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Report for Tasmania Energy Metals Pty Ltd
Scotts-Vulcan Mineral Resource Estimate
Project Number AU10285
March 2020

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1 EXECUTIVE SUMMARY

Snowden Mining Industry Consultants Pty Ltd (Snowden) was requested by Tasmania Energy Metals Pty Ltd (TEM) to compile a Mineral Resource estimate for the Scotts Hill and Mount Vulcan nickel laterite deposits (collectively referred to as “Scotts-Vulcan”), located approximately 3 km west of the town of Beaconsfield in Tasmania. The Scotts-Vulcan deposit forms part of the Barnes Hill nickel laterite project and occurs approximately 3 km to the northwest of the Barnes Hill deposit.

Snowden has not completed a site visit to the Barnes Hill project, which includes Scotts-Vulcan, at this stage; however, a visit is anticipated to occur in 2020 when drilling recommences.

Initial drilling at Scotts-Vulcan was completed in 1997, with additional drilling along access tracks completed by TEM in 2019.

1.1 Geology

The Barnes Hill and Scotts-Vulcan deposits formed from the chemical weathering of a serpentinised, ultramafic parent rock derived from the Andersons Creek Complex. The laterite profile at Scotts-Vulcan is similar to the profile at Barnes Hill and comprises (from top to bottom):

- Surficial pisolitic soil horizon
- Fe-rich lateritised hard-cap zone (in places)
- Laterite zone
- Limonite zone
- Transitional zone
- Saprolite zone
- Saprock zone
- Bedrock/serpentinite.

The geological interpretation of the laterite horizons was developed based on the profile interpreted in 2010 for the nearby Barnes Hill deposit and used in the 2010 Barnes Hill resource model (Snowden, 2010). At Scotts-Vulcan however, the upper ferruginous portion of the profile is not as well developed as at Barnes Hill and is interpreted to be less continuous, based on the current drill spacing. Snowden believes it is reasonable to combine the pisolite, hard-cap, laterite and limonite zones into a single “laterite” domain, given the somewhat gradational nature of the internal boundaries.

1.2 Data

Drilling at Scotts-Vulcan was conducted over two main phases, with initial drilling comprising 47 holes drilled in 1997 and an additional 20 holes drilled in 2019. The additional holes were largely drilled on existing access tracks to minimise ground disturbances. Drilling has primarily comprised air-core drilling (94% of drilled metres), with five short diamond core holes drilled in 1997.

There is some uncertainty with respect to the collar location of the historical data (i.e. 1997 drilling). Snowden applied a transformation from the AGD66 grid system to MGA94 Zone 55. The resulting, transformed coordinates were verified by TEM as being visually correct. The transform shifts the historical collar locations approximately 212.6 m horizontally to the northeast. Snowden strongly recommends that where collars for the historical drilling can be located, TEM resurvey the collars to verify the collar coordinates.

Air-core samples for the 1997 drilling were collected at 1 m intervals from which a nominal 0.5–1.5 kg sample was collected using a PVC or aluminium scoop. A similar method was used for the 2019 drilling, with an average of approximately 380 g collected by spearing from each metre. Snowden recommends that for future drilling, a splitter (e.g. riffle or rotary) is used to collect representative samples from the drill intervals and that larger samples, of approximately 2–4 kg, are required to reduce the sampling error (i.e. improve the sampling precision). Snowden also recommends that the sampling procedures are reviewed prior to any future drilling programs.

Samples from the 2019 drilling were submitted to the ALS Laboratory in Brisbane (322 samples) and Perth (an additional three potentially fibrous samples redirected from Brisbane) for sample preparation and assaying by borate fusion x-ray fluorescence (XRF).

Quality assurance and quality control (QAQC) for the historical data, which comprised inclusion of reference materials and field duplicates at a rate of approximately 1:50, was assessed by Snowden in 2010 for the Barnes Hill resource model. The drilling at Scotts-Vulcan was conducted concurrently with the drilling at Barnes Hill using the same QAQC protocols. Overall, the certified reference material (CRM) results show acceptable analytical accuracy was achieved for the 1997 assaying with no significant bias identified, and the duplicate data was deemed to be within acceptable variance limits.

For the 2019 drilling, TEM inserted CRMs and field duplicates into the sample batches with an insertion rate of approximately 1:40 for each of the CRMs and duplicates. Control charts for Ni show that there is no analytical bias and a high level of analytical accuracy has been achieved. In Snowden's opinion, field duplicates from the 2019 drilling generally show reasonable precision, although there appears to be an issue with the duplicates in holes SH004 and SH006, which show significant differences in MgO, Fe_2O_3 and SiO_2. These differences may be due to some samples being out of sequence and Snowden recommends that TEM investigates these two sample batches. Additionally, a batch of 36 sample pulps was sent to the SGS laboratory in Perth for check assaying, with the SGS check assays comparing closely to the ALS primary assays, with typical differences of 1–2%.

A topographic surface was provided by TEM, based on a light detection and ranging (LiDAR) derived 5 m digital elevation model of the northwest region of Tasmania completed by Geoscience Australia in 2013. The LiDAR has a reported 0.15 m vertical and horizontal accuracy.

1.3 Statistical analysis and variography

Prior to statistical analysis and estimation, the drillhole data was coded according to domain and composited to 1 m intervals.

Summary statistics for Ni, Co, Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2 within each domain, show that for the majority of domains and elements, the distributions are close to normally distributed and comprise a single population. Top cuts were applied to Co and MgO grade distributions within the Limonite-Laterite Domain to reduce the impact of outliers on the local block grade estimates. No other top cuts were applied.

Variograms were generated to assess the spatial continuity of the various elements and as inputs to the kriging algorithm used to interpolate grades. Due to the limited data, the Transitional, Saprolite and Saprock domains were combined for the variography. No clear direction of continuity was evident and as such, the variograms were modelled with the major direction (direction 1) oriented 00→000, the intermediate direction (direction 2) oriented 00→090 and the minor direction (direction 3) oriented 90→000.

1.4 Block model and grade estimation

A block model was compiled using a parent block size of 50 mE x 50 mN x 1 mRL, based on the nominal drillhole spacing along with consideration of the geometry of the mineralisation and variogram models.

In situ dry bulk density values were assigned to each block based on the domain code. As no density samples have been collected at Scotts-Vulcan and given the similar geology to Barnes Hills, the values were applied as per the current Barnes Hill Mineral Resource estimate, as detailed in Snowden's 2010 report on the Barnes Hill Mineral Resource estimate.

Snowden estimated Ni, Co, Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2 using ordinary block kriging (parent cell estimates) using Datamine Studio RM software. All domain boundaries were treated as hard boundaries for estimation purposes, with only assays from within each wireframe/domain used to estimate blocks within that domain. Dynamic anisotropy was used to locally adjust the orientation of the search ellipse and variogram models due to variations in the dip and strike of the domains.

Based on consideration of the variography, along with the general data spacing, a search ellipse of 200 m x 150 m x 5 m was used, with a minimum of eight samples and maximum of 16 samples. The second search pass utilised double the search ellipse radii (i.e. 400 m x 300 m x 10 m), with the same minimum and maximum sample criteria. For the third search pass, the minimum number of samples was reduced to two and the search radii tripled (i.e. 600 m x 450 m x 15 m). The same search ellipse ranges and parameters were used for all variables to ensure that where possible, the same samples were used for all variables to maintain correlations; however, Snowden notes that the coverage is not equal for all assays (Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2 have less assays compared to Ni and Co as not all samples from the 1997 drilling were assayed for all elements, as is the case for the 2019 drilling).

The block grade estimates were validated using:

- Visual comparison of the block grade estimates and the input drillhole composites
- Global comparison of the average composite (naïve and de-clustered) and estimated block grades
- Grade trend plots (also known as swath plots) analysis of the block grades and the input drillhole composites with respect to the de-clustered means
- Comparison of correlations in the input data and block estimates.

The conclusions from the model validation work are as follows:

- Visual comparison of the model grades and the corresponding drillhole grades shows a good correlation and trends observed in the drilling are honoured in the block estimates
- Given the uneven sampling, the correlations evident in the sample data are reproduced in the block grade estimates
- The grade trend plots display acceptable reproduction of the patterns in the drillhole grades, given the relatively sparse data
- The global average grades for blocks estimated in the first or second search pass, are generally within 5% of the global average sample grade for each domain.

1.5 Mineral Resource classification

The Scotts-Vulcan Mineral Resource estimate was classified and reported in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012). Snowden believes there are reasonable prospects for eventual economic extraction of the resource based on pit optimisations carried out by Snowden for the nearby Barnes Hill deposit, which has similar geological and chemical characteristics to Scotts-Vulcan (Snowden, 2010).

The Mineral Resource has been classified in its entirety as an Inferred Resource. The classification was developed based on an assessment of the following criteria: nature and quality of the drilling and sampling methods; drill spacing; uncertainty in the collar coordinates of historical holes due to grid transformations; confidence in the understanding of the underlying geological and grade continuity; analysis of the QAQC data; confidence in the estimate of the mineralised volume; results of the model validation; and the quantity of bulk density data.

The resource classification scheme adopted by Snowden for the Scotts-Vulcan Mineral Resource estimate is outlined as follows:

- Where blocks are located within approximately 125 m of a drillhole, the Transitional (Domain 45), Saprolite (50) and Saprock (55) domains were classified as Inferred Resources
- Blocks within the Transitional (Domain 45), Saprolite (50) and Saprock (55) domains greater than approximately 125 m from a drillhole, remain unclassified and do not form part of the Mineral Resource
- The Bedrock (60) and Laterite-Limonite (40) domains remain unclassified and do not form part of the Mineral Resource.

Extrapolation horizontally beyond the drilling is limited to approximately 125 m.

1.6 Mineral Resource statement

The Mineral Resource for the Scotts-Vulcan deposit, reported above a 0.5% Ni cut-off grade, is estimated to be 7.7 million tonnes (Mt) grading at 0.67% Ni and 0.047% Co, as detailed in Table 1.1.

Table 1.1 Scotts-Vulcan Mineral Resource estimate, March 2020

Class	Domain	Tonnes (Mt)	Ni %	Co %	MgO %	Fe_2O_3 %	SiO_2 %	Al_2O_3 %	MnO %
Inferred	Transitional	1.2	0.65	0.093	3.7	42.4	29.9	8.5	0.5
	Saprolite	3.0	0.76	0.052	12.0	29.8	38.7	5.7	0.4
	Saprock	3.5	0.61	0.025	26.6	15.7	42.8	2.7	0.2
Total		**7.7**	**0.67**	**0.047**	**17.3**	**25.4**	**39.2**	**4.8**	**0.3**

Note: Small discrepancies may occur due to rounding.

The cut-off grade of 0.5% Ni is based on the pit optimisation results Snowden completed for the nearby Barnes Hill deposit in 2010 (Snowden, 2010) and is commensurate with similar deposits. Snowden believes that the cut-off grade is reasonable assuming a standard open-pit mining approach with low-to-moderate selectivity.

Extensive historical metallurgical testwork has been conducted on the Barnes Hill deposit, which is located approximately 3 km south of Scotts-Vulcan, since 1968, with the last testwork completed in 2012. Snowden believes that, given the similar geology of the Scotts-Vulcan deposit to Barnes Hill, it can be reasonably assumed that similar recoveries should be able to be achieved at both locations and that this historical testwork also informs assumptions around the viability of processing the Scotts-Vulcan ore. The work is outlined in Snowden's February 2020 update of the Barnes Hill Mineral Resource estimate (Snowden, 2020). The testwork was conducted on composite samples from diamond core along with bulk samples from trenches. Various acid leaching tests were performed, at both atmospheric temperatures and higher temperatures of up to 260°C, along with different acid concentrations and residence times.

During 2019, TEM performed initial testwork on samples from Scotts Hill and Mount Vulcan. The aim of the program was to confirm that Scotts-Vulcan ore would perform similarly to Barnes Hill ore, and also to test improved operating conditions. For the testwork, TEM selected a purposive sample of 90 m intersections from the 2019 air-core drilling. The samples were checked for representativeness against the Barnes Hill Mineral Resource estimate.

Following this, the entire bag of these 90 drilled intersections (excluding the speared laboratory sample), was sent to the Beijing General Research Institute of Mining & Metallurgy (BGRIMM). A total of 518.5 kg of material was received by BGRIMM, with an average sample weight of 5.8 kg. The testwork applied sequential leaching with varied blends of feed ore.

In the first stage, a blend of limonite/saprolite was processed with a high dosage of acid (950 kg/t ore) at a leaching temperature of 95°C. This was followed by a further stage of leaching of saprolite feed in an autoclave, where no additional acid was added but the temperature was raised to approximately 160°C. A screened large-sized fraction from the saprock domain was then used for a neutralisation stage. This was ground and used in a tertiary leach to commence neutralisation, with no additional acid added and operating at a temperature of 90°C. Results supported the ability to achieve overall nickel and cobalt extractions of 90% with an acid consumption of 509 kg/t ore across the three leaching stages.

2 INTRODUCTION

Snowden was requested by TEM to compile a Mineral Resource estimate for the Scotts Hill and Mount Vulcan nickel laterite deposits (collectively referred to as "Scotts-Vulcan"), located approximately 3 km west of the town of Beaconsfield in Tasmania. The Scotts-Vulcan deposit forms part of the Barnes Hill nickel laterite project and occurs approximately 3 km to the north of the Barnes Hill deposit.

The Scotts-Vulcan deposit straddles granted Exploration Lease EL 2/2017 and Mining Lease 1872P/M, although the majority of the resource occurs within EL 2/2017. Tasmania Energy Metals Pty Ltd (TEM) is the registered holder of 100% of Mining Lease 1872P/M. TEM has entered into a binding agreement to acquire 100% of EL 2/2017 from its registered holder, Monclar Pty Ltd. Mineral Resources Tasmania approved the transfer without conditions on 12 February 2020 and has formally filed the transfer documentation. The updated registration is expected to be published in early 2020. The tenement details are summarised in Table 2.1.

Table 2.1 Tenement details

Lease ID	Type	Area	Grant date	Expiry date	Holder
EL 2/2017	Category 1 Exploration Lease	13 km^2	25 Aug 2017	24 Aug 2022	Monclar Pty Ltd (transfer to Tasmania Energy Metals Pty Ltd approved 12 February 2020)
1872P/M	Category 1 Mining Lease	903 ha	22 Jun 2011	30 May 2026	Tasmania Energy Metals Pty Ltd

Initial drilling at Scotts-Vulcan was completed in 1997, with additional drilling along access tracks completed by TEM in 2019.

Snowden estimated a Mineral Resource for the Barnes Hill deposit in November 2010, which was reported at the time in accordance with the 2004 Edition of the JORC Code. The Mineral Resource reporting for Barnes Hill was updated by Snowden in 2019 to comply with the current (2012) JORC Code.

Snowden has not completed a site visit to the Barnes Hill project at this stage; however, a visit is anticipated to occur in 2020 when drilling recommences.

The scope of work for the Scotts-Vulcan Mineral Resource estimate was to:

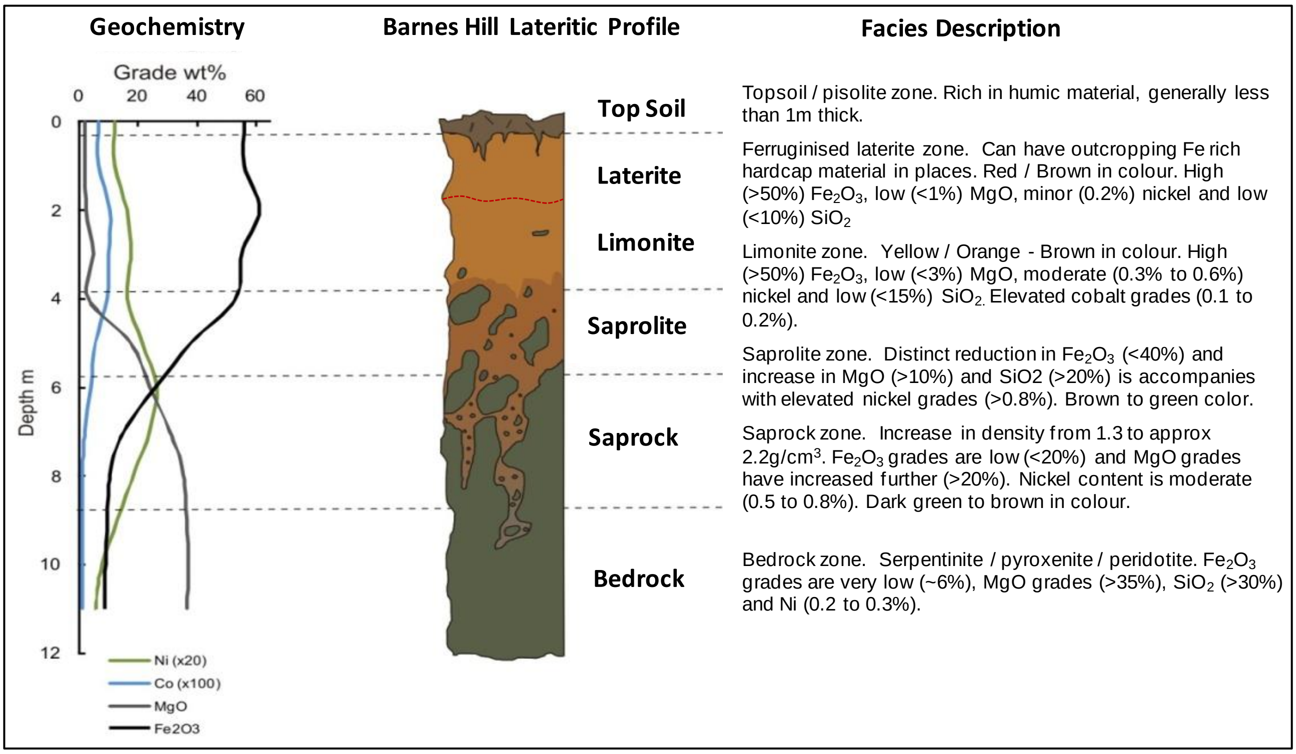
- Review and briefly validate the drillhole dataset supplied by TEM to identify any material issues with the supplied dataset
- Review the QAQC results for the drilling completed in 2019
- Complete geological interpretation using the validated drillhole dataset and develop a series of mineralised domain surfaces/solids which honour the geological and chemical zonation observed throughout the profile
- Complete a statistical analysis on the drillhole and composite samples within each domain
- Complete variography for Ni, Co, Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2
- Develop a three-dimensional (3D) block model and estimate Ni, Co, Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2 grades using an appropriate technique within each of the interpreted mineralised domains and the surrounding waste material
- Validate the block grade estimates against the input drillhole data
- Classify and report the Mineral Resource in accordance with the JORC Code (2012 Edition).

