EL25566 - MAG ANOMALY #1 GRAVITY & MAG INTERPRETATION REPORT

Executive Summary

Detailed airborne magnetic data on Gempart (NT) Pty Ltd's EL25566 has defined a distinct magnetic anomaly in the Mesoproterozoic Musgraves Province in the extreme southwest corner of the Northern Territory. Rare outcrop in the general area comprises Mesoproterozoic granitoids and felsic/mafic gneiss. Detailed ground gravity data acquired in 2020 reveals a coincident two milliGal high. Detailed modelling of both datasets indicates a source with density up to 3.4 gm/cc and magnetite concentration up to 15% occurs at shallow depth in lithologies possibly associated with Musgravian Event rocks. The source abuts an interpreted major thrust fault.

The interpreted anomaly source may well represent e.g. a skarn type of deposit, with potential for various commodities including copper, gold, lead, zinc, molybdenum, tungsten, etc.

It is recommended that ground EM data be acquired and interpreted to define possible target conductors which may be associated with economic mineralisation. Alternatively a single 300 metre hole could be drilled to investigate the nature of the gravity/magnetic source.

Introduction

The Mag Anomaly #1 prospect is located in the south-central part of granted EL25566, in the extreme southwest corner of the Northern Territory on land administered by the Petermann Land Trust. The prospect can be identified as a distinct magnetic anomaly of 1,700 nT amplitude as recorded on helicopter-borne traverses at 60 metres altitude. It is about 500 x 800 metres in extent, elongate in the WNW direction. There is no response in any of the radiometric channels. General location is shown at Figure 1, and the regional airborne magnetic response is shown at Figure 2.

A report " Mag Anomaly #1 Interpretation Report 2019" compiled for Gempart in August 2019 described interpretation of the aeromagnetic data. Gravity data were acquired in 2020. This report documents detailed interpretation of the gravity data incorporating elements of the earlier magnetic interpretation.

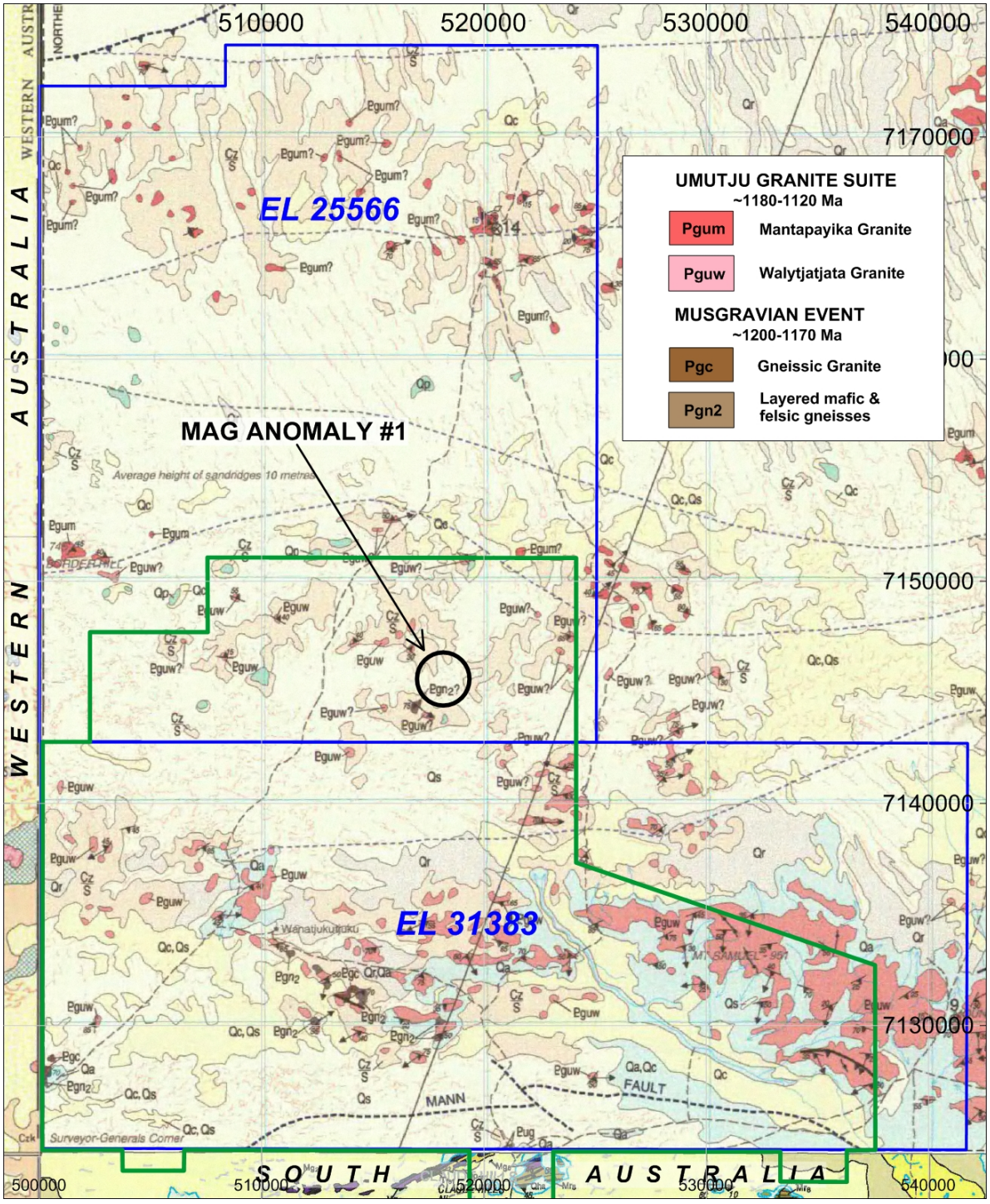


Figure 1. Location Map showing Mag Anomaly #1 prospect on published 250,000 scale geology (Petermann Ranges sheet).

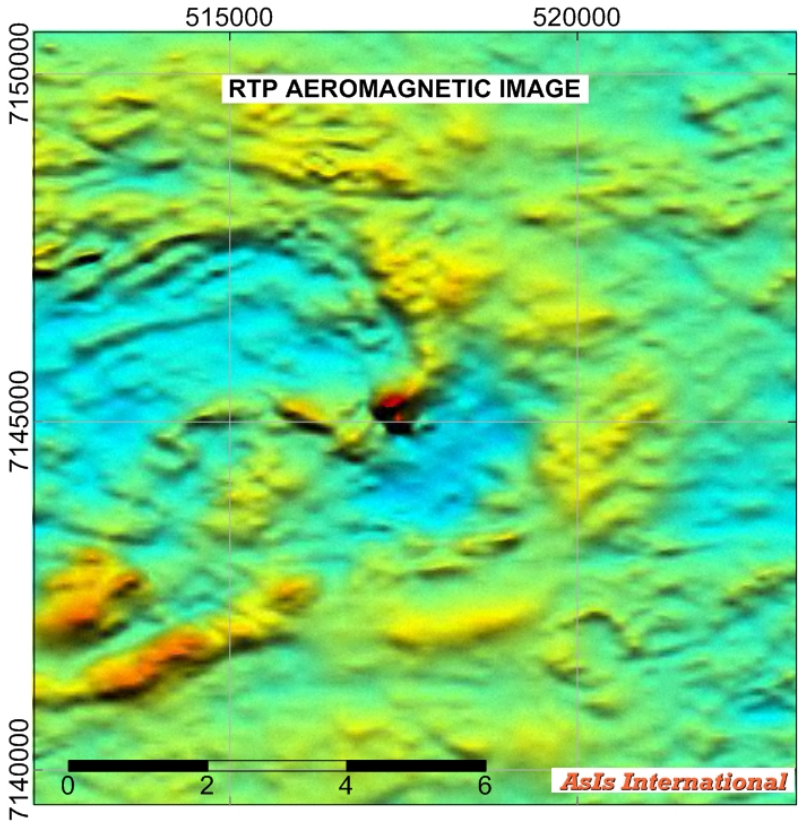


Figure 2. Mag Anomaly #1 prospect - image of RTP aeromagnetics.

