GR461_2019_GA_03_App2_MagGravInterp.pdf

EL31383 - SGC PROSPECT

Coincident gravity & magnetic anomaly - Interpretation Report

Executive Summary

Detailed geophysical surveys on Gempart (NT) Pty Ltd's EL31383 have defined a distinct coincident gravity and magnetic anomaly in the Mesoproterozoic Musgraves Province in the extreme southwest corner of the Northern Territory. There is no outcrop. Detailed modelling shows the source of the anomalies is consistent with high-density ultramafic rocks. Within the region, deeply weathered ultramafics of the Giles Complex host shallow lateritic Ni deposits at Wingellina in Western Australia (185Mt @ 0.98% Ni) and Claude Hills in South Australia (33Mt @ 0.81% Ni).

The interpreted anomaly source may well represent unweathered Giles Complex ultramafics. A drillhole is proposed to test for possible primary Ni-Cr-PGE mineralisation at depth.

Introduction

The SGC (Surveyor-Generals Corner) prospect is located in the southwest part of granted EL31383, 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 coincident gravity and magnetic anomaly about 1.5 kilometres long striking east-west. The maximum amplitude of the ground gravity anomaly is five milliGals, and maximum amplitude of the total field magnetic anomaly recorded on helicopter-borne traverses at 60 metres altitude is 1,200 nT. General location is shown at Figure 1, and the geophysical response is shown at Figure 2.

Multiple geophysical datasets including airborne EM, ground gravity and detailed magnetics/radiometrics have been acquired by Gempart (NT) Pty Ltd. Synthesis of all regional geological information and interpretation of the combined data sets has identified a high density target which should be drilled to test for possible mineralisation of economic value. The primary orebody model is nickel, chromium and PGE's in ultramafics of the Giles Complex.

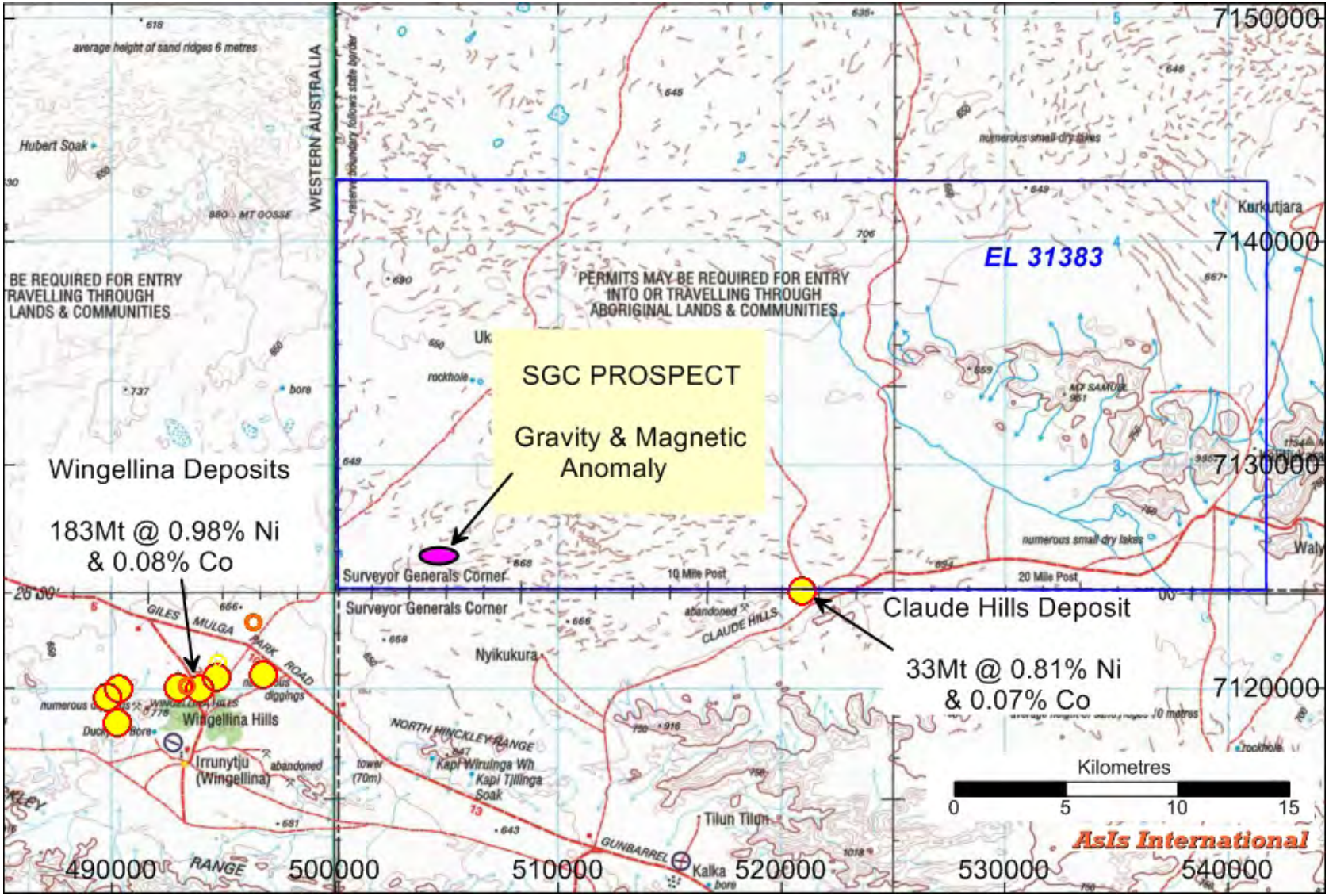

Figure 1. Location Map showing SGC prospect, EL31383 and lateritic nickel deposits.

