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Report on

Downhole Electromagnetic (DHEM) Survey

for

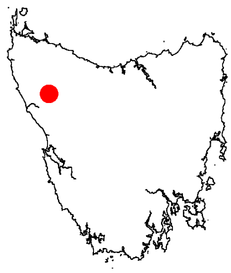
Stellar Resources Ltd.

in drill hole

SJ-1

Jasper Hill, Tasmania

May 2013



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Map coordinates

Unless noted otherwise, coordinates in this report are
MGA55 (datum: GDA94, projection: Map Grid of Australia zone 55)

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(NOTE: Appendices are contained on the CD-ROM accompanying this report).

1. Summary

A downhole electromagnetic survey in drillhole SJ-1 did not detect any anomalous off-hole responses from conductive massive mineralisation.

Processing of VTEM airborne electromagnetic data was also completed in an attempt to better understand the source of an airborne conductive anomaly upon which SJ-1 was partly targeted. It appears that the conductive response detected by the VTEM survey is most likely lithological in nature, arising from the serpentinite unit intersected in the bottom of the drillhole.

2. Introduction

Outer-Rim Exploration Services ("ORE") were contracted by Stellar Resources Limited to undertake a downhole electromagnetic ("DHEM") survey in exploration drillhole SJ-1. The survey was conducted on 30th April and 1st May 2013.

Drillhole SJ-1 is situated on EL40/2010 in the Jasper Hill area and was targeted on a combination of soil geochemistry and a conductive anomaly detected by an airborne VTEM electromagnetic survey flown by Mincor in 2008. A summary of the drillhole geometry and geology is given in the following table.

collar easting	358682 E mga	
collar northing	5406030 N mga	
nominal dip	-50 deg	
nominal azimuth	45 deg	
geology	0 – 68 m	quartz-lithic-mica wacke, mudstone, siltstone
	68 – 235 m	partly serpentinised amygdaloidal, hematite epidote altered, calcite veined basalt with minor bands of hematitic silica alteration containing traces of chalcopyrite
	235 – 250 m	basalt, hematitic silica pebble conglomerate
	250 – 291 m	serpentinite

Digital data from the DHEM survey are supplied on an accompanying CD disk (Appendix1).

3. Survey Area and DHEM Transmitter Loops

Figure1 shows the transmitter ("Tx") loop locations in relation to satellite photo coverage over the EL40/2010 area.

Figure2 shows the Tx loop layout in detail. The survey area is within the Heazlewood Hill Conservation Area and to avoid undue vegetation disturbance the Tx loop wires were laid out along existing tracks and roads where possible.

Although previous conductive plate modelling of the airborne VTEM data (*EL 40/2010 Heazlewood Hill Annual Report for the period 1 June 2011 to 31 May 2012*) suggested a shallow SW-dipping source, due to the lack of a follow-up ground survey to more confidently define the source it was felt that for the purposes of the DHEM survey the source geometry should be regarded as unknown. Consequently two Tx loops were used; the main one is Loop 1 ("L1") that encircles

SJ-1, while Loop 2 (“L2”) is positioned to the northeast and shares a side with Loop 1. If a conductor had been present but positioned unfavourably for energizing by Loop 1 and thus not easily detectable (i.e. minimally coupled to that loop’s primary field) then the different primary field direction of Loop 2 should have made it detectable (i.e. *not* minimally coupled to that loop’s primary field).

Figure3 shows plots of the primary fields for the two transmitter loops. The vectors are shown in the vertical plane that contains the drillhole.

4. DHEM – Receiver Probes

Two separate probes were used to collect the full 3-component data; this required two logging passes of each drillhole. One probe measured the electromagnetic component along the axis of the drillhole and the other probe measured the remaining two orthogonal components. The former is generally referred to by Outer-Rim as the “Z” probe (measuring the “A” component), and the latter as the “XY” probe (measuring the “U” and “V” components).

The convention for the 3-component directions is [“right-hand rule”]
A : axial, i.e. along the drill hole, +ve up the drill hole.
U : transverse to axial; in the vertical plane containing the drill hole.
At 12 o'clock when looking down the hole.
V : transverse to axial; horizontal, making a right handed set of axes A, U and V.
At 9 when o'clock looking down the hole.

The “Z” probe has an effective receiver coil area of ~8000m^2 compared to the “XY” probe with ~3000m^2. This results in the U and V component data often being noisier in the late-time channels compared to similar times for the A component data.

5. DHEM – Discussion

The DHEM data are plotted as profiles in Figure4 and Figure5 (pseudolog scale) and in Figure6 and Figure7 (linear scale). The drillhole ended at a depth of 291m but the DHEM could only be logged to 260m due to a blockage (believed to be about the depth at which the PVC casing ended).

The data does not show any evidence of a good off-hole conductor response of the type that could be expected from massive sulphide mineralisation.

The “A” component profiles for Loop 1 (Figure4 and Figure6) show an elevated early-time response for the first 80m and this corresponds to the intersected sediments. Below 100m the response gradually builds to a broad maximum at about 250m or 260m. This near-EOH response is interpreted to be due to the serpentinite that was intersected from 250m. The geological environment in Tasmania is generally quite resistive and although serpentinite is not in itself classed as a notable conductor it is expected that there is sufficient conductivity contrast between the serpentinite and the overlying basalt to make the serpentinite the more conductive rock unit in a relative sense. (This relative contrast is consistent with some very limited conductivity data on Tasmanian serpentinites and basalts available in the Mineral Resources Tasmania rock properties database).

The “A” component profiles for Loop 2 (Figure5 and Figure7) are a little more complex to interpret due in part to the drillhole being outside the transmitter loop and because of the steep topography the drill collar is significantly higher than the loop. This results in the induced ground currents passing across the drillhole as they migrate outwards and downwards from the edge of the loop (refer to Figure3, loop 2). The negative early-time data in the deeper half of the DHEM log is a consequence of this current migration across the drillhole.

Digital data from the DHEM logging is contained in Appendix1.

6. VTEM – Observations concerning the Conductive Anomaly near SJ-1

In an attempt to better understand why the VTEM survey detected a seemingly “good-looking” conductor while the DHEM didn’t detect any conductive anomalies of interest, the VTEM data was processed using EmaxAIR software (from Fullagar Geophysics) to produce conductivity-depth data. These data generally give a better understanding of conductivity structure and distribution than that conveyed by plots of simple VTEM channel data (eg. the “Channel 20” contour as used on some old plots).

Figure8 shows generalised geology over the EL40/2010 area and can be used to directly compare with subsequent figures plotted at the same scale. Figure9 shows the VTEM flightlines.

The EmaxAIR processing produces data for each of the individual flightlines and these are plotted as conductivity-depth sections; a full set of these plots is contained in Appendix2. The appendix also includes some animations that step through the sections in sequence from south to north and make it easier to visualise the progressive changes in conductivity as EL40/2010 is traversed. Selected sections are also discussed later in this report.

EmaxAIR data can also be displayed in plan view as a “depth slice” whereby conductivities occurring within a give depth range are combined and presented as an image. Three “depth slice” images have been generated for the VTEM survey;
Figure10 between 100m and 200m RL (AHD metres)
Figure11 between 0m and 100m RL (AHD metres)
Figure12 between -100m and 0m RL (AHD metres)
One of the more prominent features evident in these three plots is the migration to the southwest with depth, and weakening, of the conductivity maximum in the region of drillhole SJ-1.

Figure13 shows in more detail the 100m-to-200m conductivity depth slice in the area surrounding SJ-1. The western portions of conductivity sections from four flightlines (as shown in pink on this figure) were enlarged and are shown in the following four figures.

Starting with the southern pink flightline;

Figure14 (flightline 10450) : a weak but distinct horizontal conductive zone on the west and centred at about –80mRL, separated by an apparent structural break from a similar zone to the east at about +100mRL.

Figure15 (flightline 10480) : the western zone is shallower at about 0mRL while the eastern zone is more conductive, has shallowed to about +200mRL, and is dipping to join the western zone in a flexure rather than being separated by at a distinct structural break.

Figure16 (flightline 10510) : the more conductive zone has now clearly separated into a shallow/surficial zone above +200mRL centred at 359100E, and a bedrock zone at +100mRL centred at 358750E. *The bedrock zone is the approximate region tested by drillhole SJ-1.*

Figure17 (flightline 10560) : the bedrock conductive zone has disappeared and only the shallow/surficial zone remains.

Figure18 is a perspective view, looking northwards, of conductivity depth sections for all the full-length flightlines 10450 to 10560 (figures 14 to 18 are detail plots of the western halves of some of these flightlines). This figure better illustrates the progressive changes in the western conductive region, from the south where the conductive layer is deeper and less conductive and showing a structural break, to the north where it is more conductive and shallow (surficial). *Note that the top of each coloured section does not represent the ground surface but instead is the depth at which EmaxAIR finds the first conductivity-depth solution; the less conductive the ground the deeper the first solution is. Profiles of the topographic surface are shown in figures 14 to 18, and on the plots included in Appendix2.*

Figure19 uses stereo pairs to show the main geological units intersected by drillhole SJ-1 and their relationship with the EmaxAIR conductivity sections for flightlines 10500 and 10510. It can be clearly seen, particularly in the lower of the stereo pairs, that the bedrock conductive zone aligns particularly well with the serpentinite intersection (green on the drill trace) at the bottom of the drillhole. See Appendix3 for a movie that also illustrates this relationship.

7. VTEM – Interpretation of the Conductive Anomaly near SJ-1

Considering all of the above observations from DHEM and VTEM, it is interpreted that the source of the VTEM conductive anomaly is the serpentinite unit intersected at the bottom of drillhole SJ-1. The serpentinite appears to be a gently SW-dipping conductive zone.

For the shallower conductivity depth slice between 100m and 200m RL (Figure10) there is a good correlation between increased conductivity and drainage over the northwestern portion of the VTEM survey. Figure20 shows drainage overlain on an enlargement of that depth slice for this area.

In the vicinity of SJ-1 the NE up-dip continuation of the conductive zone culminates in a shallow conductivity high open towards the surface (eg. conductivity depth sections for flightlines 10490, 10500, 10510). This near-surface response, and its continuation towards the NNE, is the strongest part of the VTEM conductive anomaly and closely correlated with the main drainage channel through the area. Inspection of the conductivity depth sections (Appendix2) from Line 10560 (5406700N) down to at least about Line 10390 (5405000N) suggests that the up-dip continuation of the conductive zone, although becoming overall less conductive towards the south, still has expression near the surface and this near-surface trend remains very well correlated with the local drainage. This is evident in Figure20 where the trend at first continues SW from SJ-1 for about 1km, but then changes to a southerly orientation along a different drainage direction.

The interpretation is that the up-dip edge of the serpentinite is preferentially weathered making it both a little more conductive as well as an influence on the local drainage. The same alteration event evident in the basalt intersected in SJ-1 may have also resulted in a localised change to the properties of the serpentinite, making it slightly more conductive again, and causing it to be even more susceptible to near-surface weathering thus producing the distinct increase in VTEM surface conductivity near SJ-1.

8. VTEM – Other Noteworthy Observations

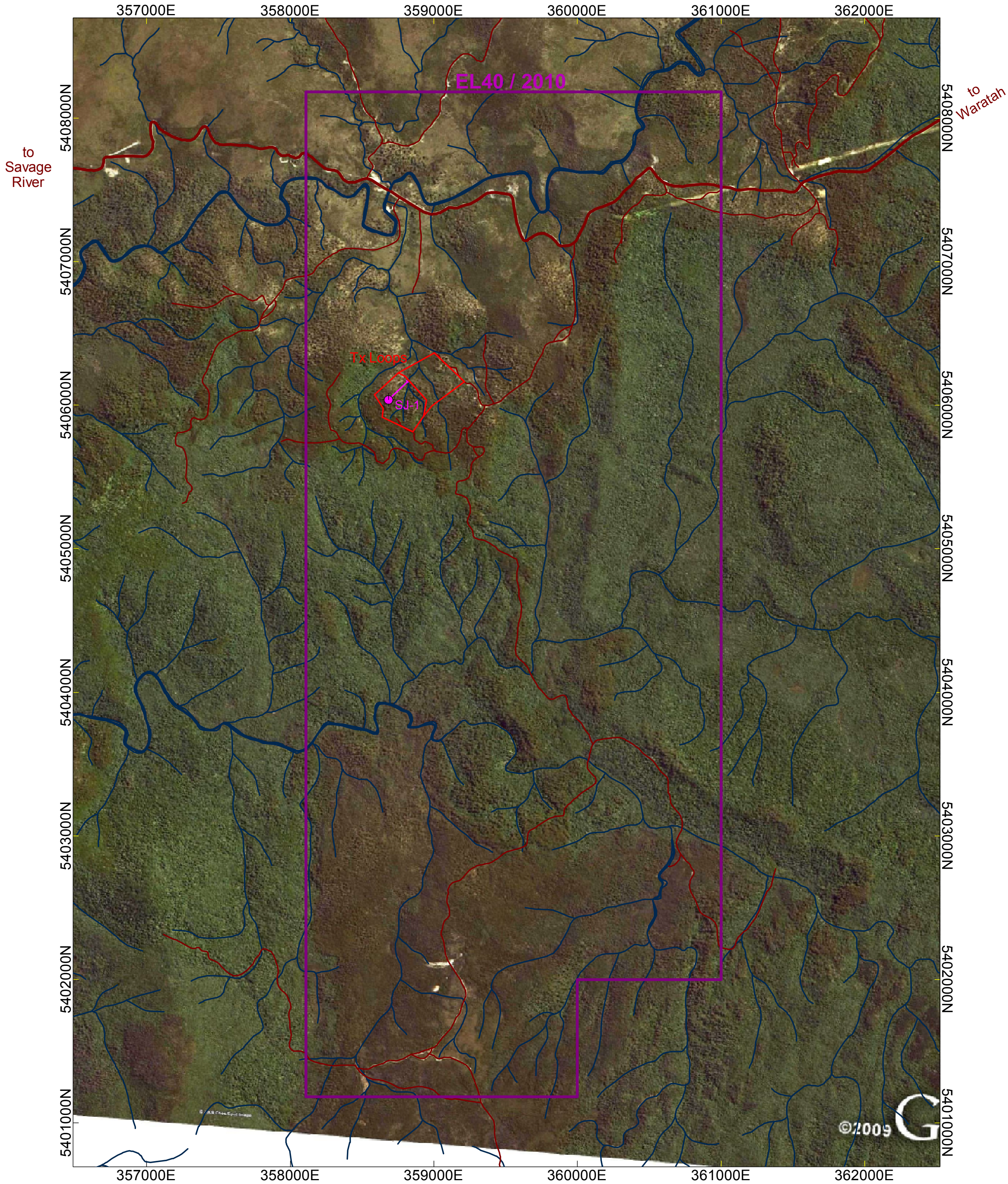
Processing of the VTEM data by EmaxAIR produced conductivity depth sections for all flightlines. The aim of this processing was to help understand the conductivity anomaly at drillhole SJ-1. Although this report has only paid attention to EmaxAIR output that seemed relevant to that aim, it is worth bringing the attention of the reader to the other prominent conductivity anomaly located on the northern extremity of the VTEM survey area.

