

**LOGISTICS REPORT PREPARED
FOR
PLUTON RESOURCES LIMITED**

**TWO DIMENSIONAL INDUCED POLARIZATION
SURVEY
ON THE
GREAT CALEDONIAN PROSPECT**

CETHANA LAKE, TASMANIA, AUSTRALIA

LATITUDE: S41° 33' LONGITUDE: E146° 04'

AGD66 Zone 55

**SURVEY CONDUCTED BY SJ GEOPHYSICS LTD.
FEBRUARY 2012**

**REPORT PREPARED BY
RYAN HALTON
JAY ENNS
FEBRUARY 2012**

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1. SURVEY SUMMARY

SJ Geophysics Ltd. was contracted by Pluton Resources Limited to acquire geophysical data on their Great Caledonian Prospect. The following table provides a brief summary of the project.

Client	Pluton Resources Limited.
Project Name	Great Caledonian Prospect
Location (approx. centre of grid)	Latitude: S41° 33' Longitude: E146° 04' 422246E, 5398888N; AMG Zone 55, AGD 66
Survey Type	2D Induced Polarization
Total Line Kilometres	700 m
Production Dates	February 4 th to 6 th , 2012
Objective	SJ Geophysics was contracted to carry out 2DIP survey with the purpose of providing 2D inverted models of resistivity and chargeability properties.

Table 1: Survey Summary

This logistics report summarizes the operational aspects and methodologies of the geophysical survey. This report does not discuss or interpret the survey results.

2. LOCATION AND ACCESS

The Great Caledonian Prospect is located near Cethana Lake, in north-west Tasmania, Australia (see Figure 1). The closest major town to the survey area is Sheffield, which is approximately 35 km north-east of the project site. The crew were accommodated at the Gowrie Park backpackers hostel, approximately 15 km east of the project area. Travel time to the project area from Gowrie Park was approximately 40 minutes and can be accessed from Gowrie Park by the following directions (See Figure 2):

- Drive west along Claude road for approximately 5 km to Cethana road.
- Follow Cethana road for approximately 7 km and turn south on to Cradle Mountain road.
- Drive south approximately 10 km on Cradle Mountain road.

The project area is predominantly temperate rain forest containing thick brush and dense undergrowth. The tree species mostly consist of the Tasmanian blue gum, wattles, various cycads and a few different species of pine. The undergrowth was characterized by several species of ferns as well as button grass in open areas. The high density scrub brush consisted of tea tree interwoven with a vine referred to as barra.

The fauna on the project was typical of Australia and, more specifically, to the island of Tasmania. Animals commonly seen were wallabies, possums, rabbits, echidnas, and bandicoots. These animals did not pose a risk to any equipment pre-placed or left on the ground overnight. Snakes were also common and consisted mostly of tiger snakes and copperheads. Both species are extremely poisonous and could be difficult to see amongst the brush.

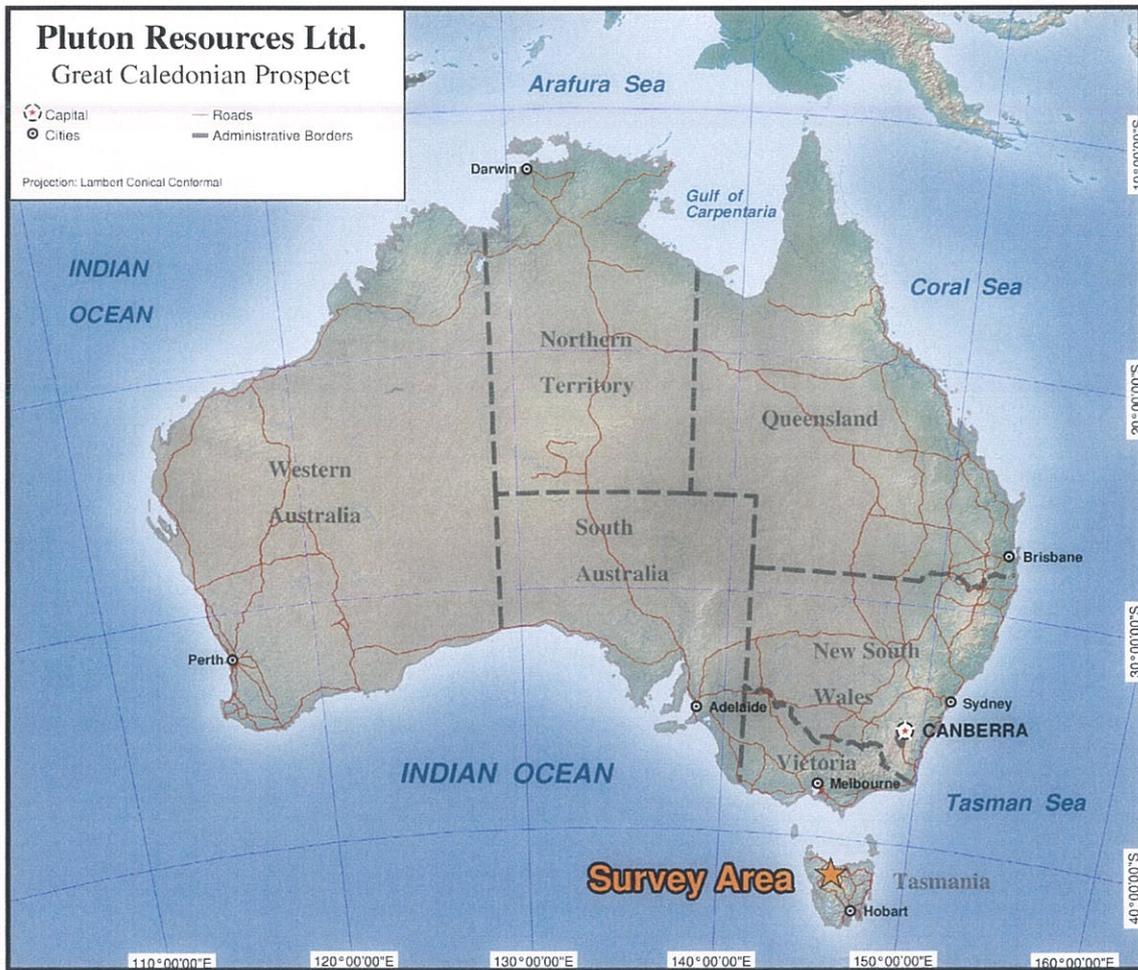


Figure 1: Overview map of the Great Caledonian Prospect located in Tasmania, Australia.

