



Project Logistics Report

Allegiance Mining

Trial Harbour Project Pole-Dipole IP & Down-hole EM Surveys

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Project No. P22001

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DIGITAL DATA ON DISC

All raw and processed data for all survey methods used.

Distribution: Allegiance Mining

1 Introduction

This report describes the project logistics of a Pole-Dipole Induced Polarisation (PDIP) and a Down-Hole EM (DHEM) survey for Allegiance Mining Pty Ltd, as it was conducted by Fender Geophysics between 1/03/2022 and 16/03/2022.

The Trial Harbour survey area is located approx. 10km west of Zeehan in Tasmania. The survey area lies within an Allegiance Mining EL.

The purpose of the survey was the collection, quality control, and processing/inversion of PDIP and DHEM data to the specifications set out in Fender Geophysics' Job Card 22001.

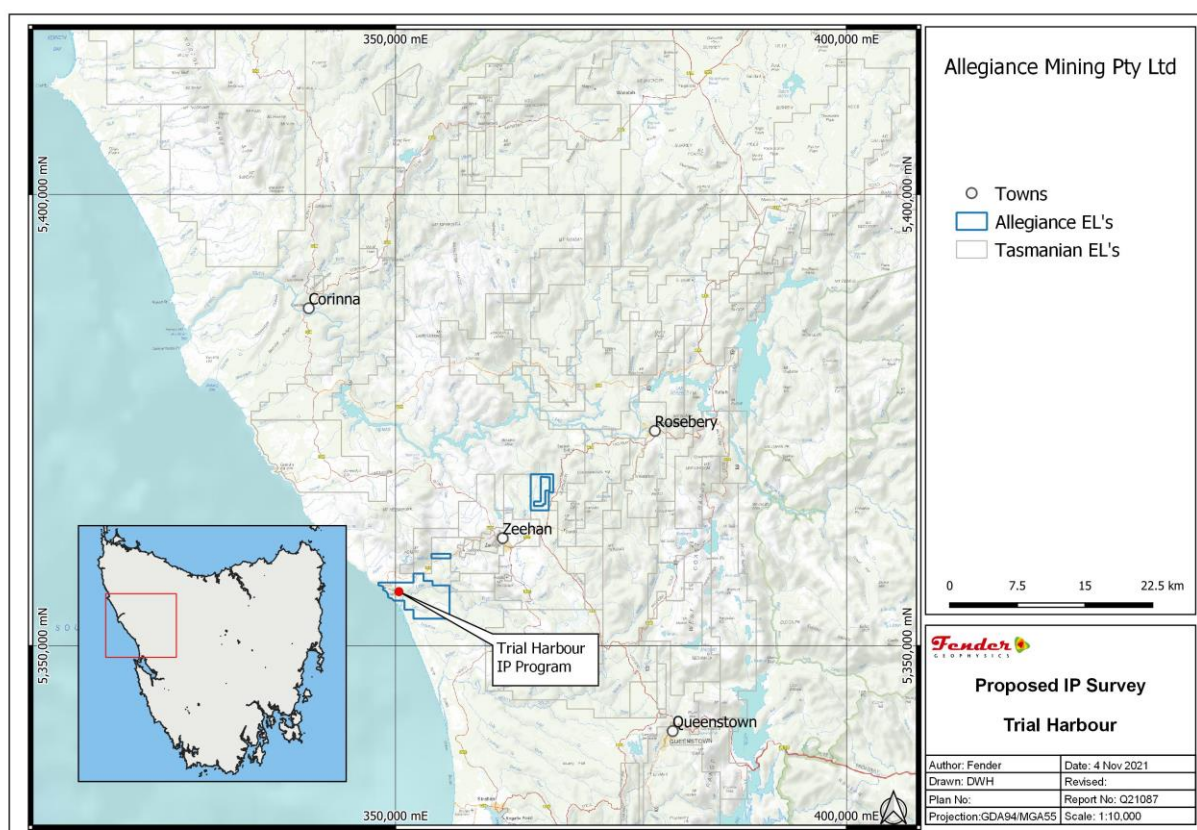


Figure 1: Project location west of Zeehan, Tasmania

2 Survey Area and Setup

The survey area is located approximately 10km west of Zeehan, Tasmania. The PDIP survey comprised a total of 4 roughly SSW-NNE oriented survey lines of 1100m to 1200m length. The DHEM survey comprised 2 surface Tx loops for a single borehole of 278m depth. All electrode locations have been recorded in GDA94, MGA 55.

Conditions on site were difficult with dense bush and hilly terrain. Line access was along several pre-cut tracks (compare Figure 3) along the planned survey lines; the DHEM equipment was transported to the borehole by helicopter.

The DHEM target consists of massive Ni-sulphide (pentlandite-pyrrhotite) mineralization within serpentinised ultramafic host rocks.

Table 1: Survey Specifications - PDIP

Survey Specifications	
Survey Type	Induced Polarisation
Array Type	Pole-dipole
Rx Dipole Length	100m
Tx Dipole Length	100m
Domain and Cycle	Time domain – 2s or 0.125Hz
Number of Lines	4
Line Separation	200m
Line Length	1100m to 12000m
Total Line Length	Approx. 4.6km
Line Bearing	27°
Coordinate System	GDA94, MGA 55

Table 2: Survey Specifications - DHEM

Survey Specifications	
Survey Type	Time Domain EM
Array Type	Down-hole
Tx Surface Loop Dimensions	400m x 400m, 530m x 400m (approximate)
Number of boreholes	1
Frequency	1Hz, lower if appropriate
Stacks	128 to 512
Repeats	1 for good data, 2 or more otherwise
Station Separation	10m, infills to 2m at anomalies
Coordinate System	GDA94, MGA 55

