOWN EXPLORATION**
Author: TJB/AWS	**Charters Towers Region**
Office: Townsville	**Mountain View**
Figure 19	**Ground Magnetic Survey TMI - UC10 March 2009**
Scale: 1:25000	Projection: MGA Zone 55 (Australia GDA94)

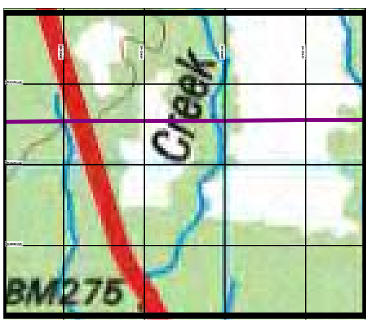




GEOLOGY

HOLOCENE	Qha	ALLUVIUM
QUATERNARY	Qa	ALLUVIUM
LATE TERTIARY	TQc?	PELITE
TERTIARY - QUATERNARY	TQc,TQr	PELITE
ORDOVICIAN	Ost	MIXED SEDIMENTARY ROCKS AND MAFITES

0 1
Kilometers
1:25,000
N

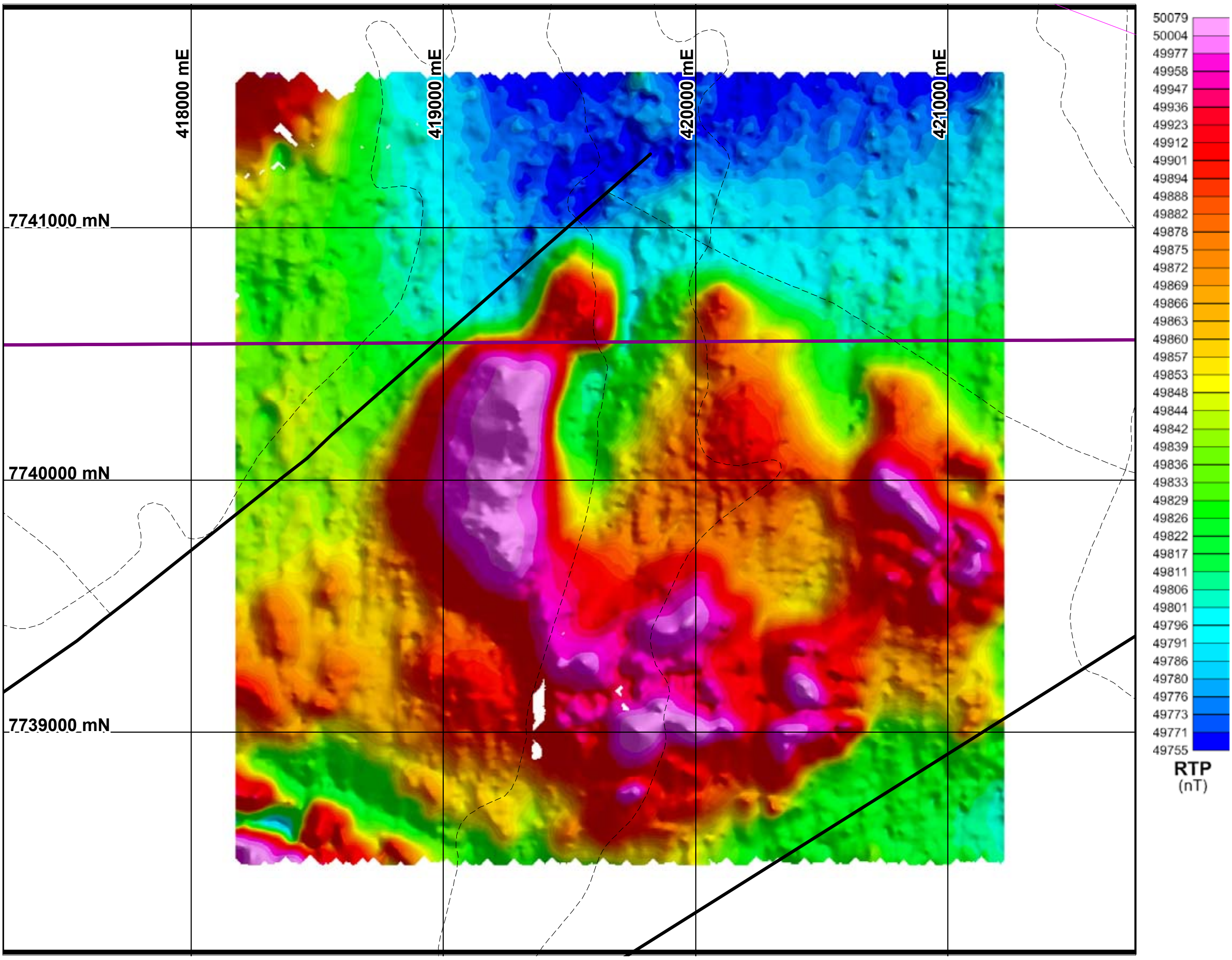


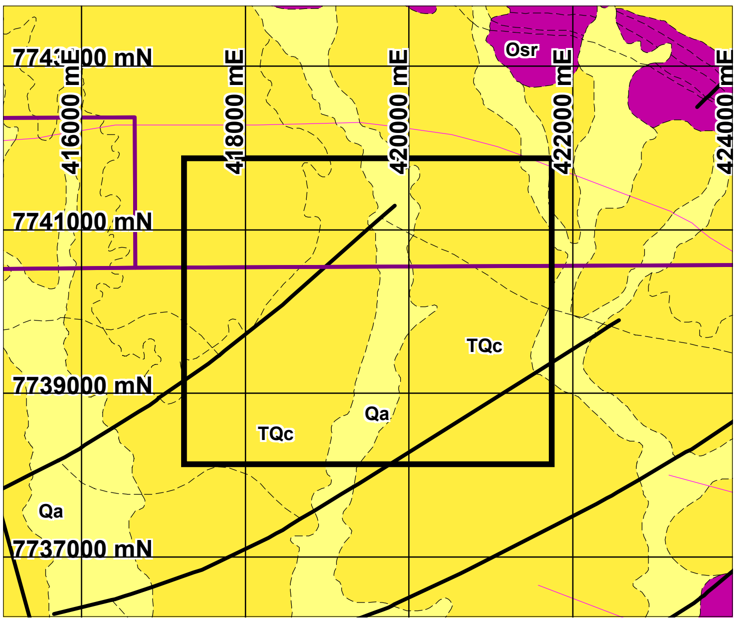
Terra Search Pty Ltd
LTRCXT0003_MountainView

Date:19/3/2009
Author: TJB/AWS
Office: Townsville
Figure 20
Scale: 1:25000

LIONTOWN EXPLORATION
Charters Towers Region
Mountain View
Ground Magnetic Survey
Analytic Signal - UC10
March 2009

Projection: MGA Zone 55 (Australia GDA94)