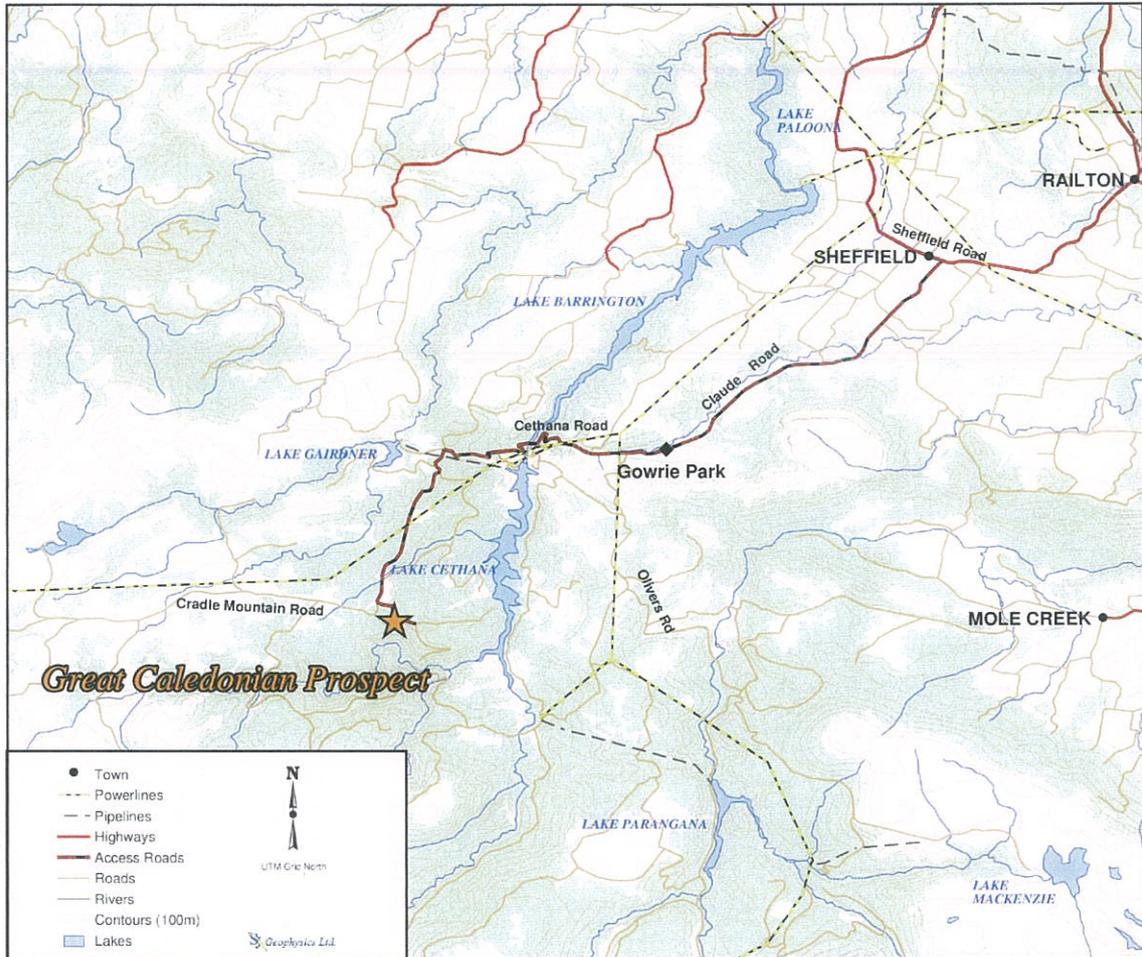


Figure 2: Location map for the Great Caledonian project showing towns and road access.

3. GRID INFORMATION

Grid	Great Caledonian Prospect
Number of Survey Lines	1
Survey Line Azimuth	125°
Line Spacing	NA
Station Spacing	25 m
Elevation range	820 – 840 m
Survey Length	700 m

Table 2: Grid parameters

The Great Caledonian Prospect consisted of only one survey line. Stations were flagged and marked every 50 m (Figure 3). Please refer to Appendix A for details of the survey line.

All of the survey location information was recorded by the SJ Geophysics crew, including GPS control points and slope/clinometric data. Control points were recorded with a Garmin GPSMap 60CSx handheld GPS in the AMG Zone 55 projection and ADG66 datum. Slope data were recorded with a Suunto handheld clinometer.

The Great Caledonian Prospect was located in a reasonably flat area with rolling contours in the west and increasingly steeper slopes and cliffs in the east. Ground conditions on the line ranged significantly. The western end of the line was quite wet with saturated moss, which was a result of heavy rainfall on the first day of the survey. The ground dried out towards the east as the line approached cliffs and rocky section. Tree coverage was quite dense, but the cut line made traveling much easier. Walking however, still remained somewhat treacherous and was often slowed while negotiating the scree slopes and cliff section. Temperatures during the survey were seasonal: approaching 20-25 °C during the day. There were consistent heavy rains during the setup which continued on and off throughout the survey.