3 GEOLOGY

The Barnes Hill and Scotts-Vulcan deposits formed from the chemical weathering of a serpentinised, ultramafic parent rock derived from the Andersons Creek Complex. The Andersons Creek Complex is a layered wedge of Cambrian ultramafic stratigraphy consisting mainly of serpentinite, pyroxenite and gabbro. In the Barnes Hill region, the ultramafic complex has been altered almost completely to serpentinite prior to the chemical weathering process. The weathered serpentinites have subsequently been altered to clays which are overlain by a ferruginous laterite zone.

A schematic laterite profile for the nearby Barnes Hill deposit is shown in Figure 3.1.

Figure 3.1 Schematic of Barnes Hill Lateritic profile



Source: Snowden, 2010

The laterite profile at Scotts-Vulcan is similar to the profile at Barnes Hill and is summarised as (from top to bottom):

- Surficial pisolitic soil horizon
- Fe-rich lateritised hard-cap zone (in places)
- Laterite zone
- Limonite zone
- Transitional zone
- Saprolite zone
- Saprock zone
- Bedrock/Serpentinite.

The ultramafic rocks of the Andersons Creek Complex are bounded by quartzites to the east and claystones and slates to the west. Permian conglomerates overlie the ultramafic complex to the north and south. The quartzites are of Cambrian age and were intruded by the ultramafic rocks in the Cambrian. The ultramafics were subsequently altered to serpentinites and in turn intruded by granitic rocks in the Devonian period. The belt of serpentine occupies topographic lows, surrounded to the west and east by rugged hills.

Snowden concluded in 2010 that the weathering history at Barnes Hill had not been suitable for the co-precipitation of soluble silica and nickel. Consequently, garnierite, a hydrous nickel silicate typically present in other nickel laterite deposits, is not prevalent at Barnes Hill. Serpentine and chlorite are the main nickel-bearing species within the host rocks.

3.1 Geological interpretation

The geological interpretation of the laterite horizons was developed based on the profile interpreted in 2010 for the nearby Barnes Hill deposit and used in the 2010 Barnes Hill resource model (Snowden, 2010). At Scotts-Vulcan however, the upper ferruginous portion of the profile is not as well developed as at Barnes Hill and is interpreted to be less continuous, based on the current drill spacing. Snowden believes it is reasonable to combine the pisolite, hard-cap, laterite and limonite zones into a single "laterite" domain given the somewhat gradational nature of the internal boundaries.

Table 3.1 Laterite profile and domain codes

Zone name	Domain number Barnes Hill 2010 model	Domain number Scotts-Vulcan 2020 model
Pisolitic zone	10	40
Hard-cap/laterite waste zone	20	40
Laterite zone	30	40
Limonite zone	40	40
Transitional zone	45	45
Saprolite	50	50
Saprock	55	55
Bedrock/Basement	60	60
Sediments/Mudstones/Siltstones	80	NA
Soil	99	NA

Wireframe surfaces were generated by Snowden for the base of the limonite zone, transitional zone, saprolite zone and saprock zone, based on a combination of the geological logging and geochemical assay data. The domains at Scotts-Vulcan and the criteria used, are outlined in Table 3.2 and shown in Figure 3.2 for a typical drillhole intersection of the full profile. A typical east-west section is shown in Figure 3.3.

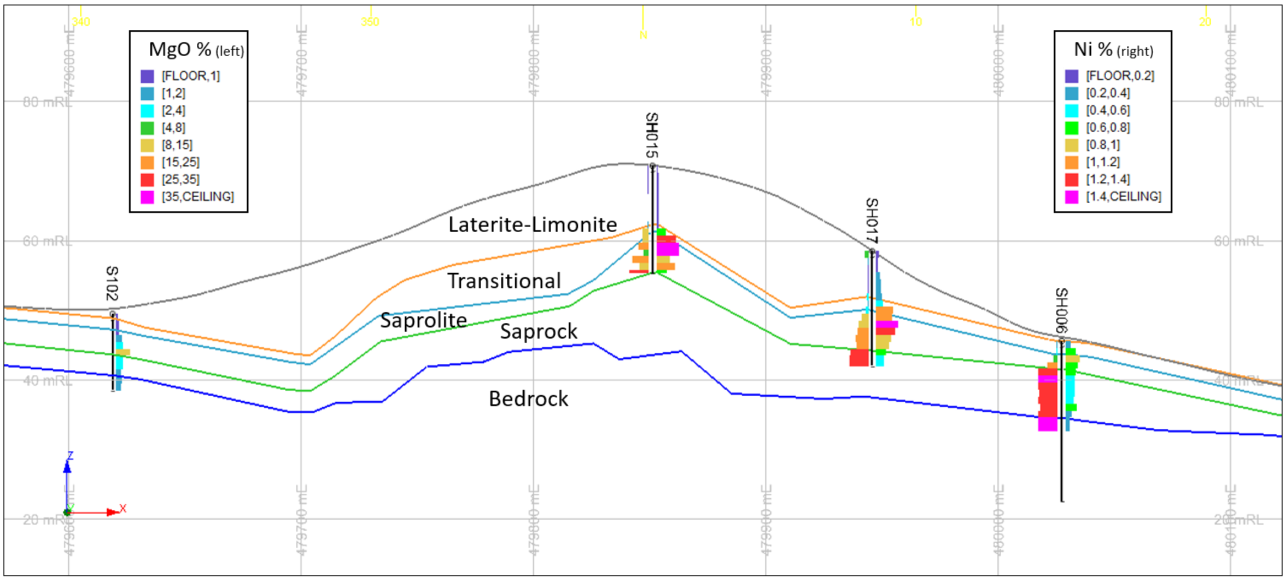
Table 3.2 Domain criteria and geological descriptions

Domain	Geochemical criteria	Description
Limonite-laterite (40)	<2% MgO 30–70% Fe_2O_3	• Combined pisolite, hard-cap, laterite and limonite material: – Pisolite zone comprises ferruginised pisolites within a humic-rich topsoil horizon; slightly elevated in Ni, MgO and SiO_2, compared to the underlying laterite zone – Laterite zone (red-brown) with sporadic ferruginised hard-cap material; characterised by high Fe_2O_3 grades and low Ni, Co, MgO and SiO_2 grades – Limonite zone (yellow-brown) has a gradational chemical boundary with the overlying laterite zone; characterised by high Fe_2O_3 with increasing SiO_2 due to greater clay content; key difference between the limonite and laterite zones is the change in colour from red-brown to yellow-brown and an increase in nickel (0.2% to 0.8%) and cobalt (>0.1%) grades. • Variable Fe_2O_3 up to 70% in places. • Very low MgO and generally low SiO_2, although local patches of silcrete(?) show elevated SiO_2 up to 15%. • Highest Co grades occur within the limonite zone.
Transitional (45)	2–4% MgO >20% SiO_2 ~40% Fe_2O_3	• Transitional domain between the limonite zone and the saprolite zone. • Reduction in Fe_2O_3 and increase in MgO and SiO_2.
Saprolite (50)	8–15% MgO < 40% Fe_2O_3 > 30% SiO_2	• Commonly associated with a colour change from red-brown/yellow-brown to green-brown or green. • Highest average nickel grade. • Drop in Fe_2O_3 and increase in MgO and SiO_2.
Saprock (55)	25–30% MgO <20% Fe_2O_3 >35% SiO_2	• Transitional domain between the mineralised saprolite zone and the parent host rock. • Contains weathered bedrock material and clay along fractured weathered zones. • Identified from the overlying saprolite zone by a drop in nickel and Fe_2O_3 and increase in MgO and SiO_2.
Bedrock (60)	>30% MgO <10% Fe_2O_3 ~0.2% Ni	• Ultramafic/Serpentinite. • Very low Fe_2O_3 and Al_2O_3; high MgO and SiO_2.

Figure 3.2 Example of interpreted domain boundaries (hole number SH014[1])

Hole Number	From	To	Logged domain	% Ni	% Co	% Al2O3	% Fe2O3	% MgO	% SiO2	
SH013	0	1	soil	0.031	0.004	14.5	51.8	1.35	14	
SH013	1	2	soil	0.053	0.008	6.94	72.95	0.5	2.25	
SH013	2	3	hardcap/waste laterite	0.028	0.005	19.3	43.76	0.68	11.2	
SH013	3	4	laterite	0.056	0.007	20.1	41.56	0.68	15.8	
SH013	4	5	laterite	0.087	0.019	5.07	79.96	0.59	2.12	
SH013	5	6	laterite	0.085	0.017	3.95	78.45	0.6	1.78	
SH013	6	7	limonite	0.166	0.048	5.52	73.65	0.88	4	
SH013	7	8	limonite	0.452	0.274	5.19	74.65	0.58	3	
SH013	8	9	limonite	0.816	0.657	2.49	79.63	0.47	1.67	
SH013	9	10	limonite	0.346	0.186	6.4	72.7	1.06	8.13	
SH013	10	11	limonite	0.598	0.148	5.43	67.99	1.36	13.2	Limonite-laterite
SH013	11	12	limonite	0.918	0.114	4.74	53.75	3.37	23.7	Transitional
SH013	12	13	transitional	1.075	0.096	3.81	47.28	3.93	32.1	Transitional
SH013	13	14	saprolite	0.97	0.063	10.45	32.57	8.22	34	Saprolite
SH013	14	15	saprolite	1.035	0.083	5.5	36.64	6.12	36	
SH013	15	16	saprolite	1.225	0.096	4.1	42.68	5.48	33	
SH013	16	17	saprolite	1.45	0.068	1.82	38.57	6.54	40.3	
SH013	17	18	saprolite	1.08	0.041	0.86	31.99	14.25	35.7	Saprolite
SH013	18	19	saprock	0.814	0.033	1.01	26.66	23.8	36.1	Saprock
SH013	19	20	saprock	0.731	0.031	0.59	16.06	28.1	42	
SH013	20	21	saprock	0.521	0.022	0.5	13.94	31.6	40.6	
SH013	21	22	saprock	0.316	0.02	0.38	17.16	32.2	38	Saprock
SH013	22	23	fresh rock	0.211	0.013	0.23	9.25	37	40.4	Bedrock
SH013	23	24	fresh rock	0.255	0.017	0.37	9.49	36.3	40.5	
SH013	24	24.7	fresh rock	0.316	0.01	1.1	5.57	36.7	42.3	

Figure 3.3 Example east-west section showing the Scotts-Vulcan laterite profile (5439850 mN)



3x vertical exaggeration

[1] Note that SH013 has a well-developed ferruginous zone. Other holes in the Scotts-Vulcan area often show lower Fe_2O_3 in the limonite-laterite zones.

4 DATA

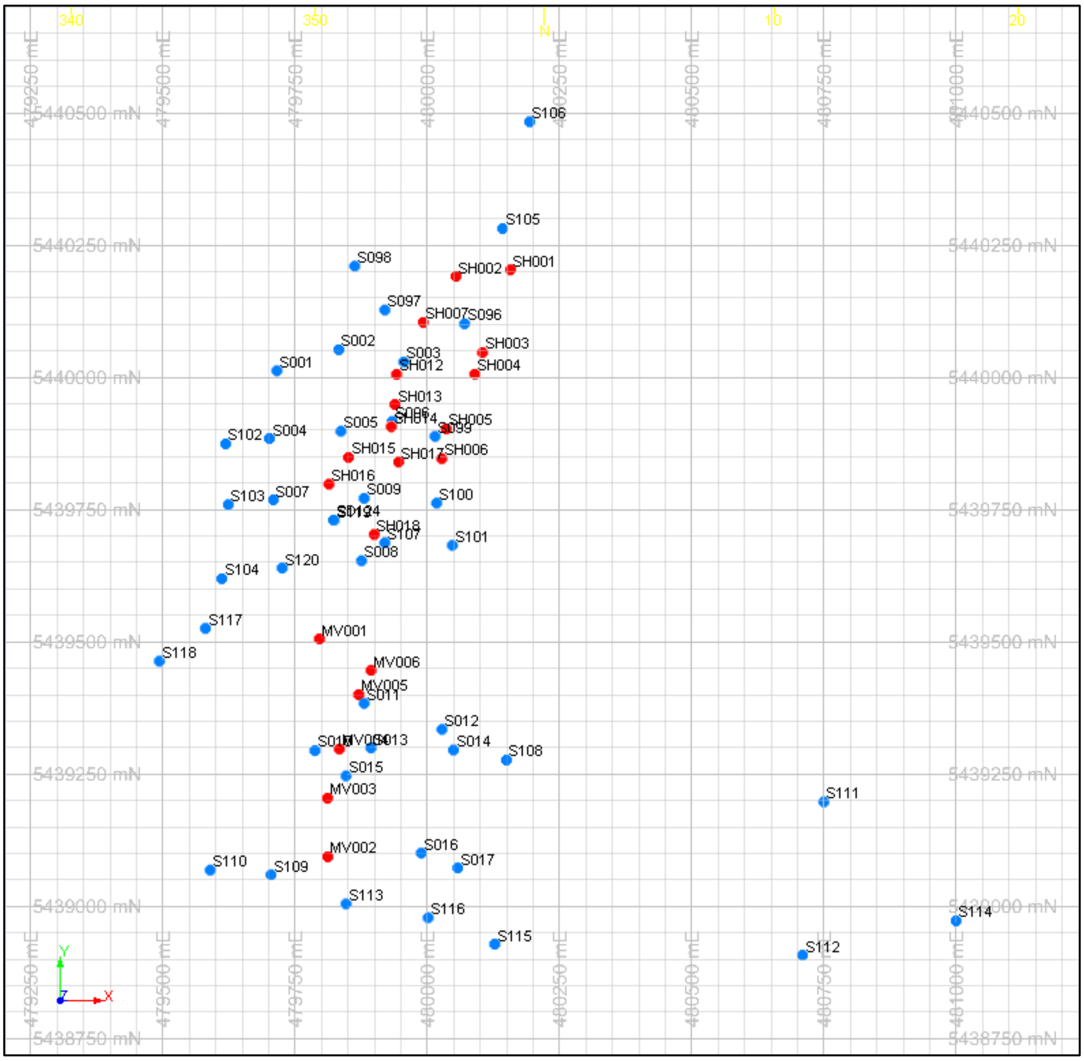
4.1 Drilling data

The drilling at Scotts-Vulcan was conducted over two main phases, with initial drilling comprising 47 holes drilled by Proto Resources and Investments Ltd (Proto) and Allegiance Mining (Allegiance) in 1997. No further drilling was conducted until February 2019, when TEM drilled an additional 20 holes. The additional holes were largely drilled on existing access tracks to minimise ground disturbances. Drilling has primarily comprised air-core drilling (94% of drilled metres), with five short diamond core holes drilled in 1997. The drilling is summarised in Table 4.1 and a collar location plan is shown in Figure 4.1.

Table 4.1 Scotts-Vulcan drilling summary

Year	Type	Company	Number	Length (m)
1997	Air-core	Proto/Allegiance	42	397.5
	Diamond	Proto/Allegiance	5	53.6
	Subtotal		**47**	**451.1**
2019	Air-core	TEM	20	365.0
	Subtotal		**20**	**365.0**
GRAND TOTAL			**67**	**816.1**

Figure 4.1 Scotts-Vulcan drillhole collar location plan (blue = 1997 drilling; red = 2019 drilling)



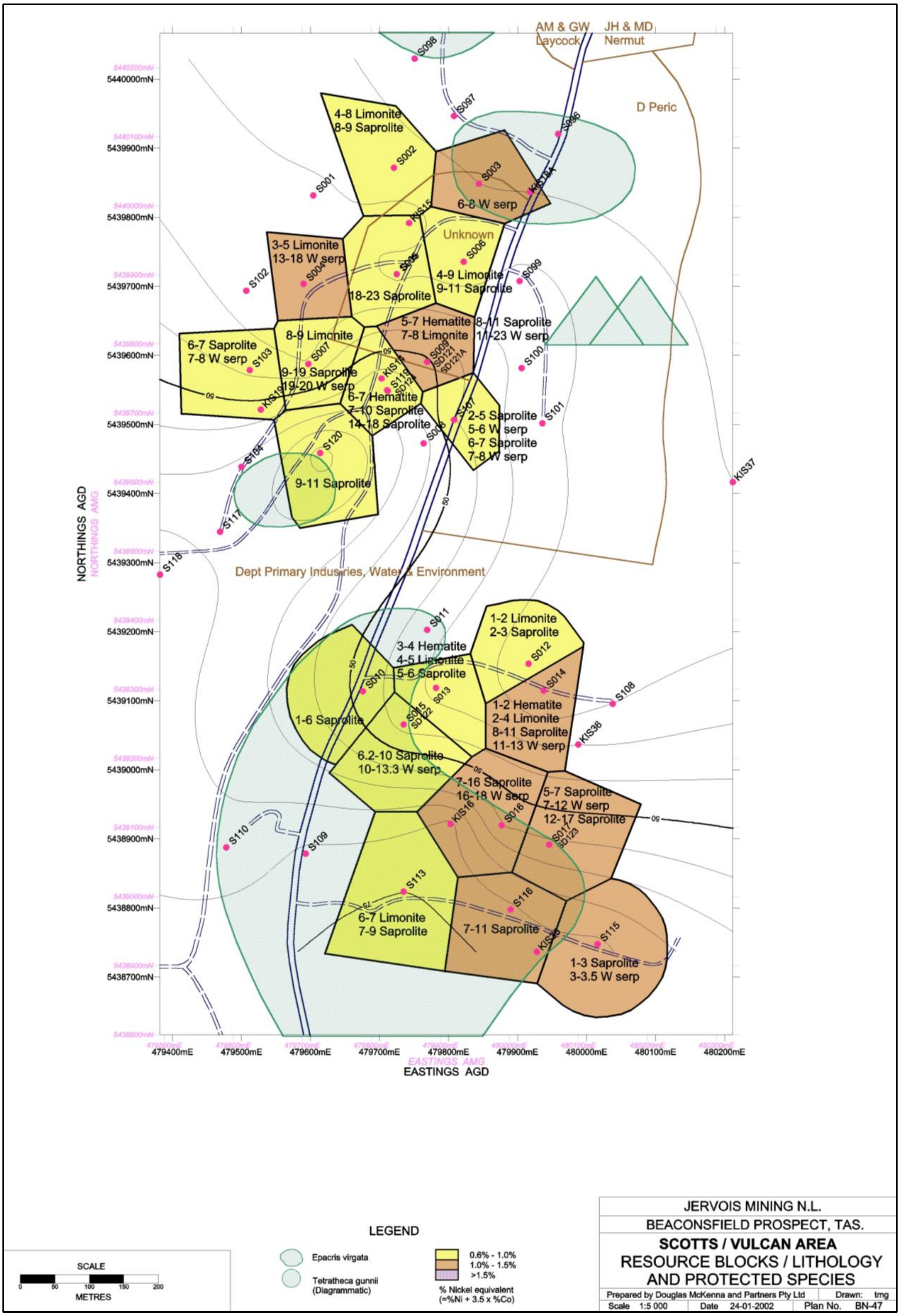
4.1.1 Coordinate system

The coordinate system used for the 2019 drilling is MGA Zone 55 projection based on the GDA94 datum.