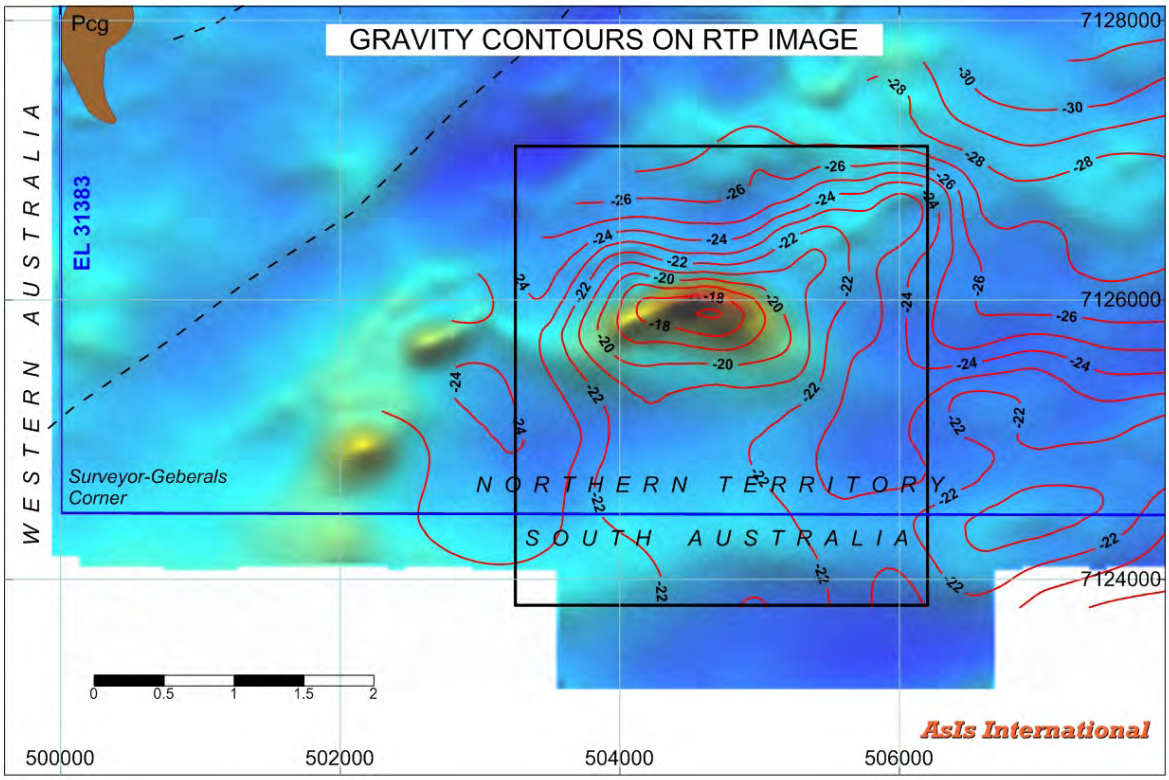

Figure 2. Gravity and aeromagnetic response of SGC prospect.

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 gneissic granite (Pgc) and 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.

Ultramafics of the Giles Complex crop out fifteen kilometres to the east, and to the WSW, of the prospect.

Within the prospect area there is no outcrop. The geology is mapped as Quaternary sands (Qs) with calcrete (Qc) developed over the source of the gravity/magnetic anomaly.

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 area has been virtually unexplored. The Giles Complex ultramafics are known to be prospective for Ni-Cr-PGE mineralisation.

Previous Exploration

Within the general area of the SGC prospect, no historical exploration has been carried out. An airborne magnetic and radiometric survey on 400 metre flight lines, called Petermann survey, was conducted on behalf of the NTGS in 1985. Gravity readings on isolated tracks and wide-spaced stations has been acquired by government agencies. These datasets are of insufficient quality and density for prospect-scale interpretation.

Exploration by Gempart 2018

Gempart (NT) Pty Ltd, as titleholders of EL31383, has completed three surveys and acquired a substantial amount of new data, especially over the southern part of the tenement. Surveys comprised VTEM, ground gravity and low-level aeromagnetics and radiometrics

A VTEM (Versatile Time-domain ElectroMagnetic) survey was completed over an area encompassing the prospect area by UTS Geophysics / Geotech in April 2017. Data was acquired on north-south traverses at 500 metre spacing. Interpretation by K. Blundell revealed no obvious bedrock conductor anomalies in the traverses across the SGC prospect; however the depth penetration of the system in this environment is difficult to quantify due to complete lack of subsurface information from drilling. The location of the VTEM flight lines is shown in Figures 4 and 5.

A ground gravity survey was conducted over an area encompassing the SGC prospect area in October 2018. Contractor Daishsat Surveys acquired readings on a nominal 500x500 metre grid, with infill readings on 250x250 metre grid. A distinct five milliGal gravity anomaly of one kilometre strike length is evident.

A helicopter-borne magnetic and radiometric survey was completed over an area encompassing the SGC prospect by Aerosystems Australia in March 2019. Data was acquired on 200 metre north-south flight lines at a terrain clearance of 60 metres. Over the prospect area flight line spacing was reduced to 100 metres. A distinct 1,200 nT magnetic anomaly is coincident with the gravity anomaly. A solid geology interpretation of the detailed airborne data suggests basement rocks in the area could comprise a mixture of Umutju Granite Suite, gneissic granites of the Musgravian Event, and ultramafics of the Giles Complex.

Readings of elemental concentration were acquired over the anomaly using a portable XRF device in 2019. No anomalous readings were recorded; maximum values in ppm were 48 Cr, 981 Cu, 45 Nb, 4972 Ti and 174 V. Due to lack of outcrop all readings were taken on calcrete.