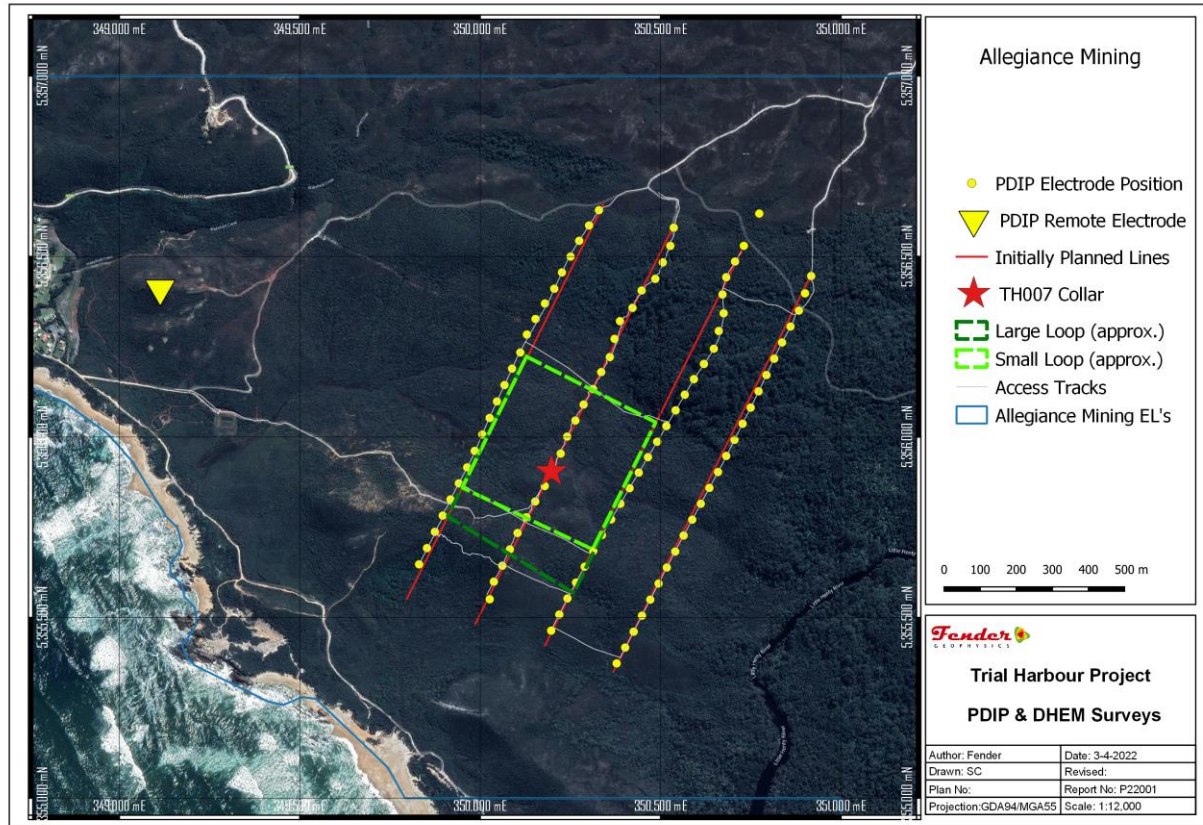


Figure 2: Survey Layout (PDIP and DHEM)

Table 3: PDIP Survey Line Coordinates

Line	Station	Easting	Northing
Remote Electrode		349113.0	5356411.0
L1000	L1000_10100	349830.3	5355647.6
	L1000_11200	350328.8	5356628.4
L1200	L1200_10100	350014.2	5355555.4
	L1200_11200	350526.4	5356529.5
L1400	L1400_10100	350196.3	5355464.1
	L1400_11300	350730.2	5356529.6
L1600	L1600_10100	350377.8	5355373.3
	L1600_11300	350916.7	5356446.0
Coordinate Reference System			GDA94, MGA 55

Table 4: DHEM Drillhole Information

Drillhole ID	Collar E	Collar N	Depth
TH007	350197	5355905	278.4m
Coordinate Reference System			MGA94, Zone 55

Table 5: DHEM Loop Corner Coordinates

Loop / Corner	X	Y
Small Loop	350128	5356223
	350486	5356041
	350311	5355689
	349950	5355860
Large Loop	350128	5356223
	350486	5356041
	350259	5355568
	349909	5355780
Coordinate Reference System		MGA94, Zone 55



Figure 3: Pre-cut Walking Track (Image courtesy of Allegiance Mining).

3 Survey Personnel

Table 6: Project Personnel

Client Representative	Josh Denholm
Client Representative (Consultant)	Nick Direen (Mitre Geophysics)
Client Representative (Consultant)	John Bishop (Mitre Geophysics)
Director/Geophysicist	Andrew Slood
Operations Manager	Doug Hall
Survey Manager/Geophysicist	JD Nicolas
Field Technician	Michael Smeja
Field Technician	Scott Bradshaw
Geologist	Henry Benn

4 Survey Equipment

4.1 PDIP Survey

Table 7: PDIP Survey Equipment - Hardware

Item	Model
Receiver	Instrumentation GDD Rx-32 16-Channel
Transmitter	Instrumentation GDD Tx 4 5kVA
Generator	Kubota Generator
Receiver Electrode Pots	Non-polarising porous pots
Transmitter Electrode Plates	120mm x 800mm x 5mm aluminum plate
Rx Cables	Multi-core data cable
Tx Wire	2.5mm single-core wire
UHF Radios	5W handheld radios
Handheld GPS Units	Garmin 64s – 3m accuracy
Vehicles	Mine-spec Toyota Hilux

Instrumentation GDD Rx32 16-channel IP Receiver

Voltage Measurement:	Resolution 1 μ V, Accuracy $\leq$ 0,15%
Chargeability measurement:	Resolution 1 μ V/V, Accuracy $\leq$ 0.4%
Adjustment:	Automatic sync, SP compensation, gain setting and stacking
ADCs:	24-bit
Primary Voltage:	$\pm$ 10 μ to $\pm$ 15V for any channel
Operating Temperature:	-40° C to +60° C
Full waveform acquisition:	Yes – QC with GDD Full Waveform post-processing software

Instrumentation GDD Tx 4 5kVA Transmitter

Output current:	0.03A to 10A
Output voltage:	150V to 2400V / 14 voltage scales
Power source:	Standard 220-240V / 50-60Hz
Master-Slave-Configuration:	Ability to link 2 GDD IP Transmitters to double power (10kVA)

Table 8: PDIP Survey Equipment - Software

Software	Developer	Use
TQIPdb	Scientific Computing Applications	QC of raw data and conversion to Geosoft format
WinDisp	Scientific Computing Applications	Plotting of resistivity and chargeability pseudosections
IP Post-Processing Software	Instrumentation GDD	Inspection of full waveform data

4.2 DHEM Survey

Table 9: DHEM Survey Equipment - Hardware

Item	Model
Receiver	DigiAtlantis DHEM Probe
Transmitter	Modified Zonge ZT30
Generator	22kVA Genset plus Teco DC Power Supply
Down-hole probe	DigiAtlantis tri-axial fluxgate EM DH probe
Transmitter Electrodes	Surface loops
UHF Radios	5W handheld radios
Handheld GPS Units	Garmin 64s – 3m accuracy
Vehicles	Mine-spec Toyota Hilux

DigiAtlantis EM down-hole probe

Sensor:	Tri-axial fluxgate magnetometer
Max. signal level:	± 70,000nT
Noise level:	approx. 3pT on late time window
ADCs:	24-bit delta-sigma
Bandwidth:	DC to 4kHz
Depth rating:	2000m vertical depth

Zonge ZT30 (modified) 120A Transmitter

Output current:	up to 120A
Loop input voltage:	up to 400V
Duty cycle:	50% or 100%
Turnoff – resistive load:	1 μ s
Turnoff – 100m loop:	< 150 μ s at 20A

Table 10: DHEM Survey Equipment - Software

Software	Developer	Use
TQIPdb	Scientific Computing Applications	QC of raw data and conversion to Geosoft format
WinDisp	Scientific Computing Applications	Plotting of resistivity and chargeability pseudosections
IP Post-Processing Software	DigiAtlantis Receiver Software	Inspection of full waveform data

5 Survey Procedure and Quality Control

This survey has been conducted under consistent application of the relevant health and safety legislation. For details refer to the Survey Safety Plan, the induction records and safety meeting minutes.