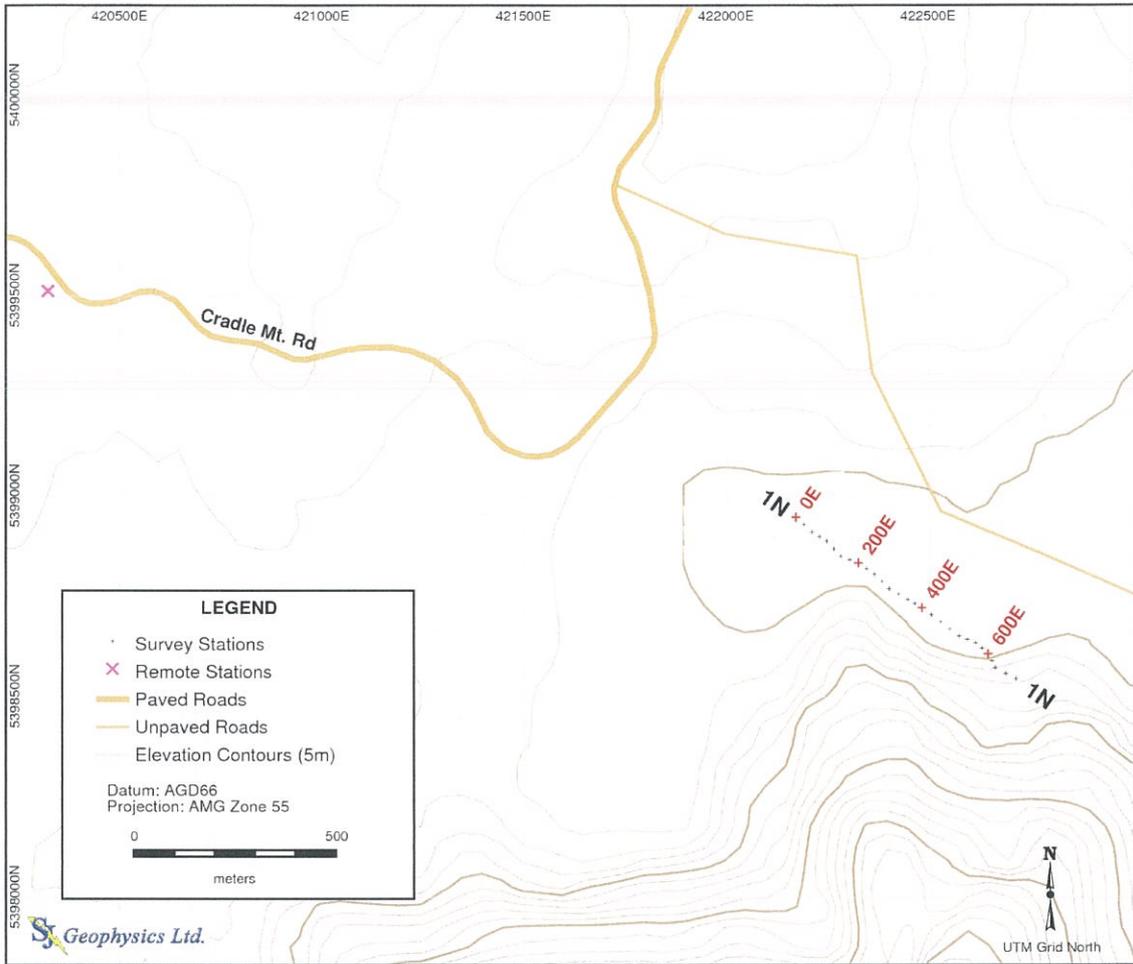


Figure 3: Grid map for the Great Caledonian Prospect.

4. FIELD WORK AND INSTRUMENTATION

4.1. Field Logistics

The SJ crew consisted of 2 employees, Jay Enns and Ryan Halton. The client, John McDougall, also joined in to assist in the completion of the survey.

<i>Crew Member Name</i>	<i>Role</i>	<i>Dates on Site</i>
Jay Enns	Field Geophysicist	February 4 th to 6 th
Ryan Halton	Field Technician	February 4 th to 6 th

Table 3: Details of the SJ Geophysics crew on site.

The survey grid, which consisted of a single traverse line, was well cut and flagged every 50m. Line cutting was contracted out to a local and was completed with the help of the client. The line was originally intended to be 1200 m in length; however, while cutting, the client decided to shorten the line due to the rough and steep terrain towards the eastern end that was deemed unsafe. The station/dipole spacing was also shortened to 25 m to address the change and improve the survey's effectiveness.

Surveying with DABstix receivers require a considerable amount of setup time. Receiver wires, rods, and remote wires were established on February 5th despite heavy rain. On the next day, while setting up the survey, several batteries for the DABstix single channel receivers were found to be low in voltage (without sufficient charge) which resulted in a shortage of receivers. The two end dipoles had to be lengthened to 50 m to reduce the number of dipoles. Also, approximately 900 m of wire was stolen from the remote line extending off the grid. Additional wires on site weren't sufficient to repair the big gap, so returning to camp to retrieve more wire delayed the start of the survey considerably.

For a typical 2D survey, current wires and receiver wires are placed on the same line. This can lead to wire coupling and current leakage which cause significant interference with the data. In this survey, wires for current and receivers were separated by approximately 15 to 20 m. Prior to the start of reading, a DABstix unit was used to monitor and assess the voltages near injection station. Receivers connected to dipoles within approximately 100 m of the injection site were found to exceed their input capacity when the current was too high. Attempts were made to

adjust the output currents to a range which would reduce receiver overloading while maintaining a strong enough signal for measuring a response. In addition, receivers adjacent to the injection site were disconnected to protect them from being damaged.

For this project, the SJ crew was able to extend their stay at Gowrie Park Wilderness Village where they had setup and resided for the previous months for another project. Trailor-type single rooms were provided for workers as well as additional rooms for processing/office use and on-site storage. Wireless internet was provided by Gowrie Park but it was not sufficient for regular use. SJ purchased a Telstra wireless stick that operates using the available cellular network.

4.2. Survey Parameters and Instrumentation

The geophysical instrumentation used to acquire the IP data consisted of a SJ full waveform digital DABstix receivers and a GDD Tx II transmitter. The specifications of these instruments are listed in Appendix B and the equipment parameters are summarized in Table 4.

For the IP survey, a single dipole array consisted of 24 consecutive dipoles of 25m and one dipole of 50 m at the end was laid out on the 700 m long line.

Array Type	2DIP modified Pole-Dipole
Number of Dipoles	25
Dipole Length	25 m (24 dipoles) and 50 m (one dipole)
Array Length	700 m
Current Interval	25 m
IP Transmitter	GDD TxII (Serial #433, 435)
Duty Cycle	50%
Waveform	Square
Cycle and Period	2 sec on / 2 sec off; 8 second
IP Receiver	SJ-24 Full Waveform Digital Receiver (DABstix)
Reading Length	90 seconds
Vp Delay, Vp Integration	1200 ms, 600 ms
Mx Delay, # of Windows Width (Mx Intergration)	200 ms, 20 36, 39, 42, 45, 48, 52, 56, 60, 65, 70, 75, 81, 87, 94, 101, 109, 118, 128, 140, 154 (200 ms – 1800 ms)
Properties Calculated	Vp, Mx, Sp, Apparent Res
GPS	Garmin GPSmap 60Csx
Average Accuracy	5 m
Projection / Datum	AGD66, Zone 55

Table 4: Instrument parameters

The potential array was connected using 60 m sections of 18 ga wire. A pair of DABstix were setup at 50m intervals along the line to reduce overall setup time. The receiver electrodes consisted of stainless steel pins, approximately 50 cm long and 10 mm in diameter, which were hammered into the ground. At each current station (25 m intervals), current was injected using

three long 1 m stainless steel electrodes hammered into the ground. The remote current location consisted of five 1 m stainless steel rods, 15 mm in diameter. Table 5 shows the UTM location of the remote site.