Historical data (i.e. 1997 drilling) was reportedly collected using the AGD66 datum; however, this was apparently later converted to GDA94 by Proto/Allegiance. Investigations by TEM revealed that there is significant uncertainty regarding the coordinate system that was used and the reliability of the transformed coordinates. Based on a historical map provided by TEM (Figure 4.2), Snowden and TEM were able to ascertain that the coordinates of the historical data recorded in the database provided by TEM, were likely based on the AGD66 system. As such, a transformation was applied by Snowden using the world coordinate transform algorithm in Datamine Studio RM software from AGD66 to MGA94 Zone 55. The resulting, transformed coordinates were verified by TEM as being visually correct relative to the locations of known roads and other ground features. The transform shifts the historical collar locations approximately 212.6 m horizontally to the northeast.

Snowden strongly recommends that where collars for the historical drilling can be located, TEM resurvey the collars to verify the collar coordinates.

Figure 4.2 Map provided by TEM showing historical holes in AMG/AGD66 and GDA94



Source: TEM

4.1.2 Collar surveying

The collars of the 2019 drilling at Scotts-Vulcan were surveyed by a contract surveyor using RTK global positioning system (GPS) with a horizontal accuracy of ±10 mm and a vertical accuracy of ±15 mm.

The survey method and accuracy of the 1997 drilling is unknown.

The vertical (Z) coordinate for the 2019 drilling matched the topographic surface reasonably well; however, Snowden noted a significant difference between the historical collars and the topographic surface of up to 43 m (average 17 m difference). Given the close match of the 2019 drilling to topography, Snowden elected to project the historical collar points onto the topographic surface.

4.1.3 Downhole surveys

All holes have been drilled vertically and have not been surveyed downhole due to the shallow depth. Snowden believes this is reasonable, given the shallow and vertical nature of the drilling and that any deviation downhole is unlikely to be material to resource modelling.

4.1.4 Sampling and assaying

Sampling methodology

Air-core samples for the 1997 drilling were collected at 1 m intervals from which a nominal 0.5–1.5 kg sample was collected using a PVC or aluminium scoop.

A similar method was used for the 2019 drilling, with the entire bulk sample of drilled material collected in a plastic bag for each metre. The recovered drill sample weights were recorded for a total of 90 samples from the 2019 air-core drilling program. Wet bulk sample weights (including the speared laboratory fraction) were measured and returned an average of approximately 6.1 kg. Three samples (of 90), or 3.3% of the dataset, had sample weights below 1 kg on a wet basis. Following collection of the bulk sample, a subsample was collected by spearing of the sample bag for each of the 299 intersections (each being 1 m except at end-of-hole). On average, a 380 g sample was collected by spearing from each bag (minimum 140 g, maximum 750 g and with a standard deviation of 0.11 g).

Snowden recommends that for future drilling, a splitter (e.g. riffle or rotary) is used to collect representative samples from the drill intervals. Scooping or spearing from the bag does not produce a representative sample as the techniques incur very high sampling errors due to incorrect delimitation of the increments. Moreover, larger samples of approximately 2–4 kg are required to reduce the sampling error (i.e. improve the sampling precision). Snowden recommends that the sampling procedures are reviewed prior to any future drilling programs.

Laboratory sample preparation and assaying

Samples from the 2019 drilling, including standards and duplicates, were submitted to the ALS Laboratory in Brisbane (322 samples) and Perth (three potentially fibrous samples) for sample preparation and assaying by XRF (fused disc). Due to the small sample size, sample preparation comprised a simple pulverisation stage to 85% passing 75 µm. A total of 18 elements were analysed: Al_2O_3 (0.01% detection limit), CaO (0.01%), Co (0.001%), Cr_2O_3 (0.005%), Cu (0.001%), Fe_2O_3 (0.01%), K_2O (0.01%), MgO (0.01%), MnO (0.01%), Na_2O (0.01%), Ni (0.005%), P_2O_5 (0.005%), Pb (0.005%), SiO_2 (0.05%), TiO_2 (0.01%) and Zn (0.001%).

In addition to the XRF analysis, loss-on-ignition (LOI) determination at 1,000°C was completed using a thermo gravimetric analyser (TGA) with a detection limit of 0.01% LOI. Scandium (Sc) was also analysed using a four-acid digest with an inductively coupled plasma-mass spectrometry (ICP-MS) determination (0.2 ppm Sc detection limit).

Proto/Allegiance drill samples from 1997 were analysed at the ALS Laboratory in Perth by fused bead XRF (Snowden, 2010). Sample preparation was completed at the ALS laboratory in Adelaide. Air-core samples that ranged in weight from 0.5 kg to 1.5 kg were dried in an oven overnight at 100°C. The entire sample was then pulverised in an LM5 mill and a 150–200 g reference subsample taken and kept in storage at Adelaide. A 20 g subsample was sent to Perth for fused bead XRF analysis. In addition to the XRF analysis, LOI determination at 1,000°C was completed using a TGA.

4.1.5 Quality assurance/quality control

Historical (1997) drilling

QAQC for the historical data was assessed by Snowden in 2010 for the Barnes Hill resource model. The drilling at Scotts-Vulcan was conducted concurrently with the drilling at Barnes Hill using the same QAQC protocols. Detailed analysis of the QAQC results is provided in the 2010 Barnes Hill resource report (Snowden, 2010).

In 2010, Snowden indicated that limited procedural documentation was available for review. Diamond core samples included CRMs at the rate of approximately one per drillhole; no coarse duplicates were collected. For the air-core drilling, field split duplicates and CRMs were initially submitted at the rate of approximately 1:50. No blanks were submitted. Additionally, no coarse split or blind re-submissions were conducted as far as Snowden is aware.

Overall, the CRM results show acceptable analytical accuracy was achieved for the 1997 assaying with no significant bias identified. Field split duplicates generally show a good grouping around the 1:1 line, with a few instances where an original low-grade result has a significantly higher nickel grade in the duplicate. Aside from these outliers, the duplicate data was deemed to be within acceptable variance limits.

New (2019) drilling

TEM inserted CRMs and field duplicates into the sample batches. Of the 325 samples submitted for the 2019 drilling, 26 quality control samples were included, comprising 15 CRMs and 11 field duplicates (leaving 299 samples representing drilling intersections), equating to an insertion rate of approximately 1:40 for each of the CRMs and duplicates.

Certified reference materials

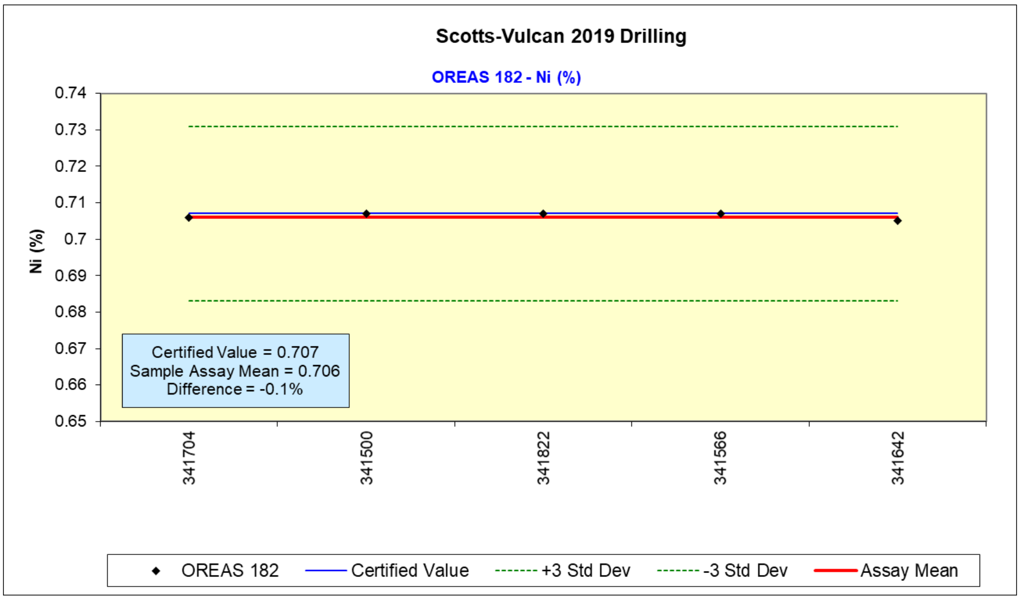
CRMs were sourced from Ore Research and Exploration Pty Ltd (OREAS) and are summarised in Table 4.2.

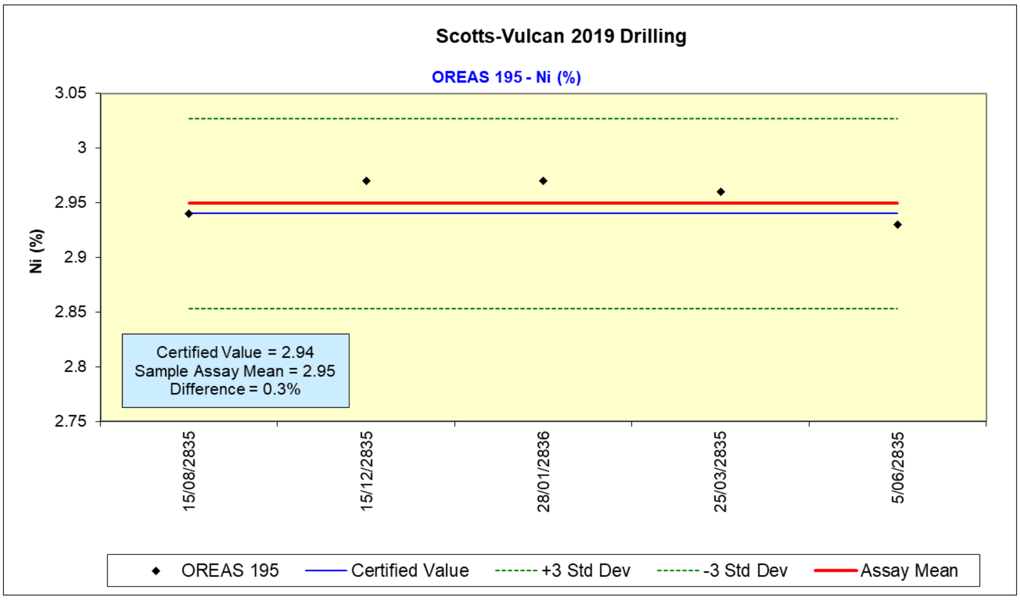
Table 4.2 CRM expected values

CRM	Composition	Expected value (expected standard deviation)					
		Ni (%)	Co (ppm)	MgO (%)	SiO_2 (%)	Fe_2O_3 (%)	Sc (ppm)
OREAS 182	Pulp – nickel laterite ore	0.707 (0.008)	728 (19)	9.16 (0.073)	46.77 (0.255)	29.40 (0.163)	-
OREAS 195	Pulp – nickel laterite ore	2.94 (0.029)	477 (10)	19.01 (0.114)	44.00 (0.190)	18.29 (0.086)	-
OREAS 199	Pulp – lateritic scandium (nickel-cobalt) ore	0.995 (0.035)	554 (12)	0.742 (0.031)	24.93 (0.131)	41.01 (0.238)	591 (11)

Control charts for Ni are presented in Figure 4.3, which show that for Ni, there is no analytical bias and a high level of analytical accuracy has been achieved. Similar trends are noted for Co, MgO and Fe_2O_3; however, a minor bias is present for OREAS 195, with results for Co and Fe_2O_3 reporting higher than the expected value (Figure 4.4). Whilst not considered material, Snowden recommends that, given the low number of results, TEM monitor this standard to assess if the bias improves.

Figure 4.3 CRM control charts – Ni





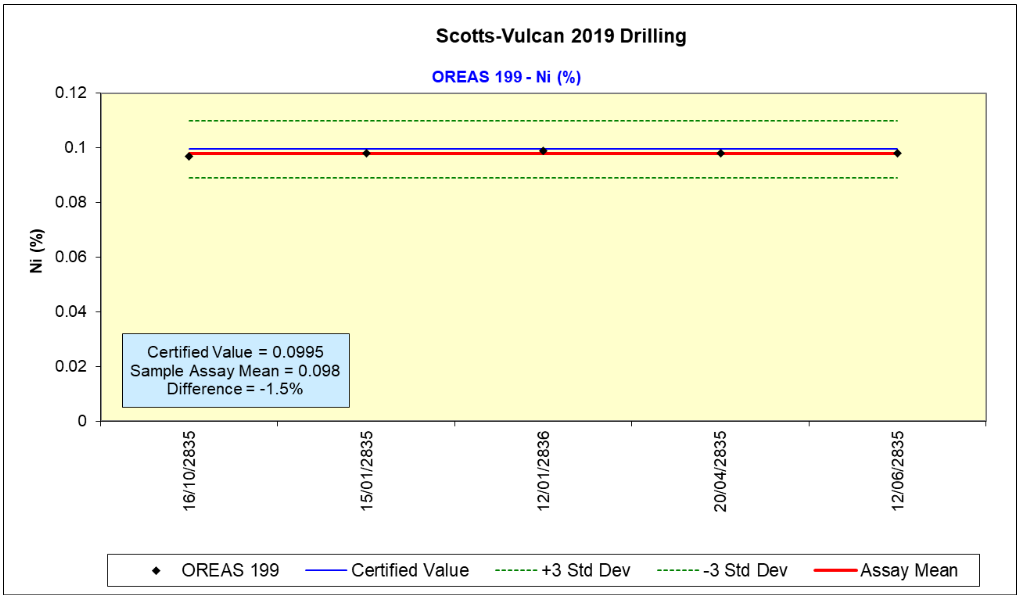
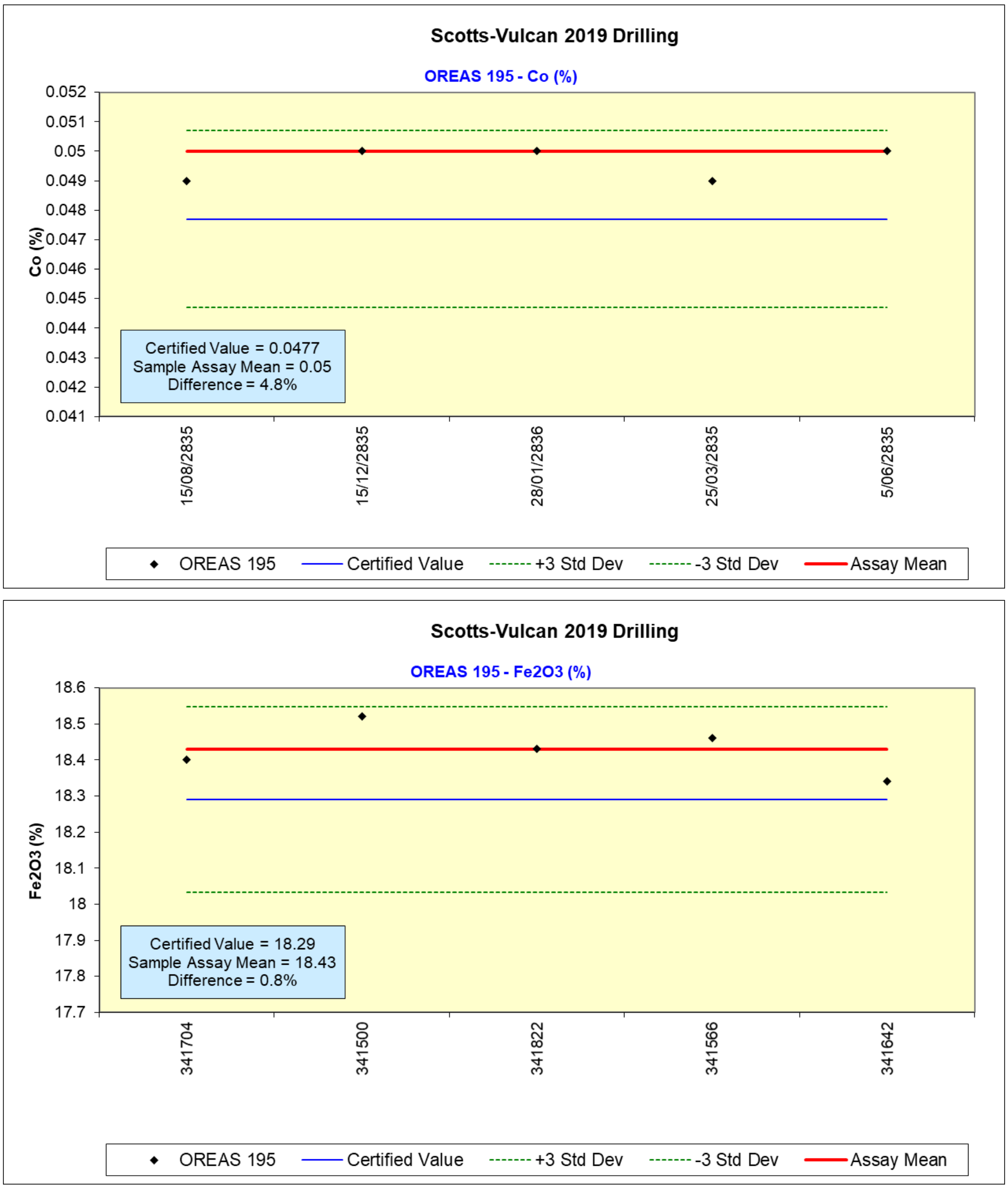