Figures 21, 22, 23 show the three most northern conductivity depth sections that lie at the northern limit of EL40/2010. The scale of these three figures is the same as that for figures 14 to 17. Two interesting observations about this conductivity anomaly are that it is stronger than the surficial anomaly near SJ-1, but unlike the latter it does not appear to be open to the surface and so is not related to surficial weathering. In the absence of any geological knowledge of that area by the author the likely explanation for the anomaly is unknown; it could be an uninteresting geological unit, but on the other hand it could be indicative of another zone of alteration that is at least partially blind to the surface. The possibilities are worthy of consideration.

9. Conclusion

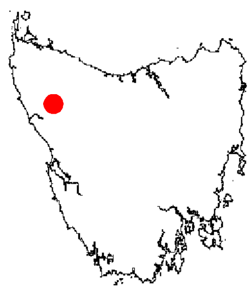
The DHEM survey in drillhole SJ-1 did not detect any anomalous off-hole responses from conductive massive mineralisation, but does appear to be consistent with elevated conductivity in the serpentinite unit intersected in the bottom of the drillhole. The serpentinite intersection also correlates with elevated conductivities in conductivity depth sections produced from the VTEM airborne electromagnetic survey.

The VTEM conductivity anomaly on which drillhole SJ-1 was partly targeted is interpreted to comprise two components; a zone of elevated bedrock conductivity consistent with a gently SW-dipping serpentinite unit, and a preferentially weathered up-dip edge of this serpentinite causing a surficial zone of increased conductivity.



Location

EL 40 / 2010



500 0 500 1000

(meters)

GDA94 / MGA zone 55

Figure 1

DHEM in drillhole SJ-1

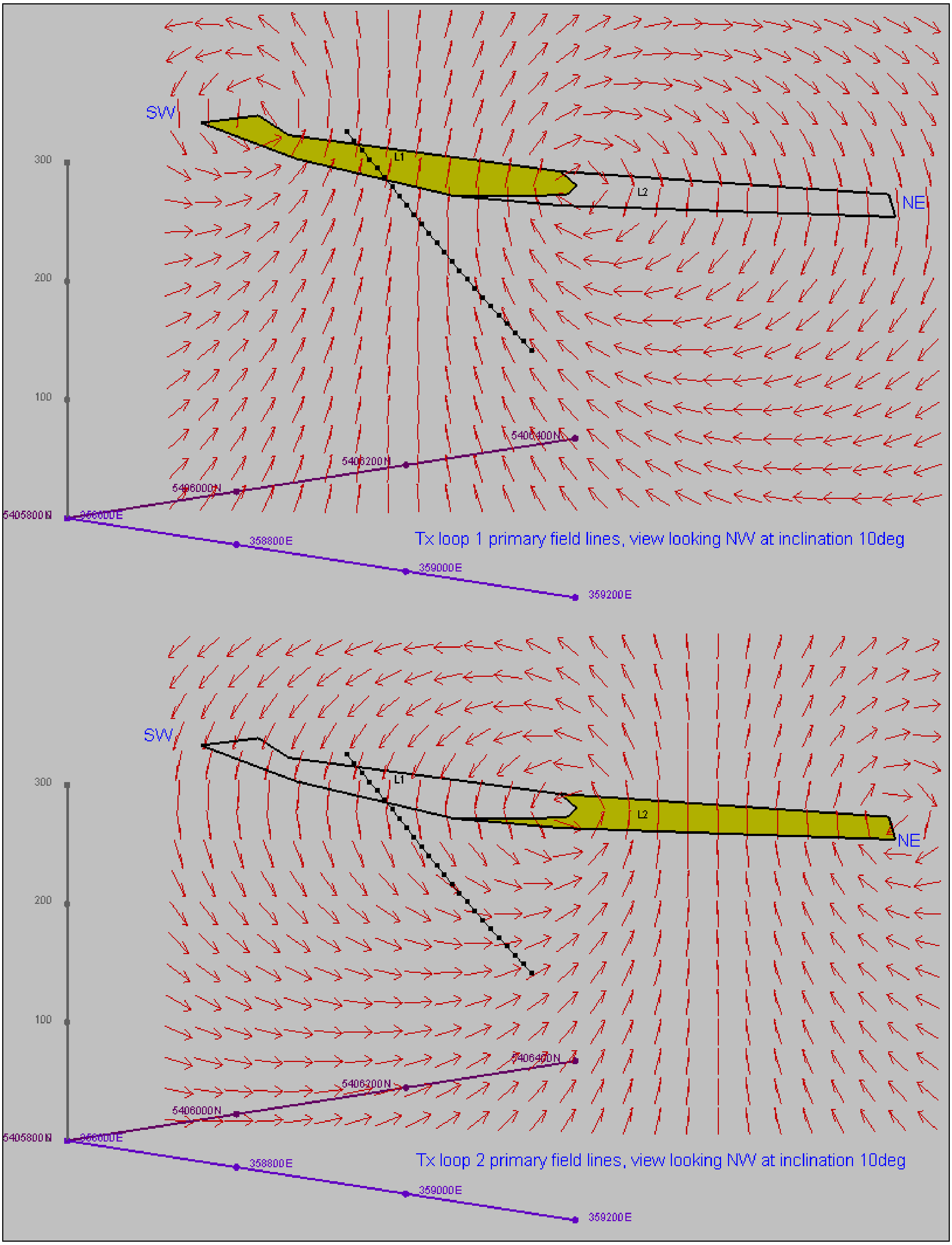
Transmitter loops layout

50 0 50 100 150

(meters)

GDA94 / MGA zone 55

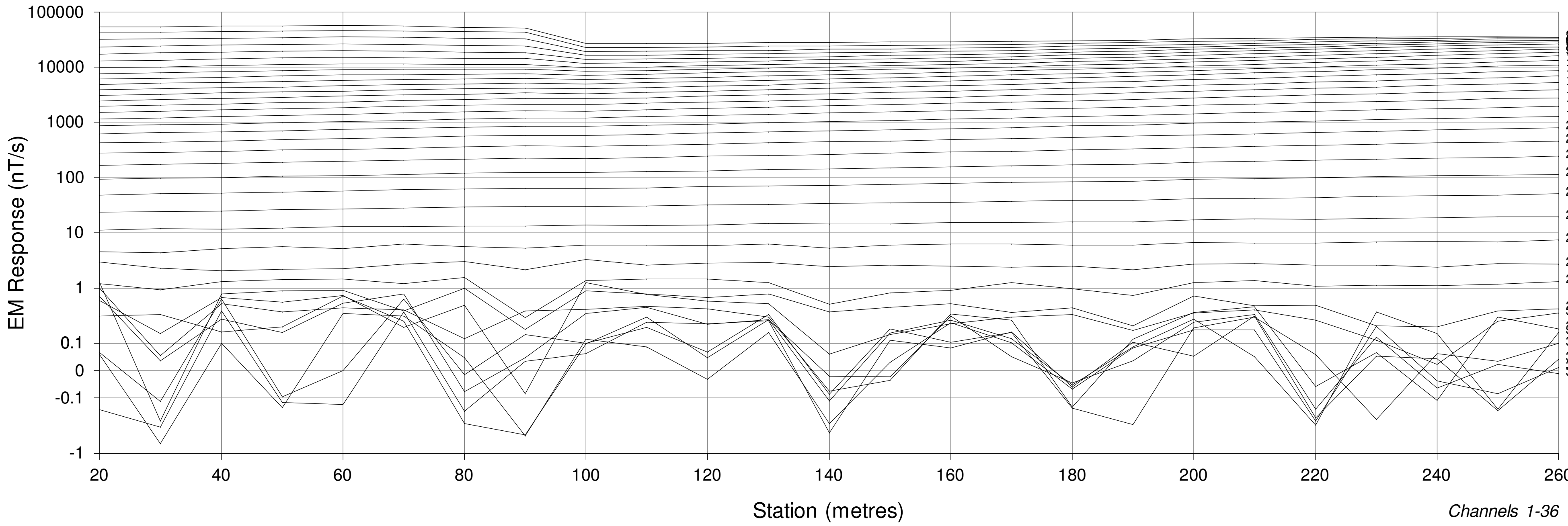
Figure 2



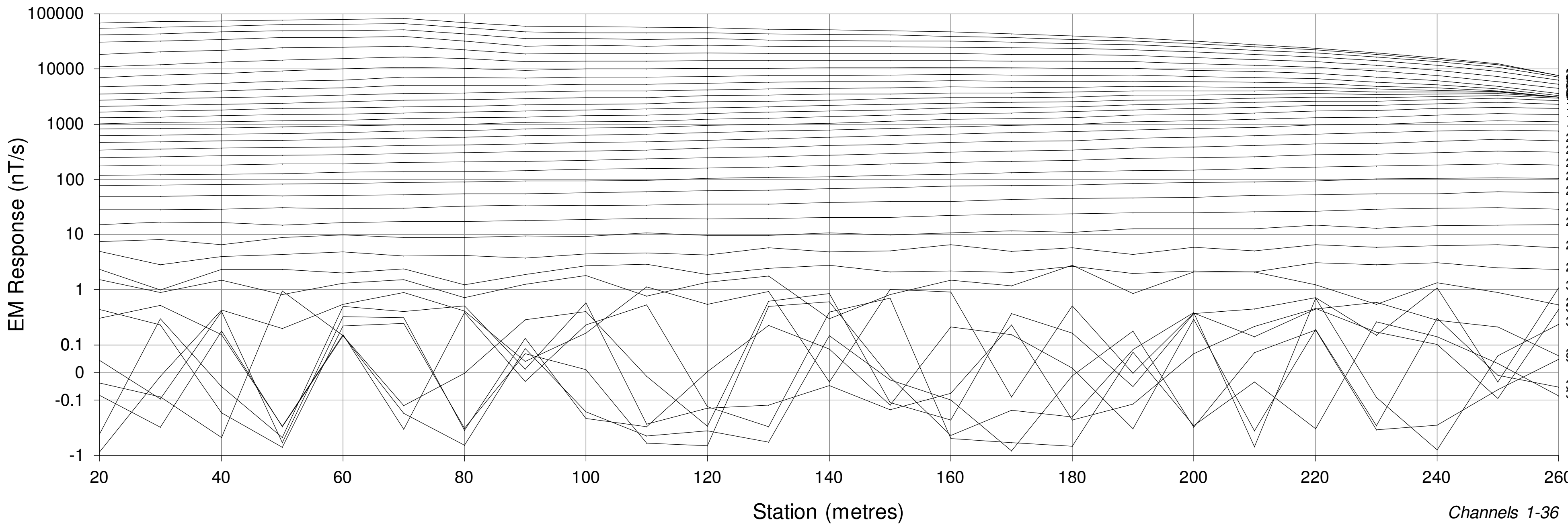
DHEM SJ-1
Tx loops L1 and L2 primary field vectors
in the vertical plane of the drillhole.

Figure 3

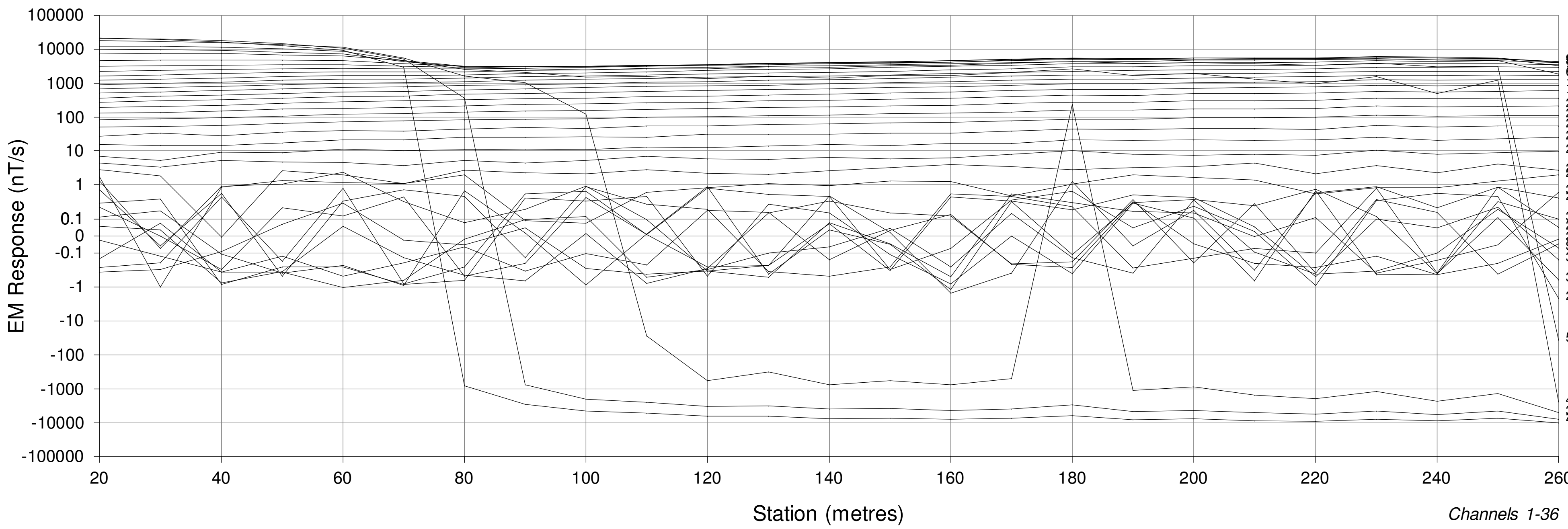
A Component



U Component



V Component



WINDOW TIMES (ms): Centre
From the start of the Ramp

1	: 0.5520	19	: 2.154
2	: 0.5640	20	: 2.500
3	: 0.5780	21	: 2.916
4	: 0.5940	22	: 3.420
5	: 0.6140	23	: 4.028
6	: 0.6380	24	: 4.762
7	: 0.6680	25	: 5.648
8	: 0.7040	26	: 6.720
9	: 0.7460	27	: 8.014
10	: 0.7980	28	: 9.578
11	: 0.8620	29	: 11.47
12	: 0.9380	30	: 13.70
13	: 1.030	31	: 16.46
14	: 1.140	32	: 19.84
15	: 1.274	33	: 23.86
16	: 1.436	34	: 28.72
17	: 1.632	35	: 34.58
18	: 1.868	36	: 41.66

SURVEY PARAMETERS

Configuration : Downhole
Station Spacing : 10 m

RECEIVER

Receiver : Crone
Frequency : 5
Component : A,U,V
Rx Coil :
Rx Area : 3090-8100 turn-m

TRANSMITTER

Transmitter :
Loop : L1
Tx Moment : 2700000 turn-m
Tx Current : 30 A
Turn Off : 0.5 ms