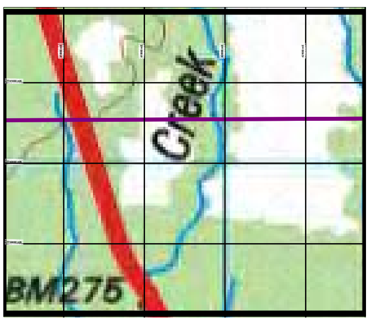




GEOLOGY

HOLOCENE	Qha	ALLUVIUM
QUATERNARY	Qa	ALLUVIUM
LATE TERTIARY	TQc?	PELITE
TERTIARY - QUATERNARY	TQc,TQr	PELITE
ORDOVICIAN	Ost	MIXED SEDIMENTARY ROCKS AND MAFITES

0 1
Kilometers
1:25,000
N

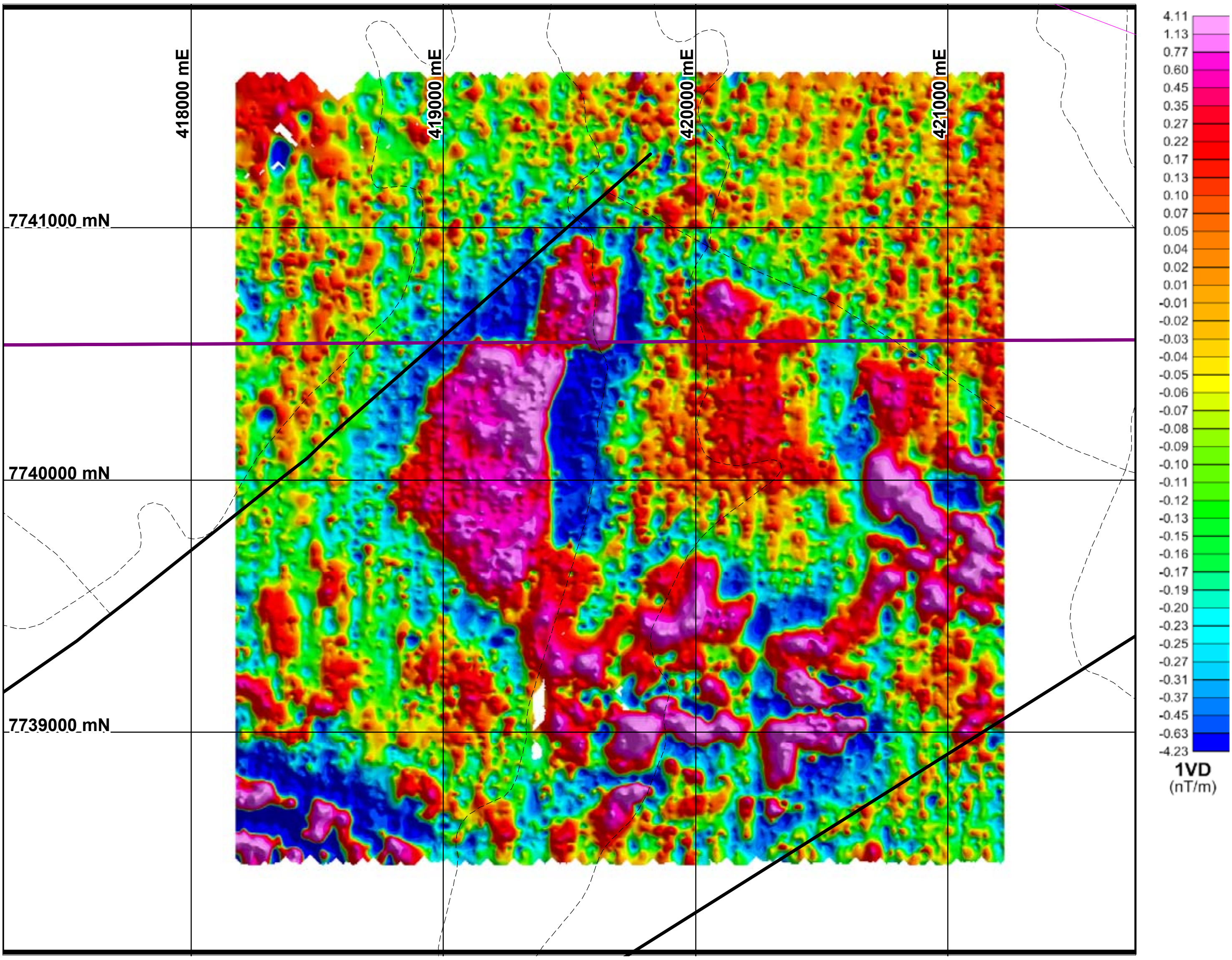


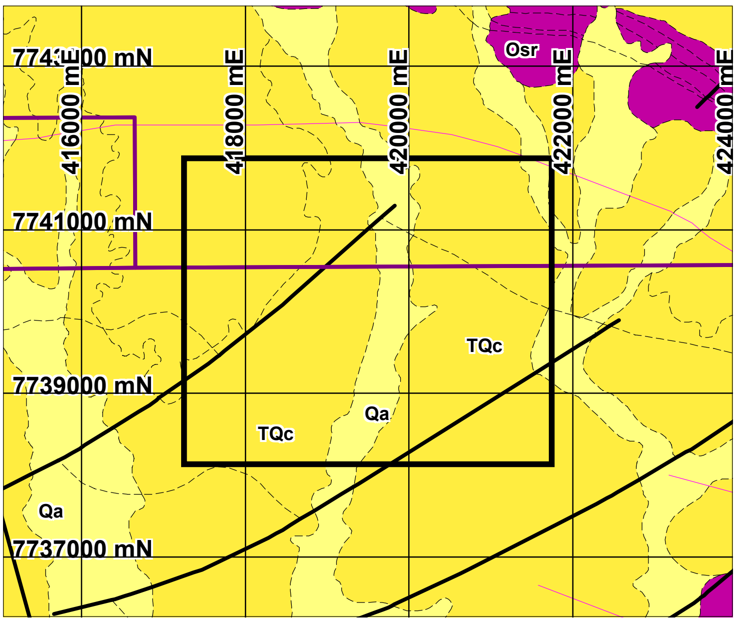
Terra Search Pty Ltd
LTRCXT0003_MountainView

Date:19/3/2009
Author: TJB/AWS
Office: Townsville
Figure 21
Scale: 1:25000

LIONTOWN EXPLORATION
Charters Towers Region
Mountain View
Ground Magnetic Survey
RTP - UC10
March 2009

Projection: MGA Zone 55 (Australia GDA94)