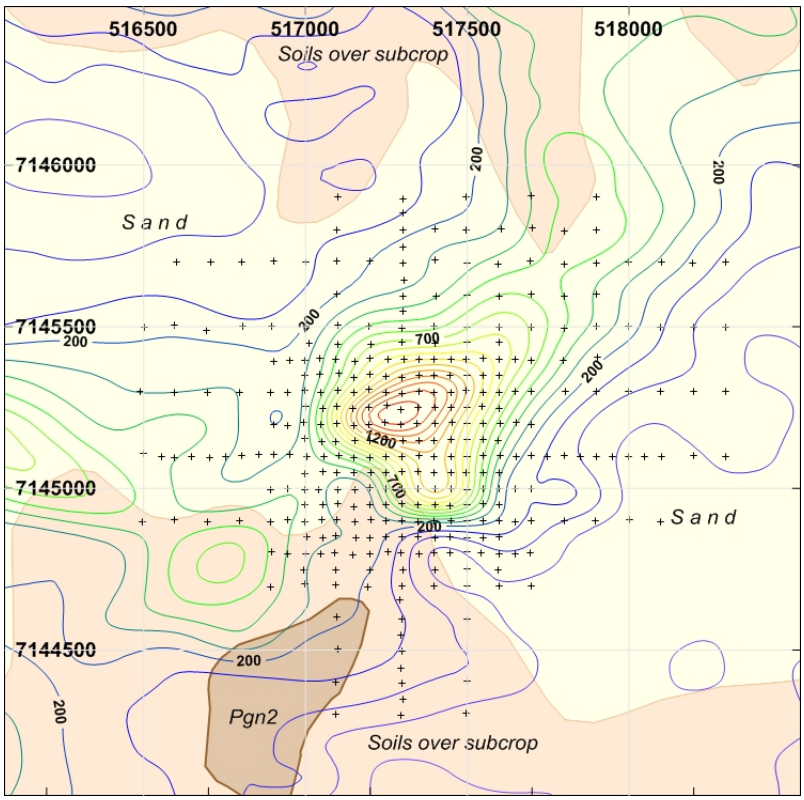


Figure 3. Mag Anomaly #1 prospect - contours of RTP aeromags on gravity reading sites.

Geology

The latest available published geology is from the Petermann 1:250,000 mapsheet published in 1999. On a regional scale there is scattered outcrop of Walytjatjata Granite (Pguw) of the Mesoproterozoic Umutju Granite Suite, with rare outcrop of un-named layered and felsic gneisses (Pgn2) assigned to the Mesoproterozoic Musgravian Event. The Walytjatjata Granite is described as porphyritic clinopyroxene granite with rounded blue-grey phenocrysts of K-feldspar, locally megacrystic or coarse grained equigranular; variably deformed and recrystallised to garnet-bearing assemblages; rare migmatite.

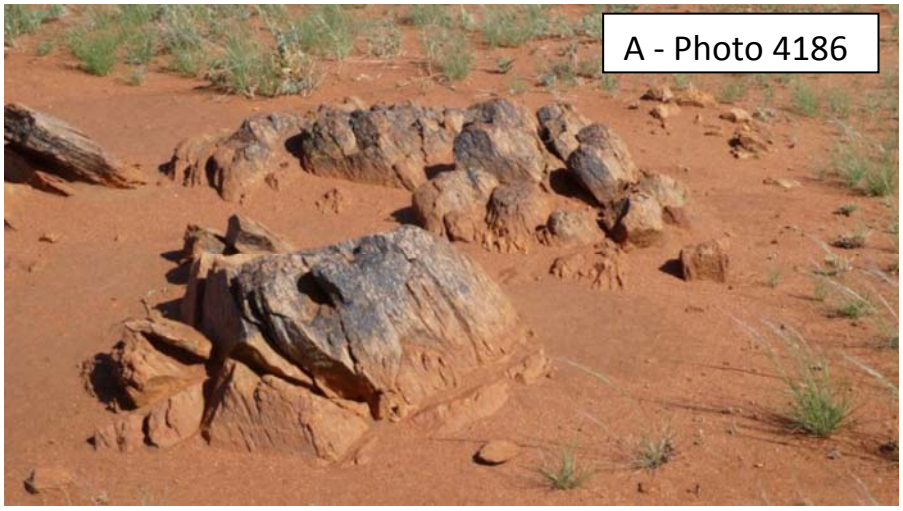
The geology in the vicinity of the magnetic anomaly is mapped as Quaternary sands (Qs). North and south of the anomaly soils over subcrop are developed. About 500 metres south of the anomaly is outcrop of Musgravian Event rocks (Pgn2). The mapped geology is shown at Figure 5.

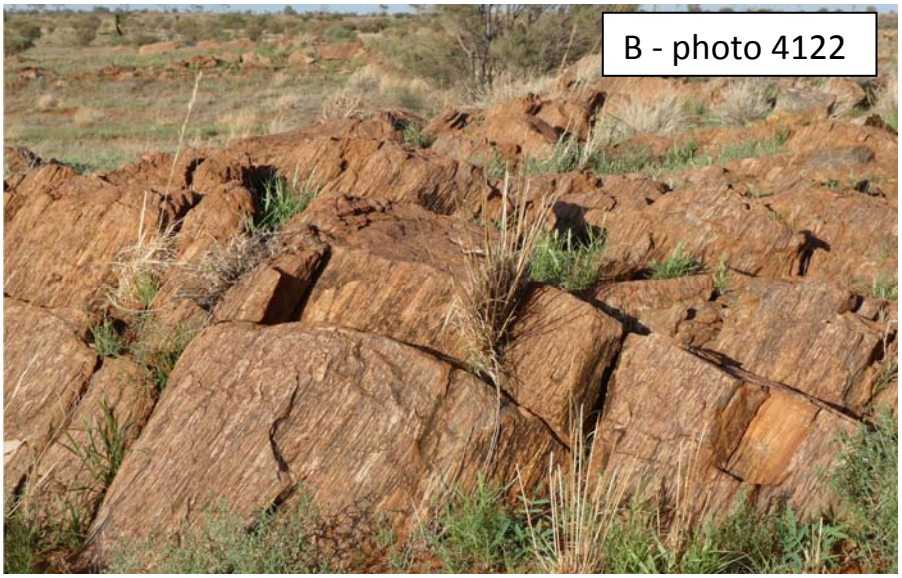
The gravity survey field crew captured photos of the general landscape, including the rare outcrop. The three photos of outcrop are shown at Figure 4, and locations shown on Figure 5. Descriptions have been provided by A. Mackie, Gempart Pty Ltd. The outcrop at site A, near the centre of the gravity anomaly, is described as hematised granitic gneiss with strong lineation indicative of thrust faulting. The outcrop at site B, on an interpreted major fault, is deformed granite with boudinaging and well developed steeply plunging lineation indicative of thrust faulting. The outcrop at site C, near mapped outcrop of Musgravian Event rocks, is described as boudinaged fine grained quartzite.

