Updated Mineral Resource Estimate - Mannar Heavy Mineral Project

titaniumsands LTD

ASX RELEASE

15th March 2023

TITANIUM SANDS LIMITED
ACN 009 131 533

Level 8, London House
216 St. Georges Terrace
Perth Western Australia 6000
Tel: +61 (08) 9481 0389
Facsimile: +61 (08) 94636103
email
http://titaniumsands.com.au

Contact:

Dr James Searle
Managing Director
Tel: +61 419 949 636
james.searle@titaniumsands.com.au

Directors
Lee Christensen
Dr James Searle
Jason Ferris

Ticket
ASX: TSL

HIGHLIGHTS:

- **An updated Mineral Resource Estimate (MRE) has been completed for the Mannar Heavy Mineral Project in Sri Lanka**
- **The objective of the drilling program was achieved, as the Indicated resource percentage in the high-grade zone increased by 2.4 times**
- **Total MRE for the project has increased to 318Mt @ 4.17% THM up from the previous 265Mt @ 4.38% THM – an increase of 20% overall**
- **The updated MRE in the high-grade zone (Domains 2 and 8) has increased 57% from 92.6Mt to 145.6Mt**
- **The Indicated resource component in the reportable high-grade zone has now increased to 75% from the previous 31% (2.4 times)**
- **The increased Indicated resource will provide sufficient basis for the forthcoming scoping study**

The resource infill and extension RC aircore drilling completed last year (([1]*ASX :TSL 25th of August 2022*) has been incorporated in an updated mineral resource estimate.

The mineral resource estimate was undertaken by GeoActive Ltd, a South African geological consulting firm with specialist expertise in heavy mineral sands exploration and resource modelling in compliance with the 2012 Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Their full JORC 2012 compliant report is contained here as Appendix 1.

In the updated MRE, it shows an increase in Indicated resources in Domain 2 and 8 from 31% to 75% and an increase in tonnes from 92.6 million to 145.6 million based on a 2% lower Total Heavy Mineral (THM) grade cut off (Tables 1 and 2). For a 3% lower THM cut off, the Indicated portion of the resource increased from 42% to 75% and tonnes from 59 million to 82 million (Tables 3 and 4). When the updated Domain 2 and 8 MRE is incorporated into the total MRE for the project it is 318 million tonnes at 4.17% THM up from 264.9 million tonnes at 4.38% THM at a 2% THM lower cut off (Tables 5 and 6). At a 3% THM lower cut off, the total MRE has increased from 164 million tonnes at 5.54% THM to 187 million tonnes at 5.36% THM (Tables 7 and 8).

The resource block modelling (Figures 3 and 4) demonstrates excellent grade continuity along the 8km long mineralisation zone with higher grades in Domain 2 being underlain by the higher grades in Domain 8. The areas of Indicated resources in both Domain 2 and 8 are also now defined as continuous zones along the mineralisation trend (Figures 5 and 6).

The drilling consisted of 315 drill holes for a total meterage of 3,438m carried out in an 8km long by 1 to 2km wide portion of the previously defined heavy mineral resources referred to as Domains 2 and 8 (shown as Inset map A in Figure 1). Domain 2 being generally defined by the near surface mineralisation down to 2 to 3m, Domain 8 the underlying mineralisation below Domain to down to 10 to 12m below land surface. The drilling program was designed to decrease line and hole spacing to test for resource extensions and to increase the proportion of Indicated resources in the MRE. Figure 2 shows all the RC aircore drill holes to date in Domain 2 and 8.

The new MRE and the increased resource definition in Domains 2 and 8 will now be used for an updated scoping study.