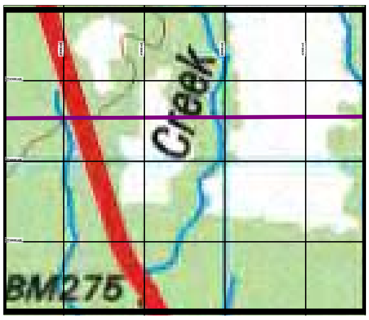




GEOLOGY

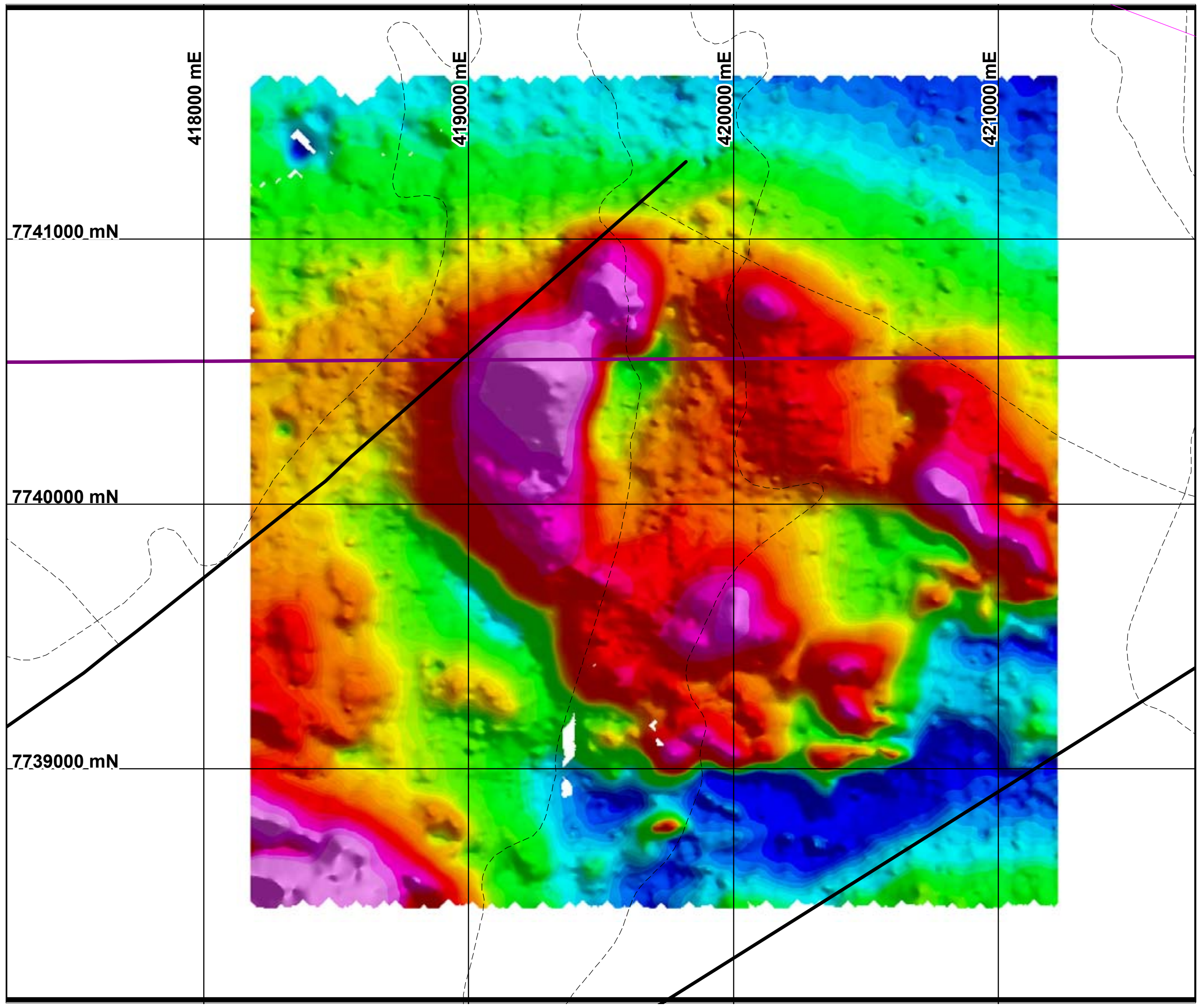
HOLOCENE	Qha	ALLUVIUM
QUATERNARY	Qa	ALLUVIUM
LATE TERTIARY	TQc?	PELITE
TERTIARY - QUATERNARY	TQc,TQr	PELITE
ORDOVICIAN	Ost	MIXED SEDIMENTARY ROCKS AND MAFITES