Interpretation

In order to construct a geological model and define the anomalous masses causing the gravity and magnetic anomalies, the aeromagnetic and gravity data were subject to detailed quantitative interpretation. The process was:

1. Derive profiles of gravity on 100 metre spaced NS traverses from the gridded Bouguer gravity.
2. Forward model the magnetics recorded on 100 metre traverses to establish general dip directions and depth to fresh rock.
3. Using the calculated dips and depths as a guide, forward model the gravity.
4. Interpret lithologies and structures from the data and model.

Interpretation of aeromagnetics

Profiles of magnetic intensity were forward modelled on a line-by-line basis to determine source geometry. The model parameters and results are summarised below, and shown in plan form at Figure 3, and cross-section format at Figures 6 to 9.

Depth to top: This is reasonably well constrained in the modelling. Depth to fresh rock as source of the primary magnetic anomaly is interpreted to vary from 25 to 100 metres below ground level.

Dip: Interpreted dips vary from 40^{o} to 60^{o} south.

True width: Magnetic modelling can only calculate a susceptibility x width product; the individual parameters cannot be independently resolved. For this exercise the thickness was fixed at 100 metres. Interpreted susceptibilities mostly range from 0.1 to 0.2 SI units, roughly equivalent of 8% to 12% magnetite. The maximum value, on line 504400mE, is 0.23 SI units or roughly 14% magnetite.

Depth extent: Except for shallow, depth-limited sources, modelling is not very sensitive to depth extent. Vertical depth extent was arbitrarily set to 700 metres.

The final model is an arcuate south-dipping body two kilometres long, within 25 metres of the surface in the centre and plunging to 100+ metres depth at each end. A simplified outline of the model is shown at Figure 5.

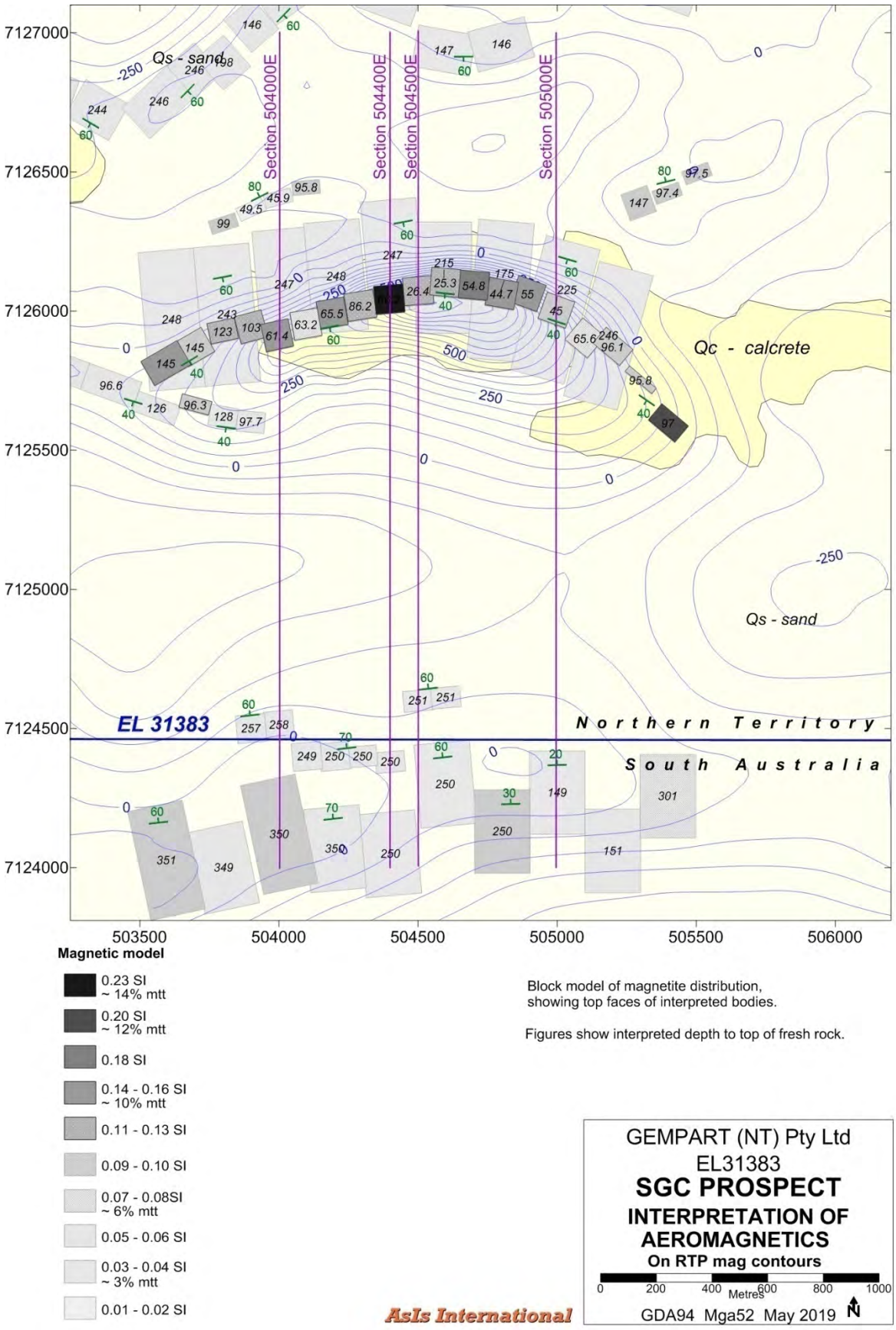

Figure 3. SGC prospect. Interpretation of aeromagnetics on magnetic contours.