Grid	Name	Label	UTM Easting / AGD66 Zone 55	UTM Northing / AGD66 Zone 55
Pluton	Pluton Remote 1	L2N -2000E	420326	5399513

Table 5: Locations of 3DIP remote site

5. GEOPHYSICAL TECHNIQUES

5.1 IP Method

The time domain IP technique energizes the ground by injecting square wave current pulses via a pair of current electrodes. During current injection, the apparent (bulk) resistivity of the ground is calculated from the measured primary voltage and the input current. Following current injection, a time decaying voltage is also measured at the receiver electrodes. This IP effect measures the amount of polarizable (or “chargeable”) particles in the subsurface rock.

Under ideal circumstances, high chargeability corresponds to disseminated metallic sulfides. Unfortunately, IP responses are rarely uniquely interpretable as other rock materials are also chargeable, such as some graphitic rocks, clays and some metamorphic rocks (e.g., serpentinite). Therefore, it is prudent from a geological perspective to incorporate other data sets to assist in interpretation.

IP and resistivity measurements are generally considered repeatable to within about five percent. However, changing field conditions, such as variable water content or electrode contact, reduce the overall repeatability. These measurements are influenced to a large degree by the rock materials near the surface or, more precisely, near the measurement electrodes. In the past, interpretation of a traditional IP pseudosection was often uncertain because strong responses located near the surface could mask a weaker one at depth. We attempt to overcome this uncertainty by employing geophysical inversion to better interpret the data.

6. QUALITY ASSURANCE

6.1. Locations

Good quality survey location data is crucial to successful analysis and interpretation of the collected geophysical data.

The quality of the location data for this survey was fair. Although the grid was heavily vegetated, and blocked by several cliffs, decent satellite coverage was attained in most spots. However, in steep ravines and areas of denser canopy, the positional accuracy of some of the GPS points was questionable. In these areas, the GPS points were removed and the clinometer measurements combined with an idealized ground distance and azimuth were used to interpolate locations.

6.2. IP Data

The IP geophysical data go through a series of quality assurance processes. Prior to acquisition, it is SJ Geophysics' best practice to check potential wires to detect possible bad connections (i.e. poor ground contacts). This allows the operator to troubleshoot problem areas in the array prior to acquisition, then once the operator is satisfied surveying can begin.

Each evening, the recorded data in receivers were dumped to a processing computer for data processing. IP data were then imported into JavIP: a proprietary IP database management system developed by S.J.V. Consultants Ltd. (SJV). This package integrates the locational information with each reading, thus allowing the calculation of the apparent resistivity and apparent chargeability. The package's interactive quality control tools include: plots of decay curves, tables of calculated parameters and a dot plot (a graphical display of data of the various parameters). These enable the field geophysicist to validate each data point. After the field geophysicist removes known bad points from field observations and other obvious outliers, the database is delivered to SJV for a more stringent second review. In this second review, the data are scrutinized to ensure erroneous data points are not passed along to the final stage of processing: the inversion.

The data collected on the Great Caledonian Prospect was of good quality. The voltage potentials (Vp), due to the proximity of injections, were quite high and the signals and resulting

decay curves were clean. Most of the data flagged for removal was due to non-coupling. This phenomena is typical in IP surveys and is related to the survey configuration. Non-coupling occurs when the receiver dipole is sub-parallel to the equipotential lines, which can result in a significant decrease in signal strength and lead to untrustworthy data. Some poor quality data points were flagged for removal either due to ground contact or poor connection with the receiver cables. As an example, Figure 4 shows data at current injection station 675E.

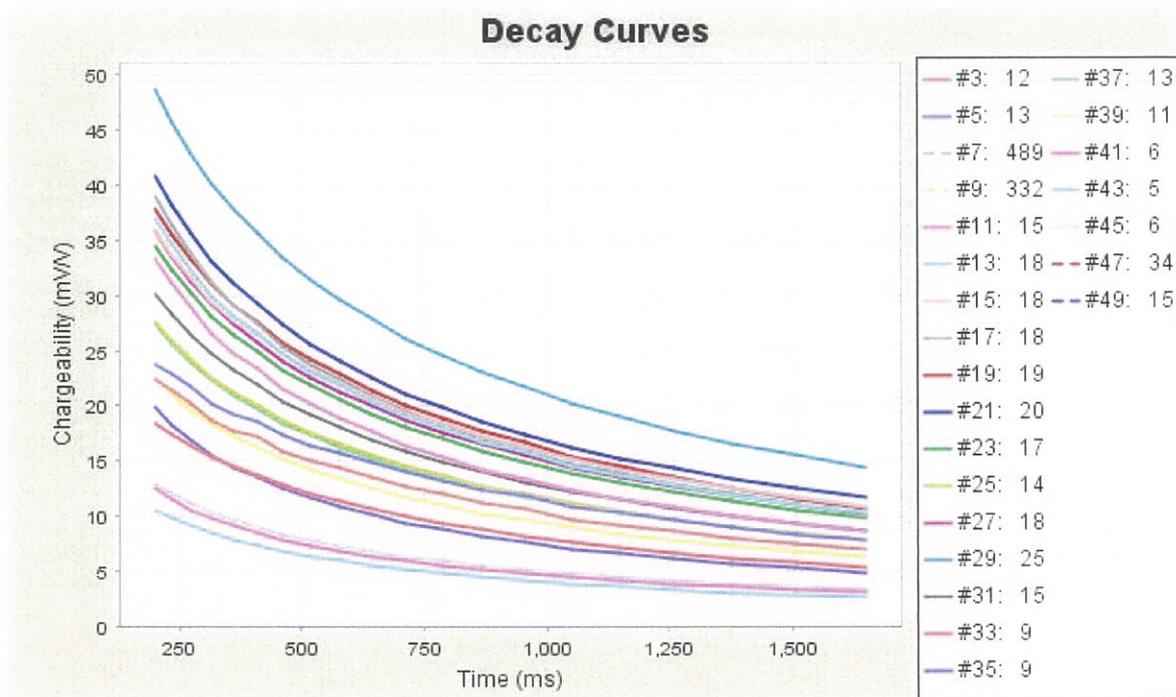


Figure 4: Decay curves from injection station 675E.