Prior to entering the field, waypoints were generated for transmitter (incl. remote) and receiver electrode locations and also for the corner points of the surface Tx loops for the DHEM survey. These waypoints were imported into handheld GPS units for the field crew to easily locate all required positions.

5.1 PDIP Survey

The receiver electrodes (non-polarising porous pot electrodes with a copper sulphate solution) were connected to the receiver via a specialized receiver cable.

The transmitting electrodes (aluminium plates) were connected to the transmitter via a single core multi strand flex transmission wire. Heavy-duty alligator clips on the plates ensured a consistent and safe contact. An isolation box installed near the transmitter disconnected the electrodes when not transmitting. Before energising the transmitter cables and electrodes, the operator communicated and checked with all crew and visitors in the field.

PDIP field data was acquired by a geophysicist with the following verification processes in place:

- Manual recording of station location, current output, primary voltage, resistivity and chargeability
- Between 2 and 35-fold stacking for each reading, with visual inspection of individual decay stacks
- Minimum of 3 readings per station, thus verifying repeatability of the recorded values

Data and any cultural features were recorded in the operator's field notes for review in conjunction with later quality control.



Figure 4: Remote electrode above Trial Harbour

5.2 DHEM Survey

Before lowering the DHEM probe into the borehole, a dummy tool was used to confirm the absence of any obstruction down-hole. The survey cable was then lowered into the borehole. Readings were taken at 10m intervals, shortened to 5m inside anomalous zones.

During data acquisition the following verification processes were in place:

- Manual recording of station depth and electric parameters
- Minimum 128-fold stacking for each reading
- Minimum of 1 readings per station, with 1 or more repeats for poorer quality data

Data was downloaded from the receivers at the end of each day. It then got uploaded to secure Cloud storage. Further QA and processing of the data were completed off-site by a second geophysicist. The raw IP data was assessed in TQIPdb for individual decay curves for each reading as well as for overall data quality. The data was then exported in Geosoft ASCII format and loaded into Windisp for presentation as a raw data pseudosection.

On completion of the field work all electrodes and cables were removed and all electrode sites returned to their pre-survey state. All field supplies were removed from the survey site.

6 Changes to Survey Specifications

The following changes were made to the initially planned survey:

- The PDIP electrode positions were moved away from the planned survey lines onto the cut tracks for access (compare Figure 2).

All changes were made in consultation with the client and the consultant.

7 Production Summary

The surveys were conducted between 1/03/2022 and 16/03/2022; with the DHEM survey undertaken between 10/03/2022 and 13/03/2022. A total of 46 PDIP stations were recorded at an average of 3.1 stations per production day.

Accommodation for the field crew was at the Avebury Mine Camp in Zeehan.

For full production details see Appendix 2.

8 Deliverables

The daily project deliverables were:

- Updated progress map (PDIP only)
- IP and resistivity pseudosections (PDIP only);
- RAW dumped receiver data files;
- Exported data in GSF ASCII file format; and
- Field notes.

On project completion the deliverables were:

- Logistics report (digital and hard copy, this document);
- All data raw and processed;
- TQIPdb Database (PDIP only); and
- Waypoint files with elevations.