Interpretation of gravity

Gravity modelling was carried out on north-south profiles at 250 metre intervals using the actual data acquired on the 250x250 metre infill grid. One profile at 504400E was interpolated from the gridded gravity data. model parameters and results are summarised below, and shown in plan form at Figure 4, and cross-section format at Figures 6 to 9.

Depth to top: Initial depths derived from the magnetic interpretation were applied. However to match the observed amplitude, and restricting the density to a geologically realistic value of 3.4 gm/cc, the high-density bodies modelled at a very shallow depth. Depth to fresh rock is interpreted to vary from 15 to 100 metres below ground level.

Dip: The infill gravity readings at 250 metre intervals do not allow for exacting interpretation of dip, however the data is of adequate density to define a steeper gradient on the north side of the anomaly, indicating a south dip. A dip of 60 degrees to the south, consistent with the magnetic model, was used.

True width: Gravity modelling can only calculate a density x width product; the individual parameters cannot be independently resolved. For this exercise the density was limited to a maximum of 3.4 gm/cc, which is at the high end of geological rocktype densities and representative of ultramafics such as dunite or peridotite. The density model was then constructed in block 'units' of 100 metre thickness. In the centre of the anomaly the thickness of 3.4 gm/cc material is nearly 300 metre thick (this is width of top; true thickness at 60 degree dip is about 250 metres).

Depth extent: Except for shallow, depth-limited sources, modelling is not very sensitive to depth extent. Vertical depth extent was arbitrarily set to 700 metres.

The final model is a complex south-dipping body 1 ½ kilometres long, within 15 metres of the surface in the centre and plunging to 50 metres at the western end and 100+ metres at the eastern end. A simplified outline of the model is shown at Figure5.

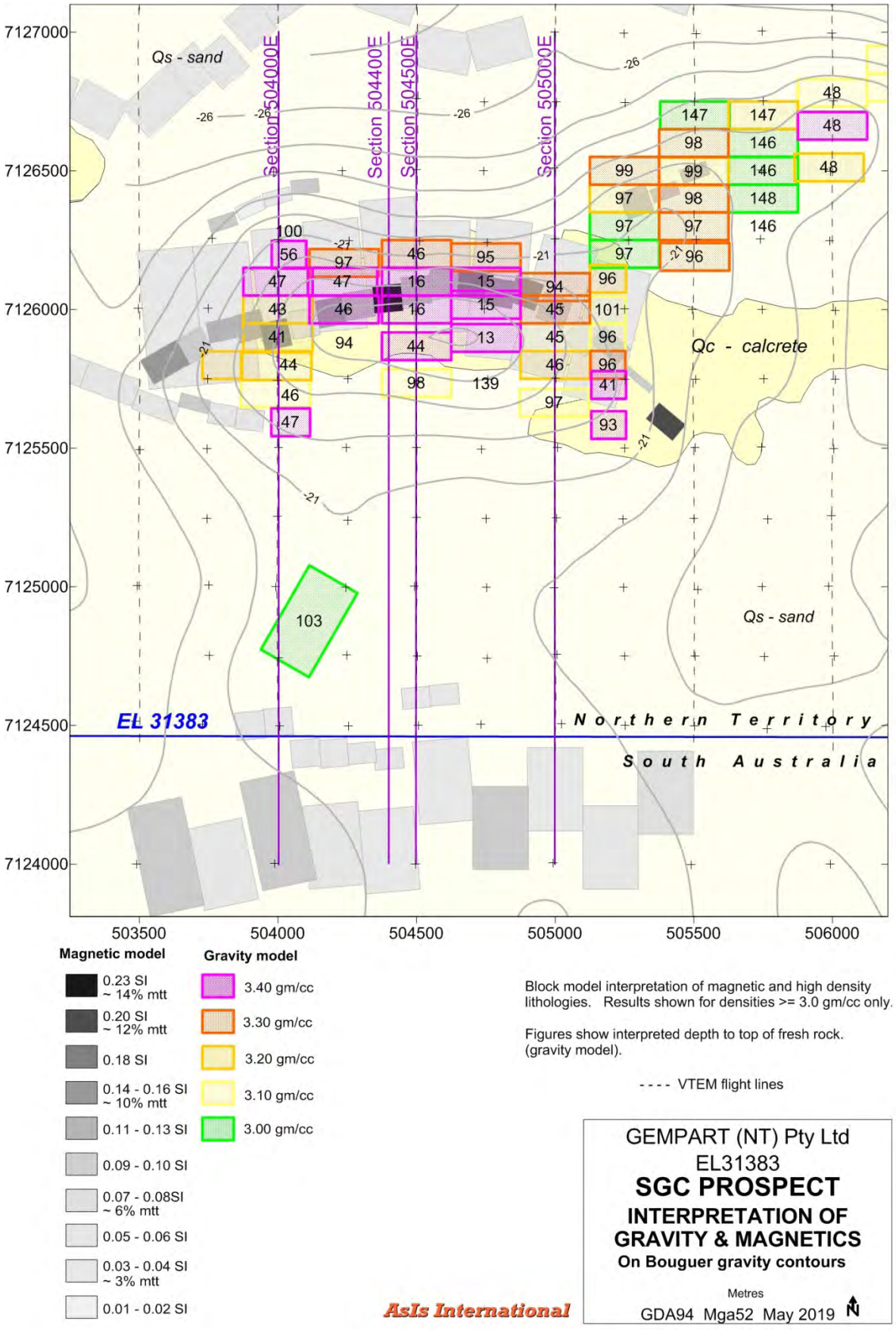

Figure 4. SGC prospect. Interpretation of gravity and magnetics on gravity contours.