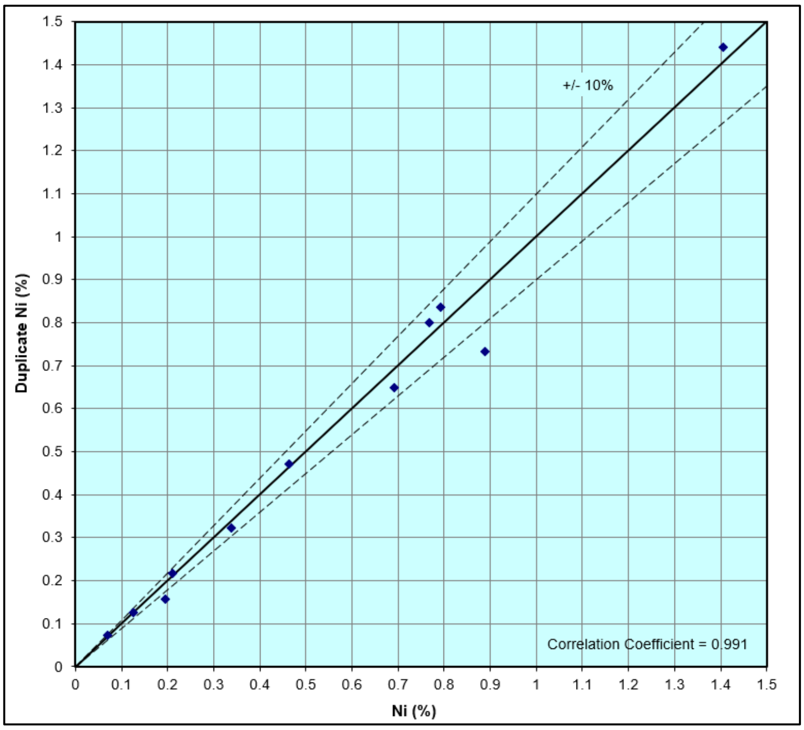
Figure 4.4 CRM control charts – OREAS 195 Co (top) and Fe_2O_3 (bottom)



Field duplicates

In Snowden's opinion, field duplicates from the 2019 drilling generally show reasonable precision, although there appears to be an issue with the duplicates in holes SH004 and SH006, which show significant differences in MgO, Fe_2O_3 and SiO_2. The differences may be due to some samples being out of sequence and Snowden recommends that TEM investigates these two sample batches. A scatterplot for Ni is shown in Figure 4.5. Snowden notes that the limited number of samples means that a detailed statistical analysis is not warranted; however, the maximum half absolute relative difference (HARD) for Ni is 11%, indicating good overall precision.

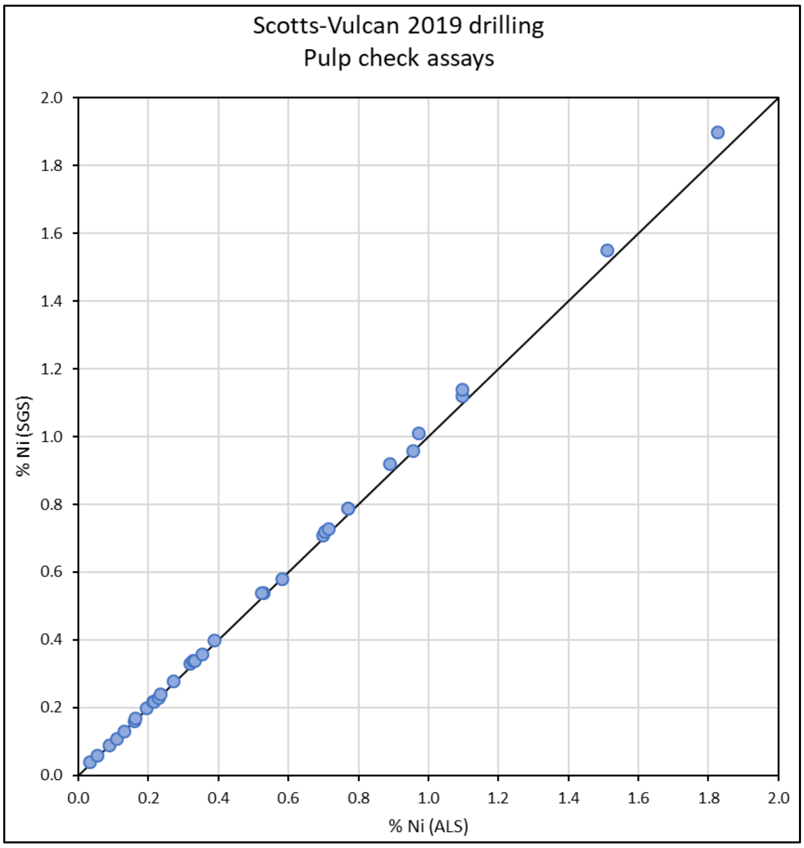
Figure 4.5 Scatterplot of 2019 field duplicates – Ni



Pulp check assays

A batch of 36 sample pulps was sent to the SGS laboratory in Perth for check assaying. Results (Figure 4.6) show the SGS check assays compare closely to the ALS primary assay, with typical differences of 1–2%.

Figure 4.6 Scatterplot of 2019 pulp check assays – Ni



<u>Grind sizing</u>

A total of six grind sizing analyses were completed on pulps for the 2019 drilling, with an average of 98.5% passing 75 µm. The minimum proportion reported was 96.1% passing 75 µm.

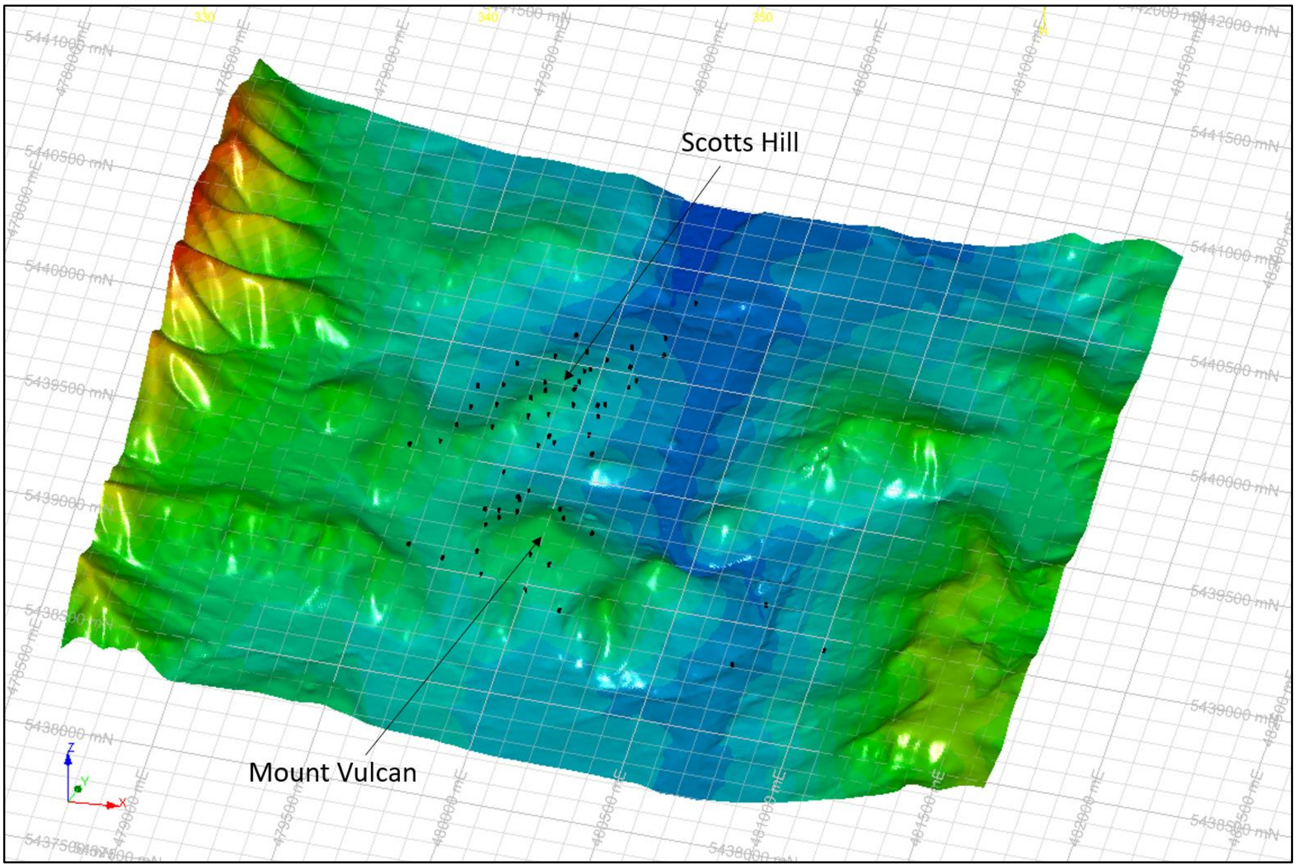
Sizing analyses of the 1997 drilling is not documented.

4.2 Topography

A topographic surface was provided by TEM, based on a LiDAR derived 5 m digital elevation model of the northwest region of Tasmania completed by Geoscience Australia in 2013. The LiDAR has a reported 0.15 m vertical and horizontal accuracy.

The data was provided as a text file of the elevations of each point which was manipulated by Snowden to produce a points file and then wireframed to create a surface. The topographic surface is shown in Figure 4.7. As discussed in Section 4.1.2, the Z coordinates for the 2019 drillhole collars match closely with the topographic surface.

Figure 4.7 Scotts-Vulcan topographic surface



Coloured in 10 m intervals

4.3 Excluded drillholes

Holes SD121, SD121A, SD122 and SD123 were excluded from the resource modelling as these holes have identical collar coordinates to other drillholes and are shorter with less assay data. Snowden recommends these holes are reviewed by TEM.

4.4 Assay adjustments

The following adjustments were made to the assay data:

- % Al was converted to % Al_2O_3 by multiplying by a factor of 1.889
- % Ca was converted to % CaO by multiplying by a factor of 1.399
- Cr ppm was converted to % Cr_2O_3 by multiplying by a factor of 1.462 and dividing by 10,000
- Cu ppm was converted to % Cu by dividing by 10,000
- % Fe was converted to % Fe_2O_3 by multiplying by a factor of 1.430
- % Mg was converted to % MgO by multiplying by a factor of 1.658
- Mn ppm was converted to % MnO by multiplying by a factor of 1.291 and dividing by 10,000
- Pb ppm was converted to % Pb by dividing by 10,000
- Sc ppm was converted to % Sc by dividing by 10,000
- Zn ppm was converted to % Zn by dividing by 10,000.

5 STATISTICAL ANALYSIS AND VARIOGRAPHY

5.1 Drillhole compositing

Prior to statistical analysis and estimation, the drillhole data was coded according to domain as per Table 3.1 and composited to 1 m intervals, which is the dominant sample interval. The compositing was run within the domain field (ESTDOM) to ensure that no composite intervals crossed any geological boundaries. To allow for uneven sample lengths within each of the domains, the composite process was run using the variable sample length method. This adjusts the sample intervals, where necessary, to ensure all samples are included in the composite file (i.e. no residuals) while keeping the composite interval as close to the desired interval as possible.

5.2 Statistics

Summary statistics for Ni, Co, Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2 within each domain, are presented in Table 5.1, with histograms for Ni in Figure 5.1. The statistics show that for the majority of domains and elements, the distributions are close to normally distributed and comprise a single population.

Figure 5.1 Histograms for Ni for the Limonite-Laterite (top left), Transitional (top right), Saprolite (bottom left) and Saprock (bottom right)

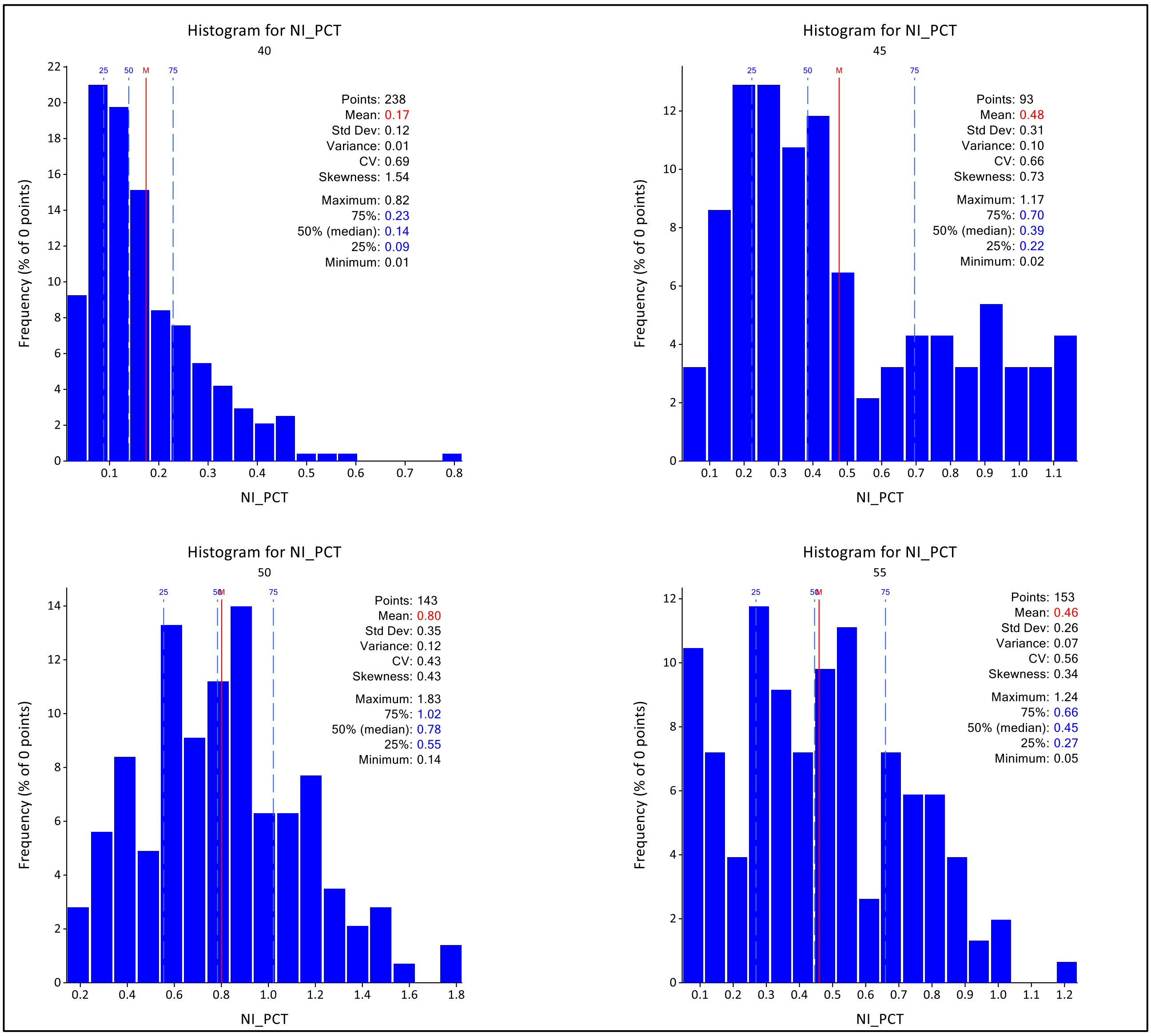


Table 5.1 Composite summary statistics by domain

Domain	Assay	Count	Minimum	Mean	Median	Maximum	Standard deviation	CV
40 Laterite-Limonite	Co (%)	238	0.001	0.063	0.022	0.657	0.092	1.47
	Ni (%)	238	0.01	0.17	0.14	0.82	0.12	0.69
	Al_2O_3 (%)	95	2.49	13.00	12.45	26.40	5.84	0.45
	Fe_2O_3 (%)	95	19.08	52.82	52.11	79.96	15.89	0.30
	MgO (%)	95	0.29	1.52	0.89	15.30	2.28	1.50
	MnO (%)	95	0.02	0.63	0.33	3.44	0.72	1.14
	SiO_2 (%)	72	1.67	16.17	14.00	58.00	10.86	0.67
45 Transitional	Co (%)	93	0.001	0.091	0.080	0.276	0.060	0.66
	Ni (%)	93	0.02	0.48	0.39	1.17	0.31	0.66
	Al_2O_3 (%)	66	2.28	9.64	8.29	23.70	5.04	0.52
	Fe_2O_3 (%)	66	12.25	42.33	42.36	68.51	13.48	0.32
	MgO (%)	66	0.92	3.68	3.45	12.85	1.87	0.51
	MnO (%)	66	0.08	0.70	0.65	3.00	0.57	0.82
	SiO_2 (%)	37	5.65	29.17	28.00	49.20	12.53	0.43
50 Saprolite	Co (%)	143	0.013	0.053	0.046	0.236	0.034	0.64
	Ni (%)	143	0.14	0.80	0.78	1.83	0.35	0.43
	Al_2O_3 (%)	98	0.35	5.22	4.44	15.95	3.72	0.71
	Fe_2O_3 (%)	98	12.26	29.77	27.85	62.42	9.87	0.33
	MgO (%)	98	2.21	12.17	10.75	32.60	6.01	0.49
	MnO (%)	98	0.07	0.44	0.37	1.97	0.30	0.68
	SiO_2 (%)	70	20.40	37.96	37.00	61.50	8.67	0.23
55 Saprock	Co (%)	153	0.006	0.022	0.020	0.078	0.012	0.55
	Ni (%)	153	0.05	0.46	0.45	1.24	0.26	0.56
	Al_2O_3 (%)	87	0.09	2.15	1.41	9.11	2.07	0.96
	Fe_2O_3 (%)	87	7.24	15.37	14.56	31.48	5.02	0.33
	MgO (%)	87	14.30	28.06	28.19	37.10	5.05	0.18
	MnO (%)	87	0.06	0.19	0.16	1.17	0.14	0.72
	SiO_2 (%)	72	31.10	41.20	39.90	58.00	5.30	0.13
60 Basement	Co (%)	63	0.004	0.011	0.011	0.023	0.004	0.35
	Ni (%)	63	0.01	0.18	0.19	0.46	0.09	0.48
	Al_2O_3 (%)	48	0.05	2.03	0.69	14.30	2.89	1.42
	Fe_2O_3 (%)	48	5.29	8.69	8.58	18.04	2.00	0.23
	MgO (%)	48	21.77	34.33	36.60	38.88	5.07	0.15
	MnO (%)	48	0.05	0.11	0.08	0.39	0.08	0.70
	SiO_2 (%)	48	35.50	41.65	40.40	55.99	4.50	0.11

CV = standard deviation/mean

5.2.1 Top cutting

Due to the elevated CV of the Co and MgO grade distributions within the Limonite-Laterite Domain (40), top cuts were applied to reduce the impact of outliers on the local block grade estimates. Top cuts were applied as per Table 5.2. No other top cuts were applied.