0 10 20 30 40 50

Scale 1:1000

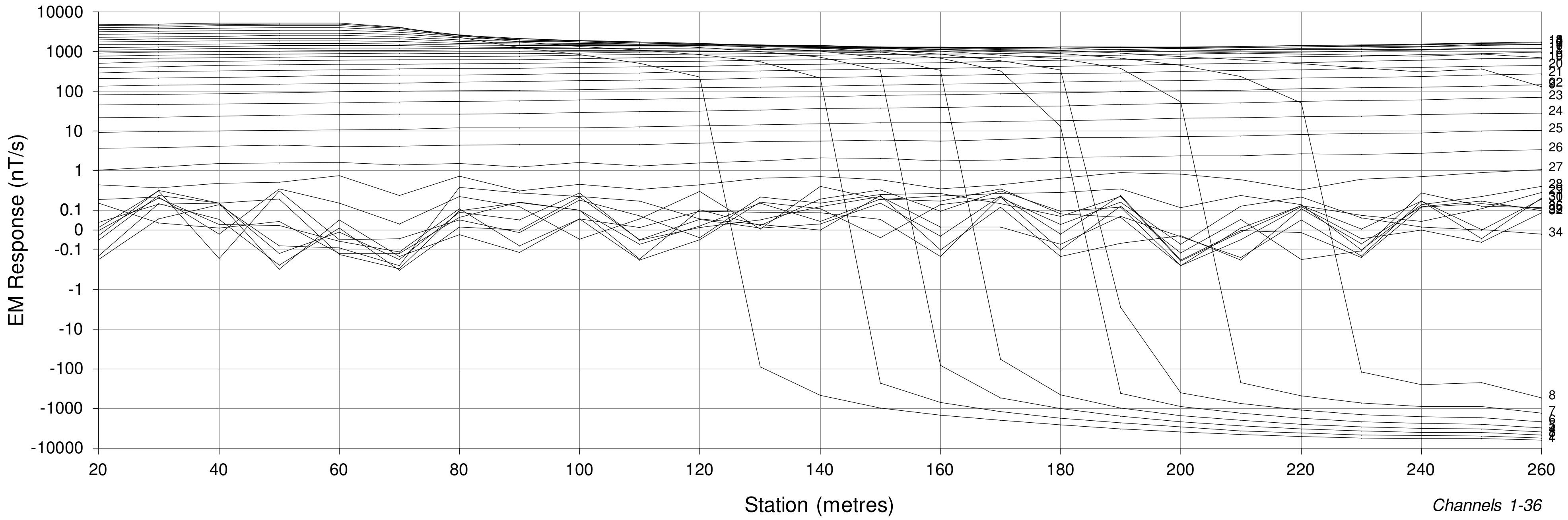
Figure 4

Electromagnetic Imaging Technology

Stellar Resources Ltd
Downhole EM Survey
SJ-1
Tx loop 1 (SW)
field data - all channels
Pseudolog profile scale

Drawn :
Job No. :

A Component



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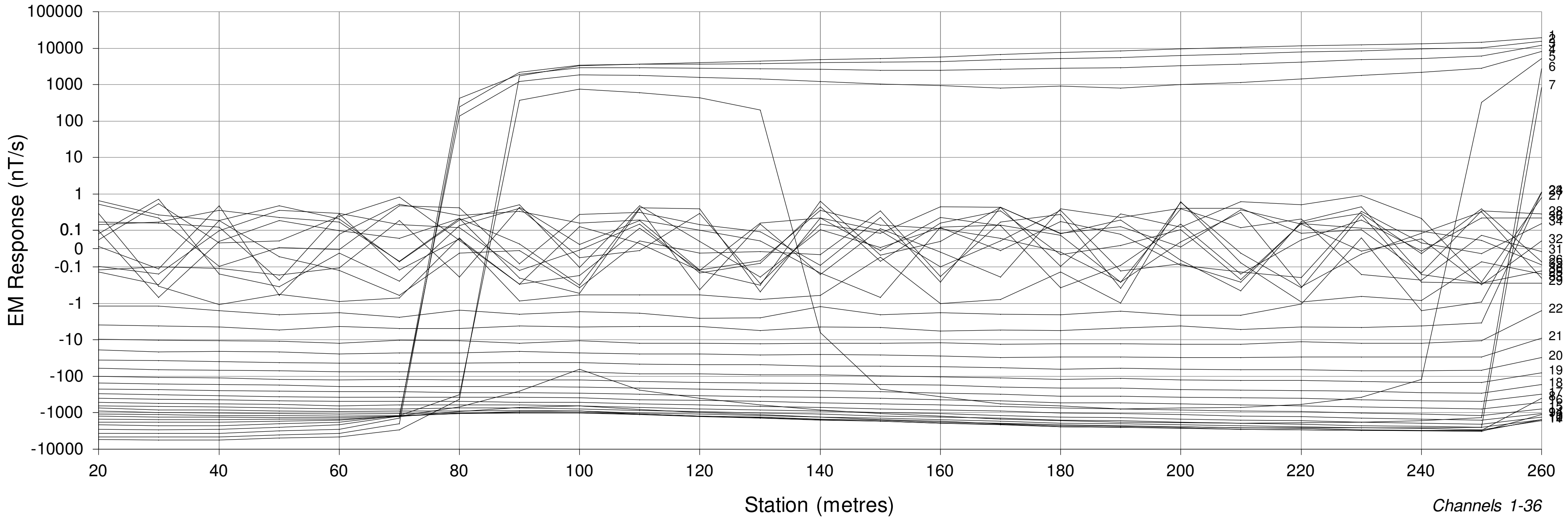
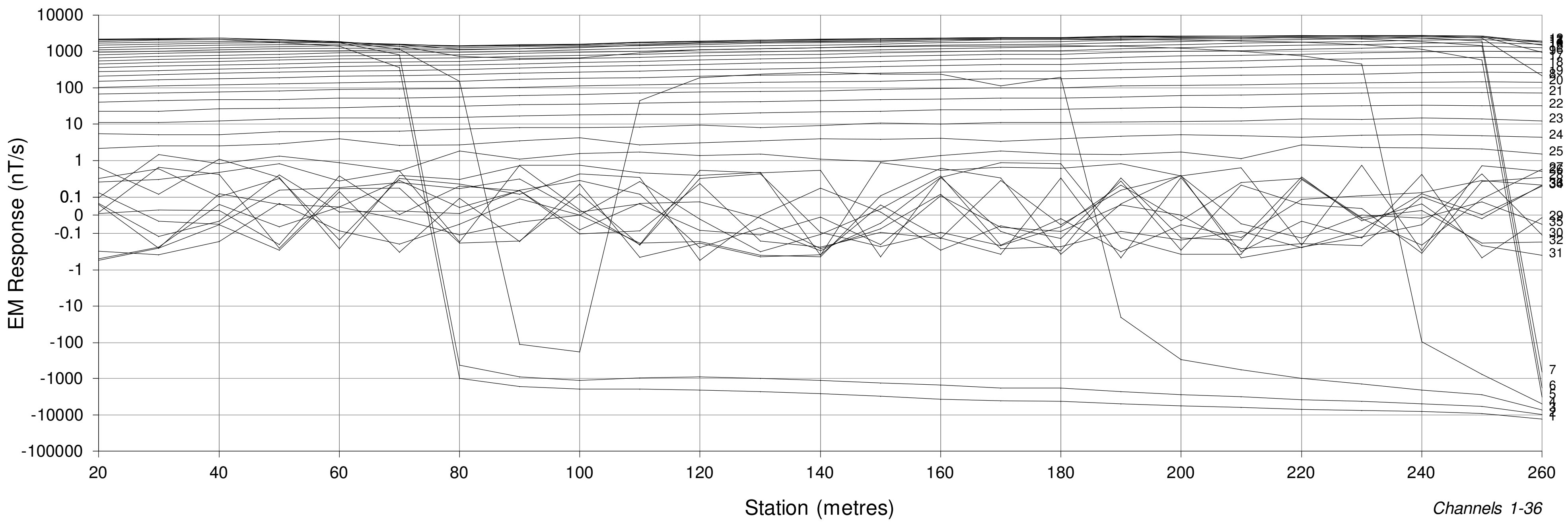


V Component



WINDOW TIMES (ms): Centre
From the start of the Ramp

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2	: 0.5640	20	: 2.500
3	: 0.5780	21	: 2.916
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16	: 1.436	34	: 28.72
17	: 1.632	35	: 34.58
18	: 1.868	36	: 41.66

SURVEY PARAMETERS

Configuration : Downhole
Station Spacing : 10 m

RECEIVER

Receiver : Crone
Frequency : 5
Component : A,U,V
Rx Coil :
Rx Area : 3090-8100 turn-m

TRANSMITTER

Transmitter :
Loop : L2
Tx Moment : 1800000 turn-m
Tx Current : 20 A
Turn Off : 0.5 ms

0 10 20 30 40 50
Scale 1:1000

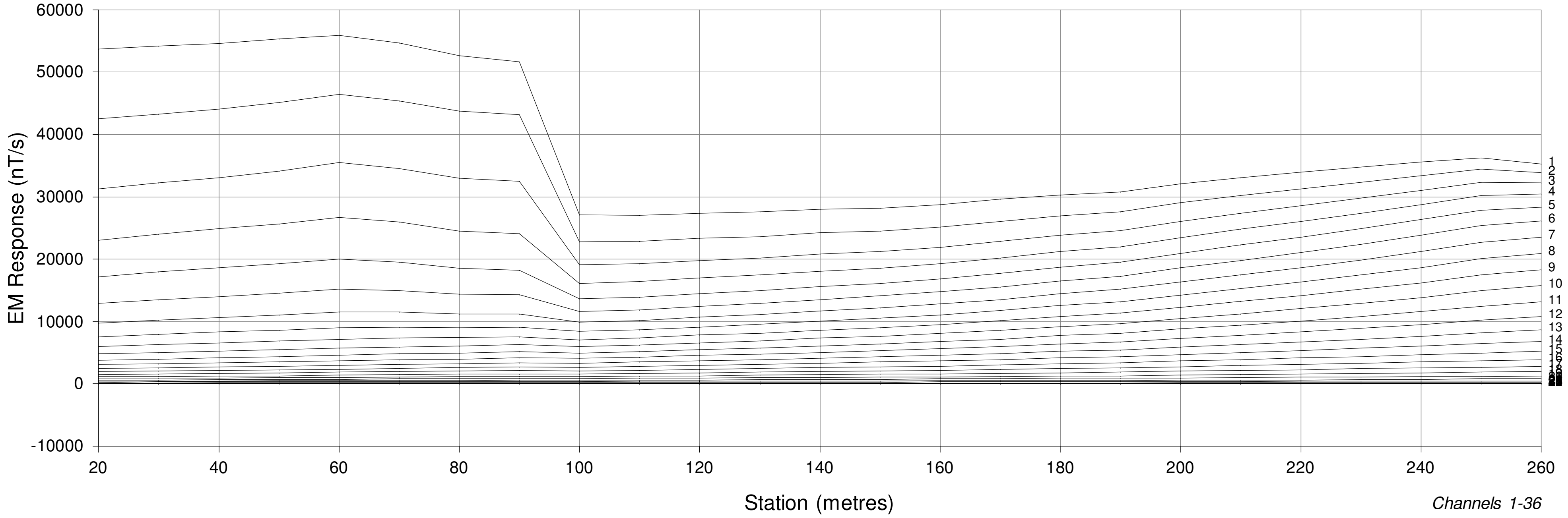
Figure 5

Electromagnetic Imaging Technology

Stellar Resources Ltd
Downhole EM Survey
SJ-1
Tx loop 2 (NE)
field data - all channels
Pseudolog profile scale

Drawn :
Job No. :

A Component



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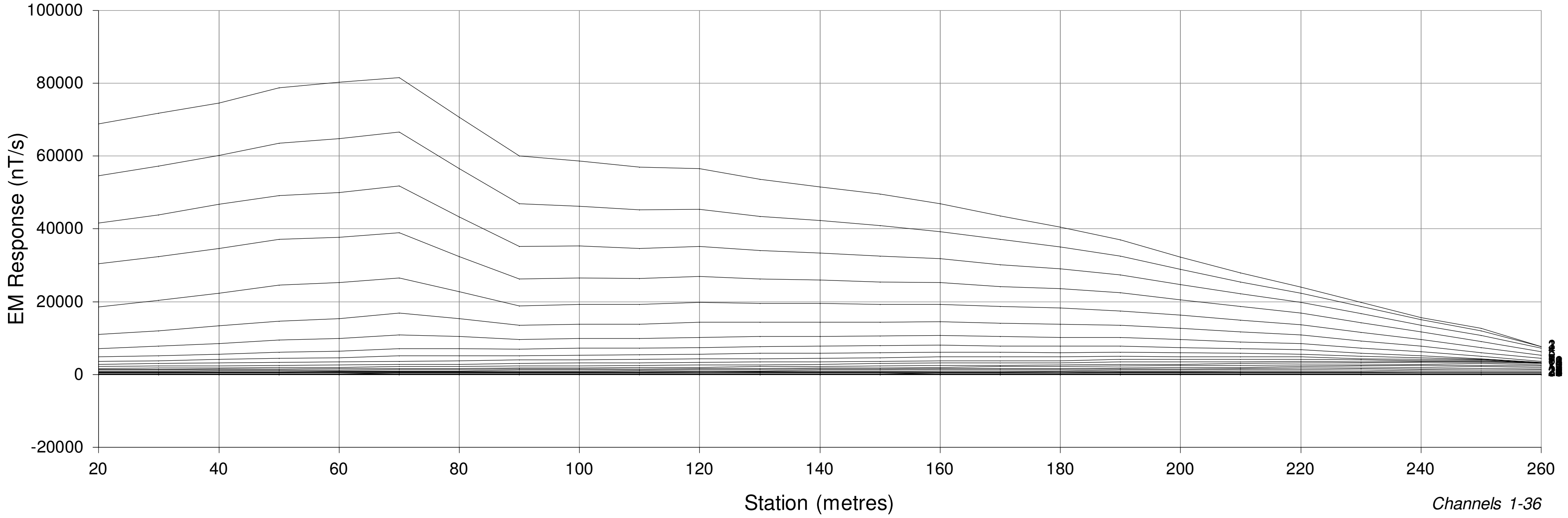
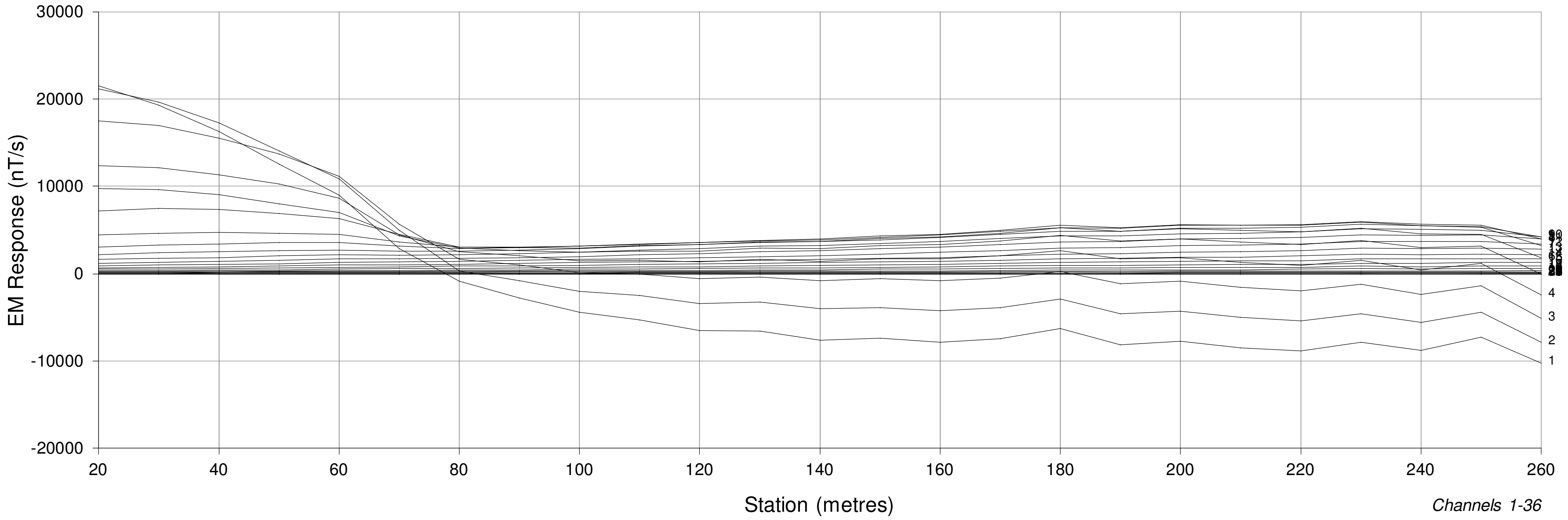