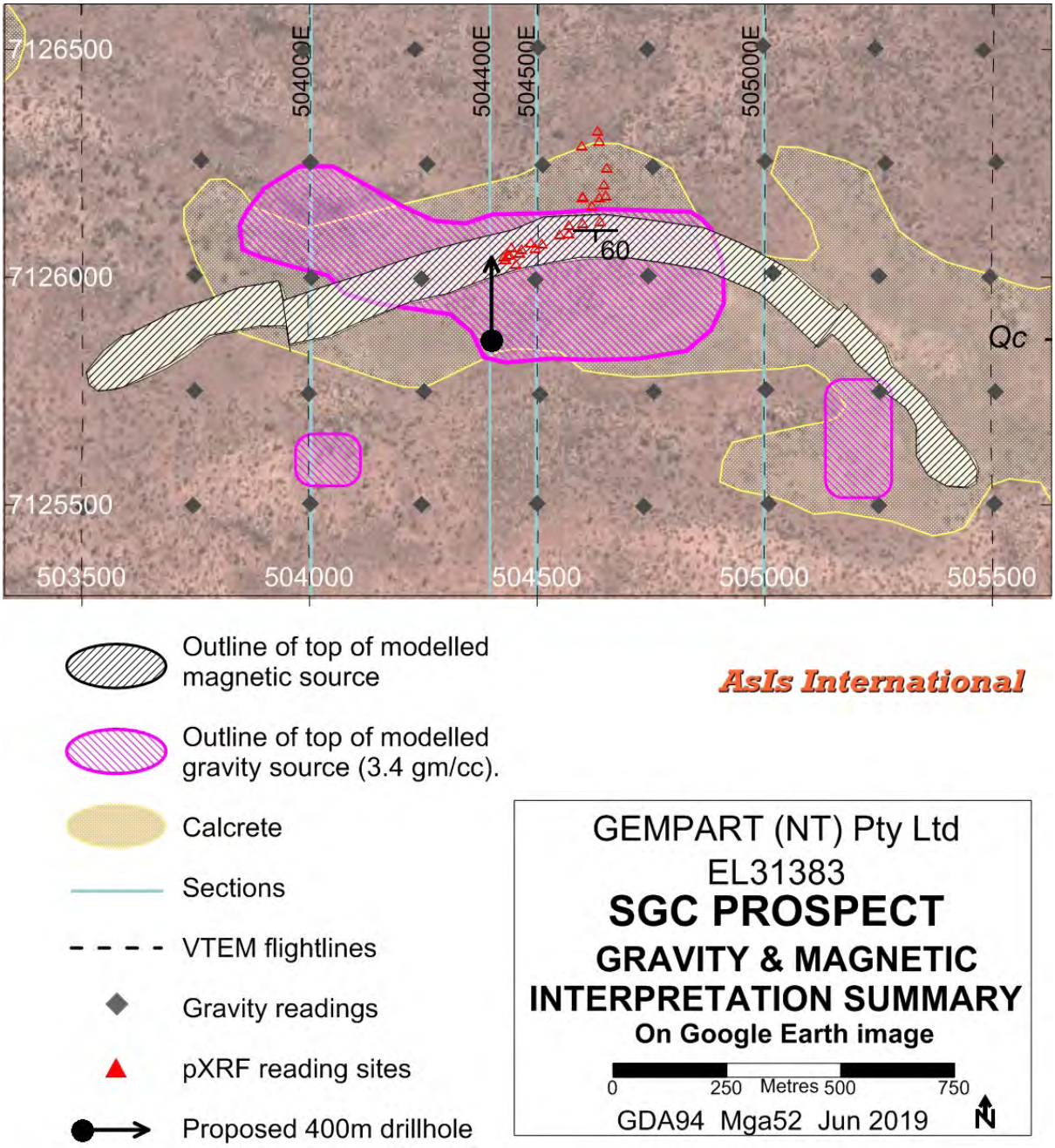

Figure 5. SGC Prospect. Summary of gravity & magnetic interpretation, and proposed drillhole.

Economic Potential

Results of modelling indicate a plausible source of the magnetic and gravity anomaly is ultramafics of the Giles Complex. These outcrop 15 kilometres to the east, near the SA/NT border at the Claude Hills Nickel deposit, and 15 kilometres to the WSW at the Wingellina nickel deposits in Western Australia; refer Figure 1. Also, the presence of calcrete coincident with the anomaly source indicates a local topographic low, which may be caused by preferential weathering of a quartz-poor lithology.

At the Claude Hills nickel deposit, a lateritic nickeliferous ochre deposit has developed from extreme leaching and then enrichment of a peridotite-gabbro intrusion. A (historical) resource has been calculated of 33 million tonnes averaging 0.81% Ni, 0.07% Co and 39% Fe_2O_3. Due to the leaching, the deposit is coincident with a gravity low and has no significant magnetic expression. At Wingellina, numerous limonitic deposits have formed via deep oxide weathering of dunite units of the Wingellina Layered Intrusive Complex. MetalsX (2011) has calculated a JORC compliant resource of 183.2Mt of ore at 0.98% Ni, 0.08% Co and 47% Fe2O3. Due to the deep weathering, the deposits have a small or no magnetic signature.

At the SGC prospect, the positive gravity and magnetic anomaly could represent unweathered ultramafic, with potential for primary nickel, chromium and PGE mineralisation. Although there is no significant response in the airborne EM data, sulphide mineralisation may be at depth.