There are no recorded deposits, mineral occurrences or drillholes. No mineralisation of economic potential has been recorded within rocks of the Umutju Granite Suite or Musgravian Event, although the region has been virtually unexplored.

Previous Exploration

Within the general area of the Mag Anomaly #1 prospect, no historical exploration has been carried out. An airborne magnetic and radiometric survey on 500 metre flight lines, called Petermann survey, was conducted on behalf of the NTGS in 1985. Surface mapping by government agencies was last published about 20 years ago.





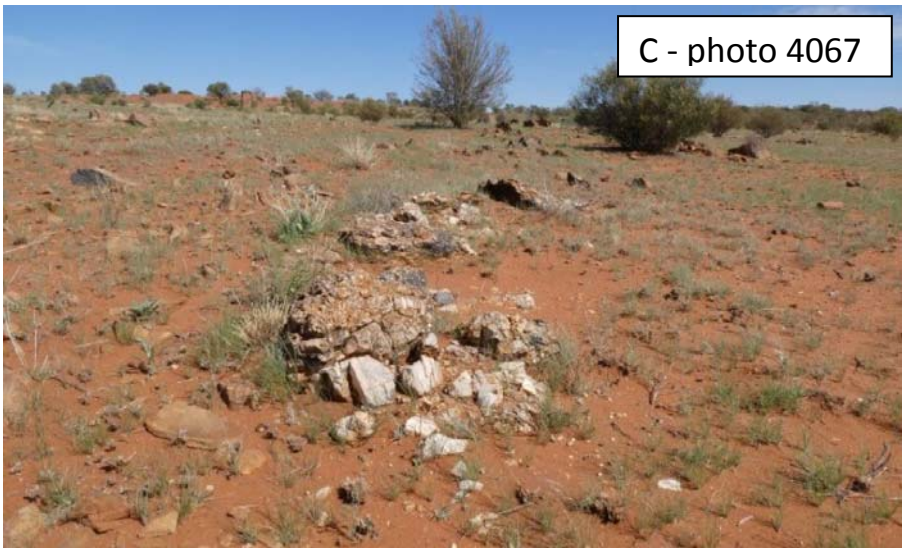


Figure 4. Mag Anomaly #1 Prospect. Photos of outcrop. Locations shown on Figure 5.

Exploration by Gempart 2019 - 2020

A helicopter-borne magnetic and radiometric survey, called Claude Hills North survey, was completed over an area encompassing the southern part of EL25566 by Aerosystems Australia in March 2019. Data were acquired on 200 metre north-south flight lines at a terrain clearance of 60 metres.

A detailed ground gravity survey was completed over the prospect area by Daishsat Surveys in February 2020. Readings were acquired on a nominal 200x200 metre grid, with infill to 100 and 50 metres as required. Location of reading sites is shown at Figure 5. Contours of Bouguer gravity are shown plotted on 250K geology and aeromagnetic image at Figures 5 and 6 respectively.

Interpretation of gravity data

Profiles of Bouguer gravity at 100 metre intervals oriented east-west and north-south were generated from the tabular data. A local background gradient of the form Regional = -1.1 - 0.0004x + 0.0007y milliGals was established. The profile data were forward modelled in ModelVision v.10 on a line-by-line basis using nominal 100x100 metre cells to determine approximate source geometry. In the absence of petrophysical data, a background density of 2.7 gm/cc was adopted, approximating the density of metamorphosed granites. The model parameters and results are summarised below, and shown in plan form at Figures 7 and 8, and cross-section format at Figures 10 to 13.

Depth to top: Outcrop occurs sporadically within the survey area, but depth of weathering is unknown. Modelling of the aeromagnetics suggests depth to fresh rock is as shallow as 35 metres. The depth to top of the gravity models is generally 30 metres.

Dip & strike: Dips were set to accord with those interpreted from the aeromagnetic data, and strike determined from the aeromagnetic interpretation and trends of the gravity response.

Depth extent: Except for shallow, depth-limited sources, modelling is not very sensitive to depth extent. Vertical depth extent was arbitrarily set to 800 metres, except for the high-density sources which were set to 500 metres.

The final model of density distribution is shown on a gravity image at Figure 7, and on a RTP aeromagnetic image at Figure 8. Interpreted dips are generally steep, 70-80° N in the vicinity of the peak of the gravity anomaly. To the north-east dips remain the same but the strike trends to the NW. In the southern part of the survey area dips vary from vertical to 60° S; in the extreme south they flatten to 30° S.