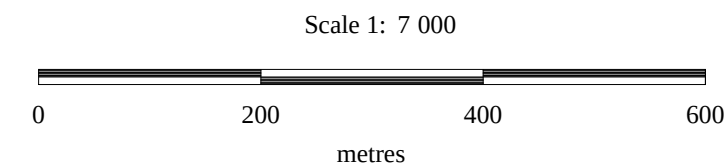
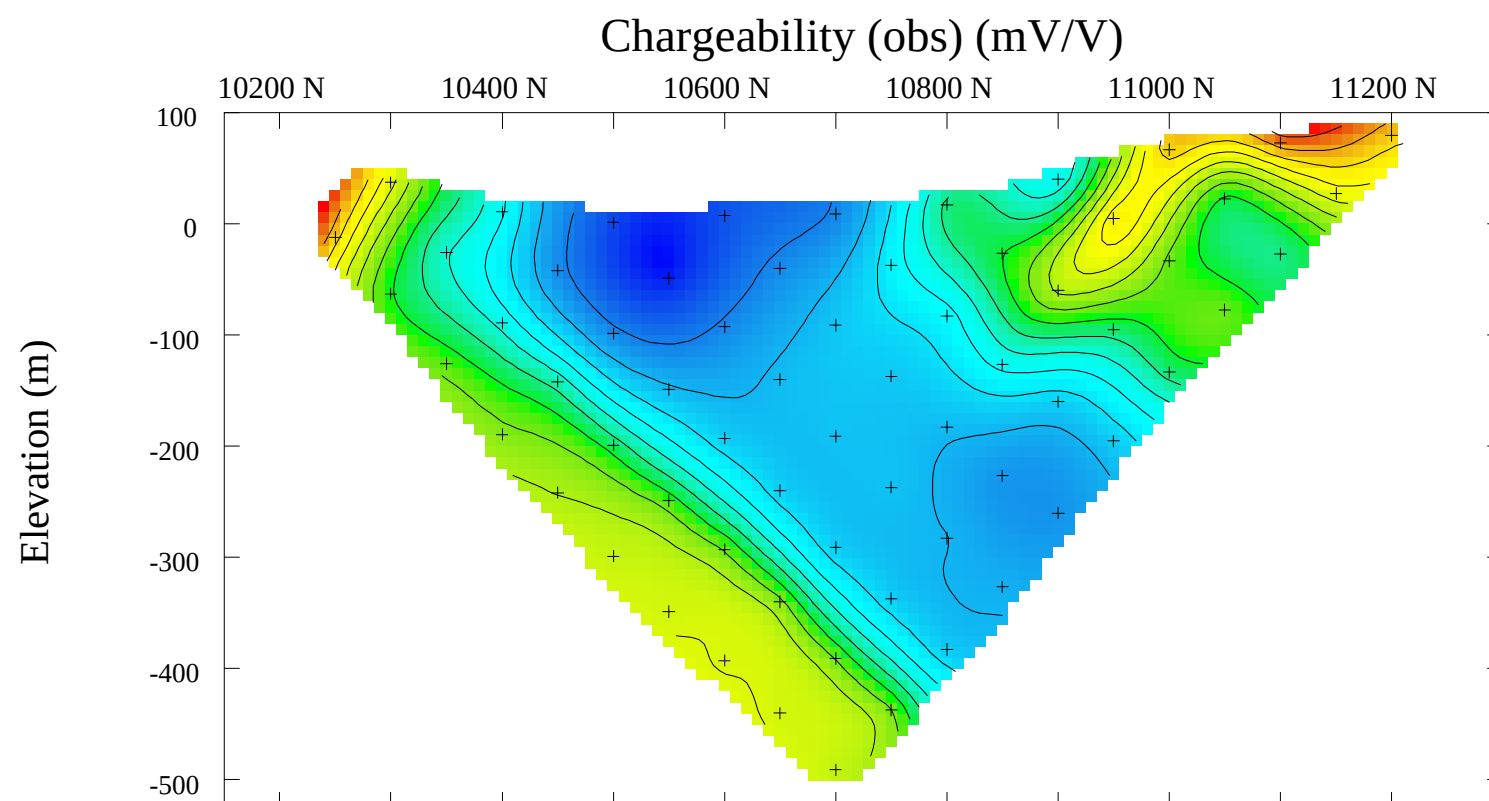
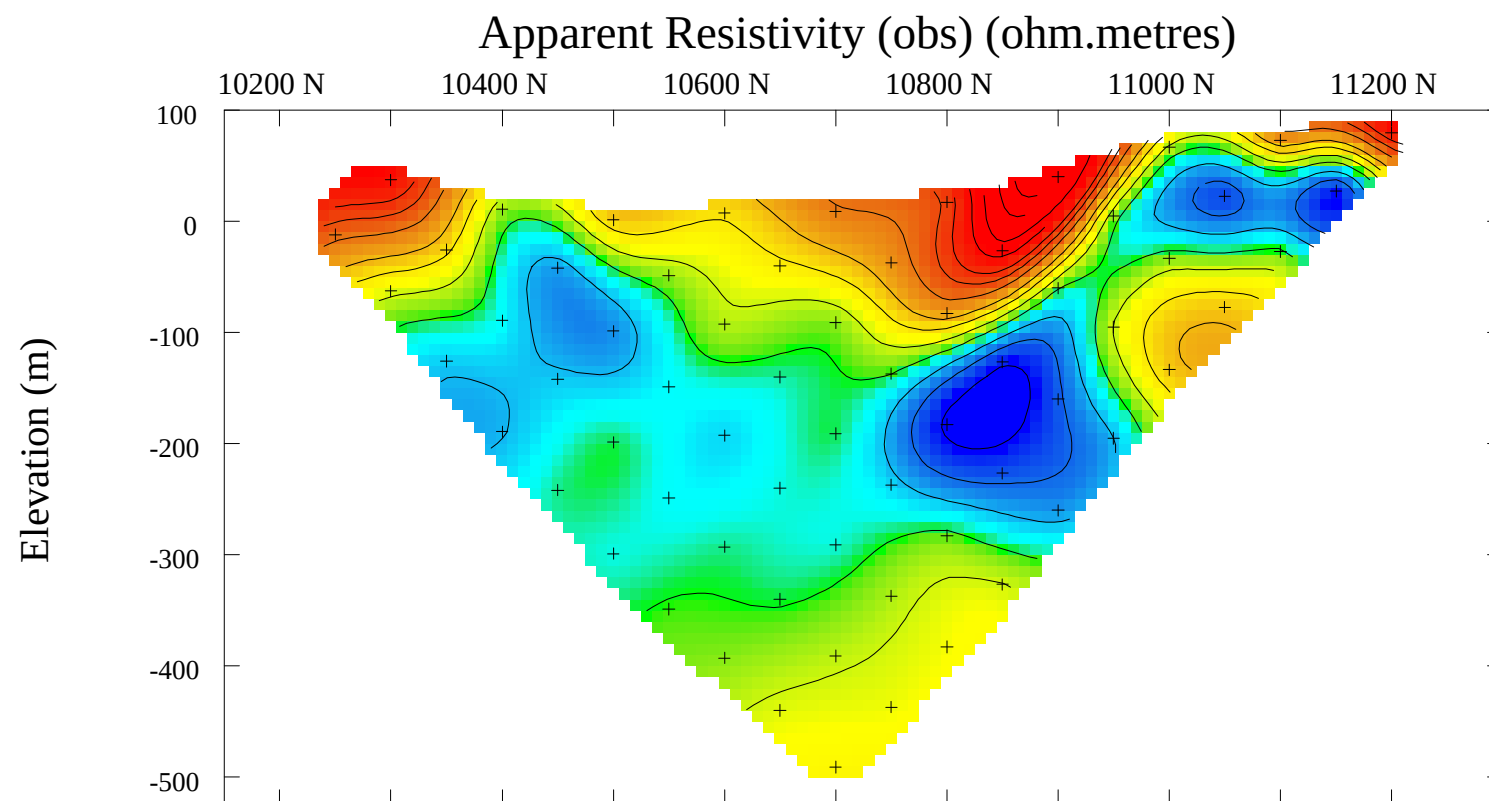
9 Data Review & Conclusions