V Component



WINDOW TIMES (ms): Centre
From the start of the Ramp

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16	: 1.436	34	: 28.72
17	: 1.632	35	: 34.58
18	: 1.868	36	: 41.66

SURVEY PARAMETERS

Configuration : Downhole
Station Spacing : 10 m

RECEIVER

Receiver : Crone
Frequency : 5
Component : A,U,V
Rx Coil :
Rx Area : 3090-8100 turn-m

TRANSMITTER

Transmitter :
Loop : L1
Tx Moment : 2700000 turn-m
Tx Current : 30 A
Turn Off : 0.5 ms

0 10 20 30 40 50
Scale 1:1000

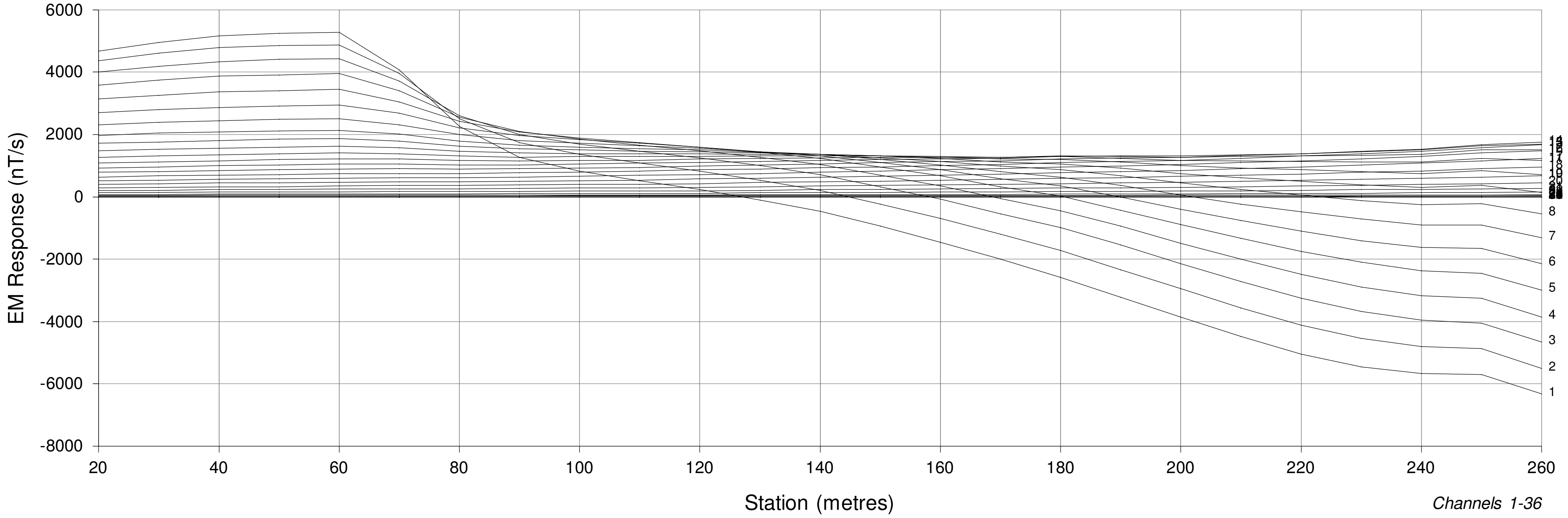
Figure 6

Electromagnetic Imaging Technology

Stellar Resources Ltd
Downhole EM Survey
SJ-1
Tx loop 1 (SW)
field data - all channels
Linear profile scale

Drawn :
Job No. :

A Component



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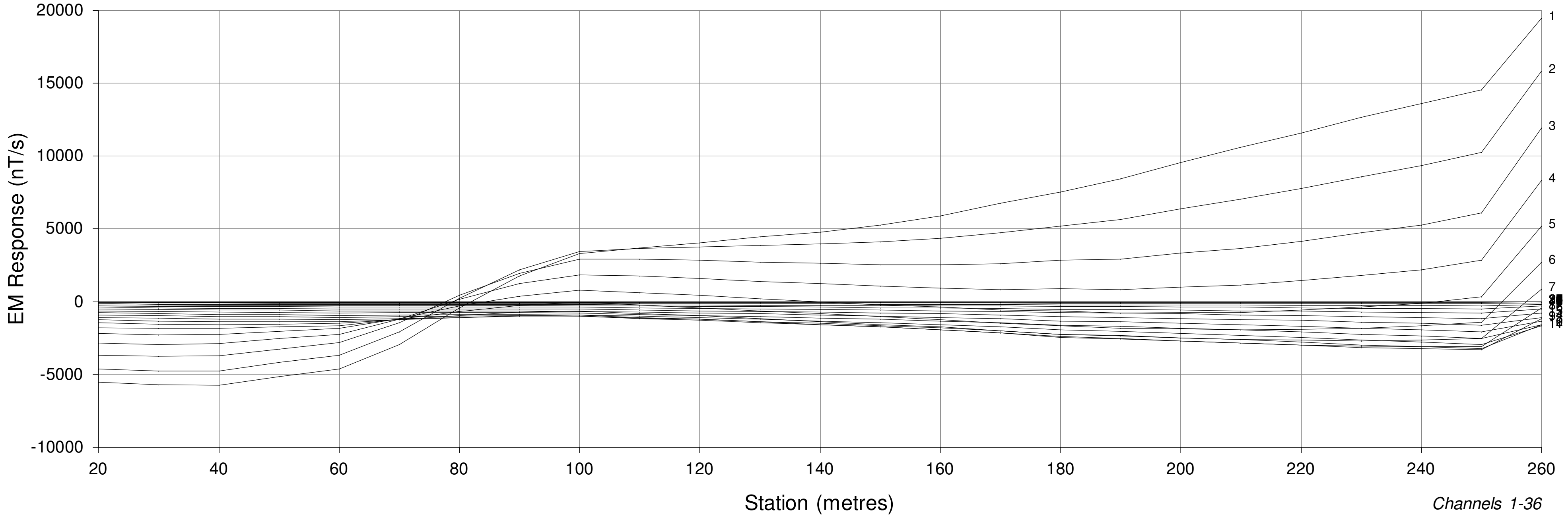
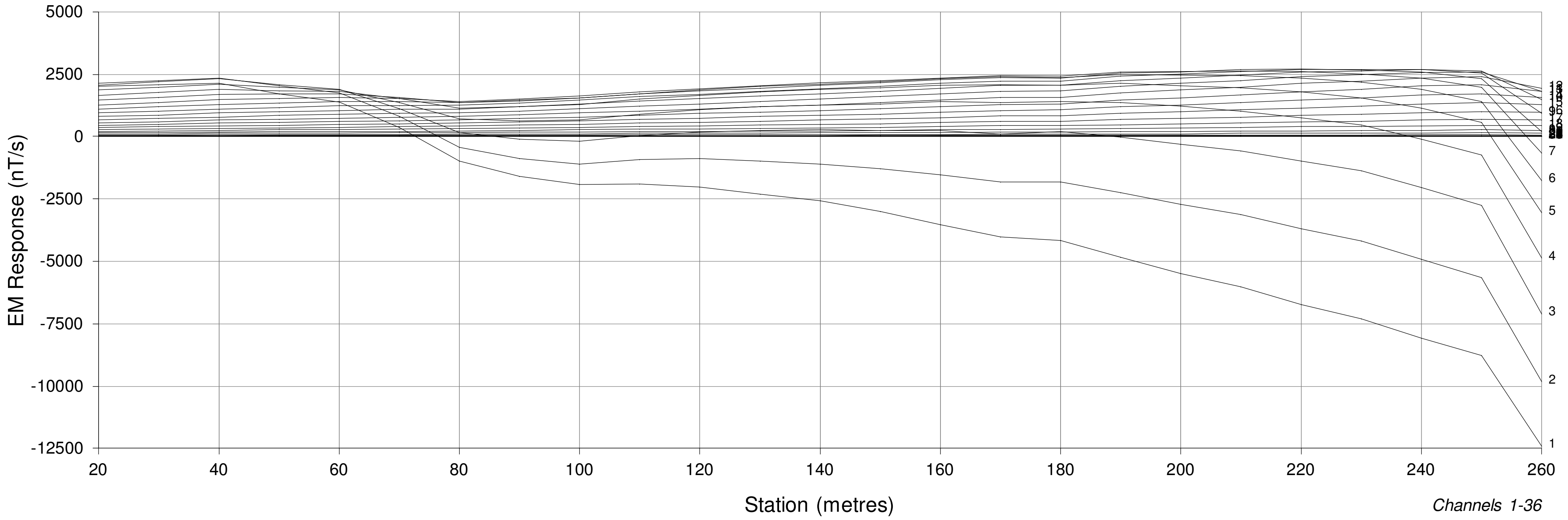


V Component



WINDOW TIMES (ms): Centre
From the start of the Ramp

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2	: 0.5640	20	: 2.500
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SURVEY PARAMETERS

Configuration	: Downhole
Station Spacing	: 10 m

RECEIVER

Receiver	: Crone
Frequency	: 5
Component	: A,U,V
Rx Coil	:
Rx Area	: 3090-8100 turn-m

TRANSMITTER

Transmitter	:
Loop	: L2
Tx Moment	: 1800000 turn-m
Tx Current	: 20 A
Turn Off	: 0.5 ms

0 10 20 30 40 50

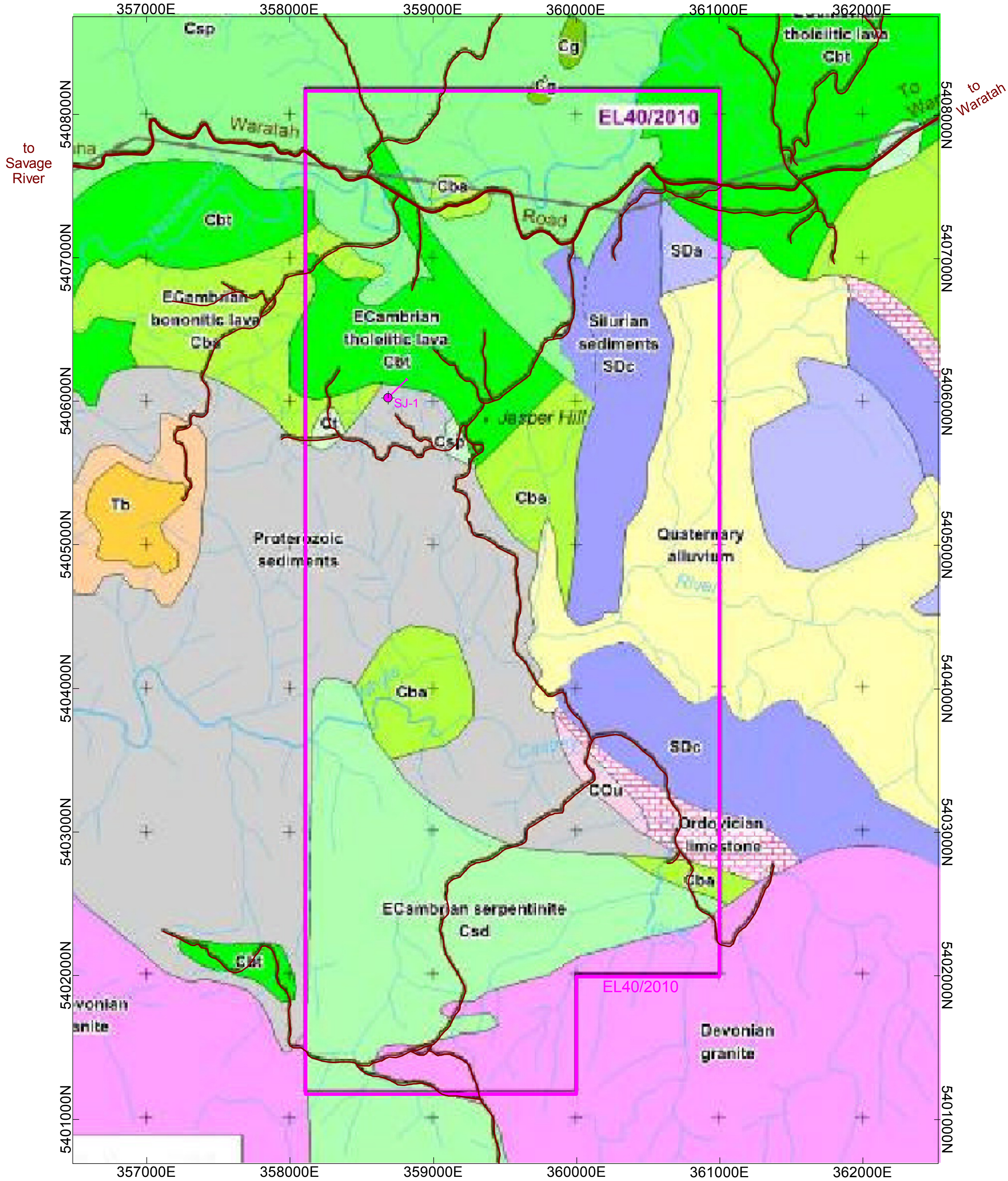
Scale 1:1000

Figure 7

Electromagnetic Imaging Technology

Stellar Resources Ltd
Downhole EM Survey
SJ-1
Tx loop 2 (NE)
field data - all channels
Linear profile scale

Drawn :	
Job No. :	