Table 5.2 Top cuts

Domain	Variable	Number of samples	Number top cut	Raw		Top cut	
				Mean	CV	Mean	CV
40	Co	238	3	0.063	1.47	0.060	1.32
40	MgO	95	2	1.52	1.50	1.37	1.08

5.3 Variography

Variograms were generated to assess the spatial continuity of the various elements and as inputs to the kriging algorithm used to interpolate grades. Due to the limited data, the Transitional, Saprolite and Saprock domains were combined for the variography. Variograms were modelled using Snowden Supervisor software via the following general approach:

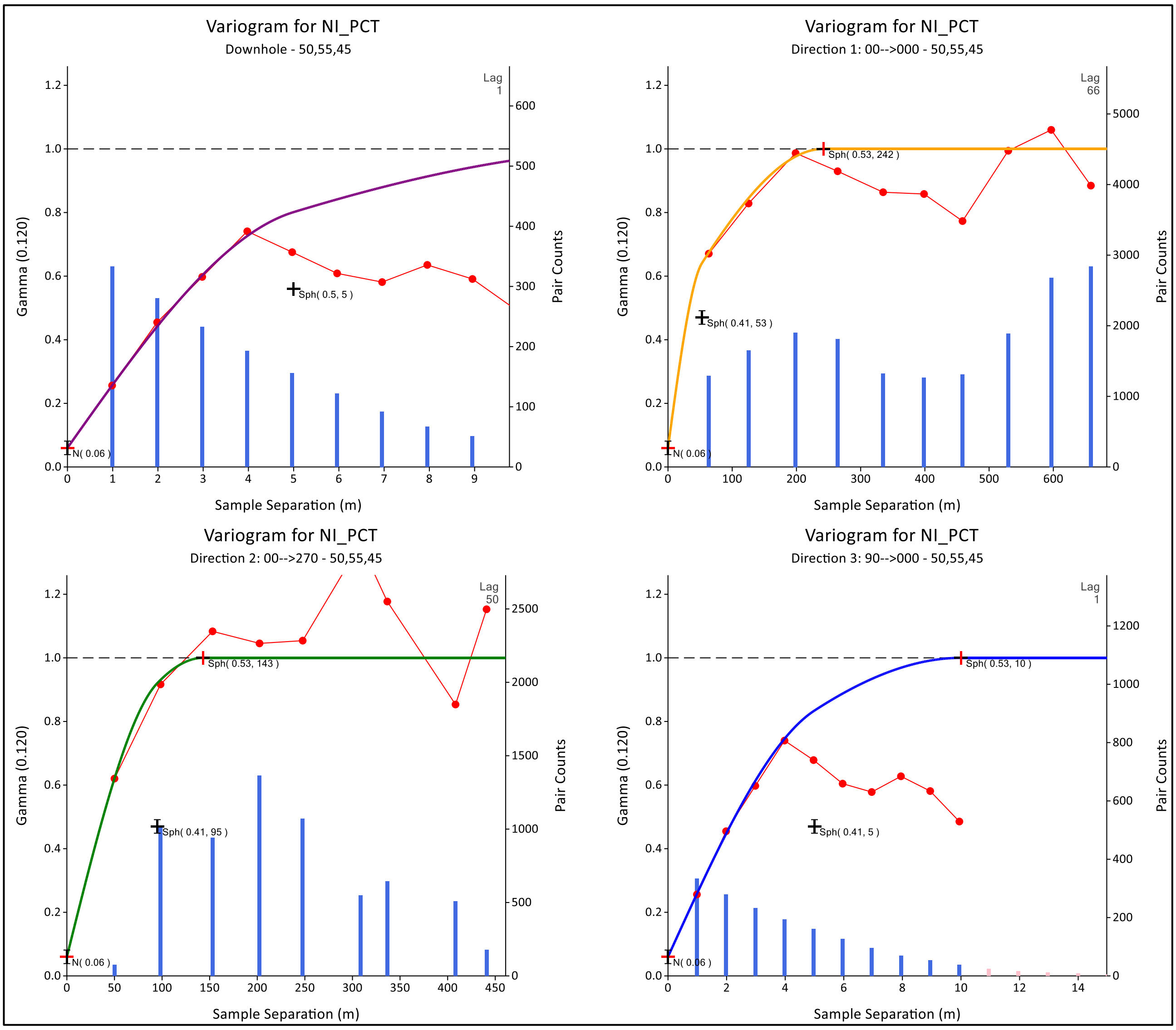
- All variograms were standardised to a sill of one
- The nugget effect was modelled from the true downhole variogram (using drillhole ID as a key field)
- Variograms were modelled using one or two-structure nested spherical variograms
- Due to the general absence of extreme values, the variograms were evaluated using traditional variograms.

Traditional variograms were constructed for Ni, Co, Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2. No clear direction of continuity was evident and as such the variograms were modelled with the major direction (direction 1) oriented 00→000, the intermediate direction (direction 2) oriented 00→090 and the minor direction (direction 3) oriented 90→000. Variogram model parameters are detailed in Table 5.3. Figure 5.2 shows the variogram model for Ni.

Table 5.3 Variogram models

Element	Domain	Nugget	1st Spherical variogram structure				2nd Spherical variogram structure			
			Sill	Range 1	Range 2	Range 3	Sill	Range 1	Range 2	Range 3
Co	45+50+55	0.15	0.85	120	120	6	-	-	-	-
Ni	45+50+55	0.06	0.41	55	95	5	0.53	240	145	10
Al_2O_3	45+50+55	0.06	0.94	220	175	9	-	-	-	-
Fe_2O_3	45+50+55	0.06	0.94	130	105	5	-	-	-	-
MgO	45+50+55	0.06	0.55	80	50	6	0.39	330	90	7
MnO	45+50+55	0.27	0.29	140	110	3	0.44	150	130	15
SiO_2	45+50+55	0.05	0.38	90	65	5	0.57	260	105	8

Figure 5.2 Variogram model for Ni for combined Transitional, Saprolite and Saprock domain



6 BLOCK MODEL AND GRADE ESTIMATION

6.1 Volume model definition

The final block model extents and parent and sub-cell sizes are listed in Table 6.1.

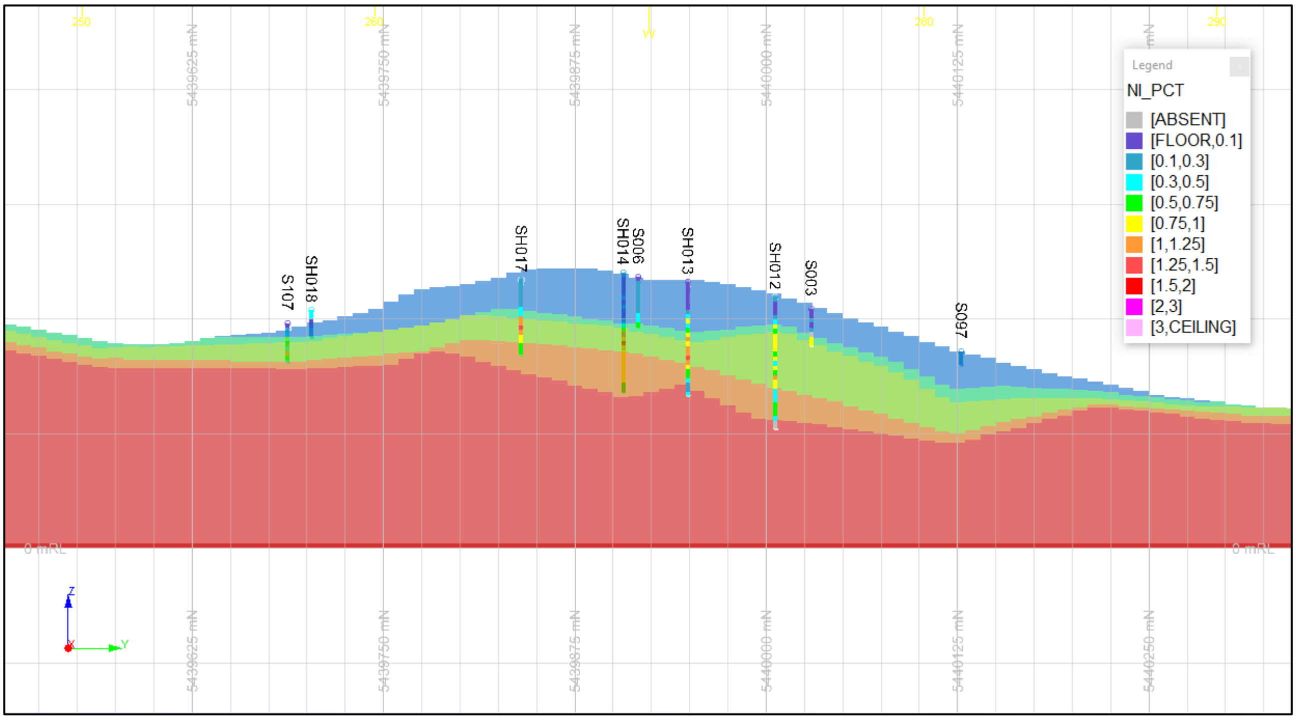
Table 6.1 Block model prototype parameters

Model setting	Value
X origin	479350 mE
Y origin	5438750 mN
Z origin	0 mRL
Maximum easting	480350 mE
Maximum northing	5440350 mN
Maximum elevation (RL)	100 mRL
Parent cell size – X	50 m
Parent cell size – Y	50 m
Parent cell size – Z	1 m
Minimum cell size* – X	10 m
Minimum cell size* – Y	10 m
Minimum cell size* - Z	0.25 m

The parent block size is based on the nominal drillhole spacing along with consideration of the geometry of the mineralisation and variogram models. The minimum sub-block was chosen to ensure adequate volume resolution within the geological domains.

The block model was coded with the domain wireframes as summarised in Table 3.1. An example cross-section is shown in Figure 6.1

Figure 6.1 Cross section at 479930 mE showing the geological domain coding



Blue = laterite-limonite; teal = transitional; green = saprolite; orange = saprock; red = basement

6.2 In situ dry bulk density

In situ dry bulk density values (field DENSITY) were assigned to each block based on the ESTDOM code. As no density samples have been collected at Scotts-Vulcan and given the similar geology to Barnes Hills, the values were applied as per the current Barnes Hill Mineral Resource estimate, as detailed in Snowden's 2010 report on the Barnes Hill Mineral Resource estimate. The density values applied to the Scotts-Vulcan resource model are presented in Table 6.2.

Table 6.2 In situ dry bulk density values applied to block model

Domain	ESTDOM	Density (t/m^3)
Limonite-Laterite	40	1.5
Transitional	45	1.4
Saprolite	50	1.3
Saprock	55	2.2
Basement	60	2.4

6.3 Estimation method and parameters

Snowden estimated Ni, Co, Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2 using ordinary block kriging (parent cell estimates) using Datamine Studio RM software. All domain boundaries (ESTDOM field) were treated as hard boundaries for estimation purposes, with only assays from within each wireframe/domain used to estimate blocks within that domain.

Variogram models were compiled for a combined Transitional-Saprolite-Saprock Domain and applied to all domains.

Due to the sparse data within each domain relative to the number of samples, blocks that were not estimated due to a lack of samples were assigned either the mean or median grade of the population within the estimation zone. The mean value for the domain was used in all cases, except if the CV was greater than one, in which case the median was applied.

Dynamic anisotropy was used to locally adjust the orientation of the search ellipse and variogram models due to variations in the dip and strike of the domains. The upper and lower surfaces of each domain was used to generate a local dip and dip direction estimate for each block, which was subsequently used to locally orient the search ellipse and variogram.

Based on consideration of the variography, along with the general data spacing, a search ellipse of 200 m x 150 m x 5 m was used, with a minimum of eight samples and maximum of 16 samples. The second search pass utilised double the search ellipse radii (i.e. 400 m x 300 m x 10 m), with the same minimum and maximum sample criteria. For the third search pass, the minimum number of samples was reduced to two and the search radii tripled (i.e. 600 m x 450 m x 15 m). The major direction was oriented 00→000, intermediate direction 00→090 and the minor direction 90→000 (i.e. vertical). To ensure vertical trends were maintained, a maximum of two samples was allowed per drillhole.

The same search ellipse ranges and parameters were used for all variables to ensure that where possible, the same samples were used for all variables to maintain correlations; however, Snowden notes that the coverage is not equal for all assays (Al_2O_3, Fe_2O_3, MgO, MnO and SiO_2 have less assays compared to Ni and Co).

The estimation settings are summarised in Table 6.3.

Table 6.3 Estimation parameters

Estimation setting	Description/setting
Final model name	sv_mod_1910v1.dm
Boundary conditions	Hard domain boundaries for all estimates
Top cuts	See Section 5.2.1
Search ellipsoid	See Section 6.3
Method	Ordinary kriging (parent cell estimation)
Variograms	See Section 5.3 (same variograms applied to all domains)
Dynamic search volumes used	Yes
Minimum number of samples – volume 1	8
Maximum number of samples – volume 1	16
Search volume 2 factor	2
Minimum number of samples – volume 2	8
Maximum number of samples – volume 2	16
Search volume 3 factor	3
Minimum number of samples – volume 3	2
Maximum number of samples – volume 3	16
Maximum number of samples from a single hole	2
Octant searching used	No
Block discretisation (XYZ)	5 x 5 x 2 (i.e. 50 points per parent cell)

6.4 Model validation

The block grade estimates were validated using:

- Visual comparison of the block grade estimates and the input drillhole composites
- Global comparison of the average composite (naïve and de-clustered) and estimated block grades
- Grade trend plots (also known as swath plots) analysis of the block grades and the input drillhole composites with respect to the de-clustered means
- Comparison of correlations in the input data and block estimates.

The conclusions from the model validation work are as follows:

- Visual comparison of the model grades and the corresponding drillhole grades shows a good correlation and trends observed in the drilling are honoured in the block estimates.
- Given the uneven sampling, the correlations evident in the sample data are reproduced in the block grade estimates.
- The grade trend plots display acceptable reproduction of the patterns in the drillhole grades, given the relatively sparse data. Grade trend plots for nickel in the Transitional, Saprolite and Saprock domains are provided in Figure 6.2, Figure 6.3 and Figure 6.4 respectively.
- The global average grades for blocks estimated in the first or second search pass, are generally within 5% of the global average sample grade for each domain.