Data quality was generally good throughout both the PDIP and DHEM surveys

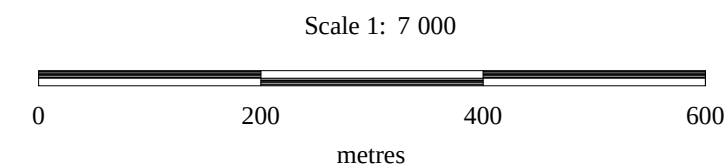
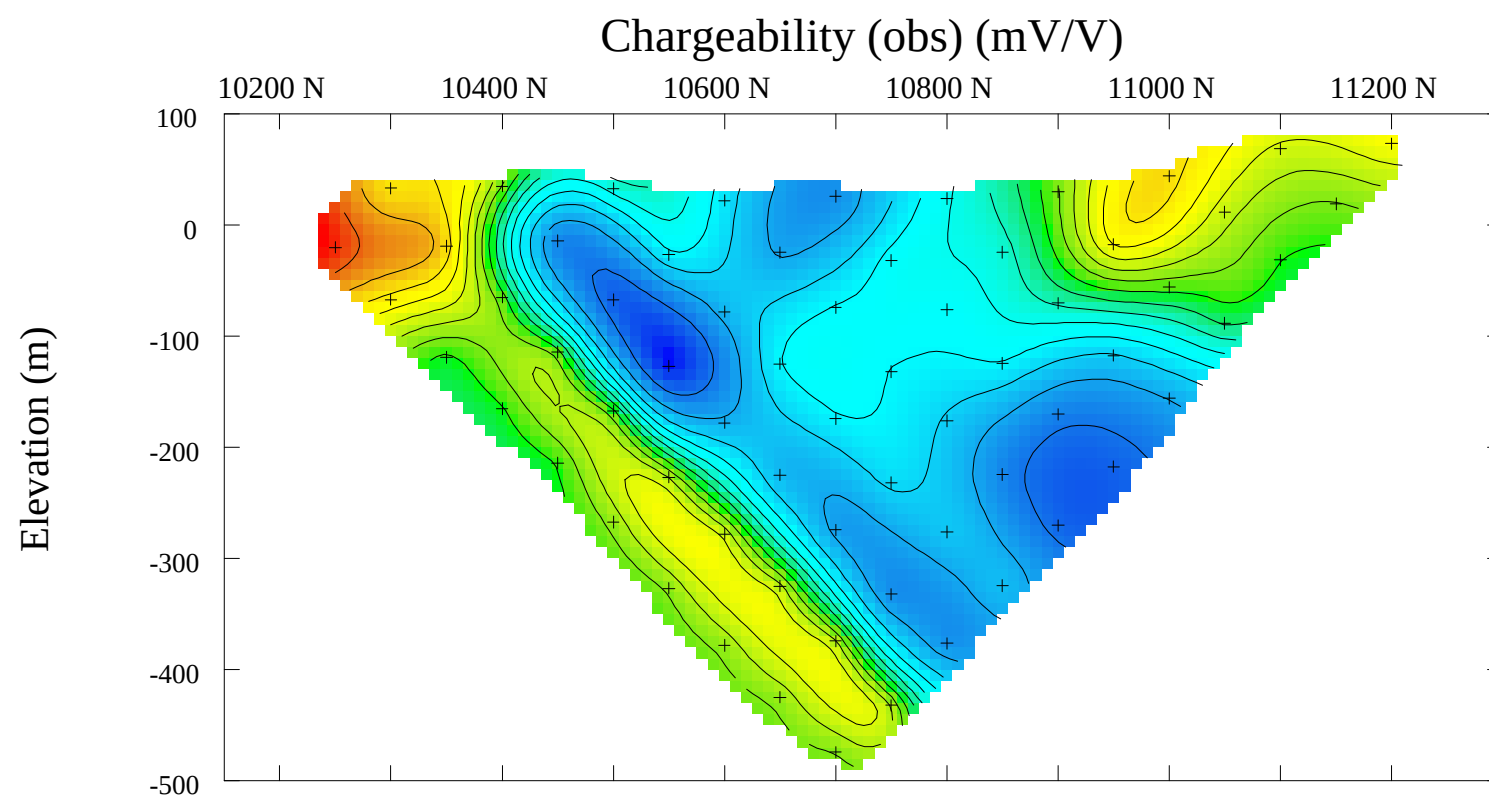
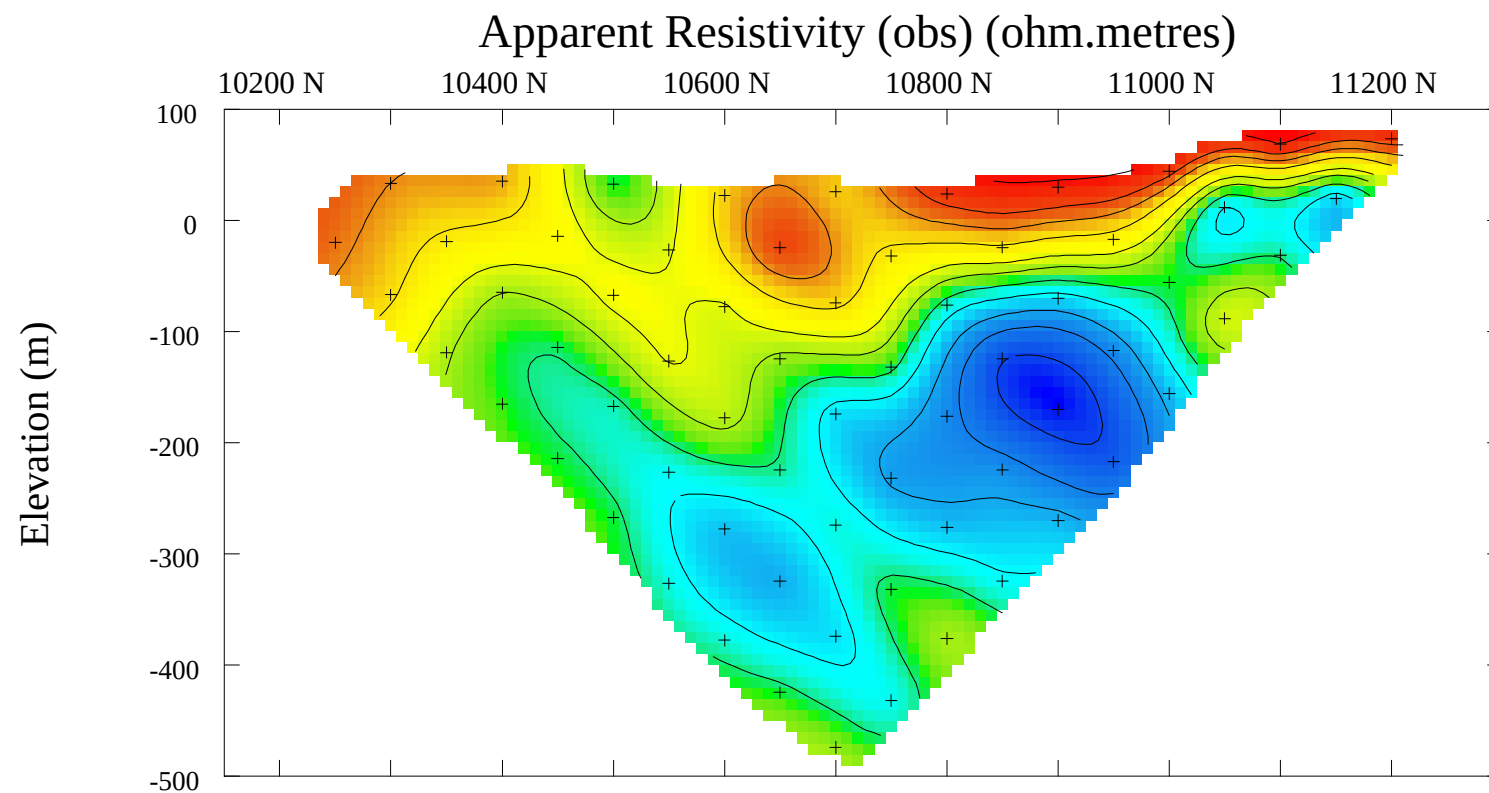
Table 11: PDIP Survey Data Range Summary

Current Range	0.8 A – 8.5 A
Maximum n separation	n = 12
Resistivity Range	7.5 Ωm – 2664 Ωm
Chargeability Window	590 ms – 1540 ms
Background Chargeability	2.2 mV/V – 29.9 mV/V
Anomalous Chargeability	30.0 mV/V – 43.7 mV/V