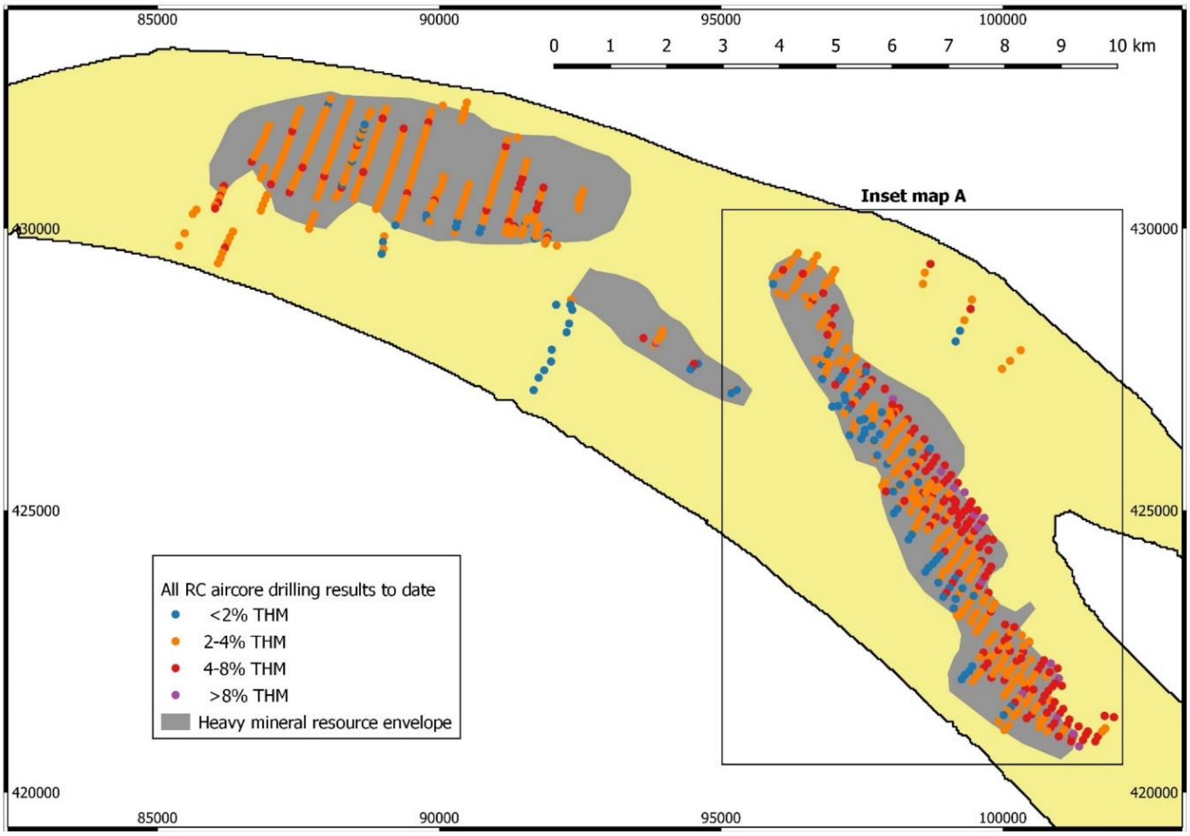


Figure 1 All RC aircore drilling results for the Mannar Heavy Minerals Project. Inset map A shows the Domain 2 and 8 zone in which the infill and extension drilling was undertaken and incorporated in the updated mineral resource estimate.