0 1
Kilometers
1:25,000
N

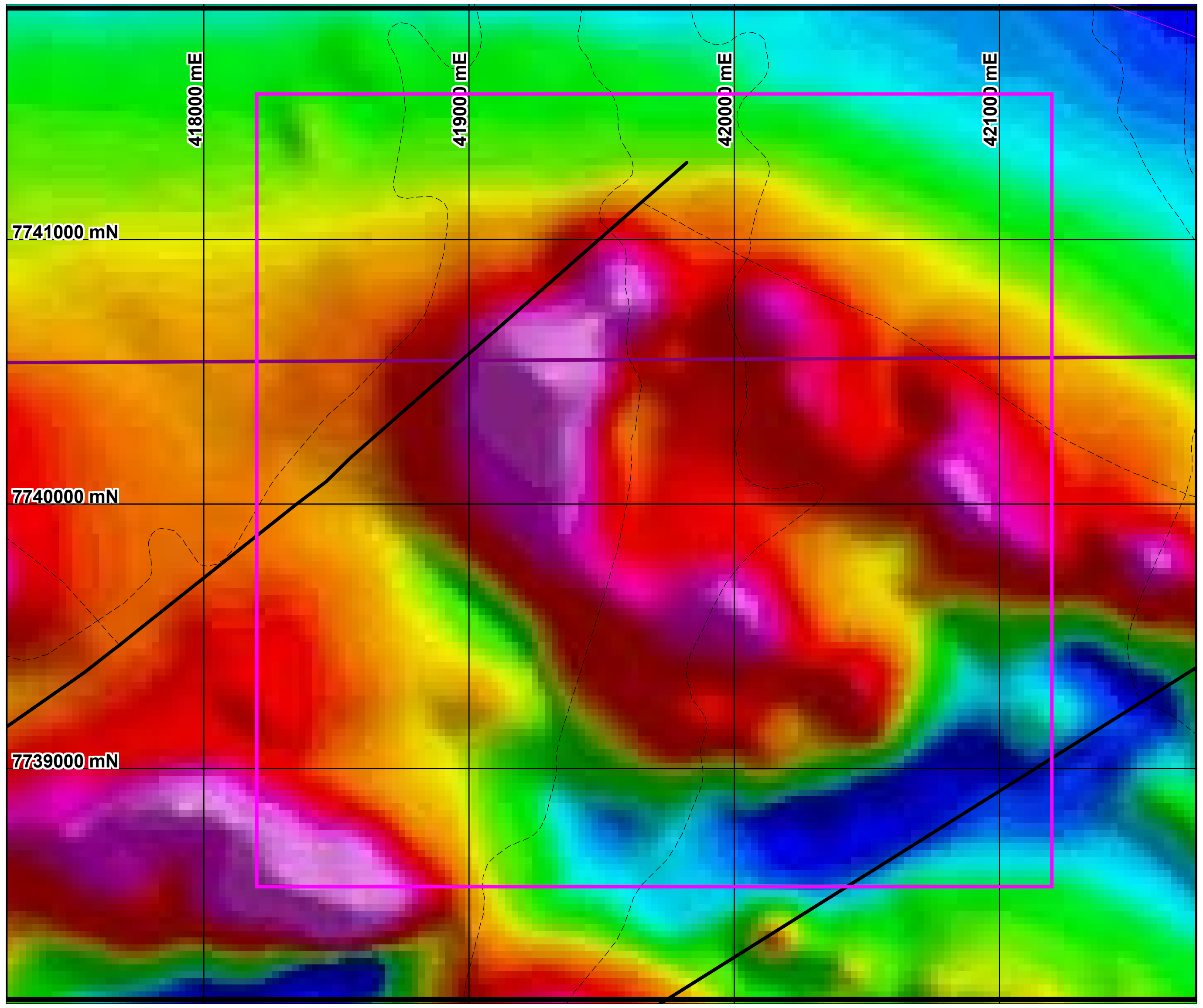


Terra Search Pty Ltd
LTRCXT0003_MountainView

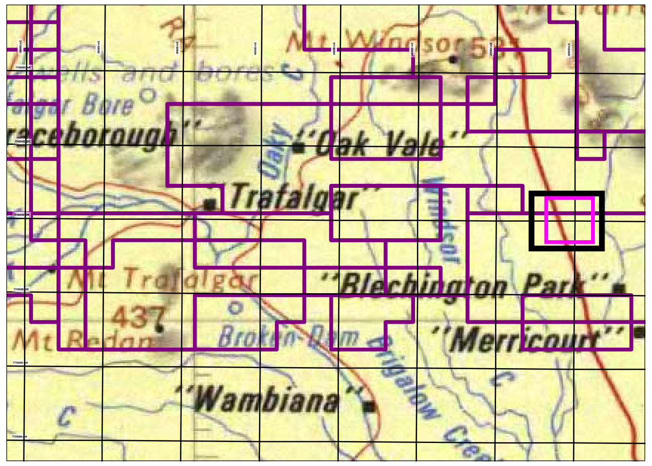
Date:19/3/2009	**LIONTOWN EXPLORATION**
Author: TJB/AWS	Charters Towers Region
Office: Townsville	Mountain View
Figure 22	Ground Magnetic Survey 1VD RTP - UC10 March 2009
Scale: 1:25000	Projection: MGA Zone 55 (Australia GDA94)

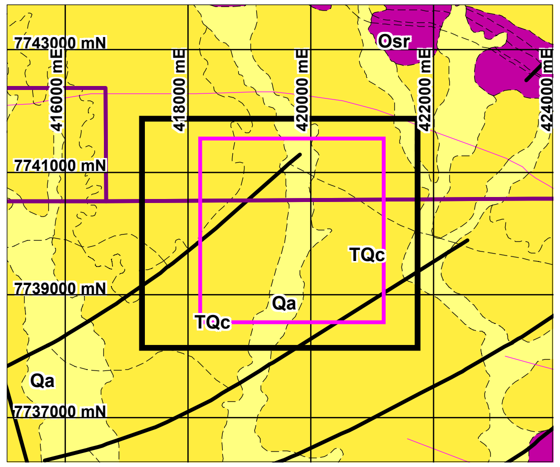


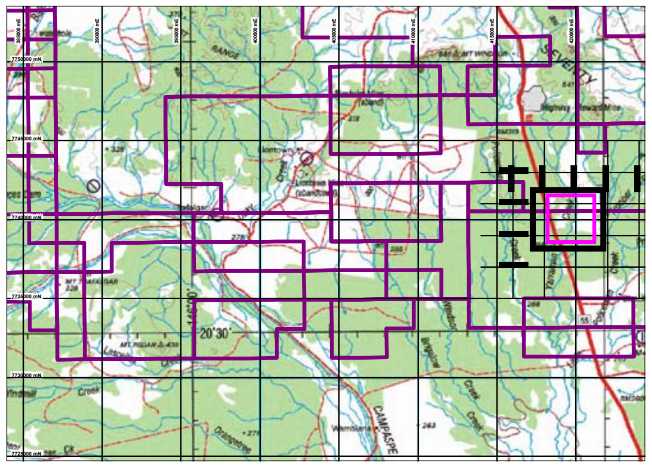
Ground Magnetics: TMI (Upward Continuation 10m)

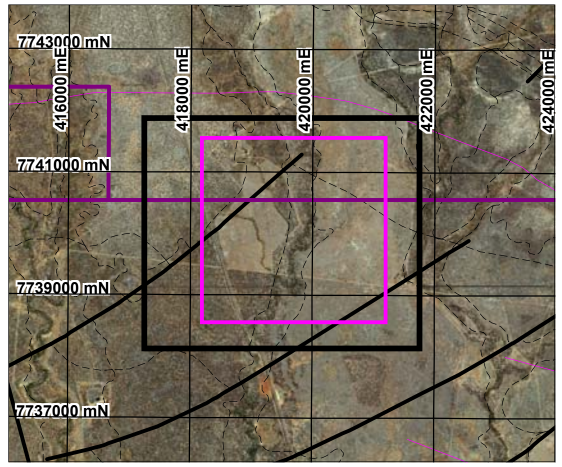


Airborne Magnetics: TMI









0 1
Kilometers
1:25,000
N

Date:19/3/2009	**LIONTOWN EXPLORATION**
Author: TJB/AWS	**Charters Towers Region**
Office: Townsville	**Mountain View**
Figure 23	**Ground Magnetic Survey** **Magnetic Comparison** **March 2009**
Scale: 1:25000	Projection: MGA Zone 55 (Australia GDA94)