Figure 6.2 Grade trend plots – Transitional Ni

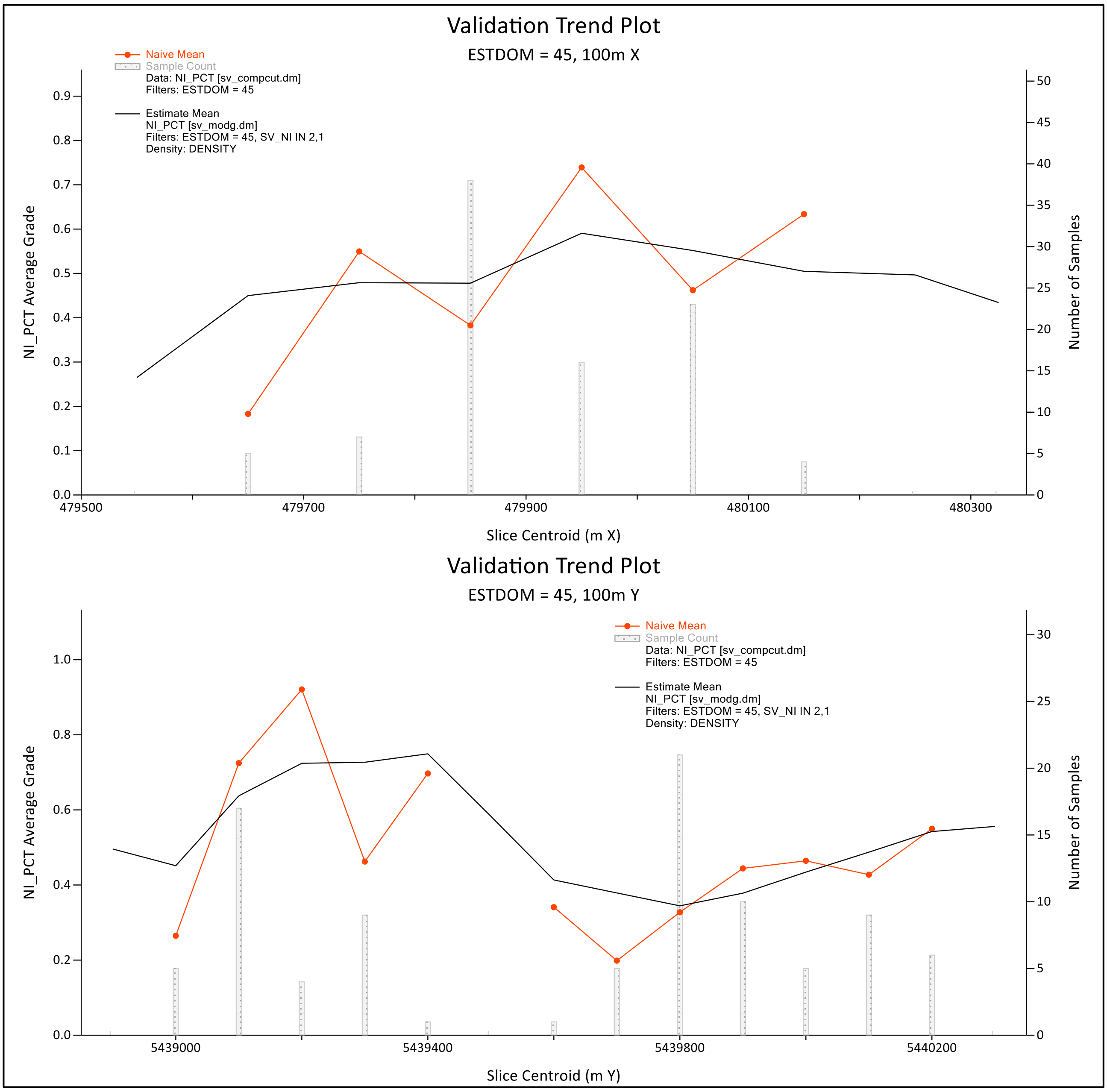


Figure 6.3 Grade trend plots – Saprolite Ni

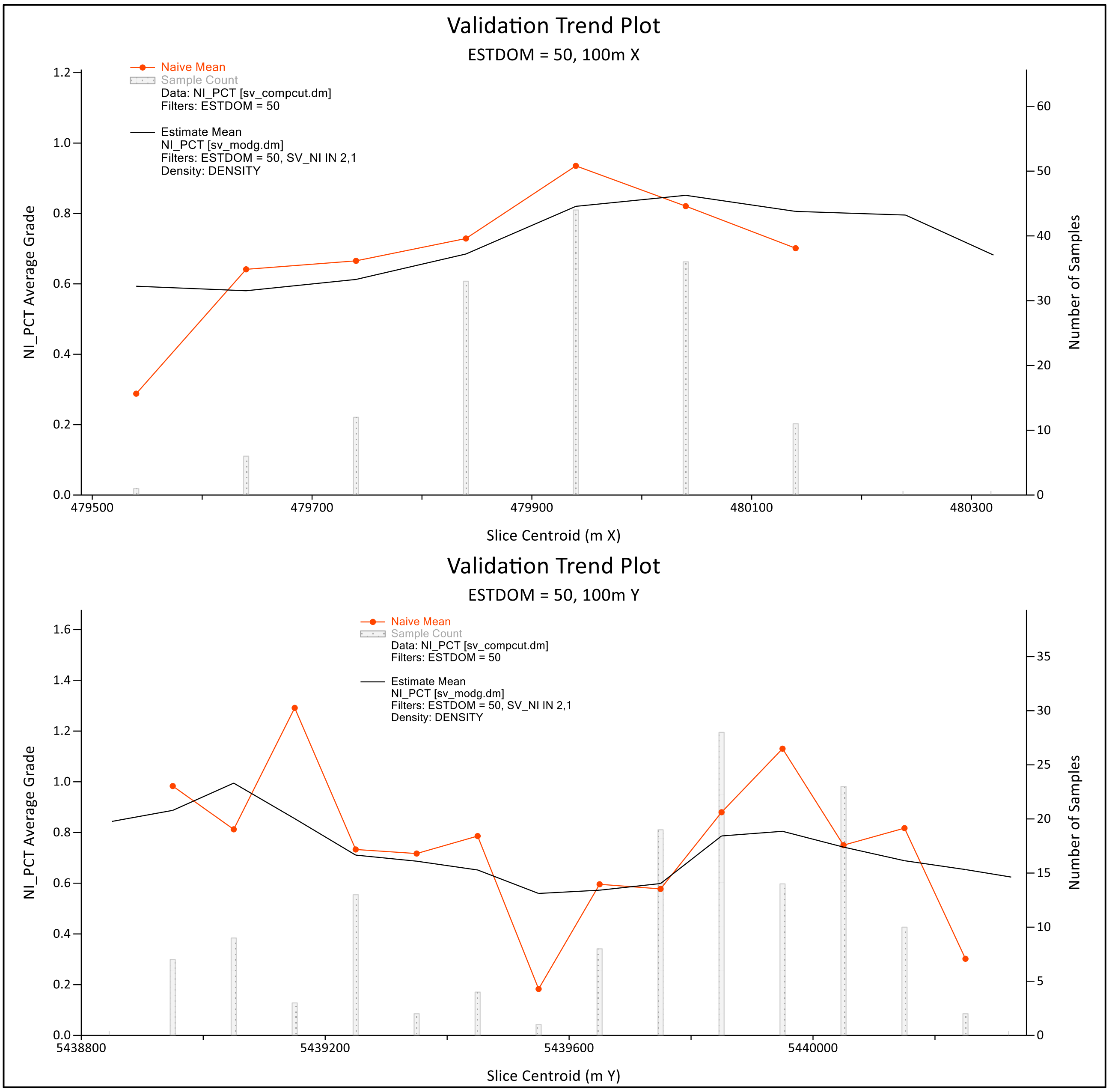
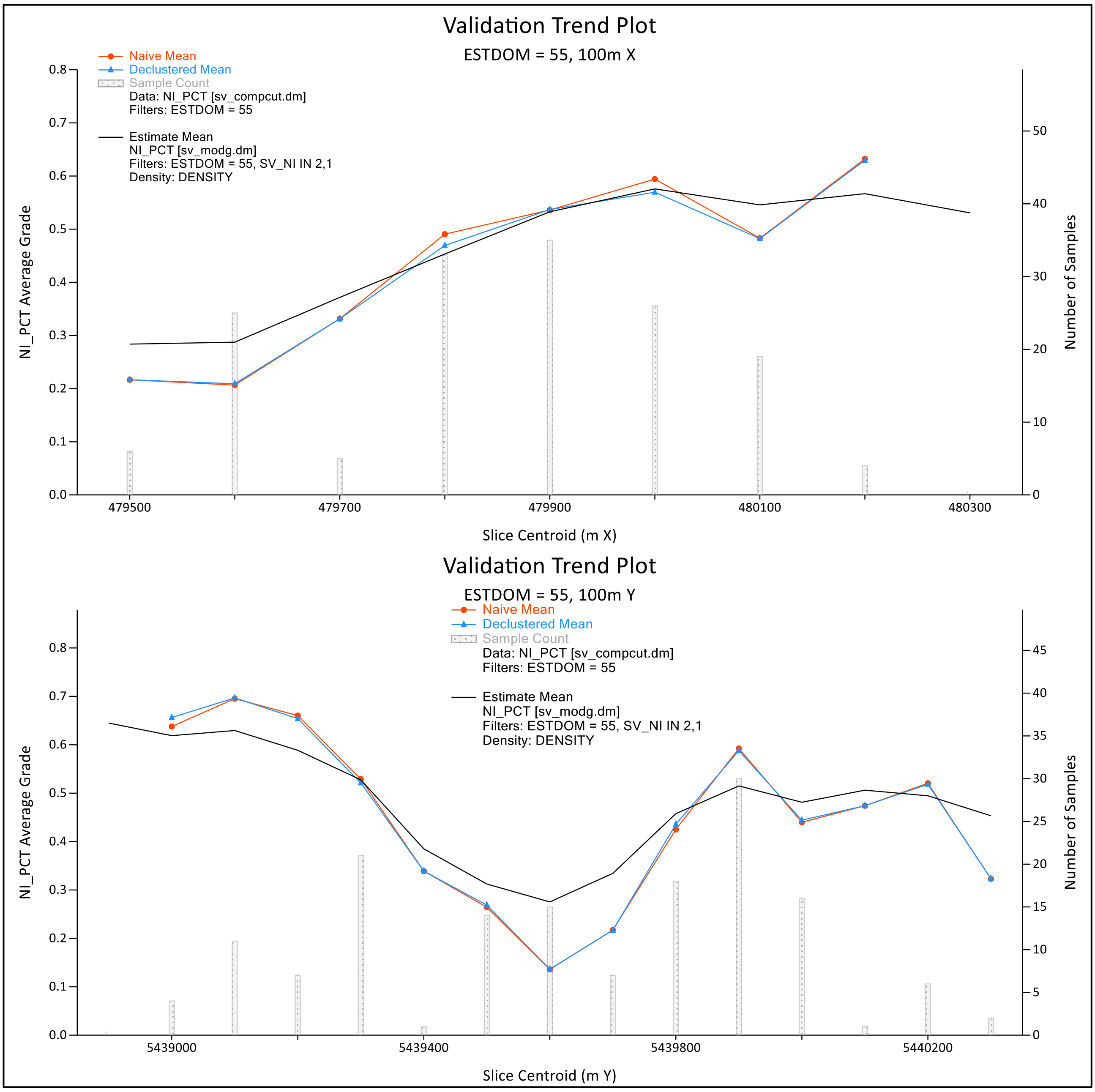


Figure 6.4 Grade trend plots – Saprock Ni



6.5 Model file

A full list of the fields in the final model file (sv_mod_1910v1.dm) is given in Table 6.4.

Table 6.4 Scotts-Vulcan block model (sv_mod_1910v1.dm) attribute fields

Field name	Description/Values
ESTDOM	Domain field 40 = Limonite-Laterite 45 = Transitional 50 = Saprolite 55 = Saprock 60 = undifferentiated bedrock
CO_PCT, NI_PCT, AL2O3_PC, MNO_PCT, SIO2_PCT, MGO_PCT, FE2O3_PCT	Estimated grade fields (%)
TRDIP, TRDIPDIR	Estimated dip and dip direction (used for dynamic anisotropy)
NS_DIP, NS_DIPDR	Number of points used to estimate the dip and dip direction
SV_DIP, SV_DIPDR	Search volume used to estimate the dip and dip direction
DENSITY	In situ dry density based on regression calculation discussed in Section 6.2 (t/m^3)
RESCAT	Resource classification field: 0 = unclassified 1 = Measured (not used) 2 = Indicated (not used) 3 = Inferred
NS_CO, NS_NI, NS_AL, NS_MN, NS_SI, NS_MG, NS_FE	Number of samples used for grade estimate
SV_CO, SV_NI, SV_AL, SV_MN, SV_SI, SV_MG, SV_FE	Search volume used for grade estimate 1 = first search pass 2 = second search pass 3 = third search pass -99 = not estimated, mean/median grade applied
KV_CO, KV_NI, KV_AL, KV_MN, KV_SI, KV_MG, KV_FE	Estimation kriging variance for grade estimate
DIST_NI	Distance (transformed distance relative to search volume 1) to nearest sample for Ni grade estimate

7 MINERAL RESOURCE CLASSIFICATION

The Scotts-Vulcan Mineral Resource estimate was classified and reported in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012). Snowden believes there are reasonable prospects for eventual economic extraction of the resource based on pit optimisations carried out by Snowden for the nearby Barnes Hill deposit, which has similar geological and chemical characteristics to Scotts-Vulcan (Snowden, 2010).

The Mineral Resource has been classified in its entirety as an Inferred Resource. The classification was developed based on an assessment of the following criteria:

- Nature and quality of the drilling and sampling methods.
- Drill spacing.
- Uncertainty in the collar coordinates of historical holes due to grid transformations. Resurveying of historical collars is required to verify the transformations applied.
- Confidence in the understanding of the underlying geological and grade continuity.
- Analysis of the QAQC data.
- Confidence in the estimate of the mineralised volume.
- The results of the model validation.
- Quantity of bulk density data.

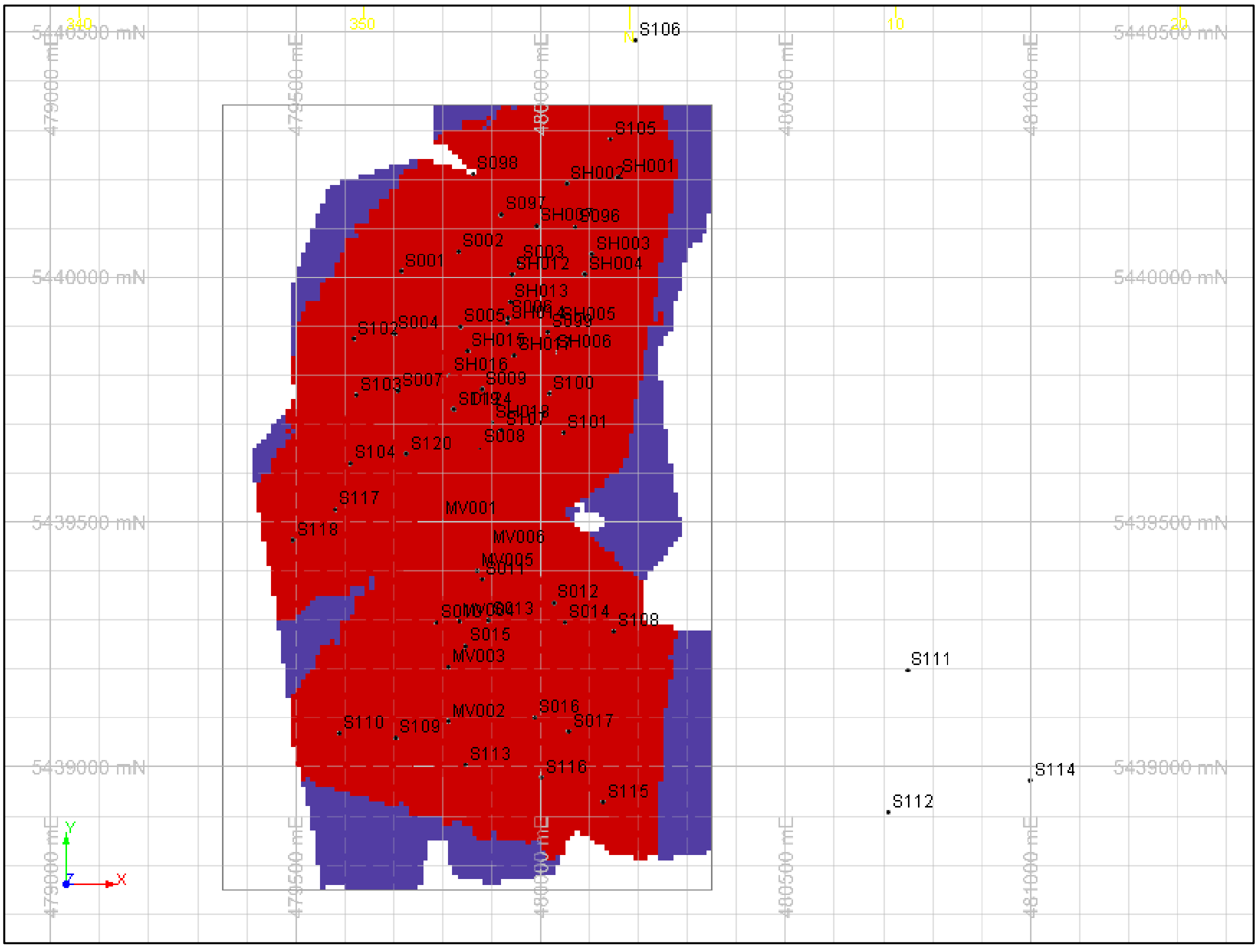
The resource classification scheme adopted by Snowden for the Scotts-Vulcan Mineral Resource estimate is outlined as follows:

- Where blocks are located within approximately 125 m of a drillhole, the Transitional (Domain 45), Saprolite (50) and Saprock (55) domains were classified as Inferred Resources
- Blocks within the Transitional (Domain 45), Saprolite (50) and Saprock (55) domains greater than approximately 125 m from a drillhole, remain unclassified and do not form part of the Mineral Resource
- The Bedrock (60) and Laterite-Limonite (40) domains remain unclassified and do not form part of the Mineral Resource.

Extrapolation horizontally beyond the drilling is limited to approximately 125 m. The Mineral Resource classification scheme is shown in Figure 7.1 and Figure 7.2.

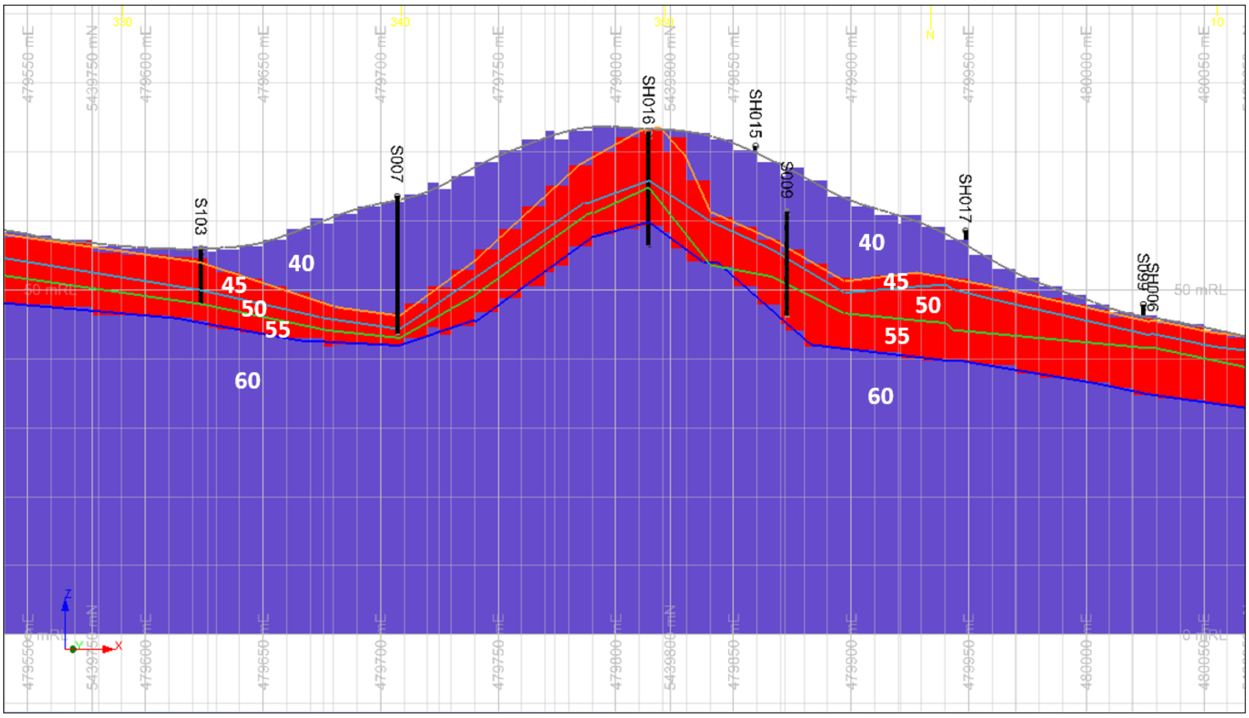
Appendix A lists Snowden's assessment of the Table 1 criteria that were considered when classifying the Scotts-Vulcan resource estimate in accordance with the JORC Code (2012 Edition) guidelines.