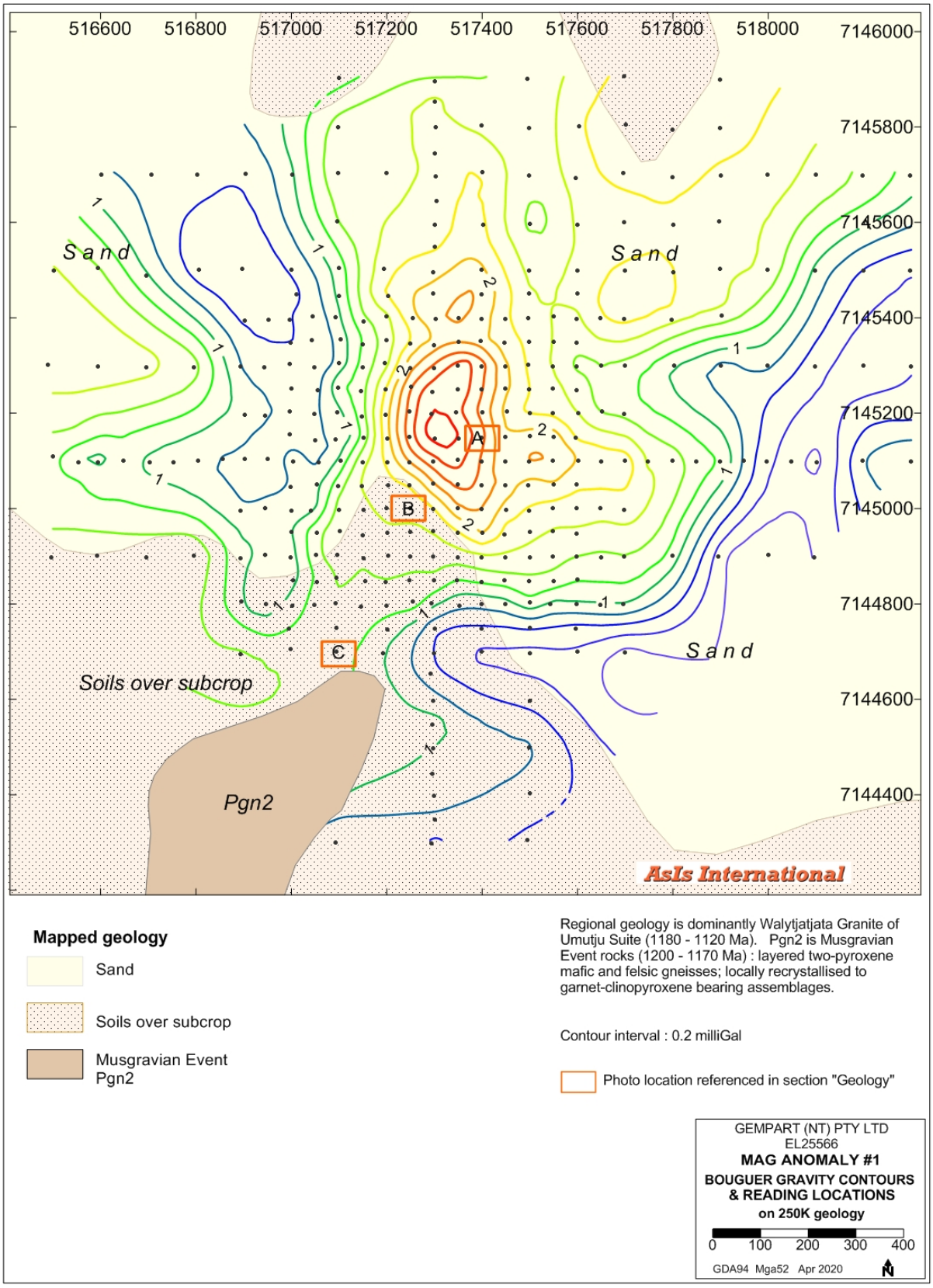


Figure 5. Mag Anomaly #1 prospect. Bouguer gravity contours on 250K geology.

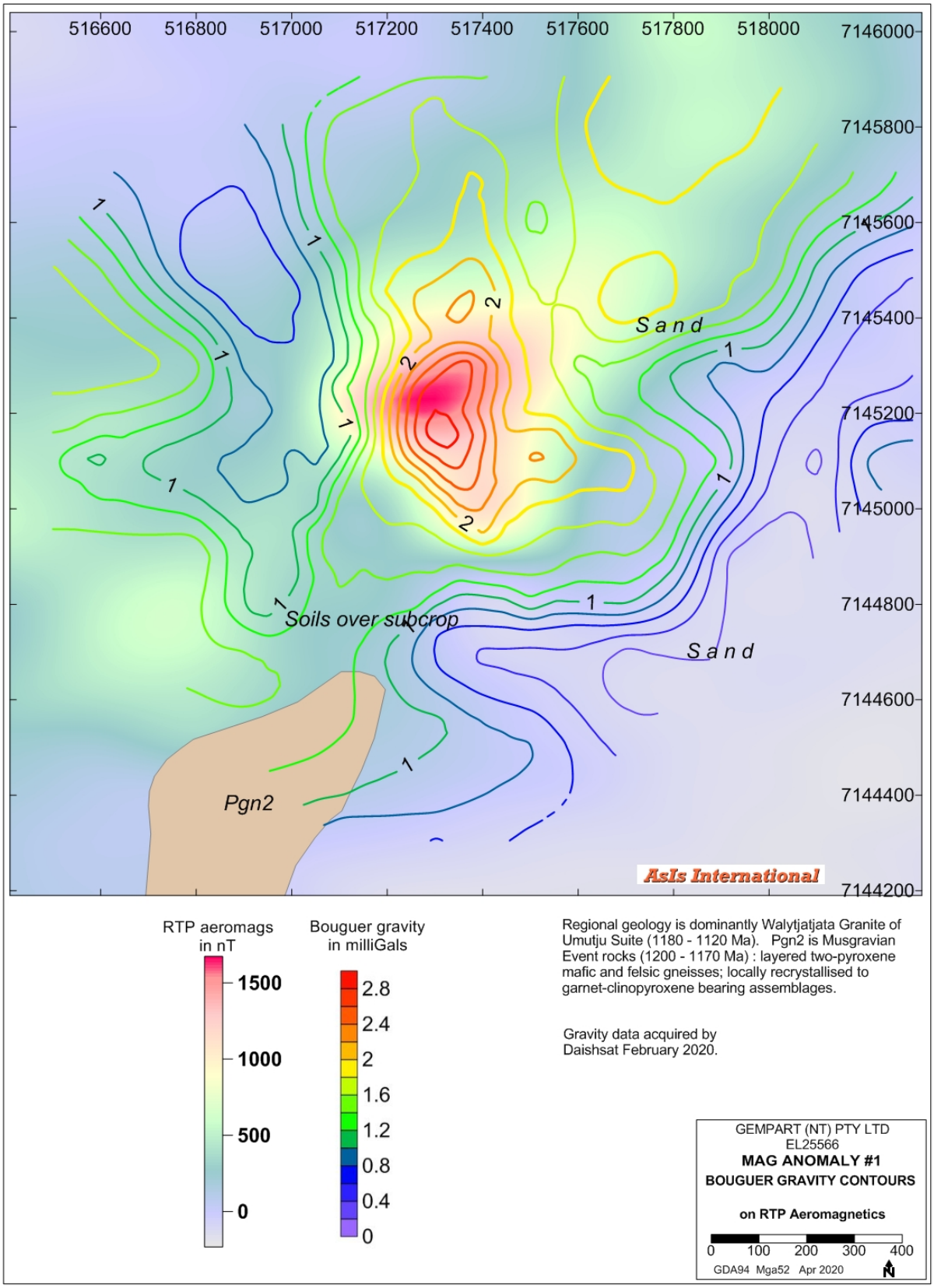


Figure 6. Mag Anomaly #1 prospect. Bouguer gravity contours on RTP aeromagnetics.