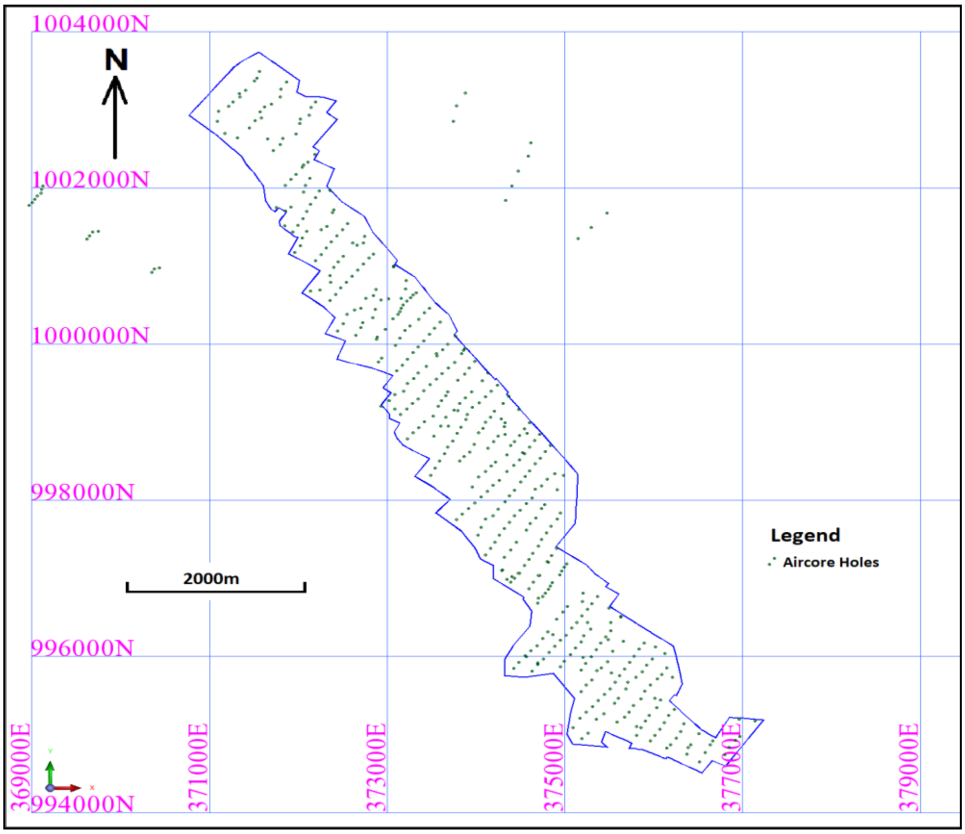


Figure 2 Domain 2 and 8 all RC aircore drilling to date.

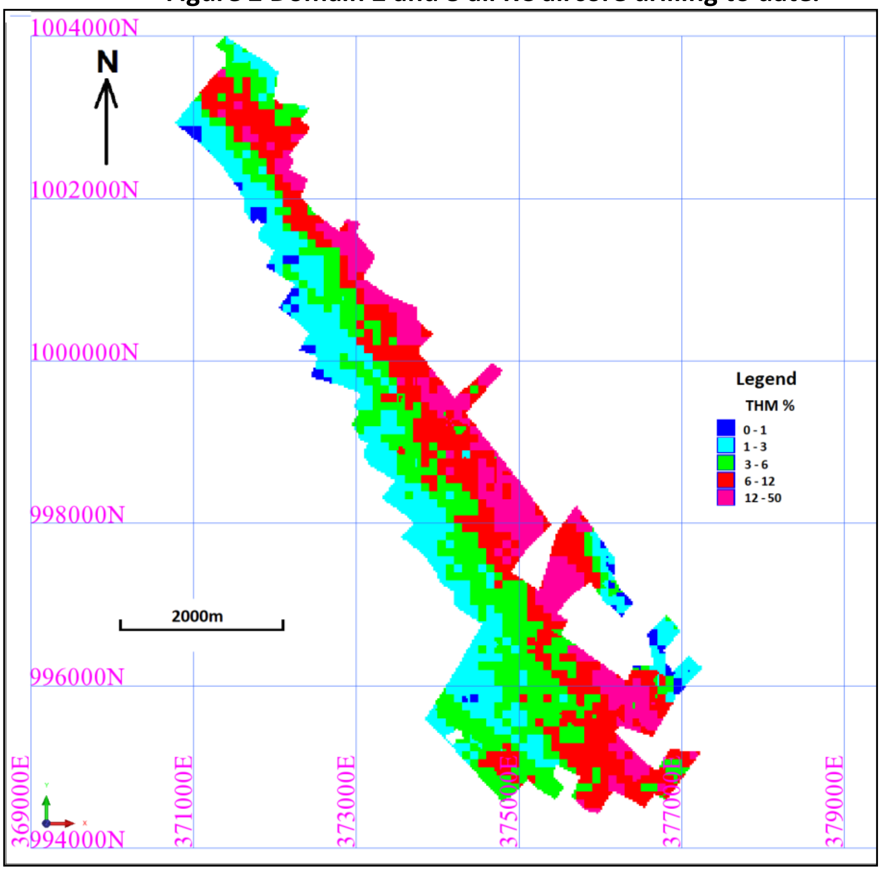


Figure 3 Domain 2 grade blocks showing excellent continuity trends along the mineralisation zone.