7. GEOPHYSICAL INVERSION

The purpose of geophysical inversion is to estimate the distribution of rock physical properties in the subsurface based on the geophysical data collected at the surface. Examples of rock physical properties include: density, resistivity, chargeability, and magnetic susceptibility. Geophysical measurements made at the surface are strongly influenced by the physical properties of rocks in the subsurface. Therefore, we can use mathematical algorithms to convert these surface measurements into a 2D picture of the subsurface. This process is called geophysical

inversion. Unfortunately, the inversion process cannot provide a single unique solution. Indeed, there are many different possible subsurface 2D physical property models that could fit our surface geophysical measurements. Despite this limitation, inversion is a very powerful tool to help identify the main subsurface features which are required by the surface geophysical data. With the combination of high quality surface measurements and geophysical inversion, a much greater understanding of the subsurface can be obtained. Several geophysical inversion programs are available, but SJ Geophysics primarily uses the UBC-GIF algorithms (e.g. DCIP2D) which were developed by a consortium of major mining companies under the auspices of the UBC-Geophysical Inversion Facility.

It is SJ Geophysics standard practice to invert data from 2DIP surveys, and to do this we use the DCIP2D program which solves two inverse problems. First, the DC potentials are inverted to calculate the spatial distribution of electrical resistivity in the subsurface. Second, the chargeability data (IP) are inverted to recover the spatial distribution of IP polarizable particles in subsurface rocks. When available, additional information, such as geological boundaries and down-hole geophysical data, can be added to the inversion in order to constrain the inversion model. The inversion programs are generally applied iteratively to evaluate the output with regard to what is geologically known, estimate the depth of detection, and determine the viability of specific measurements.

The inversion result is then run through a series of quality control steps prior to final gridding and mapping. Inversion output is plotted to show the distribution of physical properties (e.g. resistivity, chargeability, etc.) in cross-sections.

Respectfully submitted,
per SJ Geophysics Ltd.

Ryan Halton
Jay Enns

APPENDIX A: SURVEY DETAILS

Great Caledonian Project

<i>Line</i>	<i>Series</i>	<i>Type</i>	<i>Start Station</i>	<i>End Station</i>	<i>Survey Length (m)</i>
1	N	Tx/Rc	0	700	700

Total Linear Metres = 700

Rc = Receiver Line, Tx = Transmitter Line

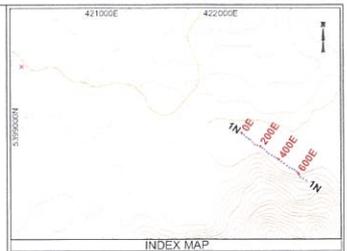
APPENDIX B: INSTRUMENT SPECIFICATIONS

SJ Full Waveform Digital DABstix Receiver

Technical:	
Input impedance:	10M Ω
Input overvoltage protection:	5.6V
Internal memory:	Storage Capacity 6.9 GB, readings dependent on sample rate and duration
Number of dipoles:	1
Synchronization:	GPS
Programmable Gain (V/V):	1, 2, 4, 8, 16, 32, 64, 128
Selectable Sampling Rates (samples/second):	10, 100, 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 7500, 10000, 12500, 15000, 17500, 20000, 20833
Common mode rejection:	More than 80 dB (for Rs=0)
Self potential (Sp):	Range:-2.048V to +2.048V Resolution: 0.24 μ V Proprietary intelligent stacking process rejecting strong non-linear SP drifts.
Primary voltage:	Range: -2.5 to 2.5V (24 bit) Resolution: 0.24 μ V Accuracy: typ. <1.0%
Chargeability:	Accuracy: typ. <1.0%
General:	
Dimensions:	19.4 x 7 x 3.7cm
Weight:	0.4 kg
Battery:	12V external
Operating temperature range:	-5 $^{\circ}$ C to 40 $^{\circ}$ C

GDD Tx II IP Transmitter

Input voltage:	120V / 60 Hz or 240V / 50Hz (optional)
Output power:	3.6 kW maximum
Output voltage:	150 to 2200 V
Output current:	5 mA to 10 A
Time domain:	1, 2, 4, 8 second on/off cycle
Operating temp. range:	-40 $^{\circ}$ C to +65 $^{\circ}$ C
Display:	Digital LCD read to 0.001 A
Dimensions:	34 x 21 x 39 cm
Weight:	20 kg



Project Information:
 Survey by: SJ Geophysics Ltd.
 2D Inversion by: S.J.V. Consultants Ltd.
 Survey Date: February 2012

Instrumentation:
 Receiver: DABStix 24-bit Single Channel Receiver
 Transmitter: GDD TX II
 Array Type: Static 2D, a=25m, N=1-24

Mapping Information:
 Section Plots: Local Coordinate System
 Index Map Datum: AGD66
 Index Map Projection: AMG Zone 55
 Mapping Date: 20-Feb-2012



Pluton Resources Ltd.