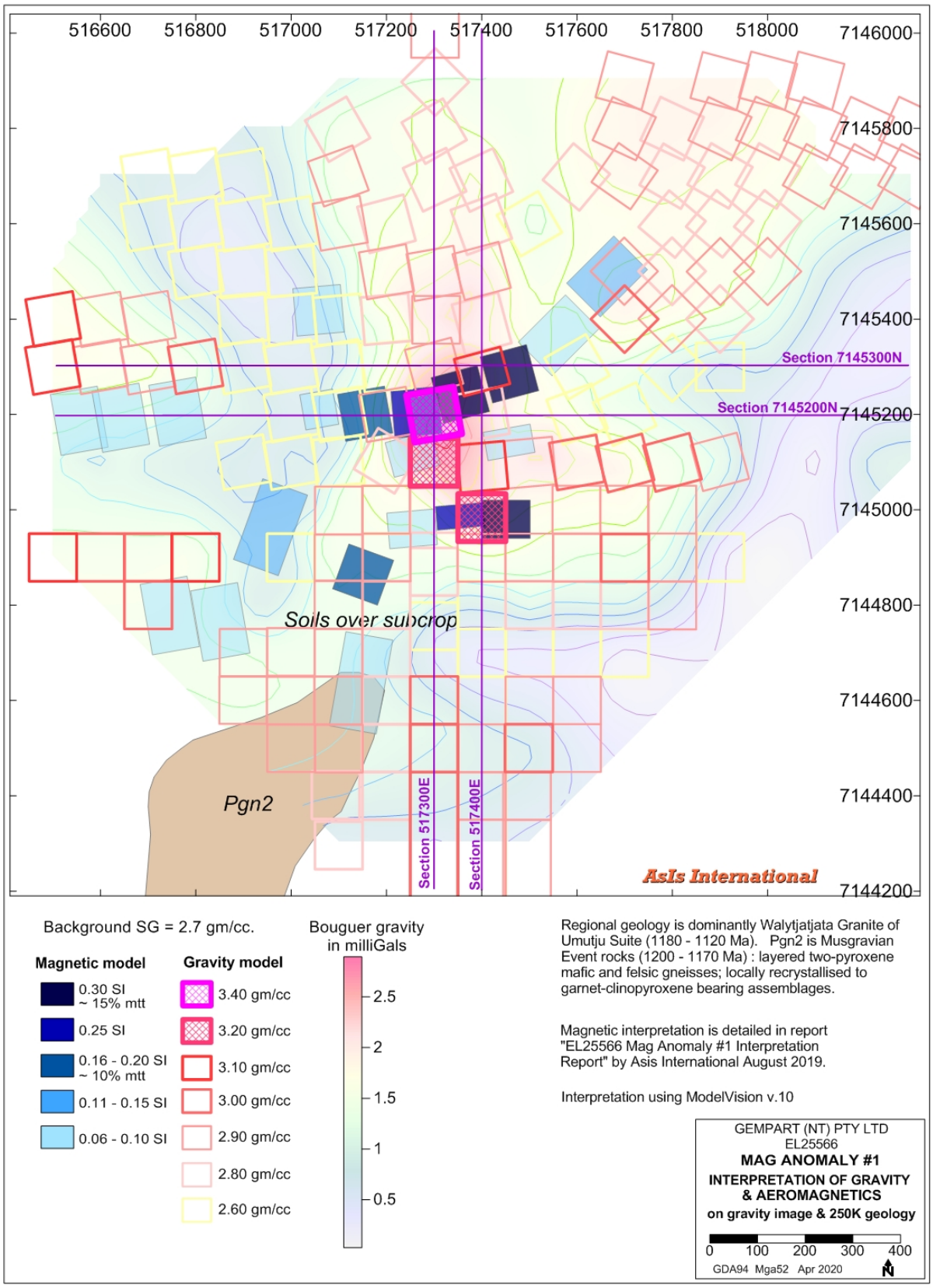


Figure 7. Mag Anomaly #1 prospect. Plan of gravity and aeromagnetic interpretation on Bouguer gravity image.

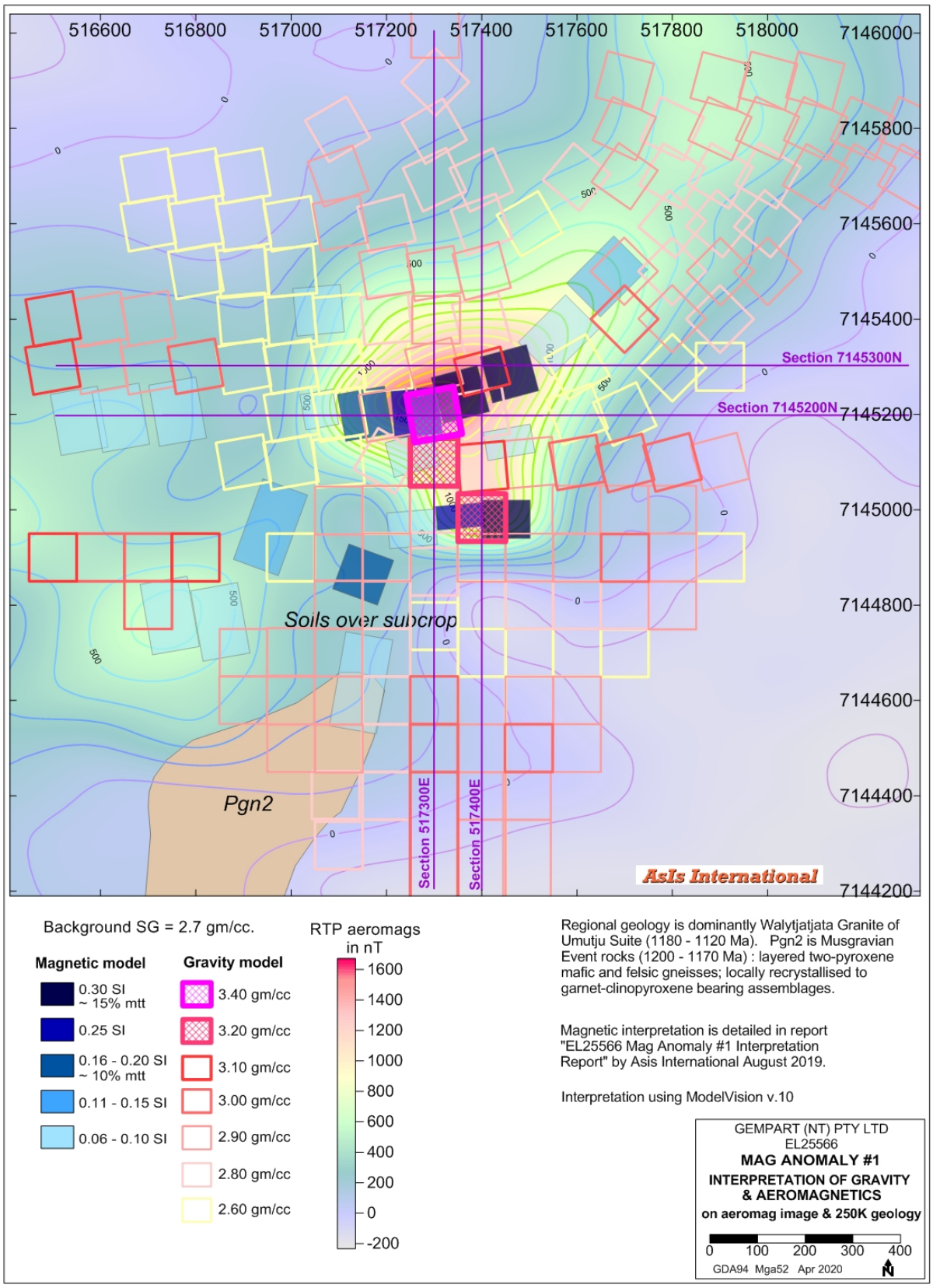


Figure 8. Mag Anomaly #1 prospect. Plan of gravity and aeromagnetic interpretation on aeromag image.

Geological interpretation

A geological interpretation based on the aeromagnetic and gravity data is shown at Figure 9.

The mapped Musgravian Event rocks (Pgn2), comprising mafic and felsic gneisses, crop out in the southern part of the survey area. They correspond to a weakly elevated gravity response and subdued magnetic signature. Based on these characteristics, further similar rocks are interpreted to occur at shallow depth in the southern and western parts of the survey area.

Distinct gravity lows with no associated magnetic response are evident in the north-west and south-east of the survey area. Gravity lows are consistent with, although not diagnostic of, felsic to intermediate granites. Given the regional geology is described as Walytjatjata Granite, the gravity lows are assumed to represent relatively undeformed Walytjatjata Granite.

The lithologies causing the coincident gravity and magnetic highs are different. Outcrop at photo site A is described as hematised granitic gneiss. Generic granitic gneiss in itself does not explain the observed geophysical anomalies. Either there has been substantial local alteration of the granite gneiss, or there is a different rock type. On the interpretation map the area of elevated gravity and magnetic response is labelled as possible Musgravian Event rocks, but different from Pgn2.