Geology

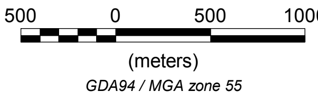
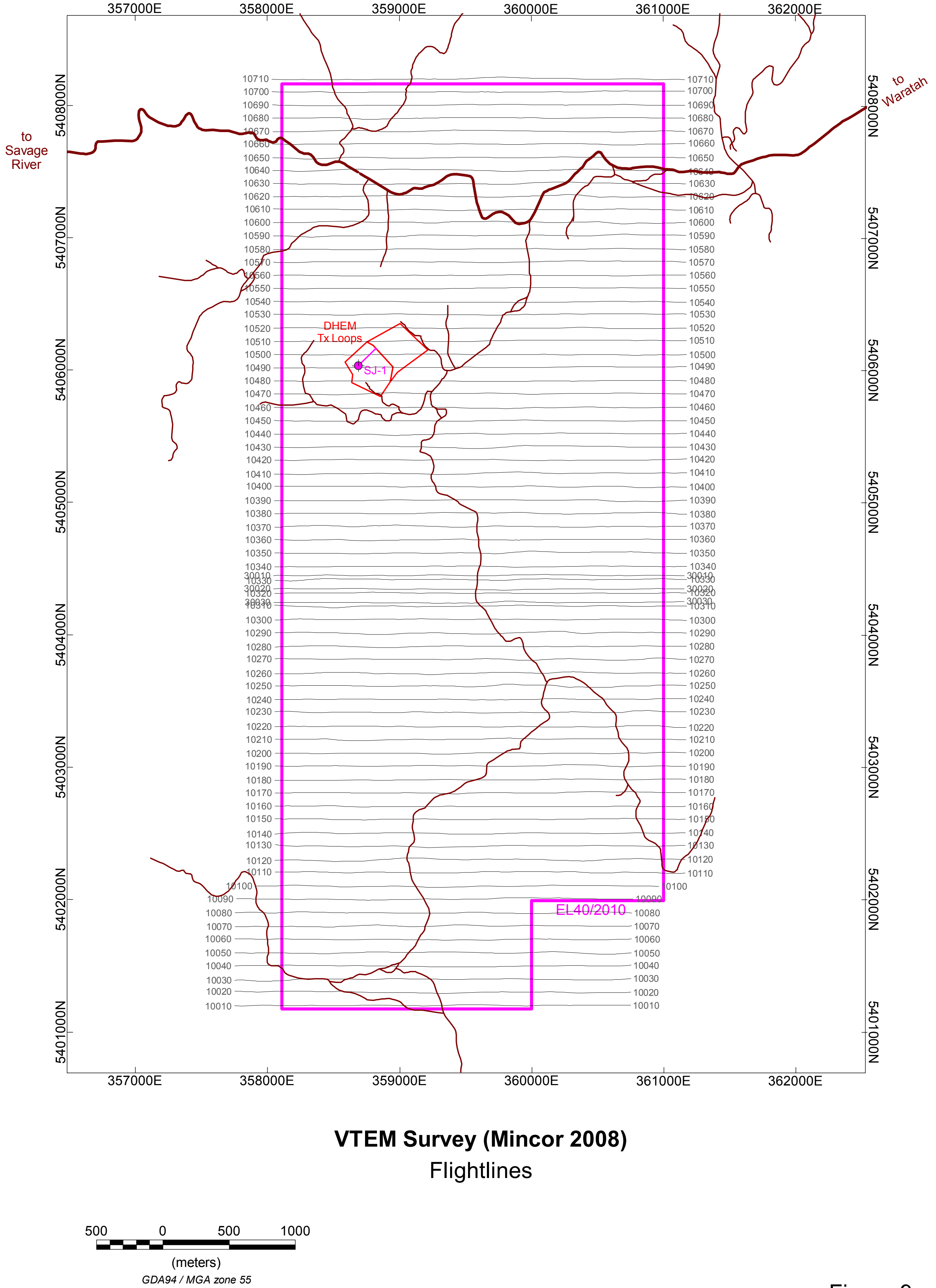


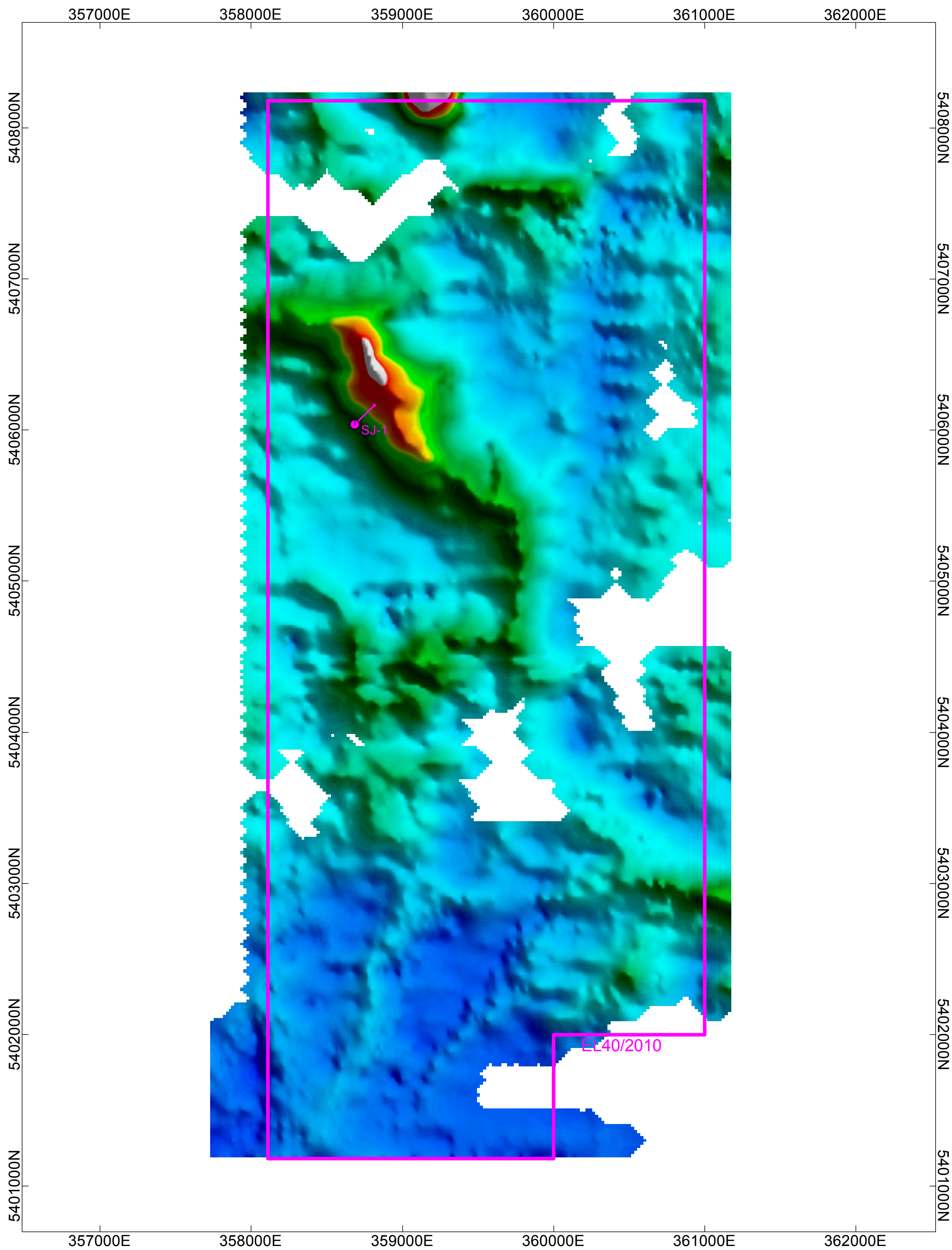
Figure 8



VTEM Survey (Mincor 2008)

Flightlines

Figure 9

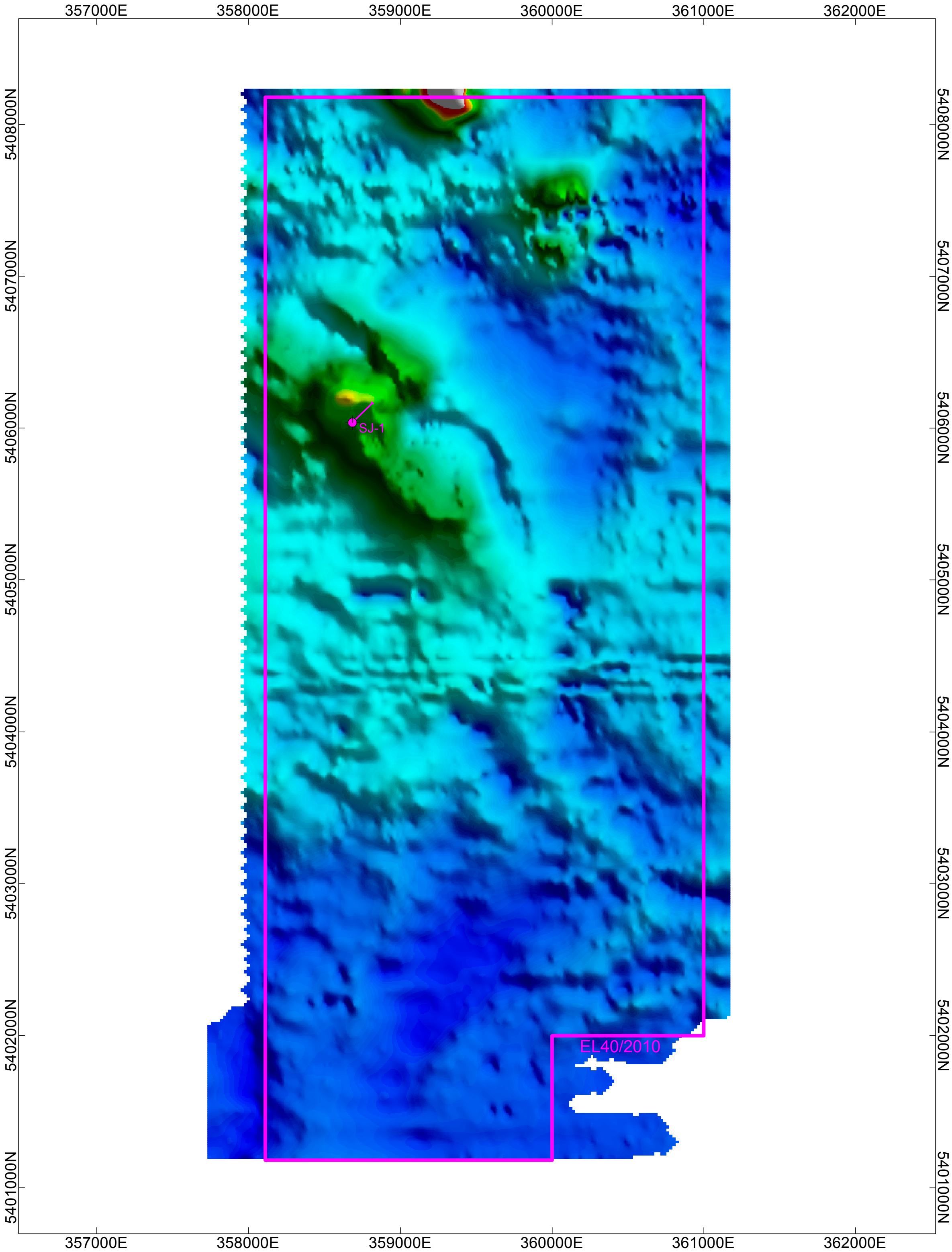


VTEM Survey (Mincor 2008)

Conductivity-Depth Slice

100m to 200m RL (AHD)

Figure 10



VTEM Survey (Mincor 2008)

Conductivity-Depth Slice

0m to 100m RL (AHD)

29
27
24
21
18
15
13
10
7
4
1

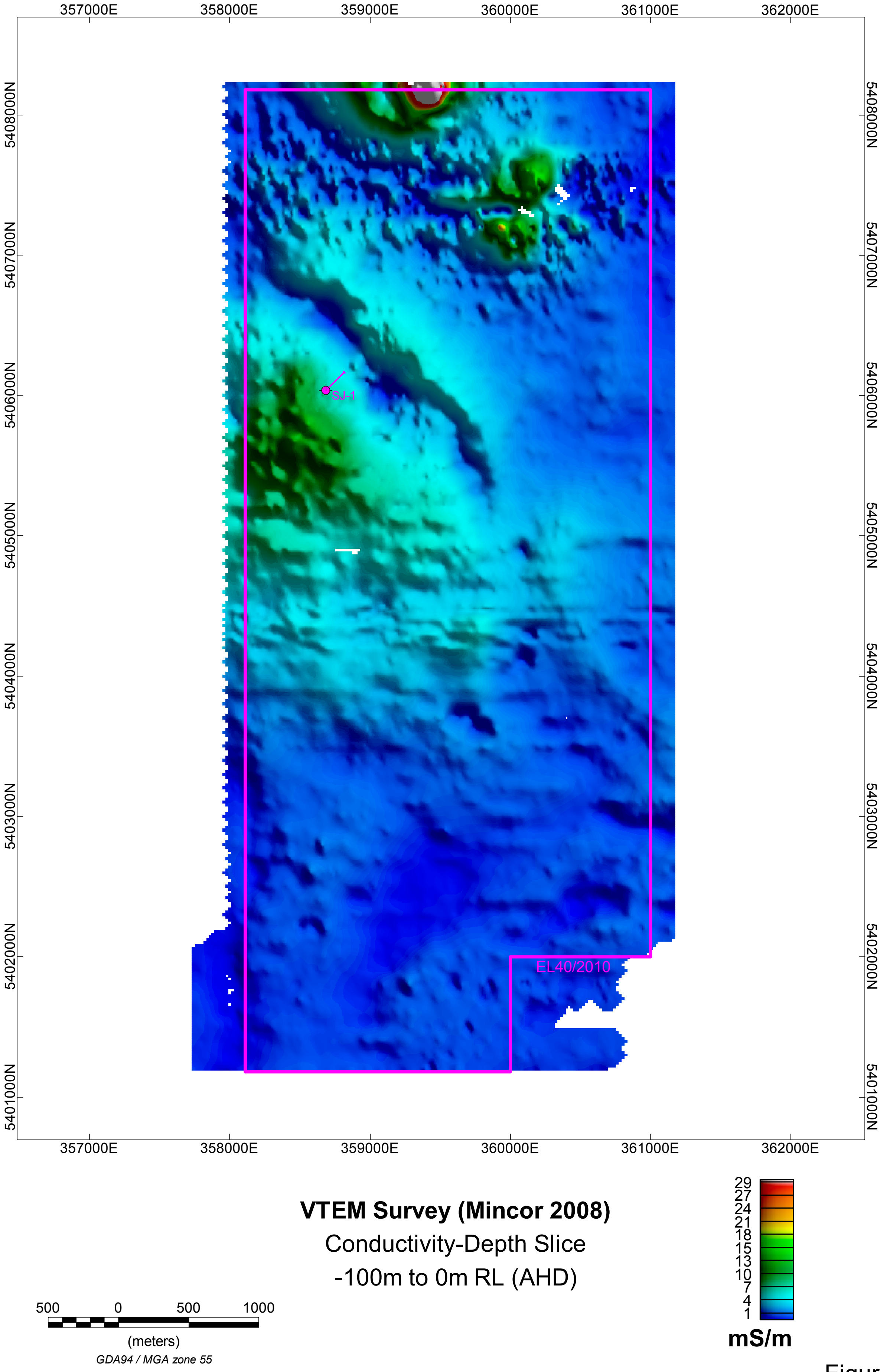
mS/m

500 0 500 1000

(meters)