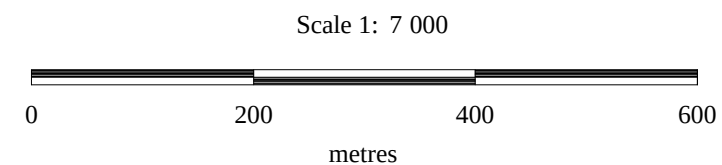
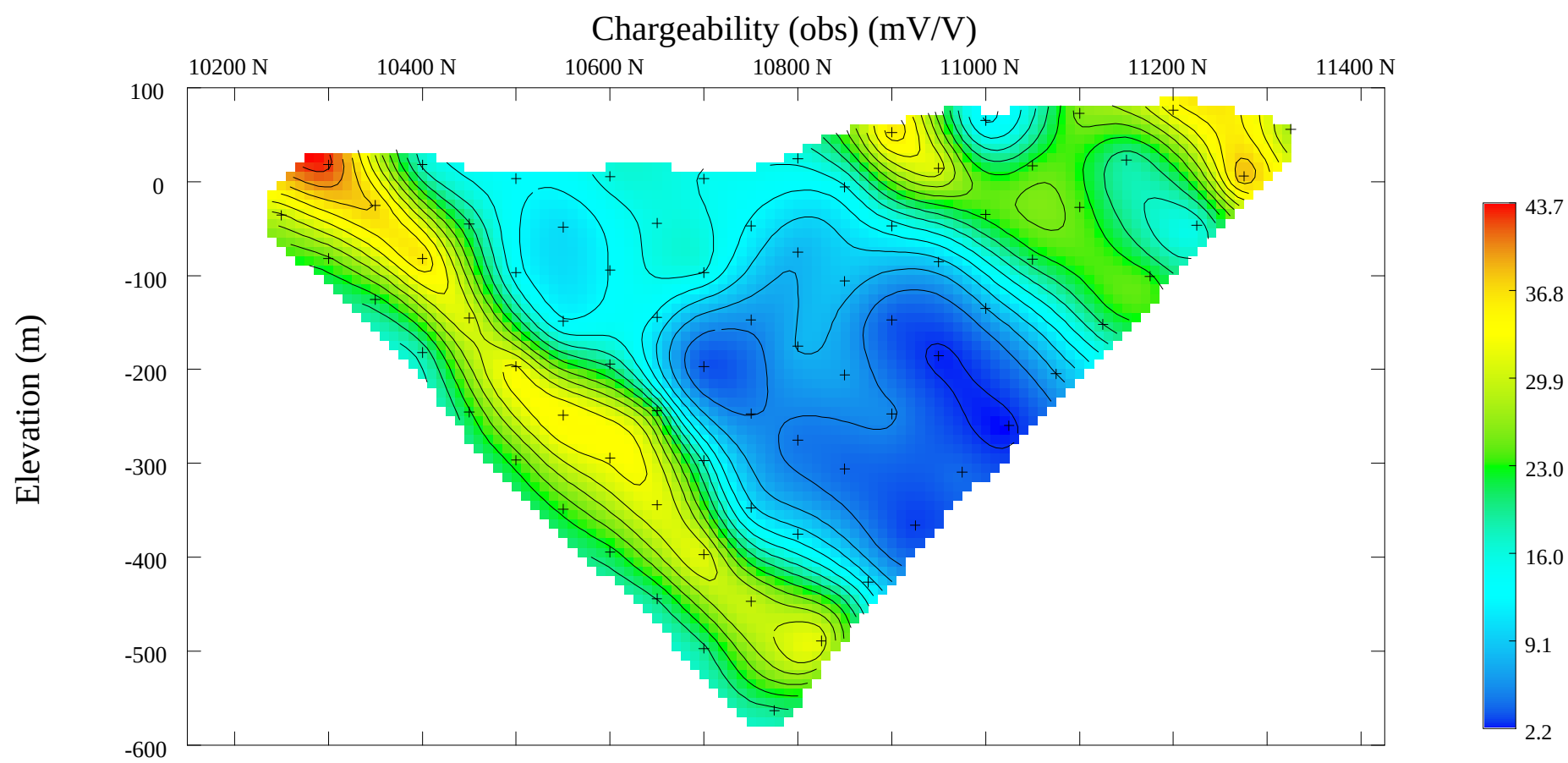
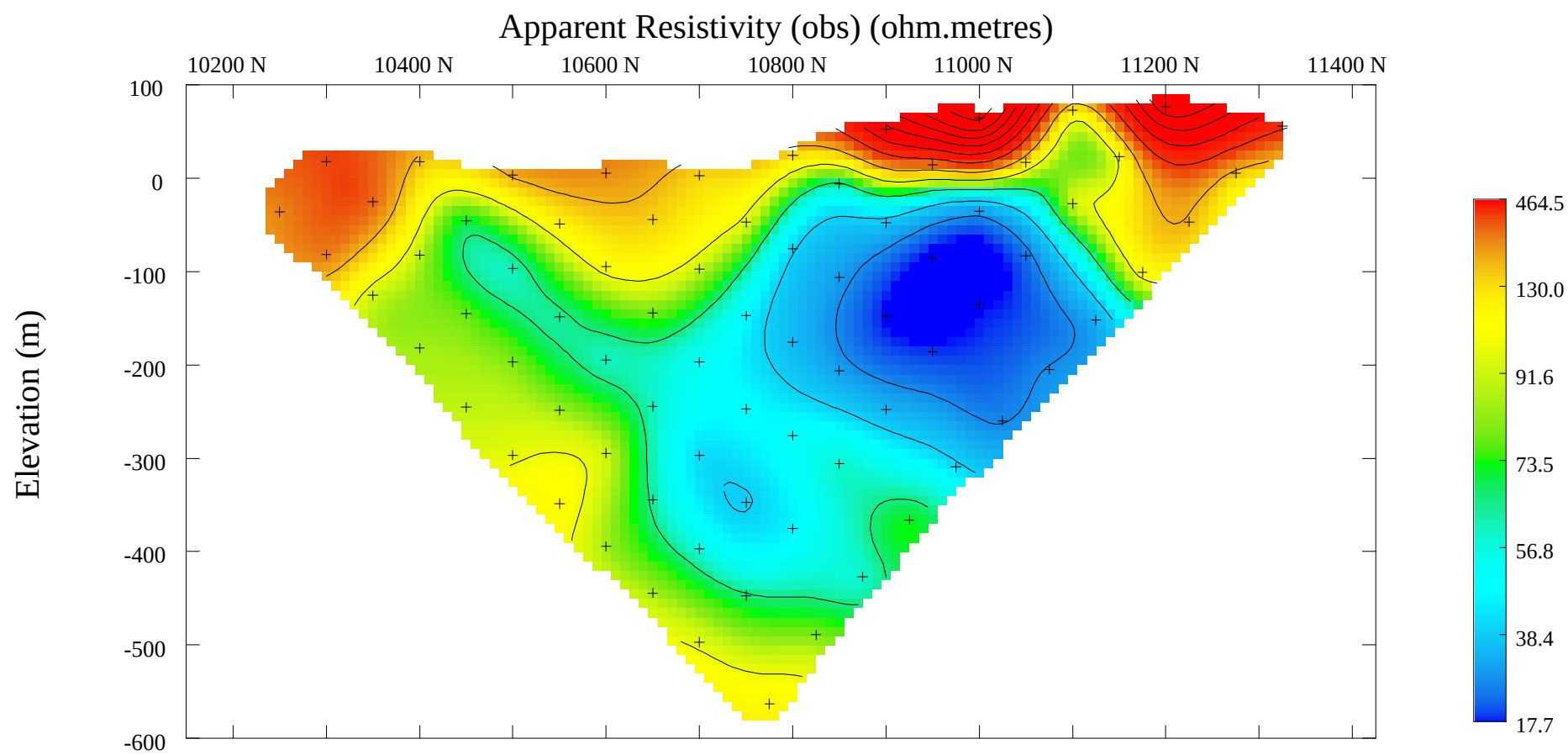
Appendix 1 - Verification Plots



Fender Geophysics	
Line 1000E	
Dundas Minerals Trial Harbour Project	
Induced Polarisation and Resistivity Pseudosection Pole-Dipole a - 100m n - 11	
Author : Fender	Ref : P22001
Drawn : JD Nicolas	
Date : 7-Mar-2022	Report No :
Scale 1: 7 000	Plan No :