Interpreted dips have been described in the previous section. Specifically, they are 70-80° N in the vicinity of the peak of the gravity anomaly. This is shown in the cross sections on 517300E and 517400E at Figures 10 and 11. The interpreted distribution of the bodies with elevated density and magnetic susceptibility also display a vague symmetry, and an overturned antiformal structure striking east-north-east is inferred.

The truncation at the western end of the gravity and magnetic anomalies, and the associated interpreted bodies, strongly suggests a major dislocation or fault zone striking 330°. This structural direction can be seen in the regional image of RTP aeromagnetics at Figure 2. Photo site B is very close to the interpreted structure. Outcrop of deformed granite with a well developed steeply plunging lineation is indicative of thrust faulting.

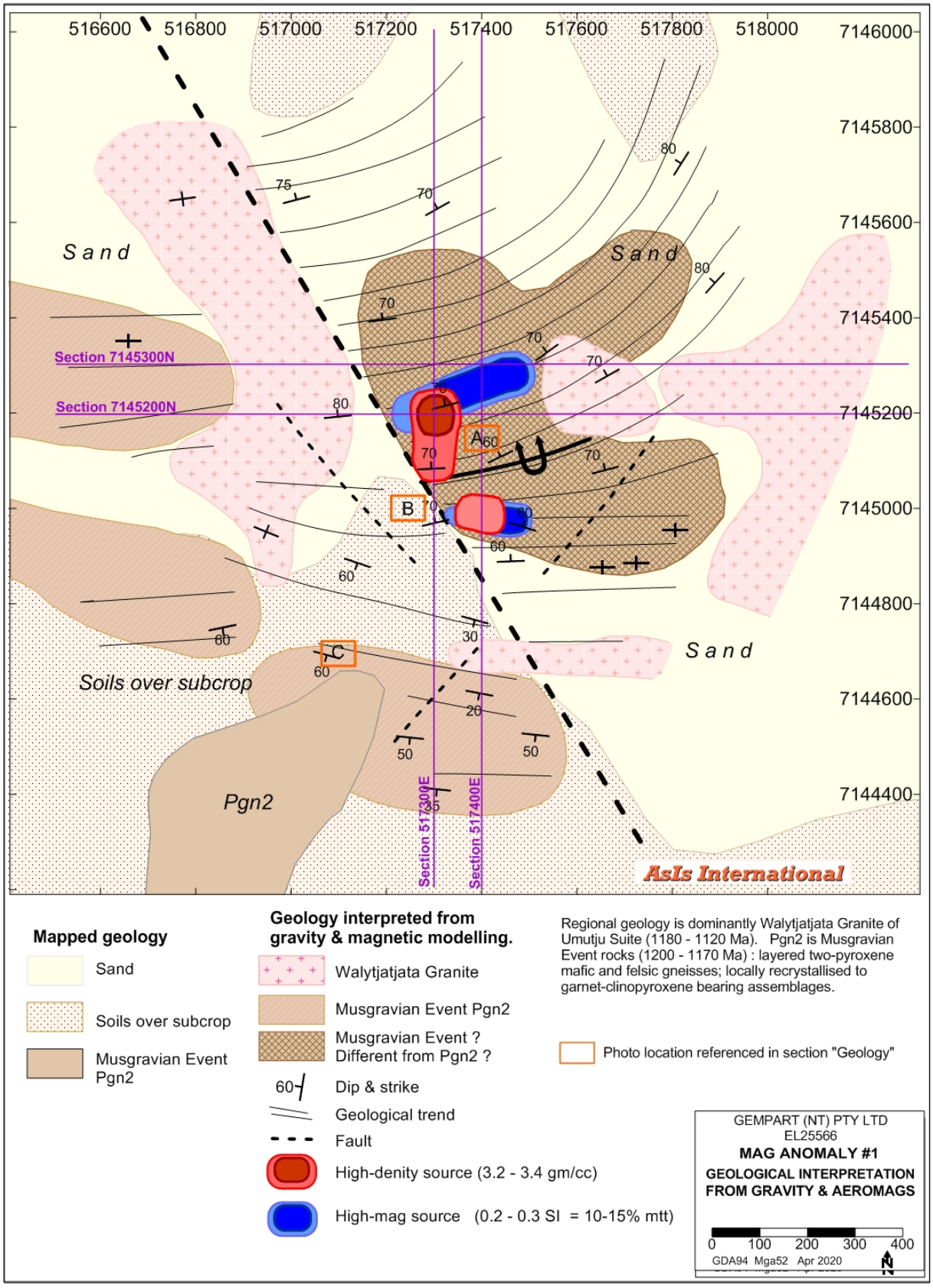


Figure 9. Mag Anomaly #1 prospect. Geological interpretation from gravity & aeromagnetics.