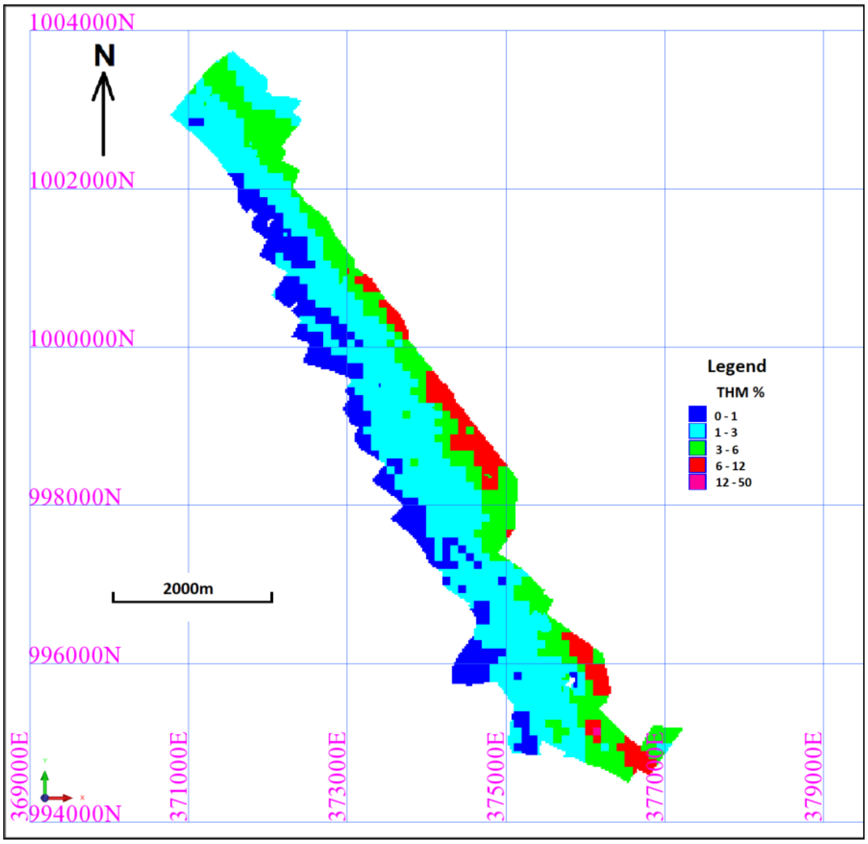


Figure 4 Similarly Domain 8 grade blocks also showing excellent continuity trends along the mineralisation zone.