Figure 7.1 Plan showing Scotts-Vulcan Mineral Resource classification scheme



Block model: blue = unclassified; red = Inferred; filtered to Transitional, Saprolite and Saprock domains only

Figure 7.2 Oblique section showing resource classification (looking north-northeast)



Block model: blue = unclassified; red = Inferred

8 MINERAL RESOURCE REPORTING

8.1 Cut-off grade

The cut-off grade of 0.5% Ni is based on the pit optimisation results Snowden completed for the nearby Barnes Hill deposit in 2010 (Snowden, 2010) and is commensurate with similar deposits. Snowden believes that the cut-off grade is reasonable assuming a standard open-pit mining approach with low-to-moderate selectivity.

8.2 Metallurgical considerations

During 2019, TEM performed initial testwork on samples from Scotts Hill and Mount Vulcan. This built on extensive historical metallurgical testwork that had been conducted on the Barnes Hill deposit, which is located approximately 3 km south of Scotts-Vulcan, since 1968, with the last testwork completed in 2012. Snowden believes that, given the similar geology of the Scotts-Vulcan deposit to Barnes Hill, it can be reasonably assumed that similar metallurgical results should be able to be achieved on ore from both locations.

Accordingly, this historical testwork also informs assumptions around the viability of processing the Scotts-Vulcan ore. That work is outlined in Snowden's February 2020 update of the Barnes Hill Mineral Resource estimate (Snowden, 2020). The historical testwork was conducted on composite samples from diamond core along with bulk samples from trenches. Various acid leaching tests were performed, at both atmospheric temperatures and higher temperatures of up to 260°C, along with different acid concentrations and residence times. Nickel recoveries of greater than 80% were achieved, with cobalt recoveries above 80% also achieved.

The aim of the program conducted by TEM in 2019 was to confirm that Scotts-Vulcan ore would perform similarly to Barnes Hill ore, and also to test improved operating conditions. In particular, results from earlier work at Barnes Hill that utilised elevated operating temperatures, and the observed performance of the Enhanced Pressure Acid Leach circuit at the Ravensthorpe nickel laterite mine suggested that it could be beneficial to pursue intermediate leaching approaches. These adopt elevated heat and pressure, but below those of the earlier generation of High-Pressure Acid Leach plants. For the testwork, TEM selected a purposive sample of 90 m intersections from the 2019 air-core drilling. The samples were checked for representativeness against the Barnes Hill Mineral Resource estimate. Following this, the entire bag of these 90 drilled intersections (excluding the speared laboratory sample which averaged 380 g across all samples), was sent to BGRIMM). A total of 542 kg (including packaging) was shipped, with an average sample weight for each metre of 5.8 kg received (518.5 kg total sample weight).

The testwork applied sequential leaching with varied blends of feed ore exposed to conditions suited for these particular combinations of limonitic and saprolitic ore. The conditions across the 60 tests performed sought to optimise performance based on the levels of Fe and Mg observed in the different domains of the resource. In the first stage, a blend of limonite/saprolite was processed with a high dosage of acid (950 kg/t ore) at a leaching temperature of 95°C. This was followed by a second stage of leaching of saprolitic ore in an autoclave, where no additional acid was added, but the temperature was raised to 160°C and above. These more aggressive leach conditions were able to utilise remnant acid, and new acid generated by Fe precipitation, to extract nickel and cobalt from this saprolitic ore, which was a blend of ore from the saprolite domain combined with a fraction screened from the underlying saprock through size-based wet screening. That screening produced a finer, lower Mg, higher Ni fraction with characteristics similar to ore from the saprolite domain by rejecting the coarser sized fraction of high-Mg and low-Ni material. The coarser fraction rejected from the screening was then used for the first neutralisation stage (in place of limestone and lime partially). This was ground and used in a tertiary leach stage to commence the neutralisation process, with no additional acid added and operating at a temperature of 90°C. Results supported the ability to achieve overall nickel and cobalt extraction of 90% with an acid consumption of 509 kg/t ore across the three leaching stages.

Further testwork directly comparing the Barnes Hill and Scotts-Vulcan mineralisation under the same laboratory conditions is recommended to confirm the assumption that the ore from both sources will perform similarly.

8.3 Mineral Resource statement

The Mineral Resource for the Scotts-Vulcan deposit, reported above a 0.5% Ni cut-off grade, is estimated to be 7.7 Mt grading at 0.67% Ni and 0.047% Co, as detailed in Table 8.1.

Table 8.1 Scotts-Vulcan Mineral Resource estimate, March 2020

Class	Domain	Tonnes (Mt)	Ni %	Co %	MgO %	Fe_2O_3 %	SiO_2 %	Al_2O_3 %	MnO %
Inferred	Transitional	1.2	0.65	0.093	3.7	42.4	29.9	8.5	0.5
	Saprolite	3.0	0.76	0.052	12.0	29.8	38.7	5.7	0.4
	Saprock	3.5	0.61	0.025	26.6	15.7	42.8	2.7	0.2
Total		**7.7**	**0.67**	**0.047**	**17.3**	**25.4**	**39.2**	**4.8**	**0.3**

Note: Small discrepancies may occur due to rounding.

8.3.1 Grade-tonnage curve

Grade-tonnage reporting of the Scotts-Vulcan resource, at cut-offs from 0% Ni to 1% Ni, in steps of 0.05, is shown in Table 8.2, and a grade-tonnage curve is presented in Figure 8.1.

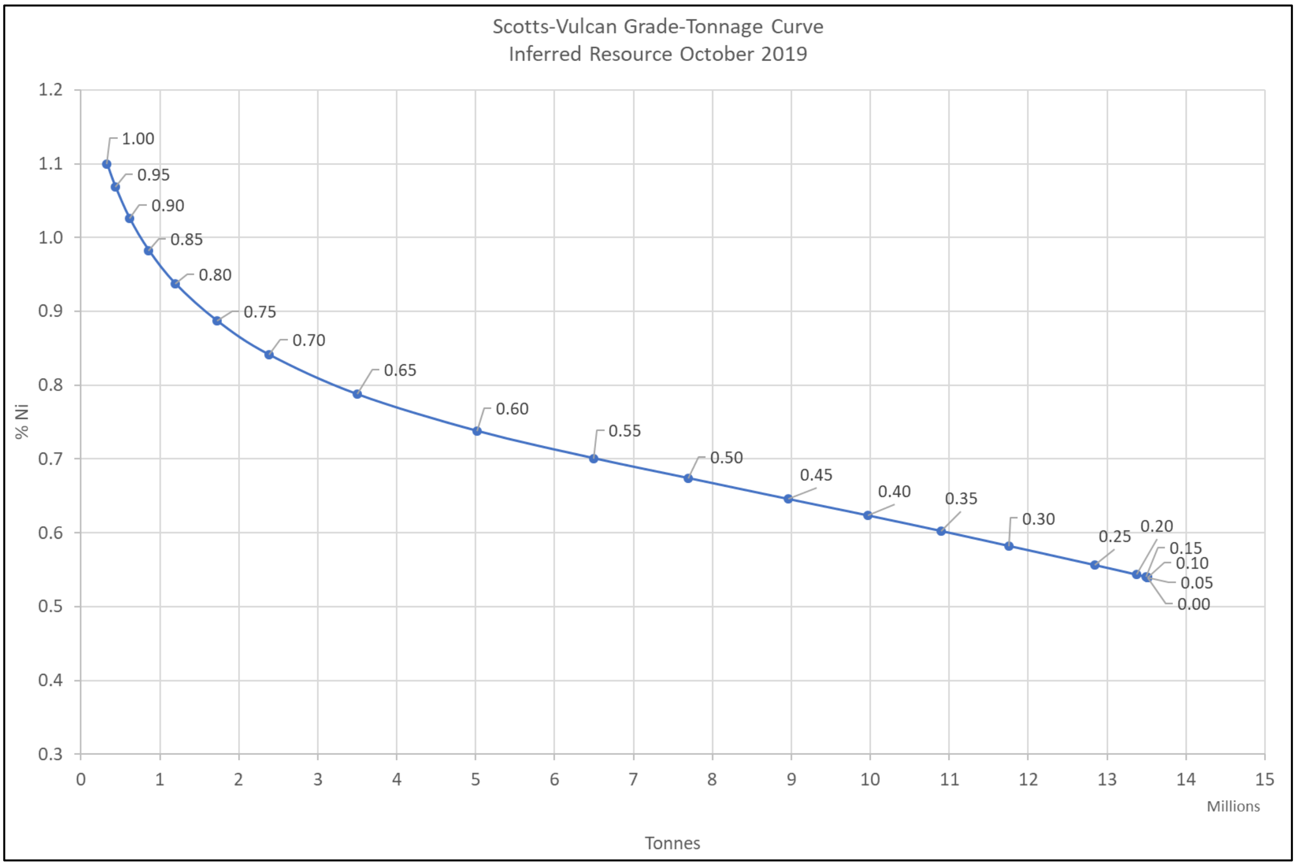
8.3.2 Competent Person's Statement – Mineral Resources

The information in this report that relates to the Scotts Hill and Mount Vulcan ("Scotts-Vulcan") Mineral Resource estimate is based on information compiled by John Graindorge who is a Chartered Professional (Geology) and a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM) and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity to which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". John Graindorge is a full-time employee of Snowden Mining Industry Consultants Pty Ltd and consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

Table 8.2 Grade-tonnage report for Scotts-Vulcan

Cut-off (% Ni)	Tonnes (Mt)	Ni %	Co %	MgO %	Fe_2O_3 %	SiO_2 %	Al_2O_3 %	MnO %
0.00	13.5	0.54	0.041	19.3	23.9	39.2	4.4	0.3
0.05	13.5	0.54	0.041	19.3	23.9	39.2	4.4	0.3
0.10	13.5	0.54	0.041	19.3	23.9	39.2	4.4	0.3
0.15	13.5	0.54	0.041	19.3	23.9	39.2	4.4	0.3
0.20	13.4	0.54	0.042	19.3	23.9	39.2	4.4	0.3
0.25	12.8	0.56	0.042	19.1	24.1	39.1	4.4	0.3
0.30	11.8	0.58	0.044	18.7	24.6	38.9	4.5	0.3
0.35	10.9	0.60	0.045	18.5	24.7	39.0	4.6	0.3
0.40	10.0	0.62	0.045	18.1	24.8	39.1	4.7	0.3
0.45	9.0	0.65	0.046	17.8	25.1	39.1	4.7	0.3
0.50	**7.7**	**0.67**	**0.047**	**17.3**	**25.4**	**39.2**	**4.8**	**0.3**
0.55	6.5	0.70	0.048	16.8	25.8	39.2	4.9	0.3
0.60	5.0	0.74	0.050	15.7	26.8	38.8	5.2	0.4
0.65	3.5	0.79	0.055	13.9	28.5	38.3	5.6	0.4
0.70	2.4	0.84	0.060	12.1	30.3	37.5	6.0	0.4
0.75	1.7	0.89	0.062	11.4	30.9	37.3	6.1	0.4
0.80	1.2	0.94	0.061	11.0	30.8	37.8	6.1	0.4
0.85	0.9	0.98	0.060	10.9	30.3	38.5	6.1	0.4
0.90	0.6	1.03	0.060	10.6	30.0	39.0	6.0	0.4
0.95	0.4	1.07	0.058	10.7	29.5	39.6	6.0	0.4
1.00	0.3	1.10	0.058	10.5	29.4	40.0	6.0	0.4

Figure 8.1 Scotts-Vulcan grade-tonnage curve – nickel



9 REFERENCES

2020, Snowden, *Barnes Hill Mineral Resource Update*, unpublished letter prepared by Snowden for Tasmania Energy Metals Pty Ltd, project number AU10285, dated 4 February 2020.

2010, Snowden, *Barnes Hill Resource Estimate and Pit Optimisation*, unpublished report prepared by Snowden for Proto Resource Pty Ltd, project number 01008, dated November 2010.

10 ABBREVIATIONS AND UNITS OF MEASUREMENT

°C	degrees Celsius
3D	three-dimensional
Al	aluminium
Al_2O_3	aluminium oxide
Allegiance	Allegiance Mining
BGRIMM	Beijing General Research Institute of Mining & Metallurgy
Ca	calcium
CaO	calcium oxide
cm	centimetre(s)
Co	cobalt
Cr	chromium
Cr_2O_3	chromium oxide
CRM	certified reference material
Cu	copper
Fe	iron
Fe_2O_3	iron oxide
g	gram(s)
g/t	grams per tonne
GPS	global positioning system
ha	hectare(s)
HARD	half absolute relative difference
ICP-MS	inductively coupled plasma – mass spectrometry
kg	kilogram(s)
kg/t	kilograms per tonne
km	kilometre(s)
LiDAR	light detection and ranging (survey)
LOI	loss on ignition
m	metre(s)
MgO	magnesium oxide
mm	millimetre(s)
MnO	manganese oxide
Mt	million tonnes
Ni	nickel
OREAS	Ore Research and Exploration Pty Ltd
Pb	lead
ppm	parts per million
Proto	Proto Resources and Investments Ltd
QAQC	quality assurance/quality control
Sc	scandium
SiO_2	silicon dioxide
Snowden	Snowden Mining Industry Consultants Pty Ltd
TEM	Tasmania Energy Metals Pty Ltd
TGA	thermo gravimetric analyser
XRF	x-ray fluorescence
Zn	zinc

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Appendix A
JORC Table 1
Assessment Criteria

JORC Table 1 – Section 1: Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	• The bulk of the data used for resource estimation is based on the logging and sampling of air-core drilling (approximately 94% of the data). • Air-core drilling from 1997 was sampled at 1 m intervals using a PVC or aluminium scoop to obtain an average weight of 0.7 kg per sample. For the 2019 drilling, an average of 0.38 kg was collected by spearing from each drilled metre. • The sample was pulverised and split to 200 g from which a 20 g subsample was taken for x-ray fluorescence (XRF) and loss on ignition (LOI) analysis. • Diamond drilling was sampled at 1 m intervals with occasional smaller length samples taken where appropriate due to mineralisation boundaries.
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• A total of 67 drillholes totalling 816 m have been drilled at the Scotts-Vulcan deposit, comprising 62 air-core drillholes (50 mm diameter) and five PQ triple tube diamond drillholes.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Diamond drillholes were completed using triple tube to enhance core recoveries. Core recovery was recorded throughout drillholes with core recovery typically exceeding 90%. • Recovery of air-core drill samples was generally reasonable based on a visual assessment, with relatively few damp or wet samples. Samples with "poor" recovery were not assayed and recorded as "No Sample". • Recovered drill sample weights were recorded for a total of 90 samples from the 2019 Tasmania Energy Metals Pty Ltd (TEM) air-core drilling program. Analysis of the wet sample weights (including the weight of the speared laboratory fraction) indicates an average whole bag sample weight of approximately 6.1 kg was attained from each drilled metre, with a total of three samples (of 90), or 3.3% of the dataset, with sample weights below 1 kg on a wet basis. • There is no relationship between sample recovery and grade as far as Snowden Mining Industry Consultants Pty Ltd (Snowden) is aware.

Criteria	JORC Code explanation	Commentary
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Air-core drillholes were logged at 1 m intervals with chip trays of each metre collected as a geological record and photos taken of all chip trays. • Diamond drillholes were logged over geological intervals ranging from centimetres to several metres. Core photos were taken of each tray throughout the hole. • Where logging exists, all intervals were logged. Logging includes the interval colour and rock type/laterite horizon.
Subsampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all subsampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• For diamond drillholes, all core was cut in half using a diamond core saw and 1 m half-core samples submitted for assay. PQ diamond drillhole samples weighed more than 5 kg and up to 10 kg in fresher rock samples. • Air-core drillholes were tube sampled with a separate sample taken for each metre. Duplicate samples and standard samples were also submitted as a quality control measure. • Field split duplicates and standards were initially submitted at the rate of approximately 1:50. No blanks were submitted. No coarse split or blind resubmissions have been completed. • Whilst the average sample size for the 1997 air-core drilling is somewhat small, it is considered reasonable given the nature of the drilling, grain size and grade variability. The samples collected for the 2019 drilling are considered to be too small and larger samples are required to reduce the sampling error and improve precision and representivity.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• All samples were submitted to the ALS Laboratory in Brisbane for assay by lithium borate fusion XRF (laboratory method ME-XRF12), with LOI at 1,000°C by thermo gravimetric analysis (TGA). Of these, three potential fibrous samples were redirected to ALS Perth to have the same method applied with additional safety protocols in place. • Samples were logged and tracked via the laboratory's internal LIMS system. • Laboratory sample preparation involved: – Any samples that did not airdry overnight were oven dried at a maximum of 120°C – Entire sample initially crushed to 90% passing 2 mm and split using a riffle splitter – A sample split of up to 1 kg was pulverised to 95% passing 106 µm – 0.66 g subsample was analysed by fused bead XRF with a lower detection limit 0.005% Ni and 0.001% Co. • QAQC procedures implemented by Proto for the 1997 drilling included the submission of certified standards, duplicate samples and pulp duplicates. • TEM inserted certified reference materials (CRMs) and field duplicates into the sample batches from the 2019 drilling. Of the 325 samples submitted for the 2019 drilling, 26 quality control samples were included, comprising 15 CRMs and 11 field duplicates, equating to an insertion rate of approximately 1:20 for the CRMs and 1:30 for the duplicates. Results of the CRMs shows that

Criteria	JORC Code explanation	Commentary
		reasonable analytical accuracy has been achieved and field duplicates show a reasonable level of precision. • Additionally, a batch of 36 sample pulps from the 2019 drilling was submitted to the SGS laboratory in Perth for check assaying. Three check assays from SGS show significantly different nickel results compared to the original sample and are suspected to have been incorrectly labelled. • ALS and SGS included standards within sample batches as part of the internal laboratory QAQC.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• As part of the 2010 Barnes Hill resource estimate, Snowden verified laboratory assay certificates against the supplied database with no discrepancies identified. • A total of five diamond drillholes twinned existing air-core drillholes to confirm grade and provided mineralised material for bulk density testwork. • Geological logging was completed on paper, transferred to Microsoft Excel spreadsheets and geological logging codes validated. • Due to the different generations of assays, where required, element assays were converted to oxides (e.g. % Fe to % Fe_2O_3). No other adjustments have been made to the assay data.
Location of data points	• *Accuracy and quality of surveys used to locate drillholes (collar and downhole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• The coordinate system used for the 2019 drilling is MGA Zone 55 projection based on the GDA94 datum. Historical data (i.e. 1997 drilling) was reportedly collected using the AGD66 datum; however, this was apparently later converted to GDA94 by Proto Resources and Investments Ltd (Proto)/Allegiance Mining (Allegiance). Investigations by TEM revealed there is significant uncertainty regarding the coordinate system that was used and the reliability of the transformed coordinates. Based on a historical map provided by TEM, Snowden and TEM were able to ascertain that the coordinates of the historical data recorded in the database were likely based on the AGD66 system. As such, a transformation was applied by Snowden using the world coordinate transform algorithm in Datamine Studio RM software from AGD66 to MGA94 Zone 55. The resulting, transformed coordinates were verified by TEM as being visually correct. The transform shifts the historical collar locations approximately 212.6 m horizontally to the northeast. • The collars of the 2019 drilling at Scotts-Vulcan were surveyed by a contract surveyor using RTK global positioning system (GPS) with a horizontal accuracy of ±10 mm and a vertical accuracy of ±15 mm. • The survey method and accuracy of the 1997 drilling is unknown. • The vertical (Z) coordinate for the 2019 drilling matched the topographic surface reasonably well; however, Snowden noted a significant difference between the historical collars and the topographic surface of up to 43 m (average 17 m difference). Given the close match of the 2019 drilling to topography, Snowden elected to project the historical collar points onto the topographic surface.