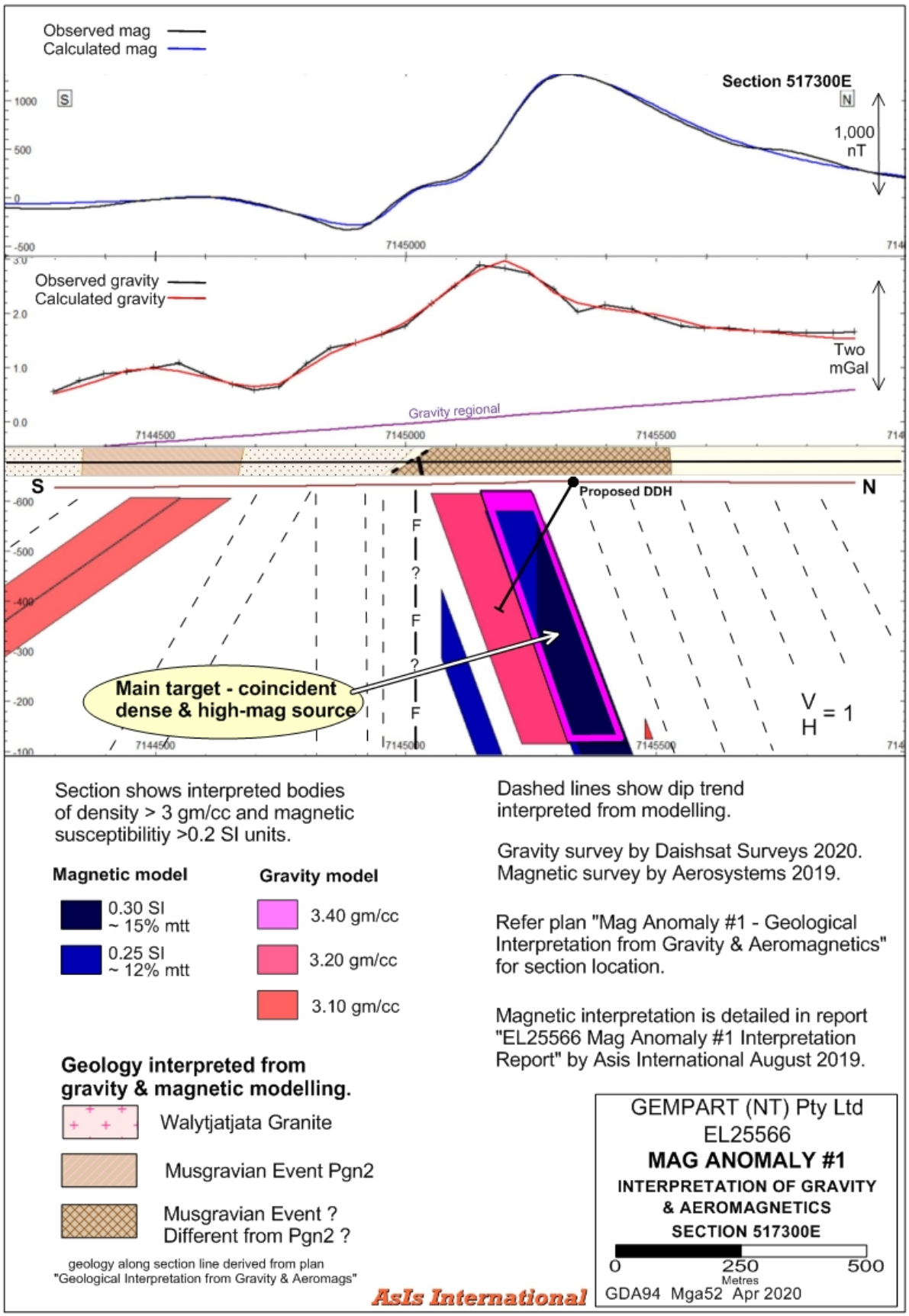


Figure 10. Mag Anomaly #1 prospect - interpretation of gravity and magnetics on section 517300E.

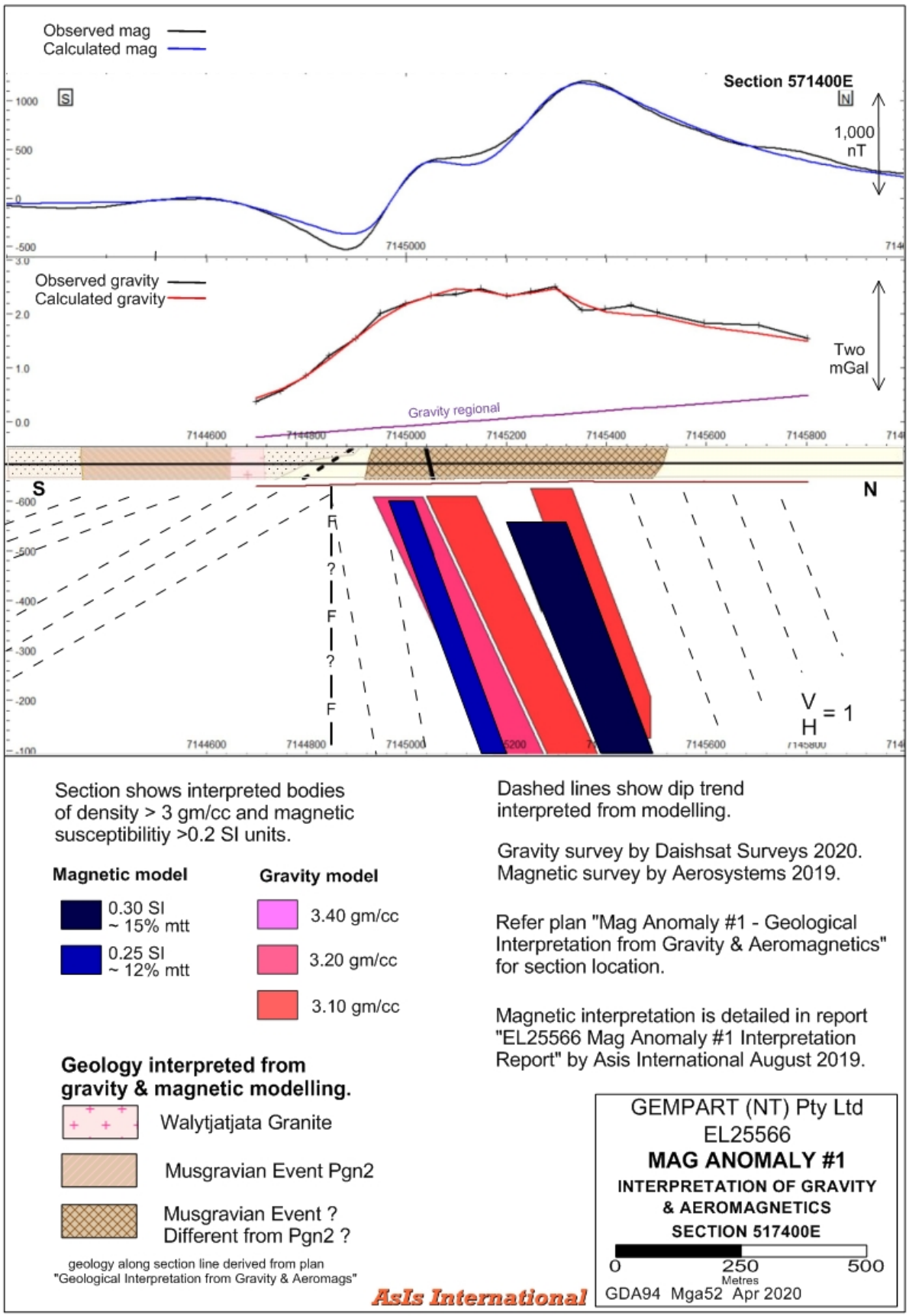


Figure 11. Mag Anomaly #1 prospect - interpretation of gravity and magnetics on section 517400E.