Dove River EL14/2006

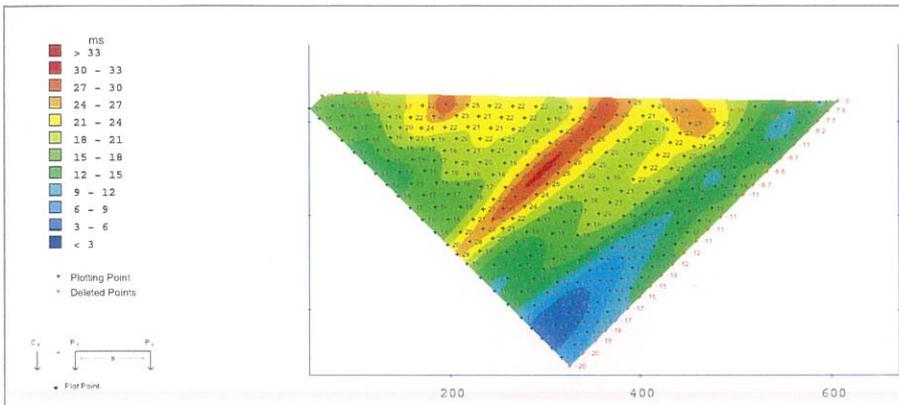
Great Caledonian Prospect

Cethana Lake, Tasmania, Australia

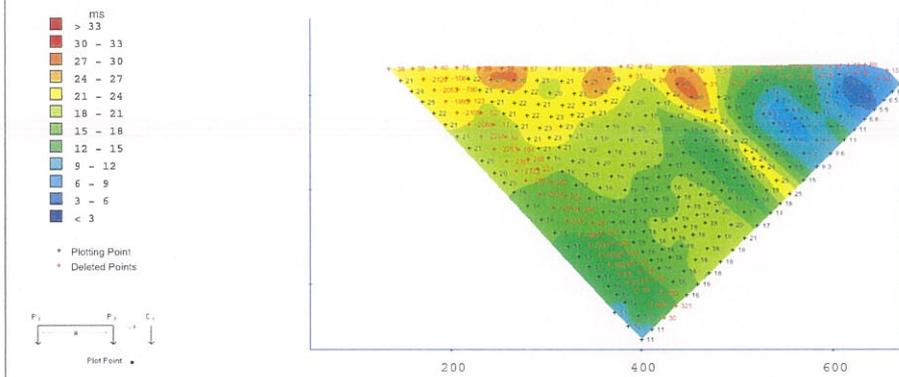
**Pseudosections
 and 2D Inversion Model
 (Dipole-Dipole)
 of
 Chargeability**

Cross Section Map

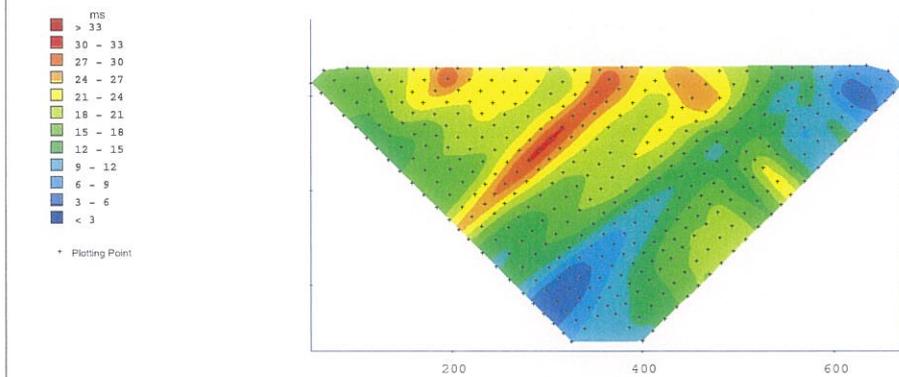
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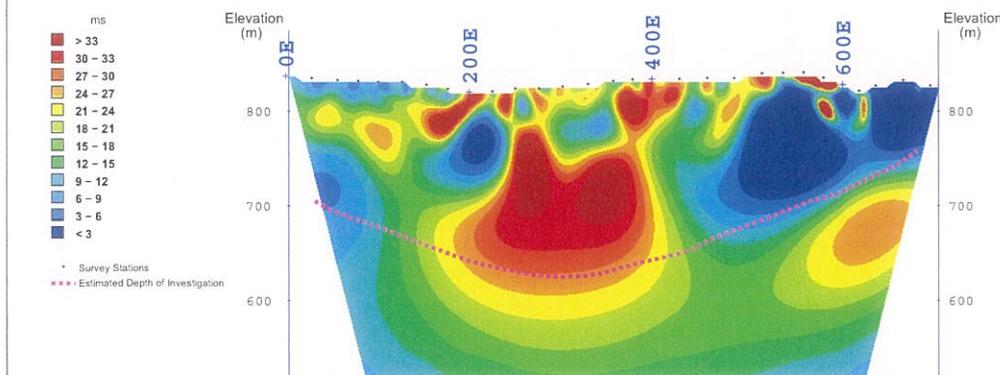
Pseudosection – Potential Dipole > Current Station: Apparent Chargeability (ms)



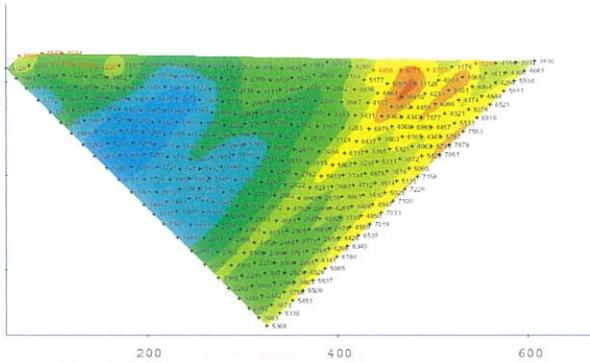
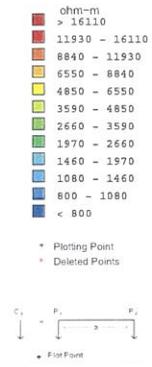
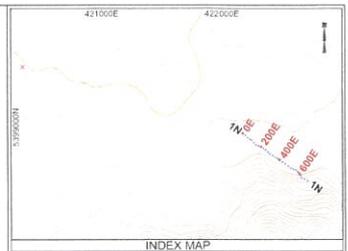
Pseudosection – Potential Dipole < Current Station: Apparent Chargeability (ms)



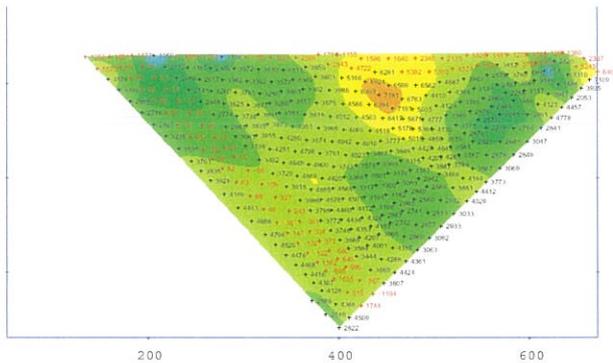
Merged Pseudosection: Apparent Chargeability (ms)



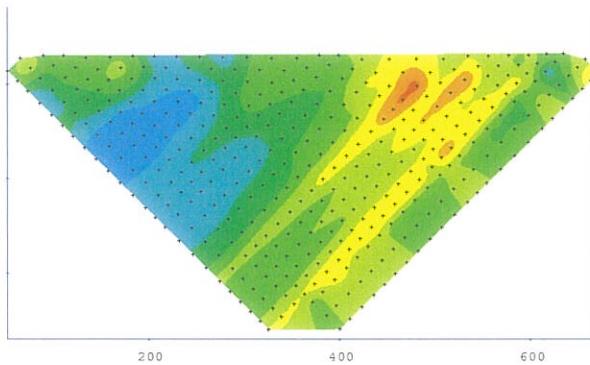
Interpreted Chargeability (ms)