Fender Geophysics	
Line 1200E	
Dundas Minerals Trial Harbour Project	
Induced Polarisation and Resistivity Pseudosection Pole-Dipole a - 100m n - 11	
Author : Fender	Ref : P22001
Drawn : JD Nicolas	
Date : 7-Mar-2022	Report No :
Scale 1: 7 000	Plan No :



Fender Geophysics

Line 1400E

Dundas Minerals
Trial Harbour Project

Induced Polarisation and Resistivity
Psuedosection
Pole-Dipole a - 100m n - 12

Author : Fender

Ref : P22001

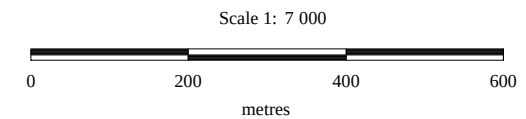
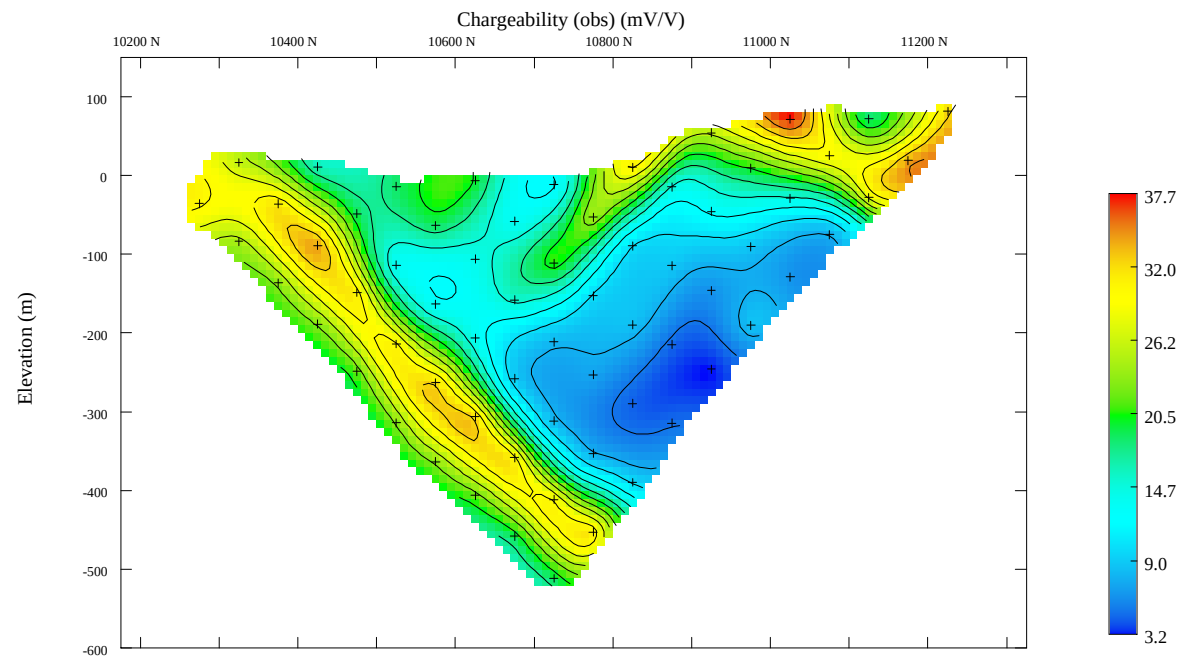
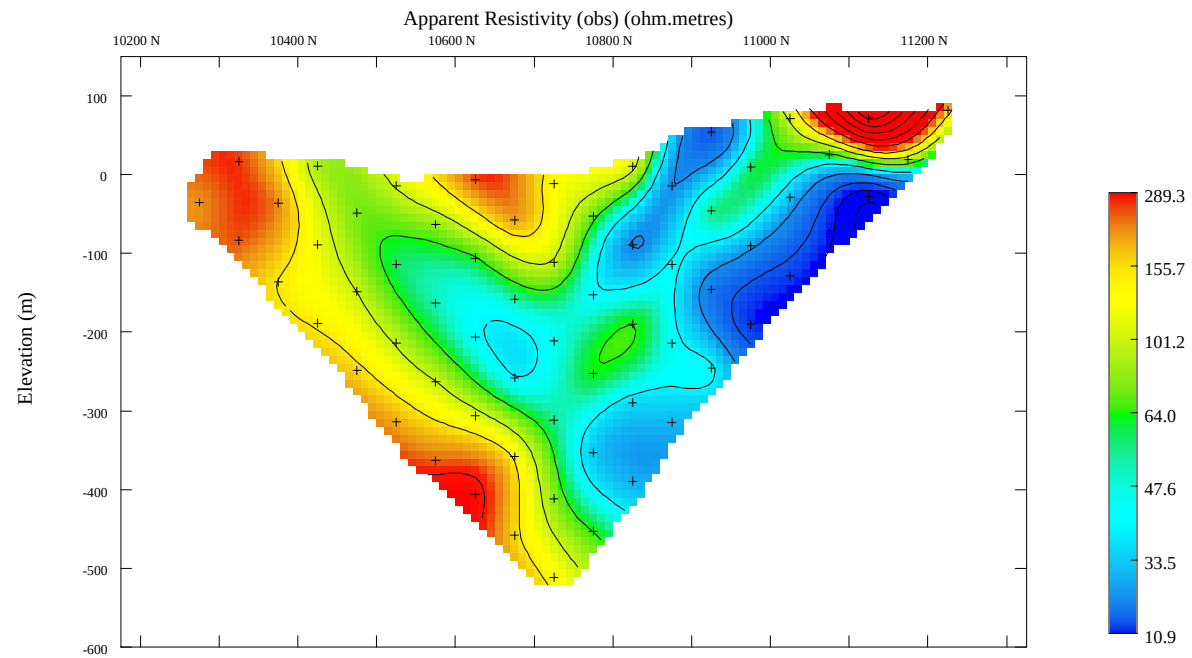
Drawn : JD Nicolas

Date : 9-Mar-2022

Report No :

Scale 1: 7 000

Plan No :



Fender Geophysics	
Line 1400E	
Dundas Minerals Trial Harbour Project	
Induced Polarisation and Resistivity Psuedosection Pole-Dipole a - 100m n - 12	
Author : Fender	Ref : P22001
Drawn : JD Nicolas	
Date : 16-Mar-2022	Report No :
Scale 1: 7 000	Plan No :