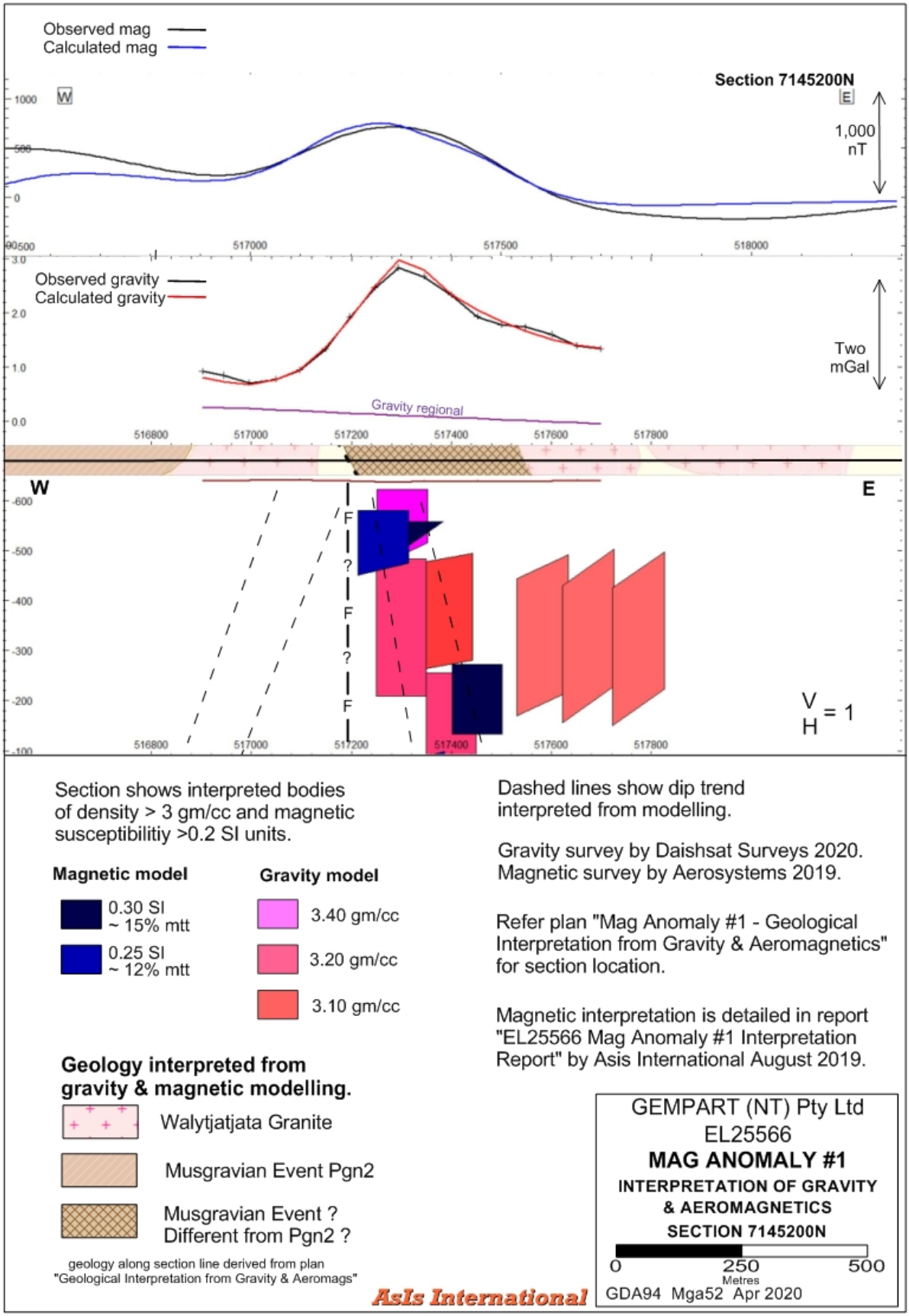


Figure 12. Mag Anomaly #1 prospect - interpretation of gravity and magnetics on section 7145200E.

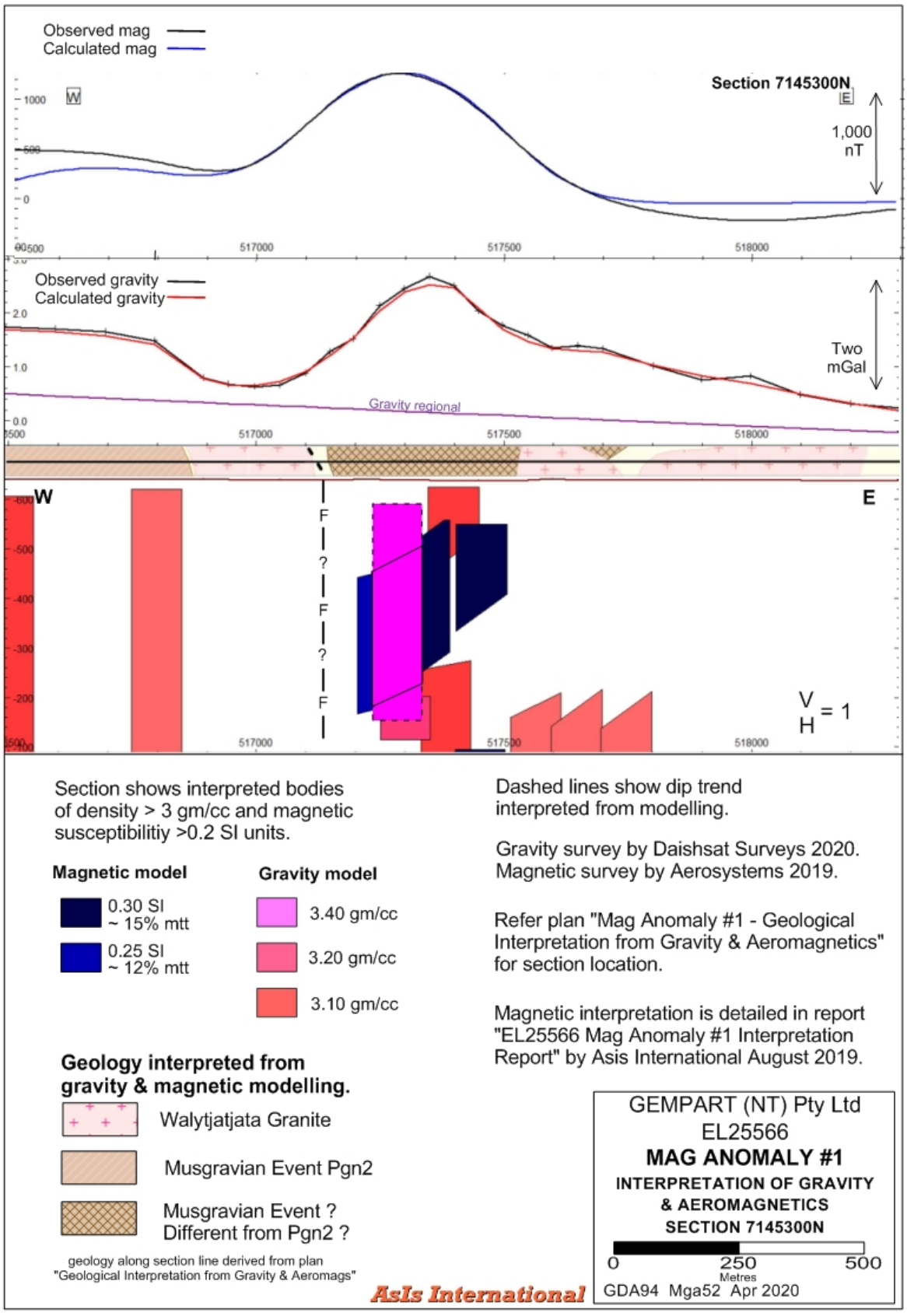


Figure 13. Mag Anomaly #1 prospect - interpretation of gravity and magnetics on section 7145300E.

Economic Potential

Results of modelling indicate a localised development of magnetite coincident with high density minerals in Mesoproterozoic rocks of indeterminate composition.

The Mag Anomaly #1 response is consistent with that observed over skarn type deposits. Examples in the Northern Territory include Johnnies Reward, a magnetite-copper-lead-zinc-gold metamorphic skarn, and Molyhil, an iron-rich molybdenum and tungsten skarn. The Cairn Hill iron-copper-gold deposit in the Mesoproterozoic Gawler Craton in South Australia is another example. All these deposits occur in different geological provinces in older rocks. However given the paucity of hard geological knowledge or exploration data in the area, possibilities of mineralisation models are a blank canvas.

Recommendations for further work

It is recommended that a moving loop ground EM survey could be carried out to test for the presence of bedrock conductor anomalies possibly representing sulphides. A small survey comprising north-south traverses at 50 metre intervals with readings at 50 metre intervals is initially envisaged. Alternatively, the coincident high-density and high-susceptibility source could be tested by one drillhole, shown in Figure 10, with the following collar details.

Easting	: 517300mE
Northing	: 7145330mN
RL	: 639m AHD
Inclination	: -60
Azimuth	: 180 True
Length	: 300 metres.

G. Bubner AsIs International

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References

Scrimegour, I., Close, D.F. and Edgoose, C.J., 1999. Petermann Ranges SG52-7 Explanatory Notes. Northern Territory Geological Survey.