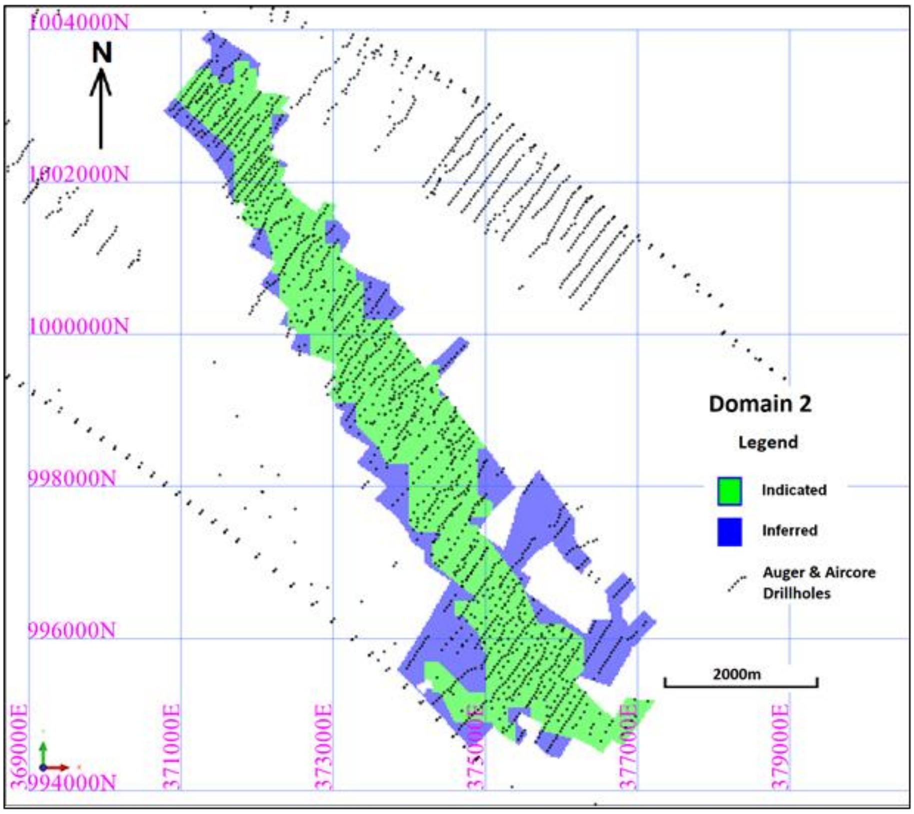


Figure 5 Domain 2 continuity of indicated mineralisation along the mineralization zone.

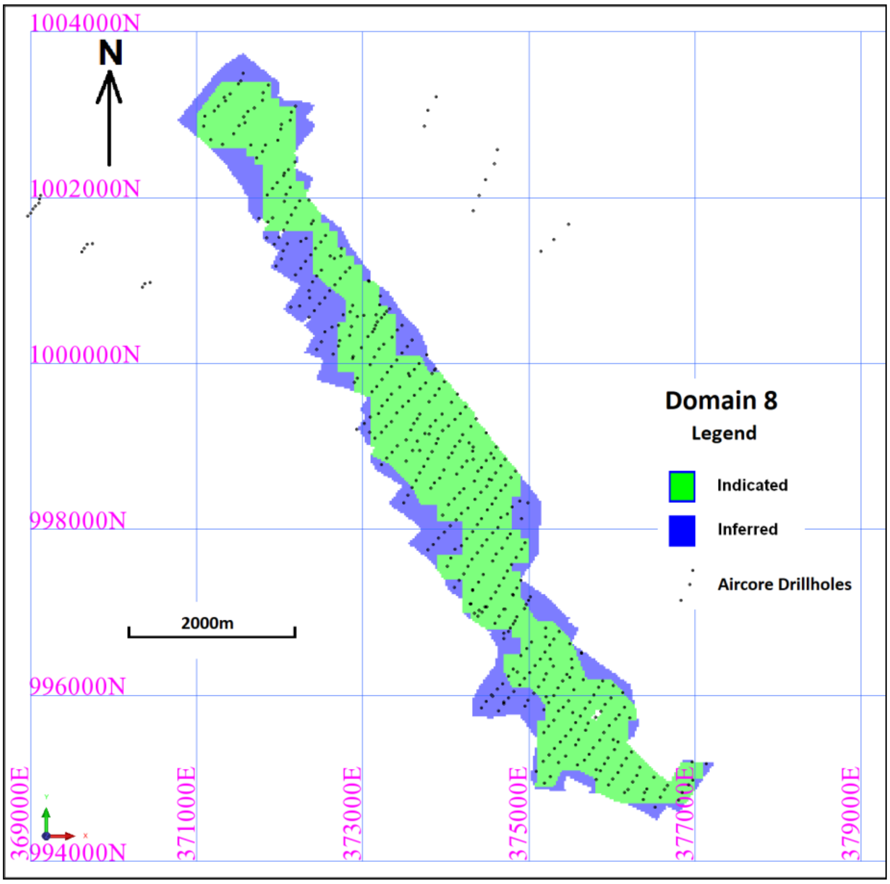


Figure 6 Domain 8 continuity of indicated mineralisation along the mineralization zone.