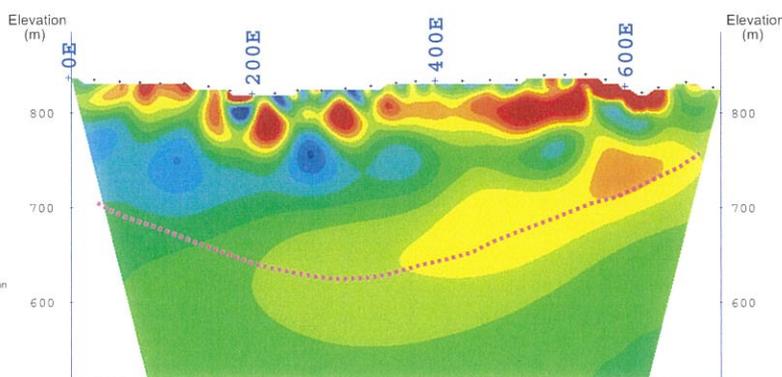
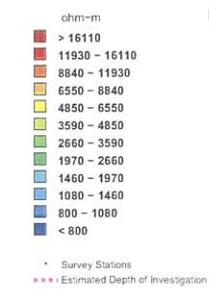
Pseudosection – Potential Dipole > Current Station: Apparent Resistivity (ohm-m)



Pseudosection – Potential Dipole < Current Station: Apparent Resistivity (ohm-m)



Merged Pseudosection: Apparent Resistivity (ohm-m)



Interpreted Resistivity (ohm-m)

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 Transmitter: GDD TX II
 Array Type: Static 2D, a=25m, N=1-24

Mapping Information:
 Section Plots: Local Coordinate System
 Index Map Datum: AGD66
 Index Map Projection: AMG Zone 55
 Mapping Date: 20-Feb-2012

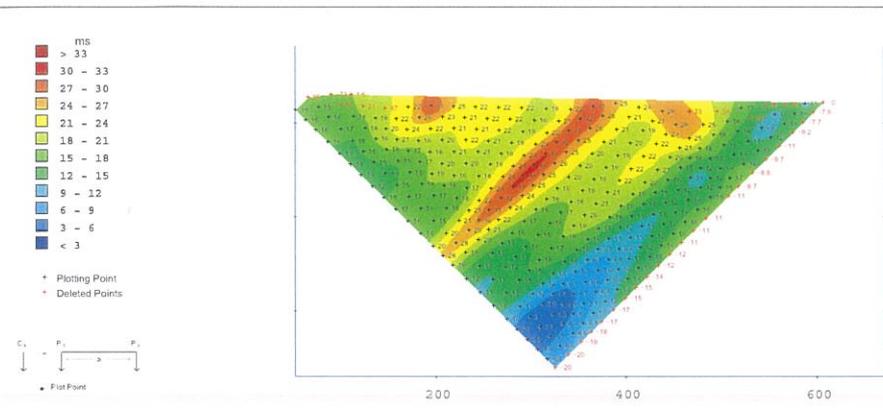


Pluton Resources Ltd.
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Great Caledonian Prospect
 Cethana Lake, Tasmania, Australia

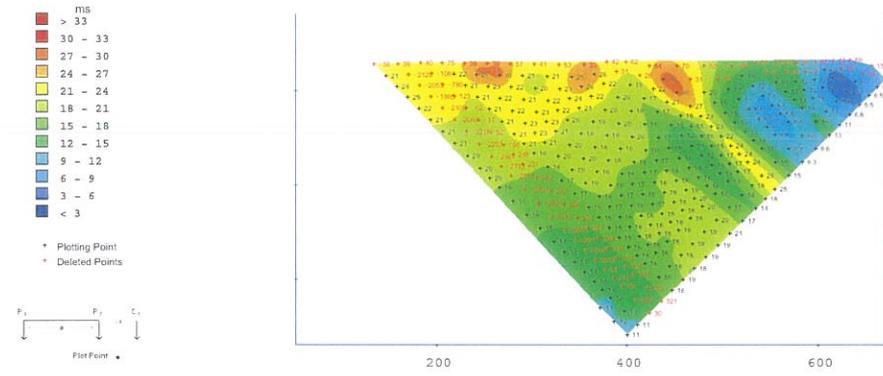
**Pseudosections
 and 2D Inversion Model
 (Dipole-Dipole)
 of
 Resistivity**

Cross Section Map

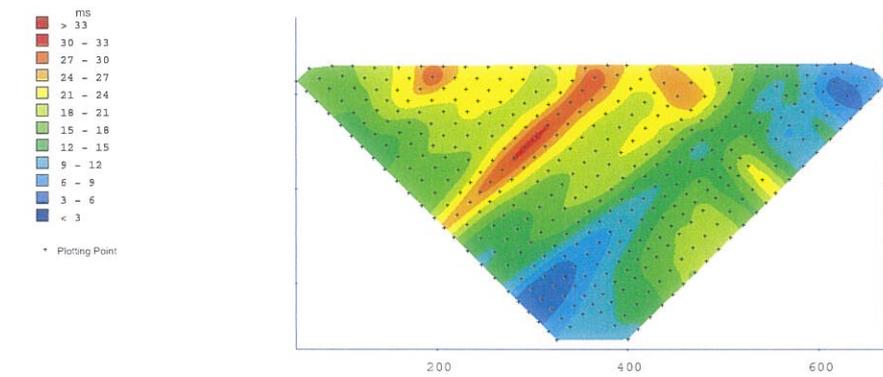
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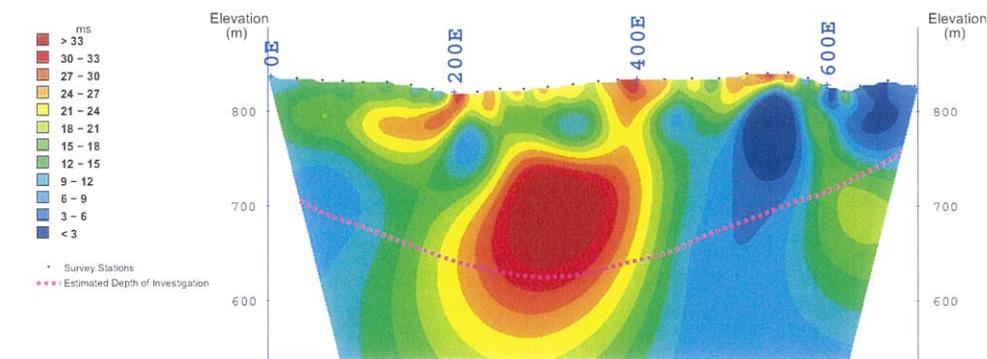
Pseudosection – Potential Dipole > Current Station: Apparent Chargeability (ms)