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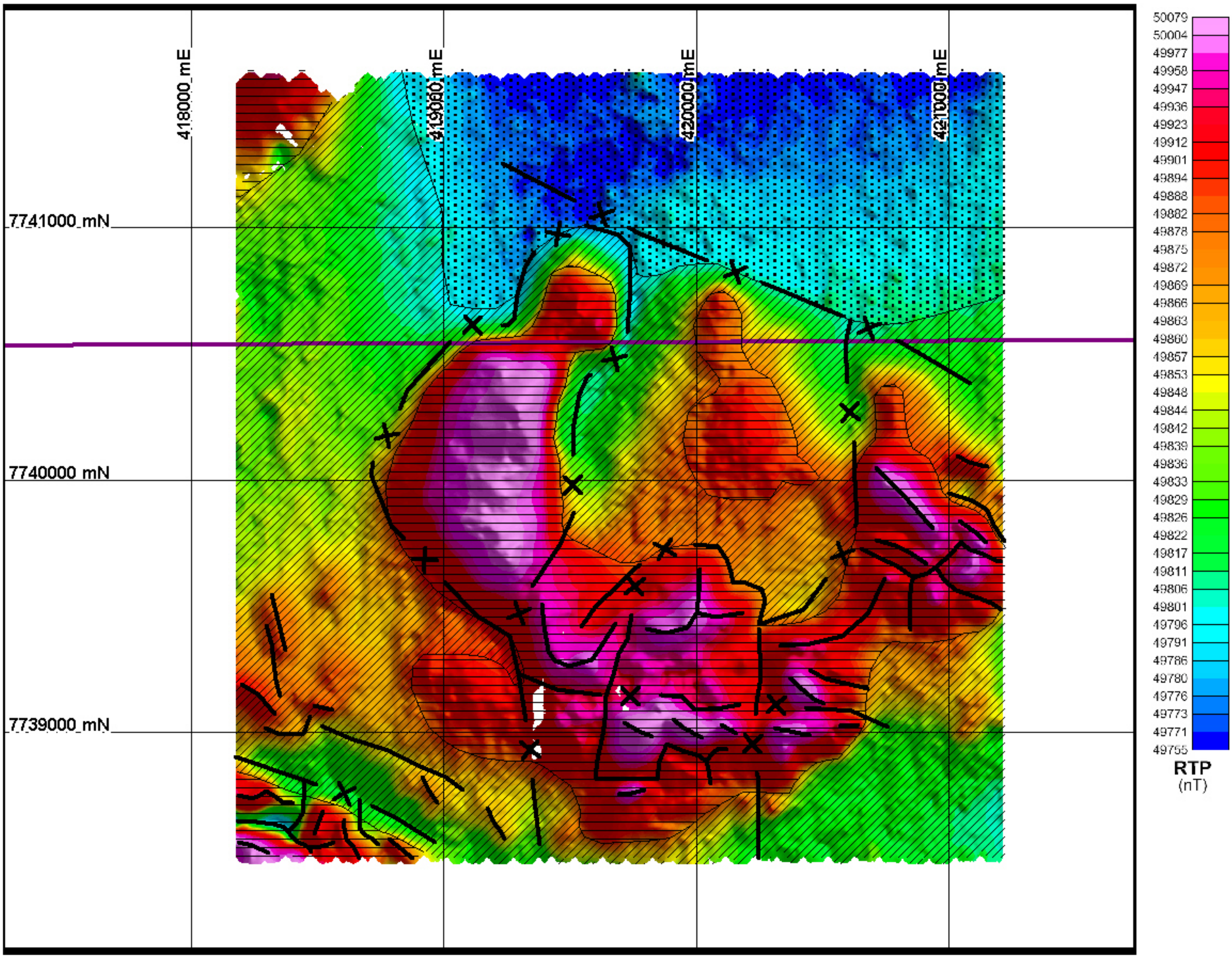
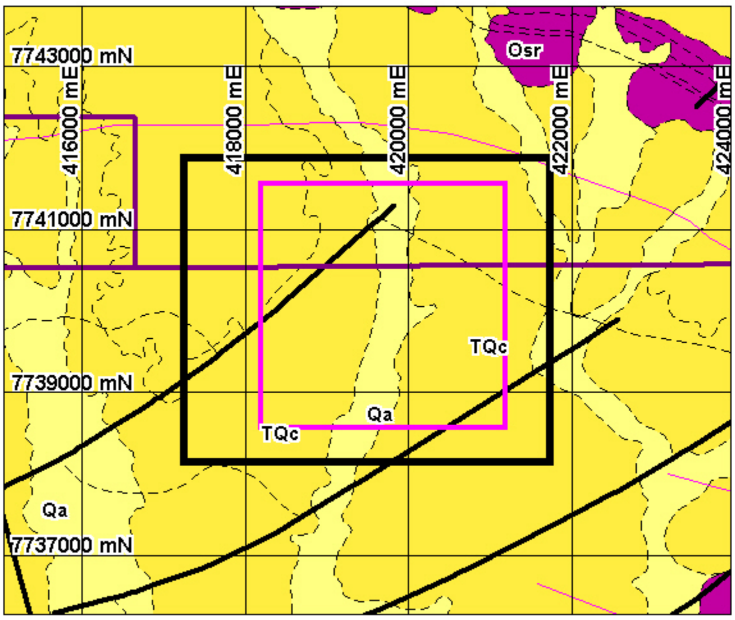
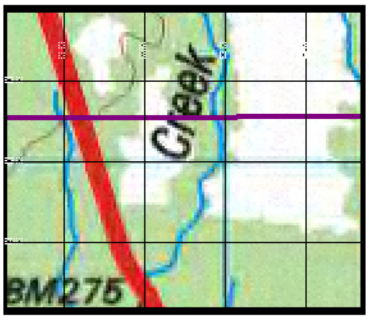
LTRCXT0003_MountainView







MAGNETIC FEATURES

- Mag Linear Low
- Mag Linear High
- Low Mag
- Moderate Mag
- High Mag

0 — 1
Kilometers
1:25,000
N

Terra Search Pty Ltd
LTRCXT0003_MountainView

Date:19/3/2009	**LIONTOWN EXPLORATION** Charters Towers Region Mountain View Ground Magnetic Survey Mag Interp March 2009
Author: TJB/AWS	
Office: Townsville	
Figure 24	
Scale: 1:25000	Projection: MGA Zone 55 (Australia GDA94)

5. Data Delivery

Data is presented on the accompanying CD. It consists of:

- GEMSYS raw field data and G856 base station raw data for each day of the survey.
- The quality assured, leveled data in both ascii (.csv) and geosoft database (.gdb) formats.
- Gridded DEM, TMI, UC10, RTP, 1VD and AS data in Geosoft grid (.grd) format.
- Registered MapInfo raster (.tab) DEM, TMI, UC10, RTP, 1VD and AS images.
- Adobe Acrobat (.pdf) versions of the report figures are also supplied in the Images directory as well as a copy of this report.

Appendix A: Processing Details

The first step in processing was to examine the base station data for any possible erroneous readings. As a check on the local base station data, the geomagnetic observatory data for the period of the survey was downloaded from the Geoscience Australia website. Figure A.1 shows the base station data for both the local base station and a best fit (10-parameter) of the government data to the local base station. The correlation between the fitted data and the local base station is excellent. Due to the good correlation of the local base station data with the government fit (the difference between the local base station data and the fit has a standard deviation of 0.55nT and 0.33nT for the Trafalgar and Mountainview surveys respectively), it was decided to use the government fit for all diurnal corrections.

Diurnal corrections were applied to the raw survey magnetic intensities using the fitted curve to the local base station. The diurnal correction amounts to an algebraic shift of the field data based on the difference between the base station at the time of the field reading and a base datum for the survey. The base datum chosen for the survey (49871.57nT and 49786.56) was the mean base station fit value over the fit period.

A control point was used for to verify the accuracy of the survey. In total 112 and 156 control point readings were taken for the Trafalgar and Mountainview surveys respectively. The precision of the magnetic intensity reading is represented by their standard deviations of 0.54nT and 0.80nT. These values suggest that the overall accuracy of the survey is about 10nT. The mean values for the control point readings are as follows (standard deviations in brackets):

Survey:	**Trafalgar**		**Mountainview**	
• No. Controls:	112		156	
• East (m MGA50):	399645.69	(0.66)	419306.83	(0.78)
• North (m MGA50):	7740035.1	(2.0)	7741986.3	(1.8)
• Elevation (m):	332.1	(2.5)	347.4	(1.8)
• TMI (nT):	49863.00	(0.54)	49785.29	(0.80)

Suspect field data points were removed. This involved first removing points where no time increment was recorded due to poor GPS signal preventing synchronization with satellites. Points within half the line spacing of recorded cultural interferences were also removed. Following this, points with anomalous gradients, determined between a data point and its immediate neighbours, in the elevation, magnetic intensity or horizontal distance, were removed. These criteria were chosen because anomalous gradients in the elevation and horizontal distance between points are invariably caused by erroneous GPS readings, and there are usually some anomalous magnetic intensity readings which are not physically realistic. After the removal of these points, the gradients were recalculated, and points with anomalous gradients (using twice the standard deviation of the original dataset as the threshold) were also removed. This process was repeated until no anomalous gradients remained in the data. The removed points are stored in the 'Bad' data set.