GDA94 / MGA zone 55

Figure 11

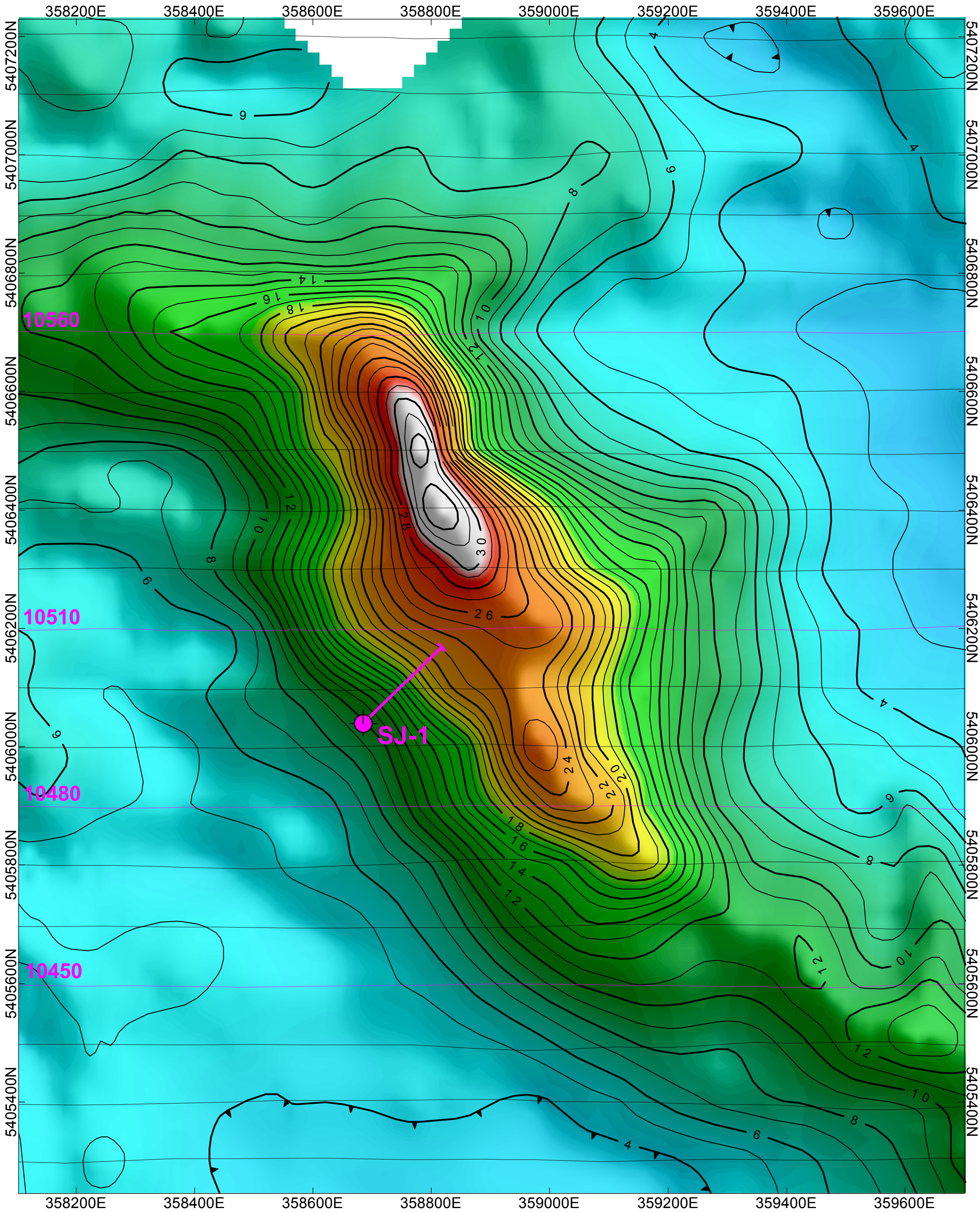


VTEM Survey (Mincor 2008)

Conductivity-Depth Slice

-100m to 0m RL (AHD)

Figure 12



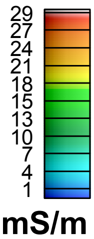
Flightlines shown in pink
correspond to detailed CDI section plots

VTEM Survey (Mincor 2008)

Conductivity-Depth Slice

100m to 200m RL (AHD)

Detail in drillhole SJ-1 area

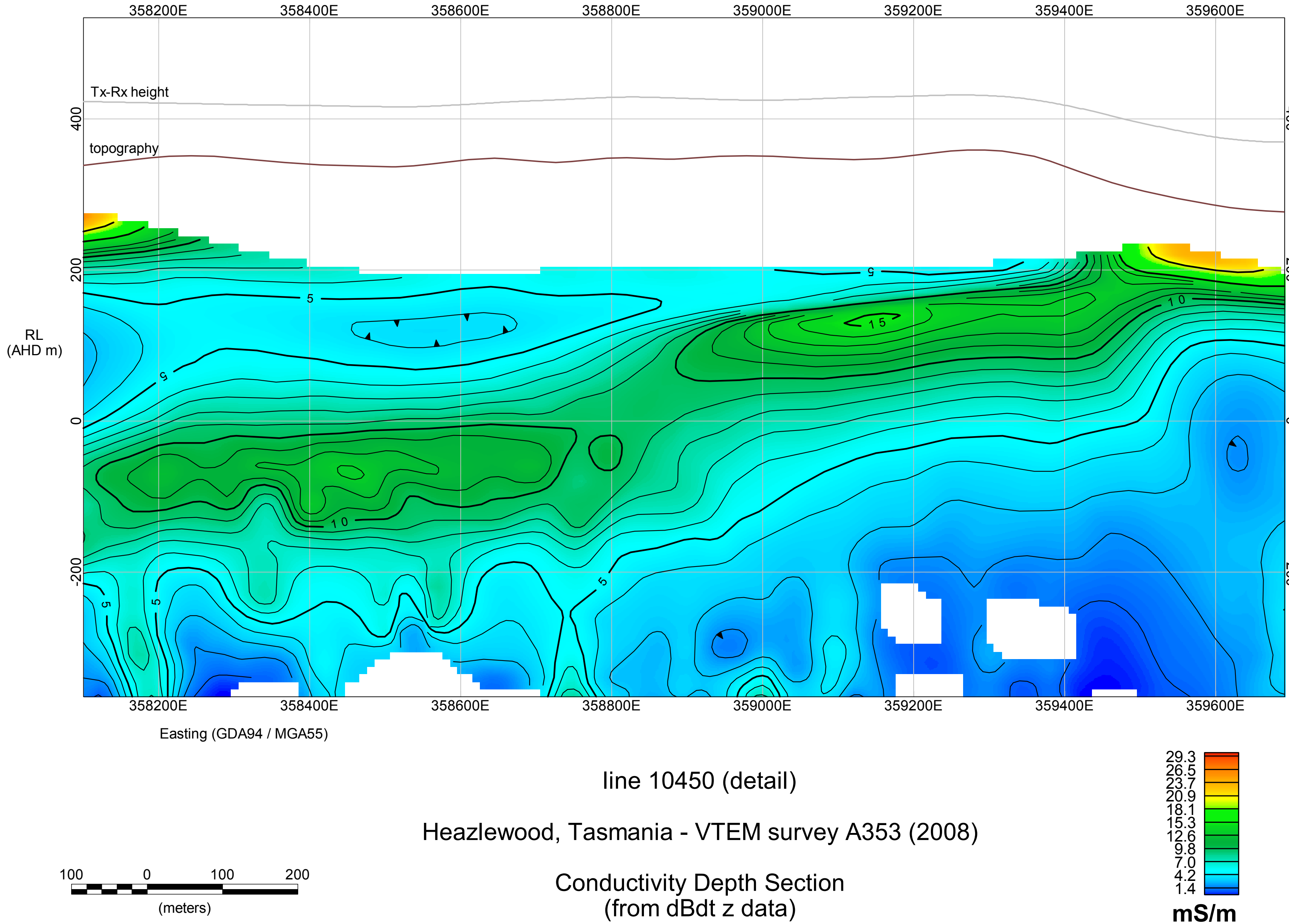


100 0 100 200 300

(meters)

GDA94 / MGA zone 55

Figure 13

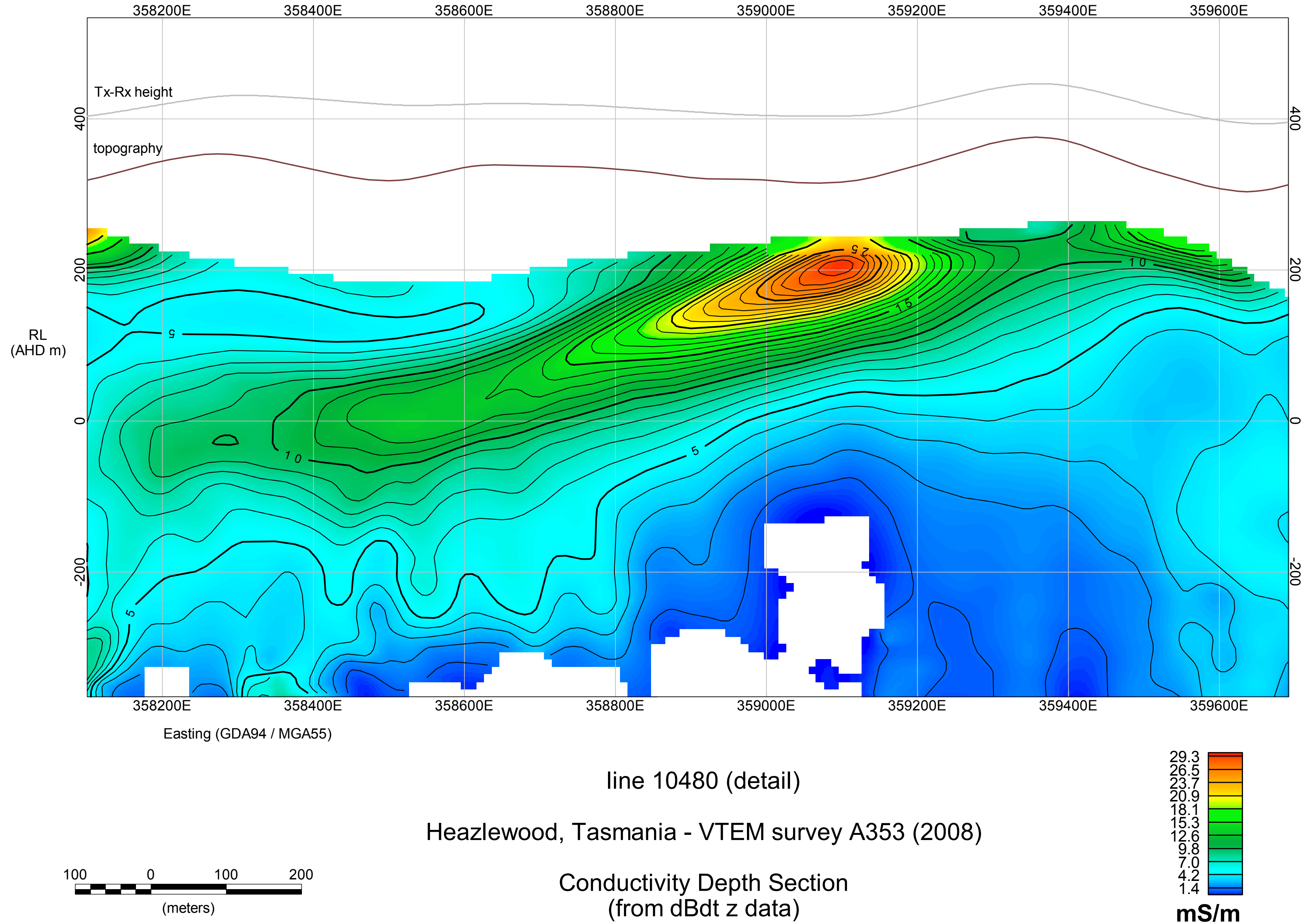


line 10450 (detail)

Heazlewood, Tasmania - VTEM survey A353 (2008)

Conductivity Depth Section
(from dBdt z data)

Figure 14

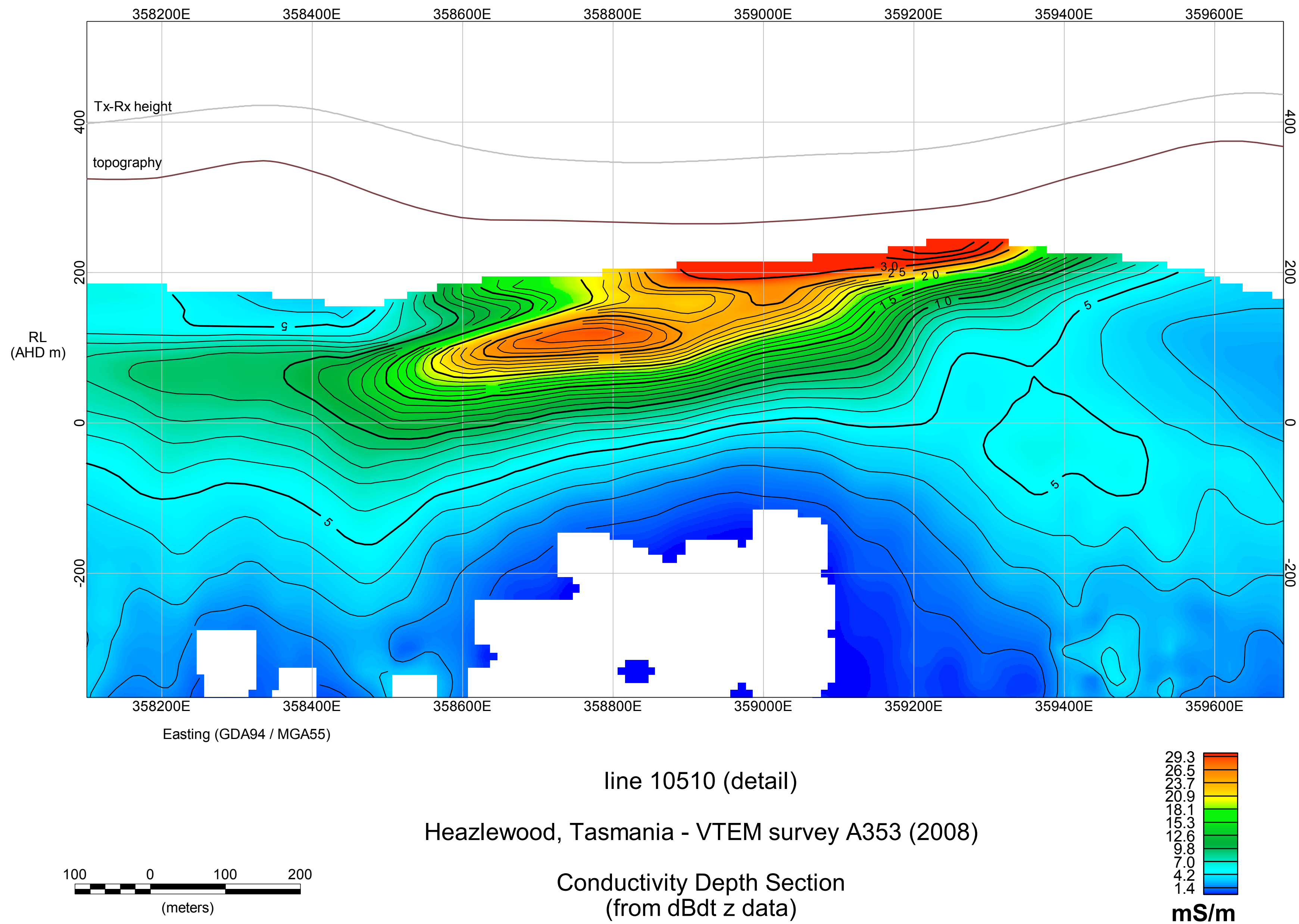


line 10480 (detail)