Recommendations for further work

It is recommended that the modelled source of the observed gravity and magnetic anomalies be drilled to test for economic mineralisation. A single angled drillhole is initially proposed to test, at a depth of 250 vertical metres, the modelled magnetic source of highest susceptibility where it coincides with modelled high densities of 3.4 gm/cc. The proposed drillhole is shown on the summary plan at Figure 5, and section 504400E at Figure 7. Collar information is:

Easting	: 504400	Inclination	: -70
Northing	: 7125860	Declination	: 000 degrees True
RL	: 646 metres	Length	: 400 metres

G. Bubner 16th June 2019 Mob: 0417 831400

AsIs International

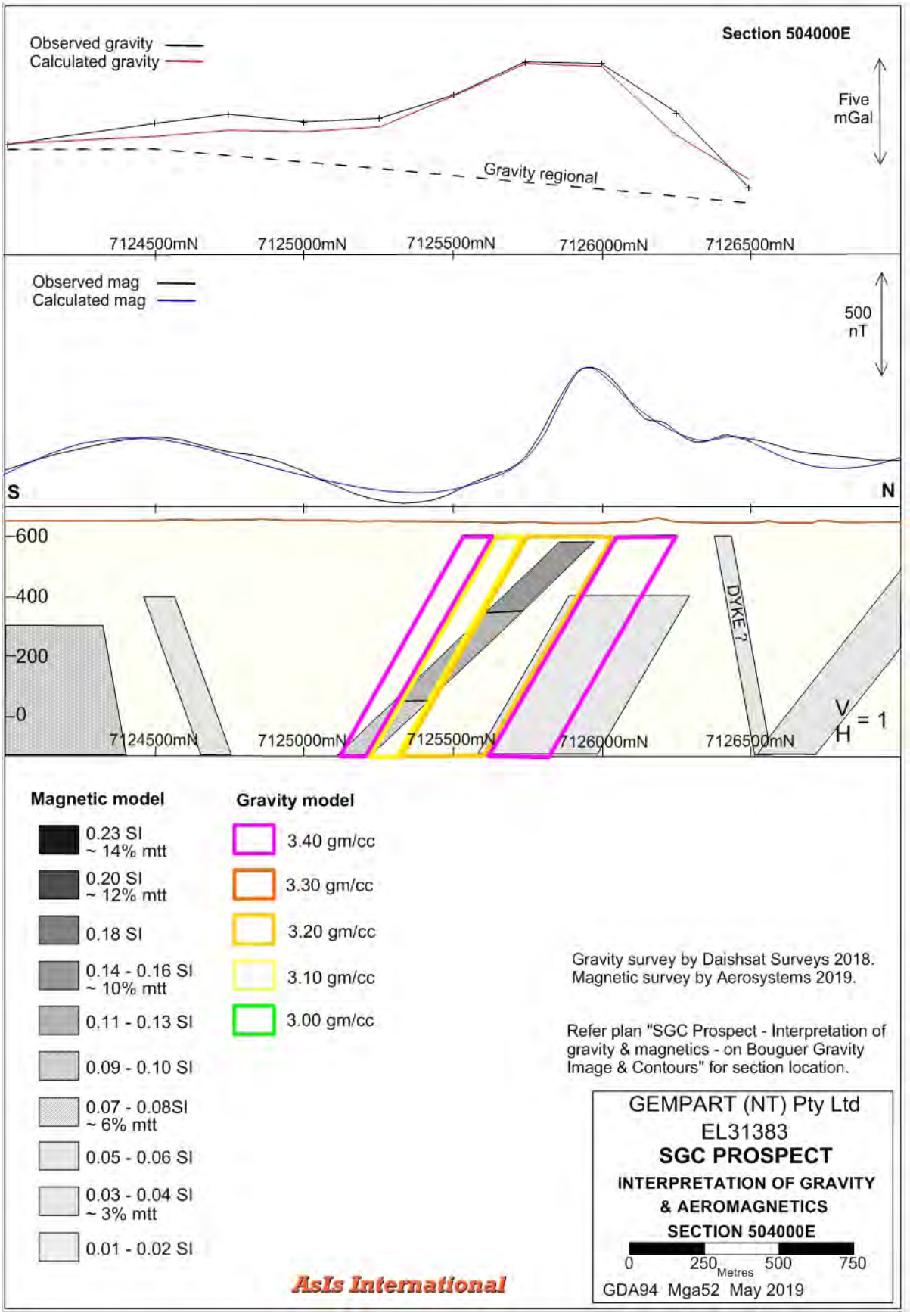

Figure 6. SGC prospect Interpretation of gravity and magnetics on section 504000E.