Appendix 2 - Production Reports

Weekly Production Report - Week: 1						
	Project Number	P22001	Method	Induced Polarisation		
	Client	Allegiance Mining	Array/Type	Pole-Dip		
	Project	Trial Harbour	Spacing	100		
			Survey Manager	Jean-Daniel Nicolas		
Monday, 28 February 2022	Line No	Start	End	No of Stations	Work Hours	
					Prod	
					Standby	
					Down	
				Total 0	Mobe	
Tuesday, 1 March 2022	Line No	Start	End	No of Stations	Work Hours	
Crew mobe Sydney to Launceston. Pick up hire cars, generator and complete shopping and drive to Zeehan.					Prod	
					Standby	
					Down	
				Total 0	Mobe	10
Wednesday, 2 March 2022	Line No	Start	End	No of Stations	Work Hours	
Complete inductions at Avebury mine and do site recon with client. Complete recon of potential remote locations. Remote confirmed by client at position 348113E, 5356411N.					Prod	10
					Standby	
					Down	
				Total 0	Mobe	
Thursday, 3 March 2022	Line No	Start	End	No of Stations	Work Hours	
Set up remote electrodes and wires and set up line 1000E.					Prod	10
					Standby	
					Down	
				Total 0	Mobe	
Friday, 4 March 2022	Line No	Start	End	No of Stations	Work Hours	
Cart some water out to line. Commence reading line 1000E using staticRx array. Some negative coupling Moving to roll-along method tomorrow.	1000	10050	10450	5	Prod	10
					Standby	
					Down	
				Total 5	Mobe	
Saturday, 5 March 2022	Line No	Start	End	No of Stations	Work Hours	
Completed reading line 1000E, using roll-along method. 10 stations read.	1000E	10350	11250	10	Prod	10
					Standby	
					Down	
				Total 10	Mobe	
Sunday, 6 March 2022	Line No	Start	End	No of Stations	Work Hours	
Set up line 1200E and flag and dig tx plate holes for line 1400E.					Prod	10
					Standby	
					Down	
				Total 0	Mobe	

Weekly Production Summary

Work Hours		Production Rate	
Prod	50	Total No of Stations	15
Standby	0	Production Days	5
Down	0	No of Stations Per Day	3
Mobe	10		

Weekly Production Report - Week: 2						
	Project Number	P22001	Method	Induced Polarisation		
	Client	Allegiance Mining	Array/Type	Pole-Dip		
	Project	Trial Harbour	Spacing	100		
			Survey Manager	Jean-Daniel Nicolas		
Monday, 7 March 2022	Line No	Start	End	No of Stations	Work Hours	
Read line 1200E, 10 stations read.	1200	10350	11250	10	Prod	10
					Standby	
					Down	
				Total 10	Mobe	
Tuesday, 8 March 2022	Line No	Start	End	No of Stations	Work Hours	
Packed up line 1200E and set up line 1400E.					Prod	10
					Standby	
					Down	
				Total 0	Mobe	
Wednesday, 9 March 2022	Line No	Start	End	No of Stations	Work Hours	
Complete reading line 1400E, 11 stations read. Tx station 11350N was not cut (inaccessable) and was moved 50m up the line to local 11400N.	1400	10350	11400	11	Prod	10
					Standby	
					Down	
				Total 11	Mobe	
Thursday, 10 March 2022	Line No	Start	End	No of Stations	Work Hours	
Refer separate DHEM Production Report					Prod	
					Standby	
					Down	
				Total 0	Mobe	
Friday, 11 March 2022	Line No	Start	End	No of Stations	Work Hours	
Refer separate DHEM Production Report				1	Prod	
					Standby	
					Down	
				Total 1	Mobe	
Saturday, 12 March 2022	Line No	Start	End	No of Stations	Work Hours	
Refer separate DHEM Production Report					Prod	
					Standby	
					Down	
				Total 0	Mobe	
Sunday, 13 March 2022	Line No	Start	End	No of Stations	Work Hours	
Commence layout of Line 1600E after completing DHEM equipment pickup					Prod	5
					Standby	
					Down	
				Total 0	Mobe	

Weekly Production Summary

Work Hours		Production Rate	
Prod	35	Total no of km	22
Standby	0	Production Days	4
Down	0	No of km Per Day	6
Mobe	0		

Weekly Production Report - Week: 3						
	Project Number	P22001	Method	Induced Polarisation		
	Client	Allegiance Mining	Array/Type	Pole-Dip		
	Project	Trial Harbour	Spacing	100		
				Survey Manager	Jean-Daniel Nicolas	
Monday, 14 March 2022		Line No	Start	End	No of Stations	Work Hours
Complete set up line 1600E		1600E				Prod 10
						Standby
						Down
					Total 0	Mobe
Tuesday, 15 March 2022		Line No	Start	End	No of Stations	Work Hours
Read Line 1600E. Rain in the morning		1600E	10350N	102N50	9	Prod 10
						Standby
						Down
					Total 9	Mobe
Wednesday, 16 March 2022		Line No	Start	End	No of Stations	Work Hours
Pack up all Rx cables from the field and pack up all gear mines All gear counted and cleaned. Return the small generator to Zeehan						Prod 10
						Standby
						Down
					Total 0	Mobe
Thursday, 17 March 2022		Line No	Start	End	No of Stations	Work Hours
Demobilise						Prod
						Standby
						Down
					Total 0	Mobe 10
Friday, 18 March 2022		Line No	Start	End	No of Stations	Work Hours
						Prod
						Standby
						Down
					Total 0	Mobe
Saturday, 19 March 2022		Line No	Start	End	No of Stations	Work Hours
						Prod
						Standby
						Down
					Total 0	Mobe
Sunday, 20 March 2022		Line No	Start	End	No of Stations	Work Hours
						Prod
						Standby
						Down
					Total 0	Mobe

Weekly Production Summary

Work Hours		Production Rate	
Prod	30	Total no of km	9
Standby	0	Production Days	3
Down	0	No of km Per Day	3
Mobe	10		

DHEM Production Report						
	Project Number	P22001	Method	Electromagnetics		
	Client	Allegiance Mining	Array/Type	DHEM		
	Project	Trial Harbour	Spacing	5		
			Survey Manager	Sahala Siahaan		
Monday, 7 March 2022	Line No	Start	End	No of Stations	Work Hours	
Refer separate IP Production Report					Prod	
					Standby	
					Down	
				Total 0	Mobe	
Tuesday, 8 March 2022	Line No	Start	End	No of Stations	Work Hours	
Refer separate IP Production Report					Prod	
					Standby	
					Down	
				Total 0	Mobe	
Wednesday, 9 March 2022	Line No	Start	End	No of Stations	Work Hours	
Refer separate IP Production Report					Prod	
					Standby	
					Down	
				Total 0	Mobe	
Thursday, 10 March 2022	Line No	Start	End	No of Stations	Work Hours	
Prepare DHEM Equipment for helicopter lift Layout loop TH1					Prod	10
					Standby	
					Down	
				Total 0	Mobe	
Friday, 11 March 2022	Line No	Start	End	No of Stations	Work Hours	
Transport generator from TX to drill collar. Dummy hole to 276m Read TH1 Loop 275-10m				1	Prod	10
					Standby	
					Down	
				Total 1	Mobe	
Saturday, 12 March 2022	Line No	Start	End	No of Stations	Work Hours	
Setup TH2 Loop and log hole 275-10m Start pickup of DHEM equipment/loop					Prod	10
					Standby	
					Down	
				Total 0	Mobe	
Sunday, 13 March 2022	Line No	Start	End	No of Stations	Work Hours	
Complete pickup of TH2 loop					Prod	5
					Standby	
					Down	
				Total 0	Mobe	

Weekly Production Summary

Work Hours		Production Rate	
Prod	35	Total no of km	1
Standby	0	Production Days	4
Down	0	No of km Per Day	0
Mobe	0		