Heazlewood, Tasmania - VTEM survey A353 (2008)

Conductivity Depth Section
(from dBdt z data)

Figure 15

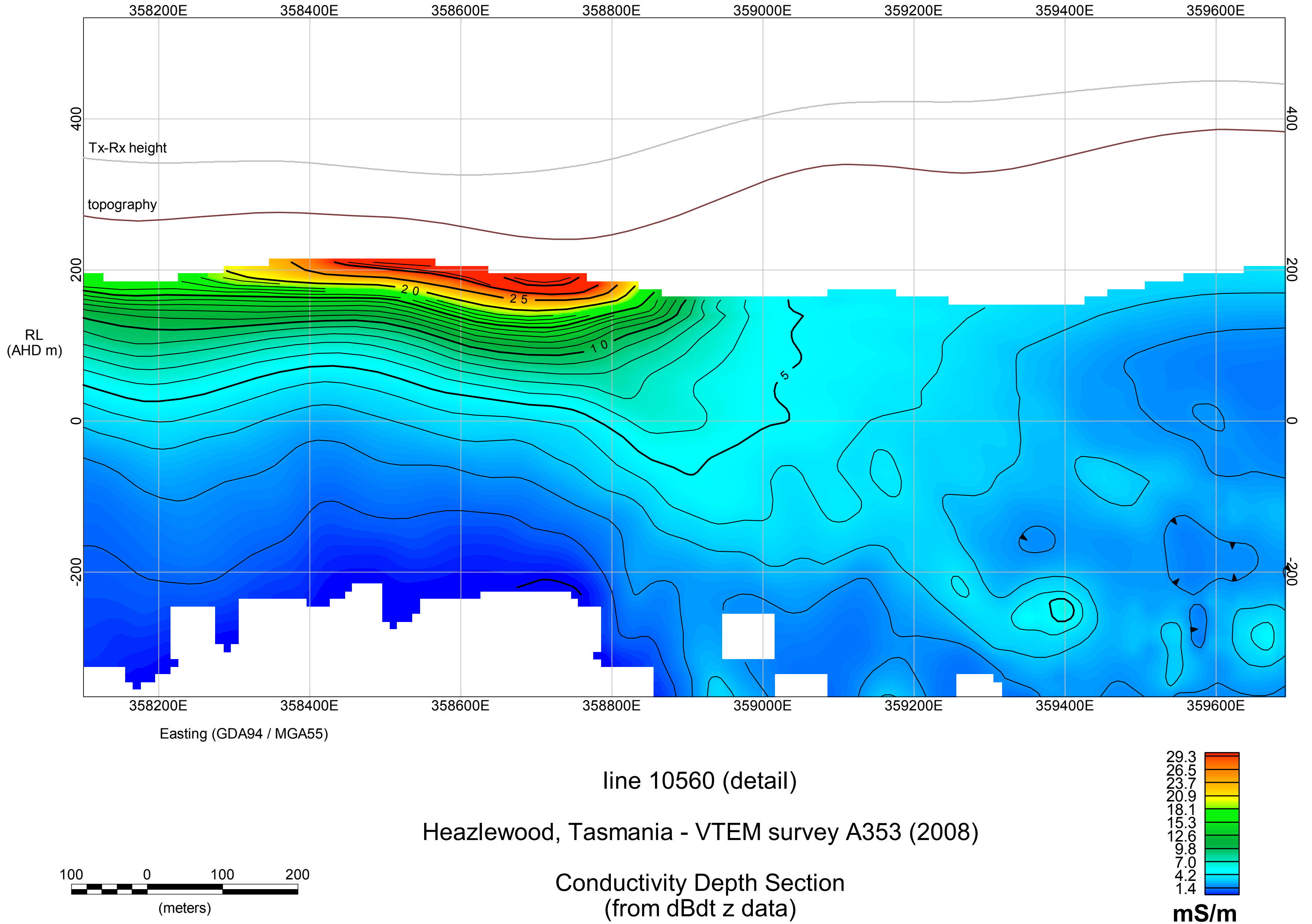


line 10510 (detail)

Heazlewood, Tasmania - VTEM survey A353 (2008)

Conductivity Depth Section
(from dBdt z data)

Figure 16

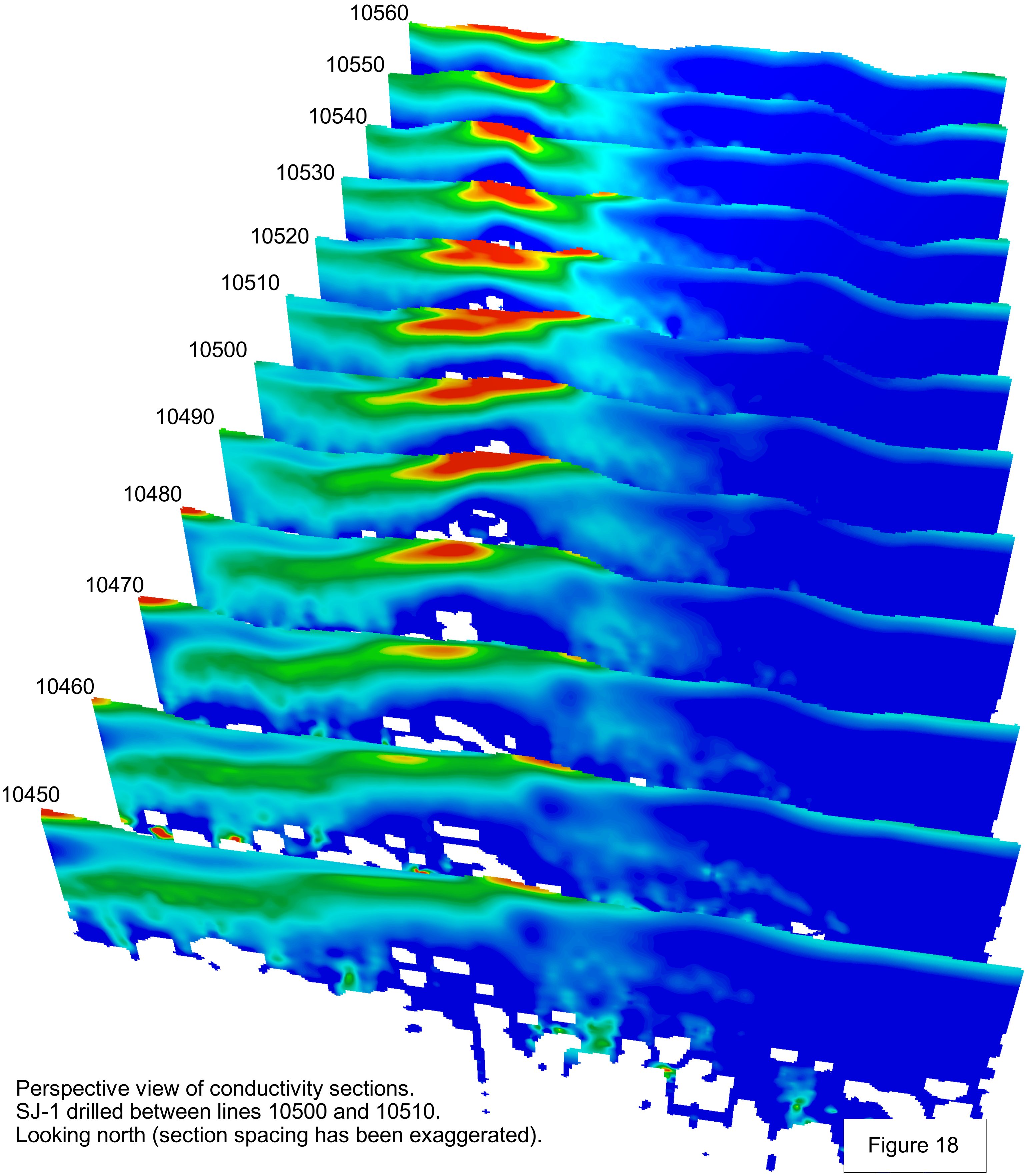


line 10560 (detail)

Heazlewood, Tasmania - VTEM survey A353 (2008)

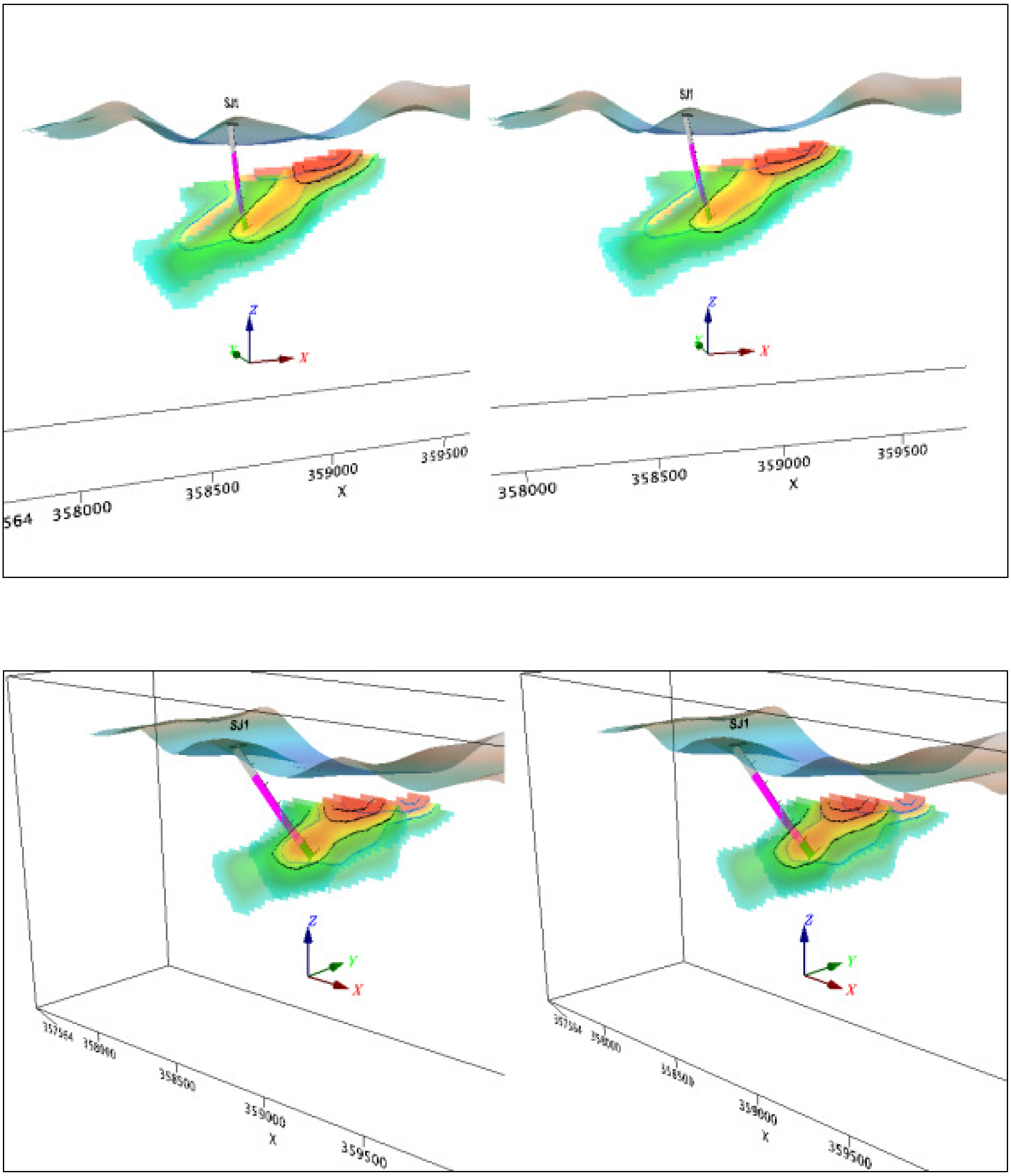
Conductivity Depth Section
(from dBdt z data)

Figure 17



Perspective view of conductivity sections.
SJ-1 drilled between lines 10500 and 10510.
Looking north (section spacing has been exaggerated).