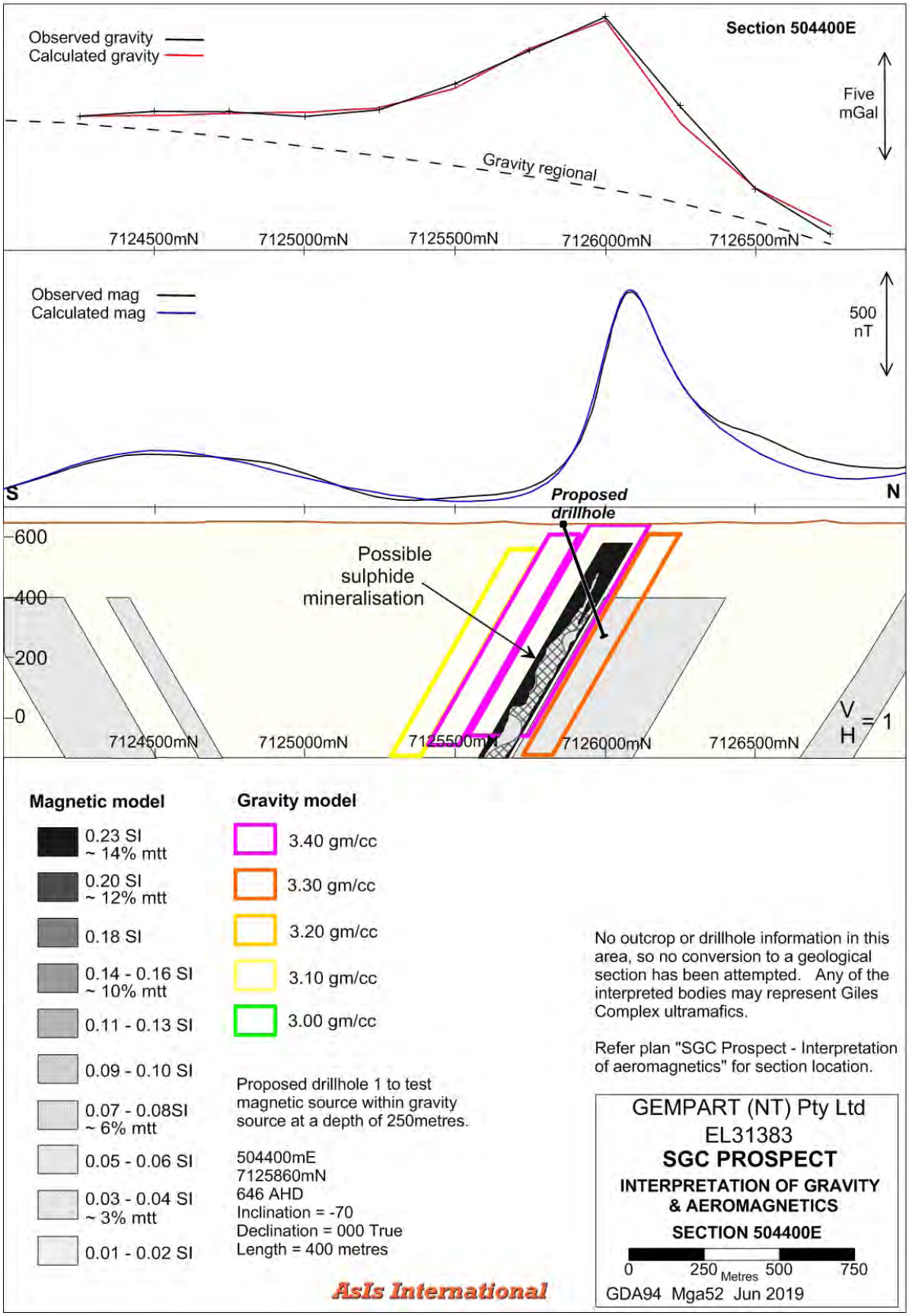

Figure 7. SGC prospect Interpretation of gravity and magnetics on section 504400E.