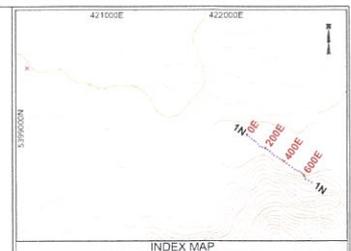
Pseudosection – Potential Dipole < Current Station: Apparent Chargeability (ms)



Merged Pseudosection: Apparent Chargeability (ms)



Interpreted Chargeability (ms)



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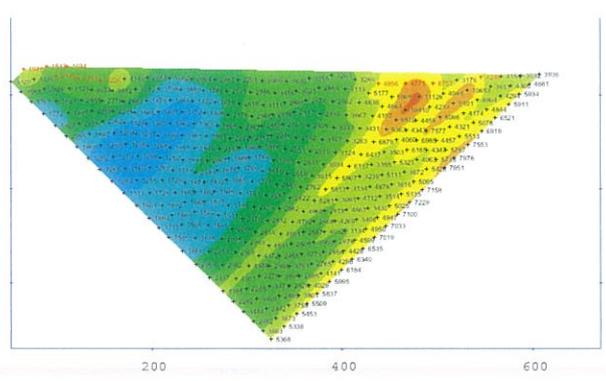
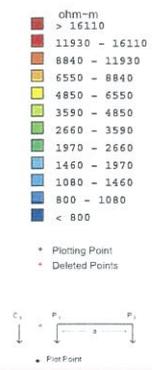


Pluton Resources Ltd.
Dove River EL14/2006
Great Caledonian Prospect
 Cethana Lake, Tasmania, Australia

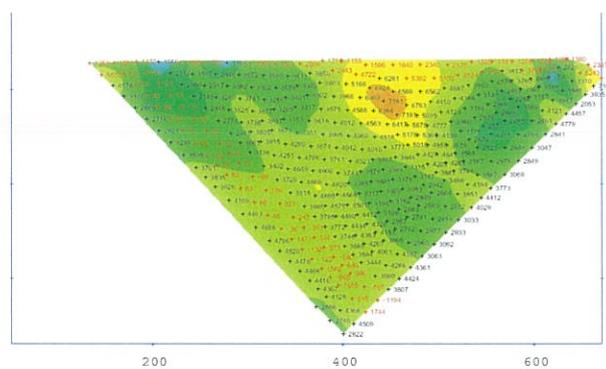
**Pseudosections
 and 2D Inversion Model
 (Pole-Dipole)
 of
 Chargeability**

Cross Section Map

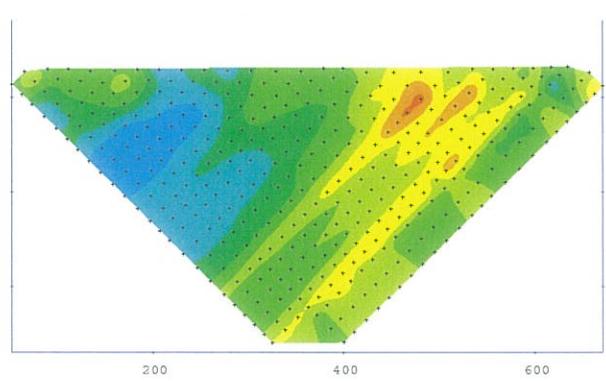
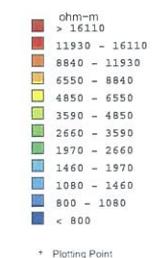
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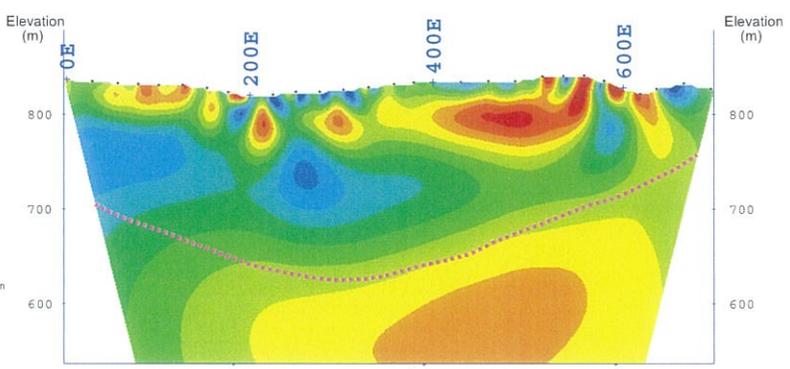
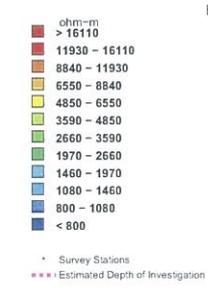
Pseudosection – Potential Dipole > Current Station: Apparent Resistivity (ohm-m)



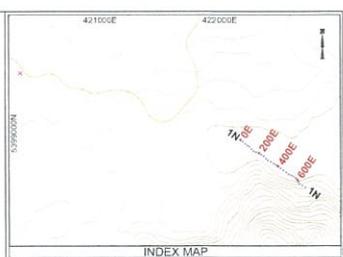
Pseudosection – Potential Dipole < Current Station: Apparent Resistivity (ohm-m)



Merged Pseudosection: Apparent Resistivity (ohm-m)



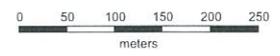
Interpreted Resistivity (ohm-m)



Project Information:
 Survey by: SJ Geophysics Ltd.
 2D Inversion by: S.J.V. Consultants Ltd.
 Survey Date: February 2012

Instrumentation:
 Receiver: DABSIx 24-bit Single Channel Receiver
 Transmitter: GDD TX II
 Array Type: Static 2D, a=25m, N=1-24

Mapping Information:
 Section Plots: Local Coordinate System
 Index Map Datum: AGD66
 Index Map Projection: AMG Zone 55
 Mapping Date: 20-Feb-2012



Pluton Resources Ltd.
Dove River EL14/2006
Great Caledonian Prospect
 Cethana Lake, Tasmania, Australia

**Pseudosections
 and 2D Inversion Model
 (Pole-Dipole)
 of
 Resistivity**

Cross Section Map

Section: 1N