Figures A.1 - A.10 show the data collected as a function of time. Figures A.1 and A.6 show the base station variation, with red points where a local base station value was recorded, a blue line for the fit to this data based on the government base stations, and the black points forming a horizontal line along the base fit mean show the times where a field station was recorded. Figures A.2 - A.5, A.7 - A.10 show the Gemsys time series, for the Trafalgar and Mountainview surveys respectively, with the control stations shown as green circles, the points removed during processing shown as red crosses and the quality assured final stations shown as black dots.

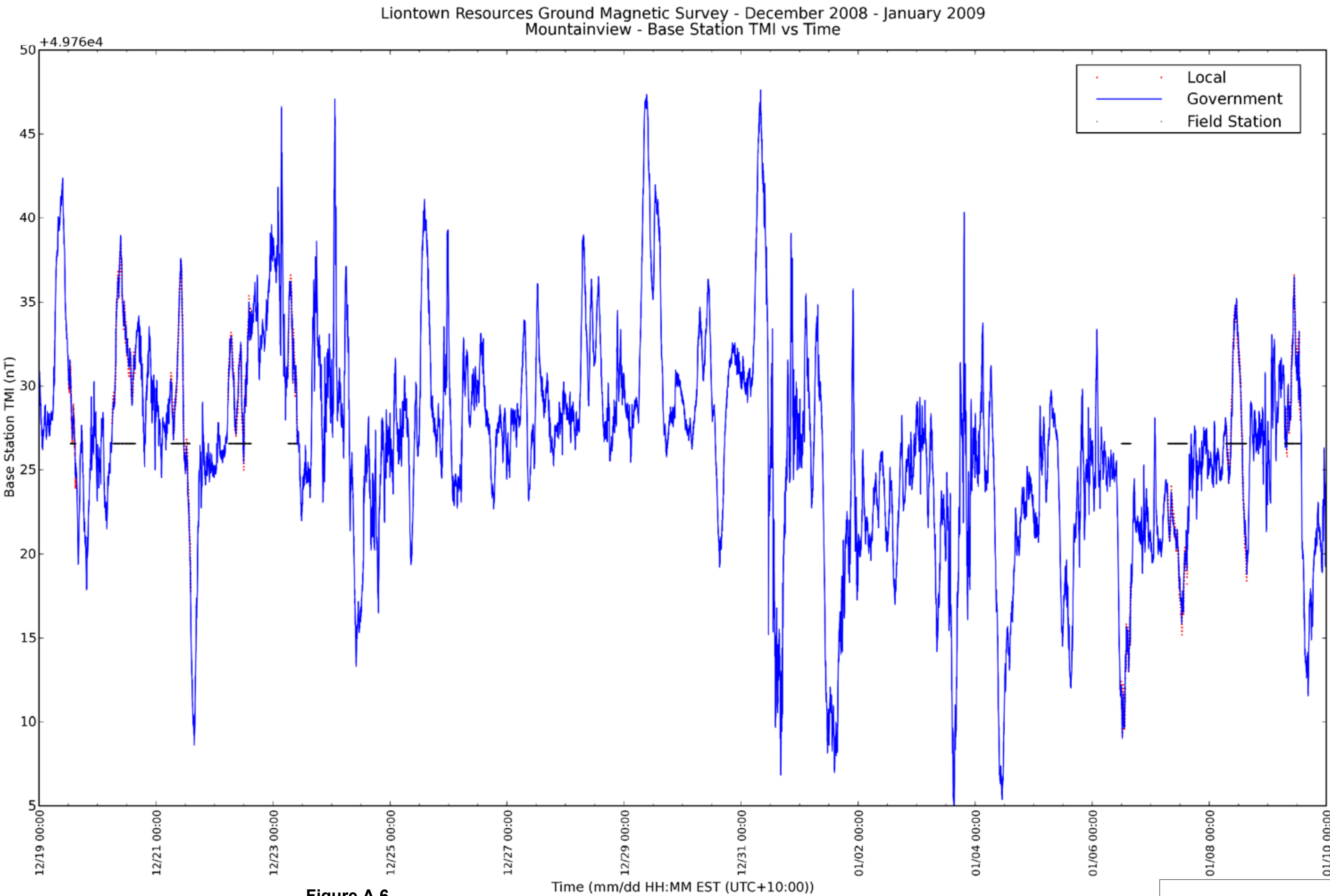


Figure A.6
Liontown Resources
Ground Magnetic Survey
December 2008 - January 2009
Mountainview
Base TMI Time Series