Resource Category	Volume (Mm³)	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	62.4	109.1	4.32	2.04	23.05	1.92	0.35	0.07	0.09	0.53
Inferred	20.9	36.5	4.93	2.13	24.97	2.31	0.39	0.08	0.11	0.58
Total	83.3	145.6	4.48	2.07	23.53	2.02	0.36	0.07	0.10	0.54

Table 1 Domain 2 and 8 new mineral resource estimate at 2% THM lower cut off extracted from the full report contained in Appendix 1 .

Resource Category	Volume (Mm³)	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	17.0	29.5	7.25	0.75	20.39	3.25	0.62	0.10	0.12	0.90
Inferred	36.1	63.1	4.29	0.99	25.10	1.80	0.33	0.07	0.08	0.47
Total	53.0	92.6	5.24	0.92	23.60	2.27	0.42	0.08	0.09	0.61

Table 2 Domain 2 and 8 mineral resource estimate at a 2% THM lower cut off previously reported ([2]*ASX 24th of September 2020*).

Resource Category	Volume (Mm³)	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	35.0	61.1	5.78	1.62	20.70	2.64	0.48	0.09	0.12	0.73
Inferred	12.0	21.0	6.78	1.71	22.59	3.27	0.53	0.10	0.14	0.82
Total	47.0	82.0	6.03	1.64	21.18	2.80	0.49	0.09	0.13	0.75

Table 3 Domain 2 and 8 new mineral resource estimate at 3% THM lower cut off extracted from the full report contained in Appendix 1 .

Resource Category	Volume (Mm³)	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	14.2	24.6	8.19	0.76	19.04	3.73	0.70	0.11	0.14	1.01
Inferred	19.7	34.4	5.79	0.96	21.30	2.47	0.45	0.09	0.11	0.64
Total	33.8	59.0	6.79	0.87	20.36	3.00	0.56	0.10	0.12	0.79

Table 4 Domain 2 and 8 mineral resource estimate at a 3% THM lower cut off previously reported ([2]*ASX 24th of September 2020*).

Resource Category	Volume (Mm³)	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	83.3	145.7	4.28	1.76	18.41	1.90	0.35	0.08	0.09	0.44
Inferred	98.5	172.3	4.07	1.31	16.37	1.87	0.31	0.08	0.10	0.30
Total	181.7	318.0	4.17	1.52	17.30	1.88	0.33	0.08	0.10	0.37

Table5 Project all domain mineral resource estimate at 2% THM lower cut off with updated Domain 2 and 8 MRE extracted from the full report contained in Appendix 1 .

Resource Category	Volume (Mm³)	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	37.8	66.1	5.54	0.83	11.63	2.48	0.46	0.10	0.10	0.51
Inferred	113.6	198.8	3.99	1.06	17.56	1.77	0.30	0.08	0.10	0.30
Total	151.4	264.9	4.38	1.00	16.08	1.95	0.34	0.08	0.10	0.35

Table 6 Project all mineral resource estimate at a 2% THM lower cut off previously reported ([2]*ASX 24th of September 2020*).

Resource Category	Volume (Mm³)	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	50.7	88.7	5.45	1.39	15.54	2.48	0.44	0.10	0.11	0.58
Inferred	56.2	98.4	5.27	1.26	15.50	2.48	0.40	0.11	0.13	0.41
Total	106.9	187.0	5.36	1.32	15.52	2.48	0.42	0.10	0.12	0.49

Table 7 Project all domain mineral resource estimate at 3% THM lower cut off with updated Domain 2 and 8 MRE extracted from the full report contained in Appendix 1 .

Resource Category	Volume (Mm³)	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	29.8	52.2	6.36	0.83	11.14	2.89	0.53	0.11	0.12	0.59
Inferred	63.9	111.8	5.15	1.08	15.96	2.33	0.39	0.10	0.12	0.40
Total	93.8	164.0	5.54	1.00	14.43	2.51	0.43	0.10	0.12	0.46

Table 8 Project all mineral resource estimate at a 3% THM lower cut off previously reported ([2]*ASX 24th of September 2020*).

COMPLIANCE WITH THE JORC 2012 ASSESSMENT CRITERIA AND ASX LISING RULE 5.8.2

The JORC Code (2012) describes criteria which must be addressed in the public reporting of mineral resources estimates for significant projects. These criteria provide means of assessing whether or not parts of the entire data entry used in the estimate are adequate for that purpose. The resource estimate stated in this document was based on the criteria set out in Table 1 of that Code. These criteria are discussed in the table below.