Figure 18

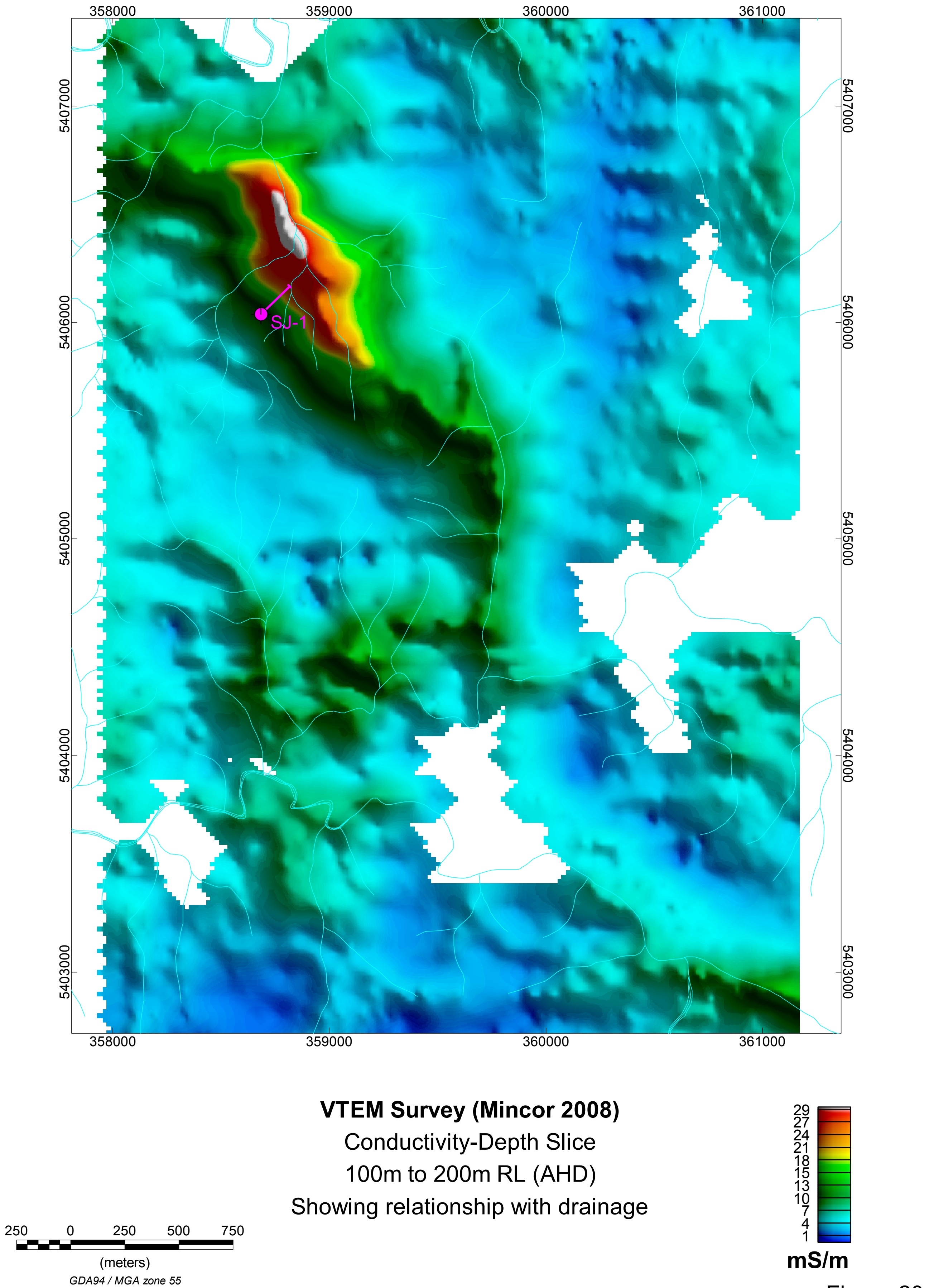


SJ-1 geology (simplified summary);

grey	0 – 68 m	wacke, mudstone, siltstone
pink	68 – 250 m	basalt : altered +/- traces chalcopyrite
green	250 – 290 m	serpentinite

Two stereo pair views of
SJ-1 geology
with adjacent
VTEM conductivity-depth sections
(flight lines 10500 and 10510)

Figure 19



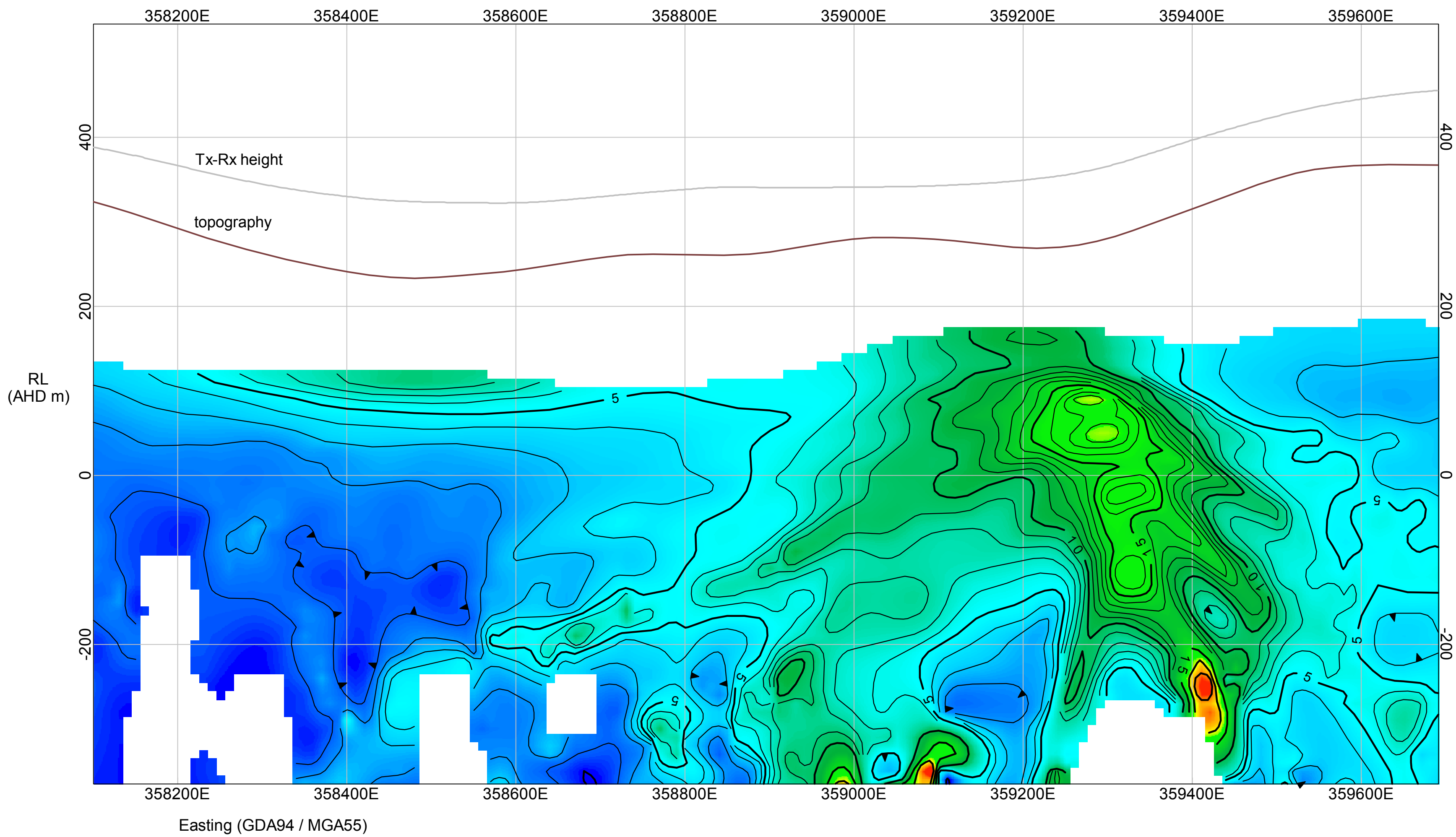
VTEM Survey (Mincor 2008)

Conductivity-Depth Slice

100m to 200m RL (AHD)

Showing relationship with drainage

Figure 20



line 10690 (detail)

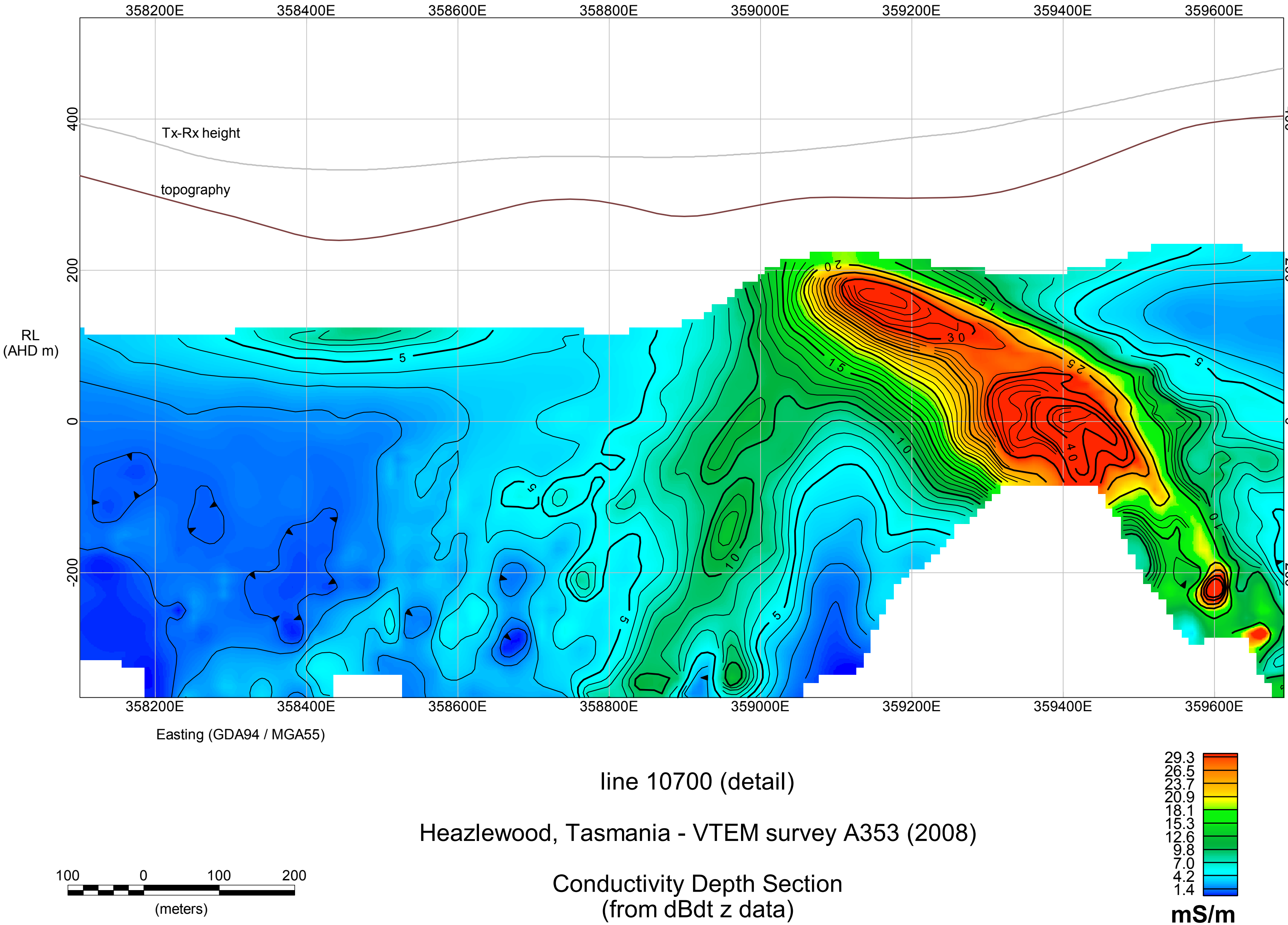
Heazlewood, Tasmania - VTEM survey A353 (2008)

Conductivity Depth Section
(from dBdt z data)

100 0 100 200
(meters)

29.3
26.5
23.7
20.9
18.1
15.3
12.6
9.8
7.0
4.2
1.4
mS/m

Figure 21

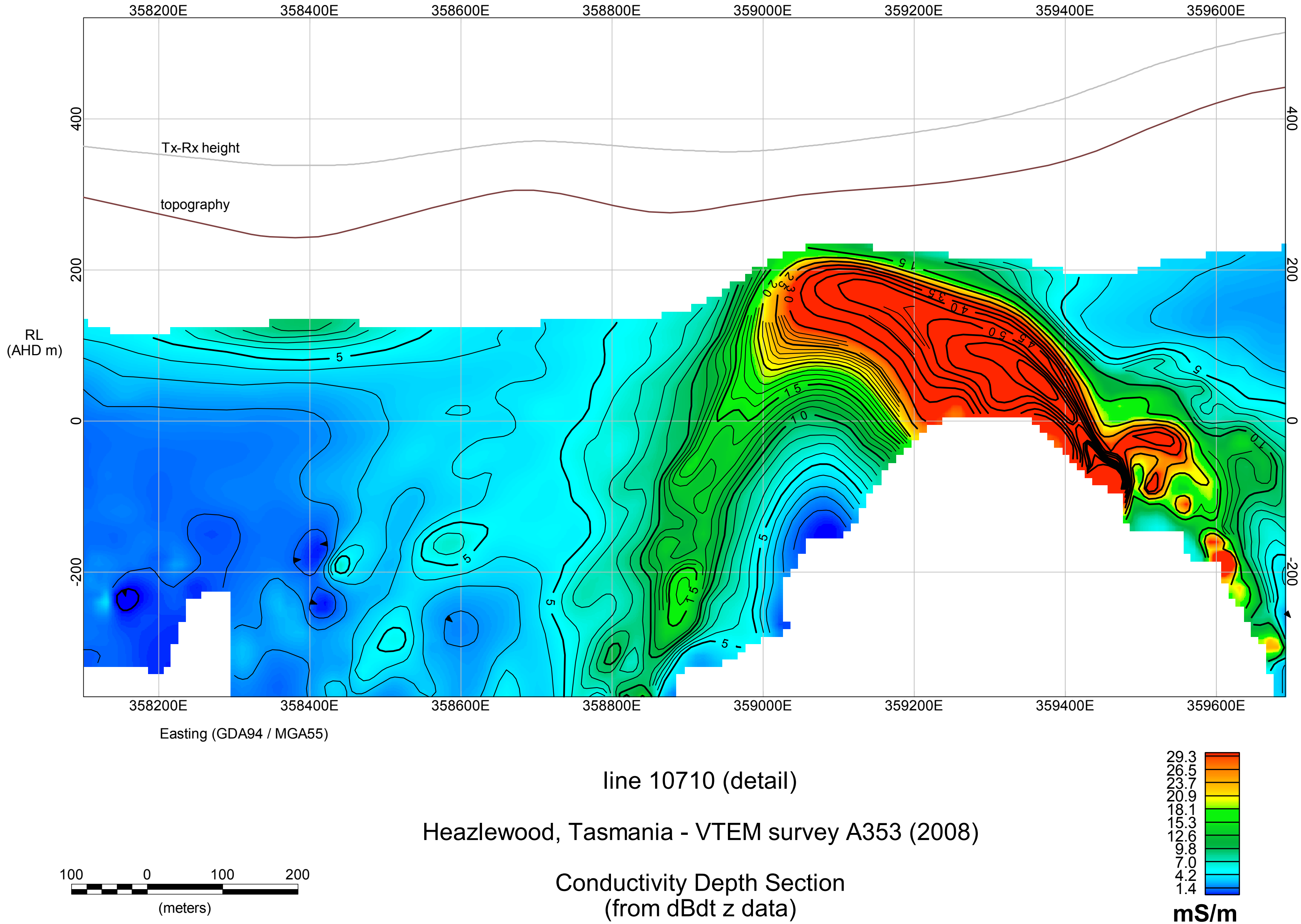


line 10700 (detail)

Heazlewood, Tasmania - VTEM survey A353 (2008)

Conductivity Depth Section
(from dBdt z data)

Figure 22



line 10710 (detail)

Heazlewood, Tasmania - VTEM survey A353 (2008)

Conductivity Depth Section
(from dBdt z data)

Figure 23