Criteria	JORC Code explanation	Commentary
		• A topographic surface was provided by TEM, based on a light detection and ranging (LiDAR)-derived 5 m digital elevation model of the northwest region of Tasmania completed by Geoscience Australia in 2013. The LiDAR has a reported 0.15 m vertical and horizontal accuracy.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Air-core drillhole spacing across the Scotts-Vulcan resource area is somewhat variable but is based on an approximate 100 mE x 100 mN grid. • Five diamond drillholes were completed at various locations across the deposit to gain material for bulk density and to twin existing air core drillholes. • Samples were composited to a 1 m interval for resource estimation.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Drillholes were drilled vertically, perpendicular to the interpreted mineralisation orientation which is sub-horizontal.
Sample security	• *The measures taken to ensure sample security.*	• No specific measures have been taken to ensure sample security. • Snowden does not believe that sample security poses a material risk to the integrity of the assay data used in the Mineral Resource estimate.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No external review of sampling and drilling procedures has been completed as far as Snowden is aware.

JORC Table 1 – Section 2: Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The Scotts-Vulcan deposit straddles granted Exploration Lease EL 2/2017 and Mining Lease 1872P/M, although the majority of the resource occurs within EL 2/2017. • Tasmania Energy Metals Pty Ltd is the registered holder of 100% of Mining Lease 1872P/M. TEM has entered into a binding agreement to acquire 100% of EL 2/2017 from its registered holder, Monclar Pty Ltd. Mineral Resources Tasmania formally approved the transfer without conditions on 12 February 2020 and has filed the transfer documentation. The updated registration is expected to be published in early 2020.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• A number of phases of mapping, drilling and metallurgical testwork have been completed over the nickel/cobalt laterites in the Barnes Hill area, which includes Scotts-Vulcan, by various companies: – **1955 to 1956, Ben Lomond Mining.** Reconnaissance sampling completed to identify nickel-rich clays above serpentinites. – **1958, Consolidated Zinc.** Enterprise Exploration Company Pty Ltd completed an exploration report in 1958. Initial mapping identified garnierite bearing serpentine in a 4,000 ft x 2,500 ft area. Auger drilling completed on three lines south of Barnes Hill. Holes were 100 ft apart over a distance of 1,400 ft, 1,700 ft and 2,400 ft. Sample recovery was reportedly excellent and all holes except two ended at the bedrock contact. Average grades ranged from 0.4% Ni to 0.96% Ni and thicknesses varied from less than 5–9 ft. Other smaller areas were also identified and an additional six lines of auger drillholes were completed; however, the nickel laterite profile was thinner (4–6 ft) and of lower grade (0.2% Ni). – **1965 to 1967, BHP.** Regional and detailed mapping was completed. Airborne and ground magnetic surveys, along with geochemical sampling. One diamond core hole drilled at Scotts Hill to 673 ft to investigate magnetic anomaly – intersected magnetite (no sulphide mineralisation). A series of pits were completed on 17 separate lines within the “Chromite Gravels”. BHP concluded the laterites near Andersons Creek were of low grade and not worthy of development. – **1967 to 1968, King Island Scheelite.** 17 diamond drillholes completed. Assay analyses were completed by Minex in Melbourne. Mineralogical study using x-ray diffraction completed with nickel bearing phases identified. Identification of different domains laterally (Scotts Hill/Mount Vulcan/Barnes Hill) and throughout the profile (Laterite Zone/Transitional Serpentinite Zone/Bleached Serpentinite Zone/Fresh Zone). Beneficiation tests were also completed (H_2SO_4 leach tests, size analysis of ore, size analysis of residue of H_2SO_4 leach, caustic soda recovery, ammonia recovery, Nicaro process) with the Nicaro process achieving 67.7% Ni recovery. – **1969, King Island Scheelite.** Additional 20 diamond drillholes completed. Four ore locations delineated (Scotts Hill, Mount Vulcan, Barnes Hill and Barnes Hill South). Resource estimate of

Criteria	JORC Code explanation	Commentary
		6.0 Mt at 1.04% Ni and 0.06% Co at a 0.7% Ni cut-off. Analysis for Ni, Co, Cr, Al_2O_3, CaO, MgO, SiO_2 and FeO was completed. Analyses were completed by the Launceston Laboratories of the Tasmanian Department of Mines. – **1971 to 1972, Allstate Exploration.** 15 core holes completed. Trenching also completed. – **1969 to 1981, Northern Chromite.** Chromium production on western flank of Barnes Hill. Drilling completed at Rifle Range. – **1988, Placeco Australia.** Rock chip samples taken from Barnes Hill, Dans Hill and Mount Vulcan areas. – **1997 to 2000, Allegiance.** Completed 549 m of air-core drilling in 51 holes. Drilling contractor was Tas Diamond Driller Pty Ltd. All holes were vertical with 1 m samples. All samples were weighed. Nine holes at Scotts Hill, eight holes Mount Vulcan, 17 holes at Barnes Hill, and 17 holes at Barnes Hill South. Revere circulation (RC) drilling program of 65 holes totalling 492 m. Updated resource estimated in March 1998. – **2001 to 2005, Jervois Mining.** Air-core holes relogged to standardised format. Check assaying was completed on pulps from Allegiance air-core holes S001 to S051. Composite bulk samples for limonite, saprolite and weathered serpentinite lithologies for the Bames Hill region and the Scotts Hill/Mount Vulcan regions were collected for metallurgical testing. Resource estimate re-done based on lithological domains. – **2007, Proto.** Completion of a high-level review of the Barnes Hill project and drillhole database by Snowden. Air-core drilling program (17 holes for 202 m) completed to validate historical drilling results and to provide samples for metallurgical testwork. Detailed flora and fauna assessment of the resource areas by North Barker Ecosystem Services. Cutting and assaying of some historical diamond core holes held at the MRT Rockstore in Mornington. Metallurgical testwork at HRL Testing in Brisbane. Regional soil sampling program consisting of 429 samples taken along 400 m spaced east-west lines. Aboriginal heritage and European heritage surveys completed. Column leach testwork on further air-core drilling samples from the Barnes Hill deposit. First phase of a resource drilling program at the Barnes Hill deposit which consisted of 75 air-core drillholes (BHA001–BHA075) for 1,080 m was completed in 2008. Second phase of the resource drill-out at Barnes Hill was completed in late 2009 through to early 2010 and consisted of 549 air-core drillholes (BHA076–BHA625) for 4,839 m and 16 diamond drillholes (BHD001–BDH016) for 416 m.

Criteria	JORC Code explanation	Commentary
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The Barnes Hill deposits, including Scotts Hill and Mount Vulcan, are interpreted to have formed from the chemical weathering of a serpentinised ultramafic parent rock (Andersons Creek Complex). The ultramafic Andersons Creek Complex is a layered wedge of Cambrian ultramafic stratigraphy consisting mainly of serpentinite, pyroxenite and gabbro. The ultramafic complex around the Barnes Hill region has been altered almost completely to serpentinite prior to the chemical weathering process. The weathered serpentinites have subsequently been altered to clays which are overlain by a ferruginised laterite zone. • The laterite profile identified at Scotts-Vulcan is similar to Barnes Hill and comprises: – A surficial pisolitic soil horizon – Fe-rich laterised hard-cap zone (in places) – Laterite zone – Limonite zone – Saprolite zone – Saprock zone – Bedrock/serpentinite. • At Scotts-Vulcan, the upper ferruginous portion of the profile is not as well developed as at Barnes Hill and is less continuous. • The Barnes Hill ultramafic rocks (Andersons Creek Complex) are bounded by quartzites to the east and claystones and slates to the west. Permian conglomerates overlie the ultramafic complex to the north and south. The quartzites are of Cambrian age and were intruded by the ultramafic rocks in the Cambrian. The ultramafics were subsequently altered to serpentinites. In turn the serpentinites were intruded by granitic rocks in the Devonian period. The belt of serpentine occupies a topographic low and is surrounded to the west and north by rugged hills. • The weathering history at Barnes Hill has not been suitable for the co-precipitation of soluble silica and nickel. Consequently, the hydrous nickel silicate garnierite, which is typically present in other nickel laterite deposits, is not prevalent at Barnes Hill. Serpentine and chlorite are the main nickel bearing species.
Drillhole information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drillholes:* – *easting and northing of the drillhole collar* – *elevation or RL (Reduced Level – elevation above sea level in metres) of the drillhole collar* – *dip and azimuth of the hole* – *downhole length and interception depth* – *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• No exploration results being reported. • A diagram showing the location of drillhole collars is included in the accompanying release.

Criteria	JORC Code explanation	Commentary
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• No exploration results being reported.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drillhole angle is known, its nature should be reported.* • *If it is not known and only the downhole lengths are reported, there should be a clear statement to this effect (e.g. 'downhole length, true width not known').*	• No exploration results being reported. • Drillholes were drilled vertically – perpendicular to the interpreted orebody orientation. • The true width of mineralisation is not considered to be materially different from the drillhole intercepts for vertical drilling.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• No exploration results being reported.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• No exploration results being reported.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• No exploration results being reported.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Further drilling is planned as part of ongoing feasibility programs. This will target areas where historical work, including sampling by BHP and drilling by King Island Scheelite, reported anomalous nickel values. In particular, exploration around and north of Simmonds Hill is proposed. • Additional bulk density measurements using different methods are planned to validate existing bulk density measurements.

JORC Table 1 – Section 3: Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• Selected checks by Snowden of drillhole data against original assay certificates were completed with no errors identified. • Geological logging completed on paper, transferred to Microsoft Excel spreadsheets and geological logging codes validated. • Drillhole database backed up on a regular basis. • Statistical checks completed to ensure all assays fall within acceptable limits. • Checks on overlapping or duplicate intervals completed. • Checks were completed on all samples which fell below analytical detection limits to ensure samples were assigned zero grades in resource estimation. • Holes SD121, SD121A, SD122 and SD123 were excluded from the resource modelling as these holes have identical collar coordinates to other drillholes.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• Due to the lack of outcropping geology and as no drilling is currently taking place, Snowden does not believe that a site visit is warranted at this stage; however, a site visit is anticipated when drilling recommences.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• Snowden believes the local geology is well understood as a result of work undertaken by Proto and other companies working in the region. The Scotts-Vulcan nickel laterites have developed from the weathering of an ultramafic host rock sequence. • The geological interpretation of the laterite horizons was developed based on the profile interpreted in 2010 for the nearby Barnes Hill deposit and used in the 2010 Barnes Hill resource model. At Scotts-Vulcan however, the upper ferruginous portion of the profile is not as well developed as at Barnes Hill and is less continuous, especially given the current drill spacing. Consequently, the pisolite, hard-cap, laterite and limonite zones were combined into a single “laterite” domain, which Snowden believes is reasonable given the somewhat gradational nature of the internal boundaries. • Surfaces of the laterite horizons were interpreted based on a combination of geochemistry (mainly Ni, MgO and Fe_2O_3) and the geological logging. Each surface was treated as a hard boundary for resource modelling. • Geological interpretation in this region has been limited to the extent of current drilling. • Alternative interpretations of the mineralisation are unlikely to significantly change the overall volume of the mineralised zone in terms of the reported classified resources.

Criteria	JORC Code explanation	Commentary
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• The deposit has an extent of approximately 1.6 km north-south x 0.9 km east-west. • The main and thickest regions of the deposit are centred around Scotts Hill and Mount Vulcan and extend approximately 500 m north-south x 500 m east-west. • Nickel mineralisation within the limonite zone is overlain in most part by ferruginised lateritic waste material which may be up to 15 m thick in places.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• Ordinary kriging estimation (parent cell estimation) technique for Ni, Co, MgO, MnO, Al_2O_3, Fe_2O_3 and SiO_2. • Sample selection honoured geological domains which were developed considering the vertical chemical and geological trends of the profile. Five domains developed: combined Limonite-Laterite Domain, Transitional Domain, Saprolite Domain, Saprock Domain and Bedrock Domain. • Statistical analysis by domain completed. Top cuts were applied to Co (0.35% Co) and MgO (8% MgO) within the Limonite-Laterite Domain to control sporadic extreme values during estimation. No other top cuts were applied. • Variography completed for Ni, Co, MgO, MnO, Al_2O_3, Fe_2O_3 and SiO_2. Due to the low number of samples for individual domains, variograms were modelled within a combined Transitional-Saprolite-Saprock Domain and applied to all domains. • Validation of block estimates included visual and statistical checks, both global and local. Checks were completed against original and de-clustered drillhole composites. The validations show that while smoothed, the block estimates reproduce the trends observed in the drillhole data.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• All tonnages have been estimated as dry tonnages.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• Resources have been reported within domain boundaries above a 0.5% Ni cut-off. The cut-off grade of 0.5% Ni is based on the 2010 pit optimisation results for the Barnes Hill deposit and is commensurate with similar deposits. Snowden believes that the cut-off grade is reasonable assuming a standard open-pit mining approach with low-to-moderate selectivity.

Criteria	JORC Code explanation	Commentary
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• It is assumed that the deposit will be mined using conventional drill and blast open cut mining methods with low-to-moderate selectivity.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• During 2019, TEM performed initial testwork on samples from Scotts Hill and Mount Vulcan. The aim of the program was to confirm that Scotts-Vulcan ore would perform similarly to Barnes Hill ore, which had previously been tested (as noted below), and also to test improved operating conditions. The testwork applied sequential leaching with varied blends of feed ore exposed to conditions suited for these particular combinations of limonitic and saprolitic ore. A total of 60 tests were performed. Results supported the ability to achieve overall nickel and cobalt extraction of 90% with an acid consumption of 509 kg/t ore across the three leaching stages. • Metallurgical testwork has been conducted on the Barnes Hill deposit, which is located approx. 3 km south of Scotts-Vulcan, since 1968, with the last testwork completed in 2012. The testwork was conducted on composite samples from diamond core along with bulk samples from trenches. Various acid leaching tests were performed, at both atmospheric temperatures and higher temperatures of up to 260°C, along with different acid concentrations and residence times. Nickel recoveries of greater than 80% were achieved, with cobalt recoveries above 80% also achieved. • Snowden believes that, given the similar geology of the Scotts-Vulcan deposit to Barnes Hill, it can be reasonably assumed that similar recoveries should be able to be achieved at both project sites. However, further testwork on the Scotts-Vulcan mineralisation is required to confirm this assumption.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• It is assumed that no environmental factors exist that could prohibit any potential mining development at the Scotts-Vulcan deposit.

Criteria	JORC Code explanation	Commentary
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vughs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• Bulk density was determined for a total of 244 density samples by the water immersion technique (Archimedes principle) on 20–30 cm samples of PQ diamond core from the nearby Barnes Hill deposit. • Default density values were assigned to each domain based on the Barnes Hill measurements: Limonite-Laterite Domain (1.5 g/cm^3), Transitional Domain (1.40 g/cm^3), Saprolite Domain (1.3 g/cm^3), Saprock Domain (2.2 g/cm^3) and Bedrock Domain (2.4 g/cm^3).
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• Classification is based on a number of considerations: – Nature and quality of the drilling and sampling methods. – Drill spacing. – Uncertainty in the collar coordinates of historical holes due to grid transformations. Resurveying of historical collars is required to verify the transformations applied. – Confidence in the understanding of the underlying geological and grade continuity. – Analysis of the QAQC data. – Confidence in the estimate of the mineralised volume. – The results of the model validation. – Quantity of bulk density data. • The resource classification scheme adopted by Snowden for the Scotts-Vulcan Mineral Resource estimate is outlined as follows: – Where blocks are located within approximately 125 m of a drillhole, the Transitional (Domain 45), Saprolite (50) and Saprock (55) domains were classified as Inferred Resources. – Blocks within the Transitional (Domain 45), Saprolite (50) and Saprock (55) domains greater than approximately 125 m from a drillhole, remain unclassified and do not form part of the Mineral Resource. – The Bedrock (60) and Laterite-Limonite (40) domains remain unclassified and do not form part of the Mineral Resource. • Extrapolation horizontally beyond the drilling is limited to approximately 125 m. • The Mineral Resource classification appropriately reflects the view of the Competent Person.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• Snowden is not aware of any independent reviews of the Mineral Resource estimate. • Snowden's internal review process ensures all work meets quality standards.

Criteria	JORC Code explanation	Commentary
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• The Mineral Resource has been validated both globally and locally against the input composite data. • Given the relatively sparse drilling within the Inferred Resource, estimates are considered to be globally accurate. Closer spaced drilling is required to improve the local confidence of the block estimates. • There is no operating mine at the Barnes Hill project, including Scotts-Vulcan, and as such, no production data is available.