Terra Search Pty Ltd
25/03/2009

Liontown RESOURCES LIMITED

LTRCXT0009_GMag_200812To200901_Mountainview_TimeSeriesBaseTMI.WOR

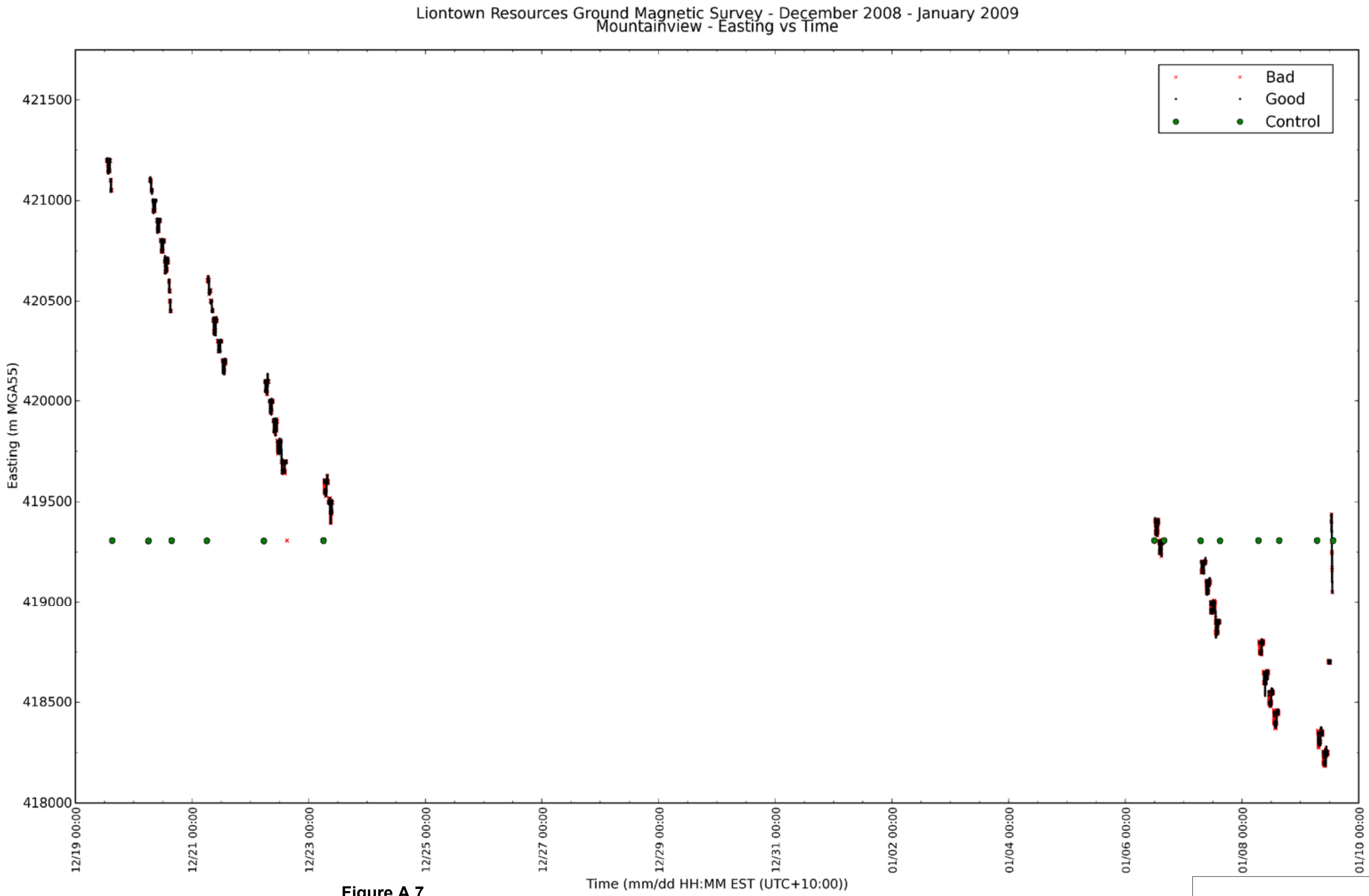


Figure A.7
Liontown Resources
Ground Magnetic Survey
December 2008 - January 2009
Mountainview
Easting Time Series

Terra Search Pty Ltd
25/03/2009

Liontown Resources Limited

LTRCXT0010_GMag_200812To200901_Mountainview_TimeSeriesEasting.WOR

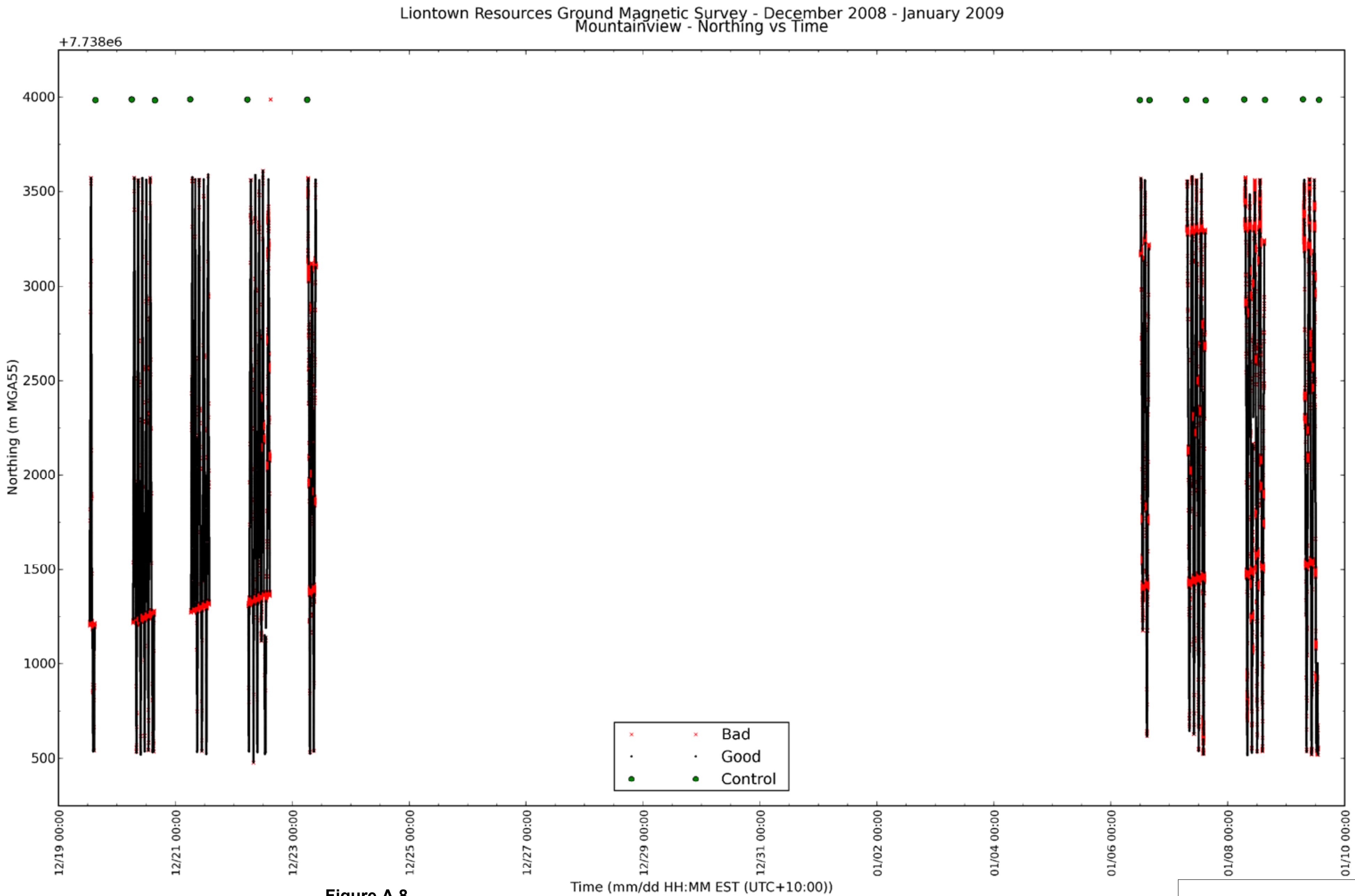


Figure A.8
Liontown Resources
Ground Magnetic Survey
December 2008 - January 2009
Mountainview
Northing Time Series