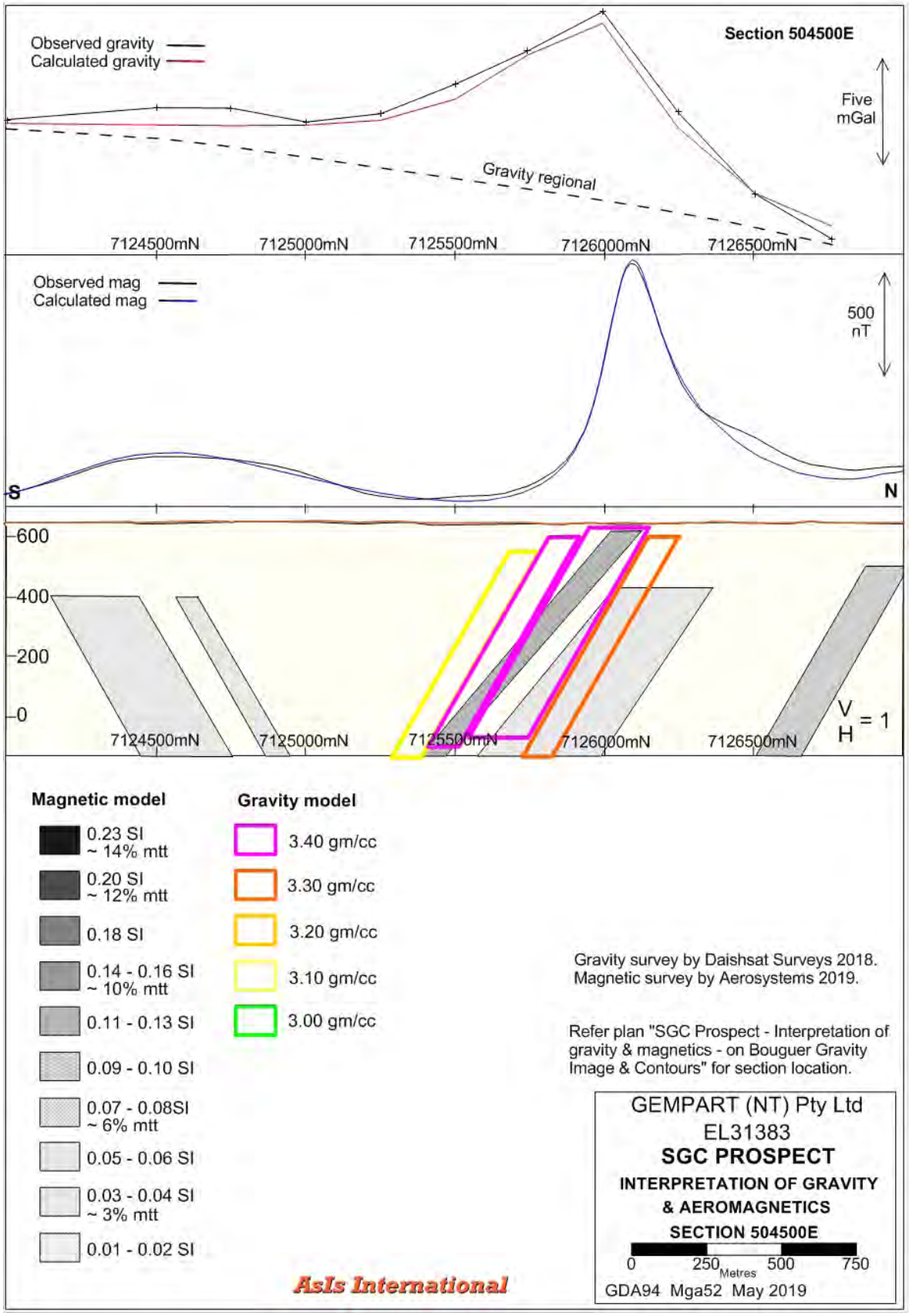

Figure 8. SGC prospect Interpretation of gravity and magnetics on section 504500E.

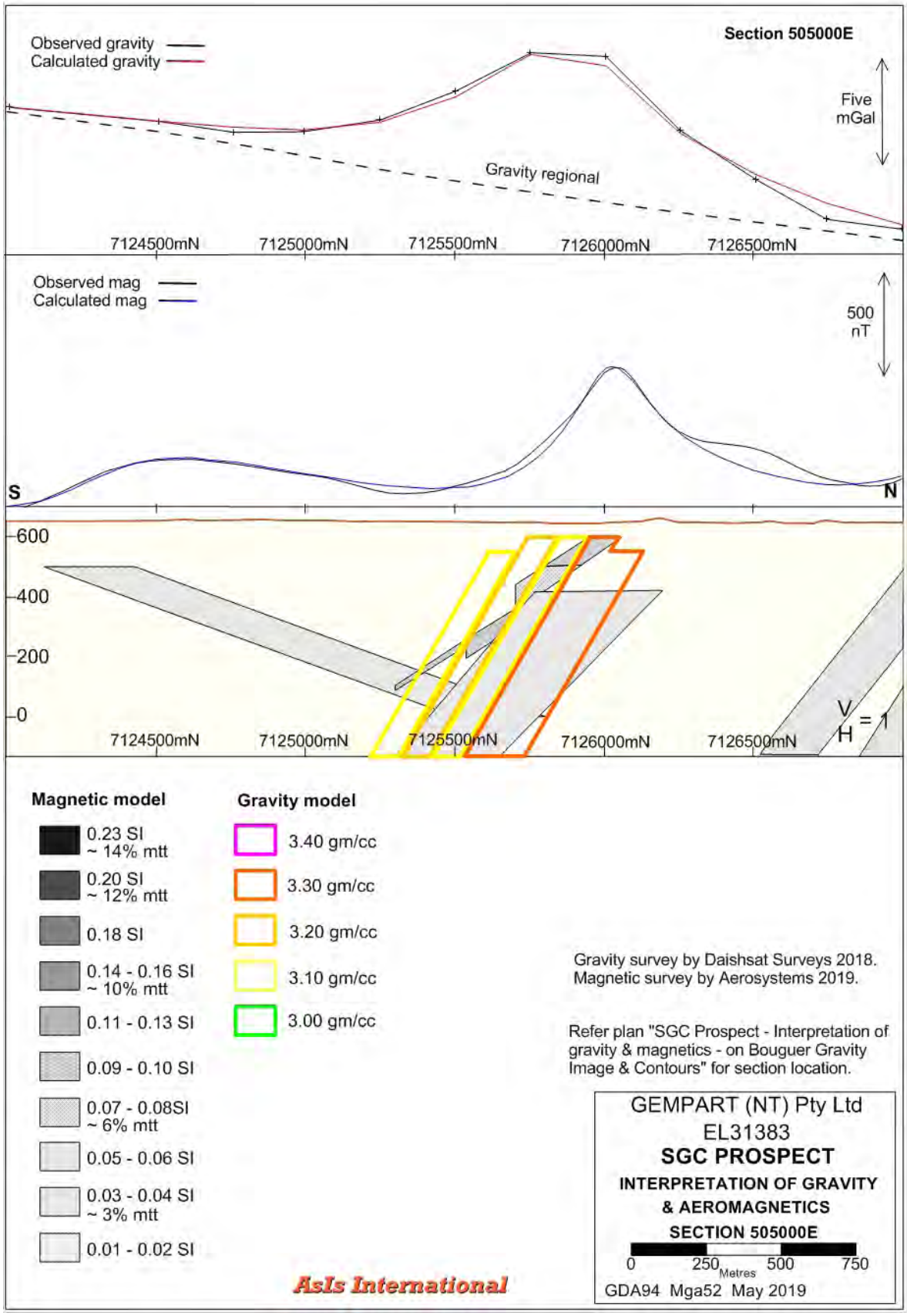

Figure 9. SGC prospect Interpretation of gravity and magnetics on section 505000E.

References

NTGS, 1985. Petermann airborne magnetic and radiometric survey. Flown by Austirex International on 500 metre north-south lines at 100 metres terrain clearance. GA survey no. 554.

MetalsX Limited, 2011. ASX Release. *Metals X sells 20% of Wingellina Nickel-Cobalt Project for a Consideration worth Approximately $50M.*

Miller, P.G. and Rowan, I.S., 1966. Nickel Exploration - Claude Hills Extension, Northern Territory. SADME Mining Review 125 p52-65

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