Terra Search Pty Ltd
25/03/2009

LTRCXT0011_GMag_200812To200901_Mountainview_TimeSeriesNorthing.WOR

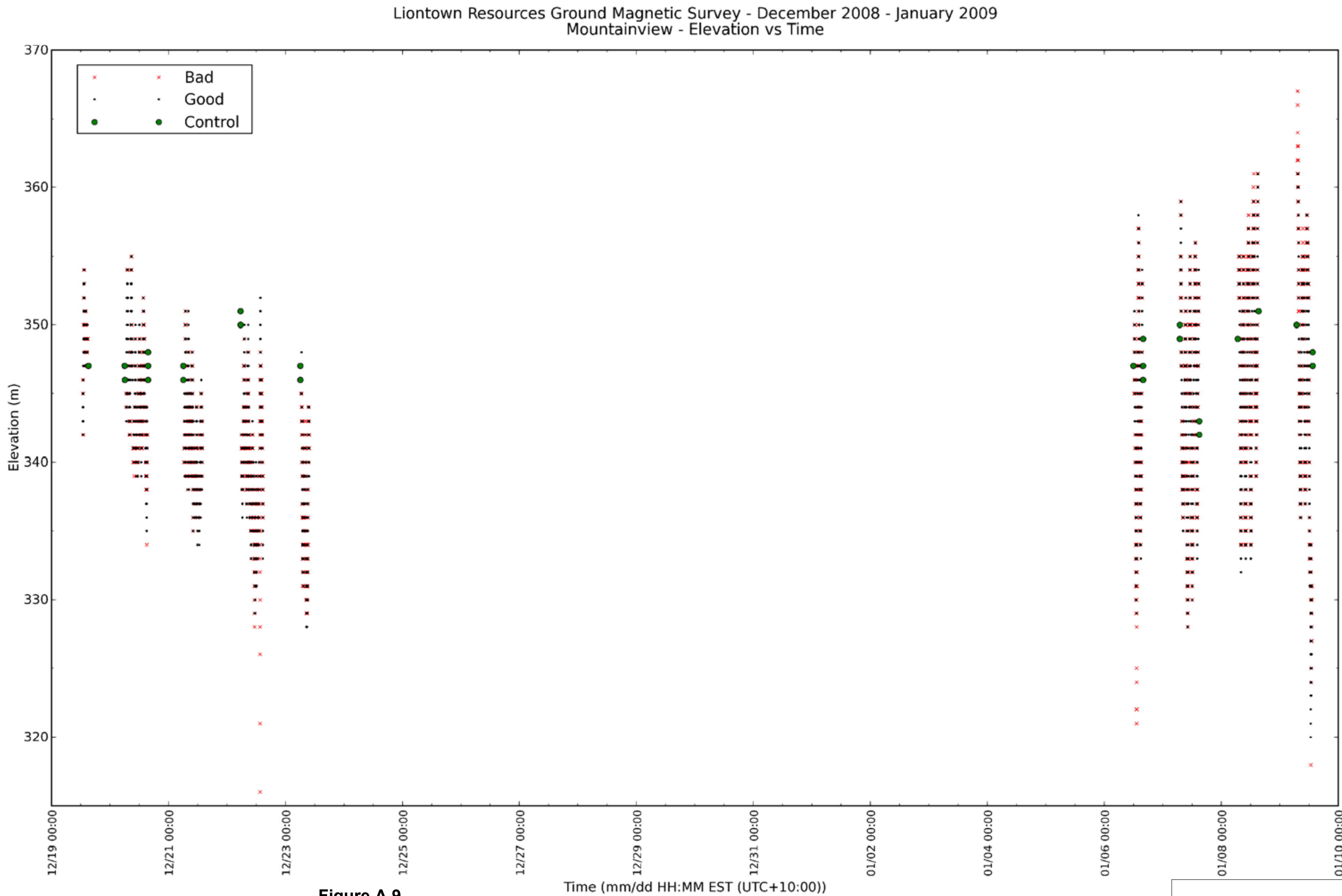


Figure A.9
Liontown Resources
Ground Magnetic Survey
December 2008 - January 2009
Mountainview
Elevation Time Series

Terra Search Pty Ltd
25/03/2009

Liontown RESOURCES LIMITED

LTRCXT0012_GMag_200812To200901_Mountainview_TimeSeriesElevation.WOR

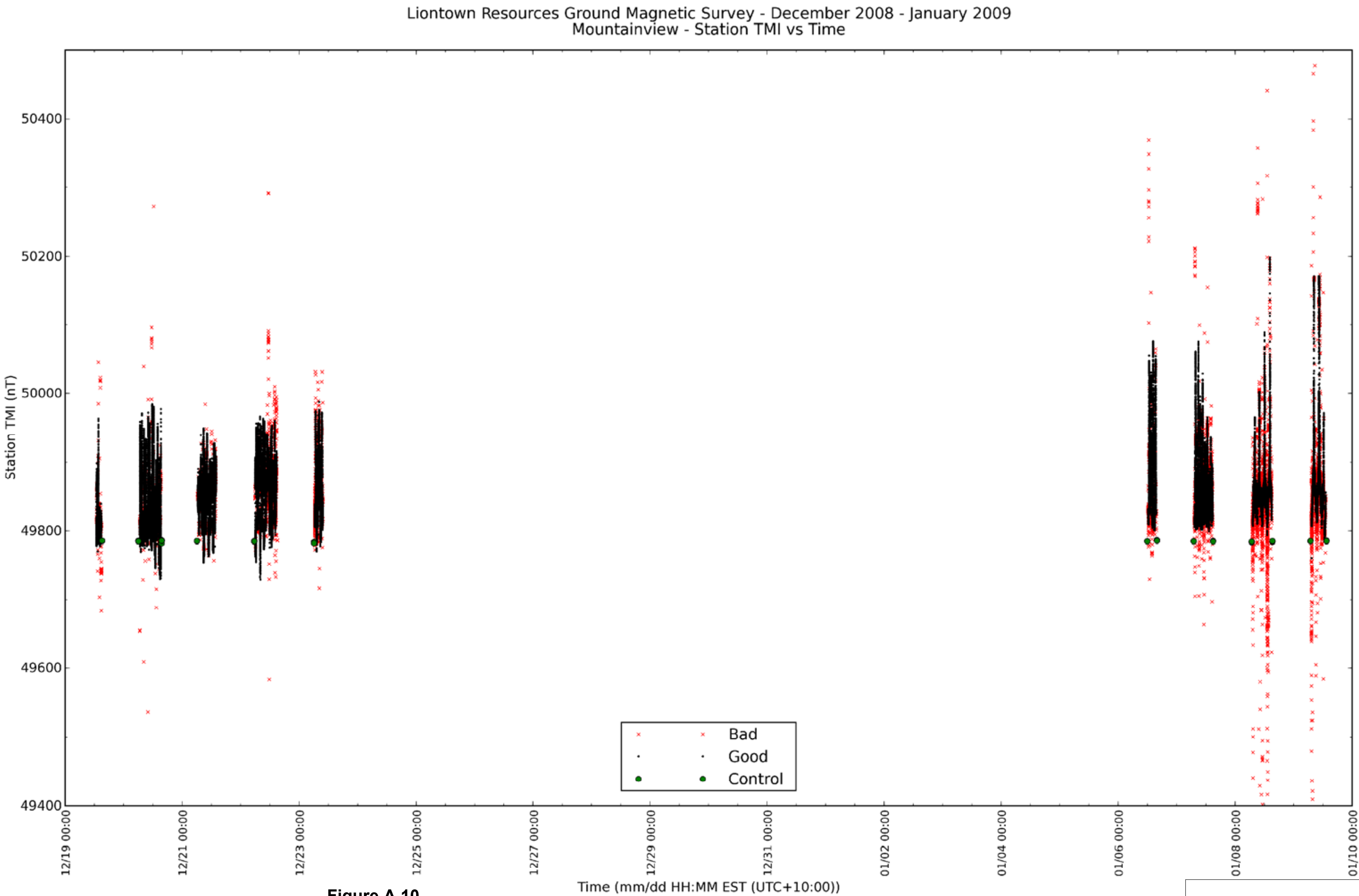


Figure A.10
Liontown Resources
Ground Magnetic Survey
December 2008 - January 2009
Mountainview
Station TMI Time Series

Terra Search Pty Ltd
25/03/2009

LTRCXT0013_GMag_200812To200901_Mountainview_TimeSeriesStationTMI.WOR