In addition, ASX listing rule 5.8.2 requires this information be included here in the text of the announcement as below.

Geology and Geological Interpretation

The heavy mineral resource is hosted by quartz rich, well sorted dune, beach ridge, beach and nearshore sand facies of Holocene age that form Mannar Island, a 26 kilometer by 6 kilometer sand island separated from the Sri Lankan mainland by tidal flats and narrow tidal channels. The heavy minerals have been transported by rivers transport to the coast from Precambrian metamorphic complexes in the interior of Sri Lanka.

Sampling and Subsampling Techniques

Samples we collected from an RC aircore drilling rig at 1m intervals down the entire drill hole. The nominally 10kg samples were dried and split in the on-site laboratory using a 3 tier riffle splitter to a 2.4kg subsamples. The subsamples were further processed to screen off and record the oversize >1mm material and the fines component of -45 micron. The -1mm to +45micron subsample was then re-dried and riffle split to produce a 150 to 250g subsample for consignment to Scientific Services Ltd a Cape Town, South Africa, analytical laboratory with specialist expertise in heavy mineral analyses.

Drilling Techniques

The drilling undertaken for this mineral resource estimate update consisted of 315 Reverse Circulation Aircore (RC/AC) drill holes drilled vertically surface to a target depth of 12m. RC/AC drilling is and established drilling technique for heavy mineral sand resource definition. The drilling rig used is owned by Titanium Sands Ltd and has been optimized for the drilling conditions of this project. The tractor mounted drilling rig operates with HQ gauge (96mm OD and 63.5mm ID) RC rods with face sampling bits. The on board air supply has the capability to deliver 120psi/90cfm.

Resource Classification

The resource classification was primarily based on drill hole separation. Drill hole coverage of the updated MRE is based on drilling coverage based on an RC/AC drill hole pattern of 200m by 50m infilled by later 100m by 100m drilling. The infilled drilling pattern delivering the indicated category of resources.

Sample Analysis Methods

All samples submitted to the laboratory were analyzed by standard heavy media separation techniques using TBE as a separation medium (Tetra Bromo Ethyl). TBE sinks were composited from drill holes for magnetic separation work, XRD and XRF analysis. The drill holes selected for compositing were selected to be sufficiently representative of the resource Domains.

Estimation Methodology

The MRE methodology was based on SURPAC block modelling with block sizes of 100mX100mX2m and minimum sub-blocking of 25X25X0.5m. THM (Total Heavy Mineral), mineral species contents, silt%, oversize % and relative density were among the values assigned to the blocks. Grade interpolation was implemented by hard boundary conditions by domain area. Inverse distance by the power of 3 was used for in situ grade interpolations based on domain variography.

Cut Off Grade

Cut off grades of 2 and 3% THM were selected for MRE reporting based on general considerations of operating parameters of notionally similar heavy mineral sand projects.

Modifying Factors

No other modifying parameters were identified or used in the MRE.

Mining Factors or Assumptions

No mining factors or assumptions were made in the mineral resource estimate or were deemed necessary. While the project is at a resource definition stage it is anticipated by the project proponent that it will be mined by dredge operations. The mineralisation has no overburden. The mineralisation at expected cut off grades has continuity along strike of 8 kilometers and cross strike widths of over 1km and as such boundary dilution by sub grade or barren material is expected to be negligible.

JORC Code Assessment Criteria	Comments
Section 1	**Sampling techniques and data**
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 down hole 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.*	Aircore drilling: Samples collected at 1 m intervals for the most recent aircore drilling programme. The following covers the aircore sampling process: • A sample of sand, approx. 20 g is scooped from the sample bag for visual THM% and SLIMES% estimation and logging. The same sample mass is used for every pan sample for visual THM% and SLIMES% estimation. • The standard sized sample is to ensure calibration is maintained for consistency in visual estimation. • A sample ledger is kept at the drill rig for recording sample intervals. • The 1 m aircore drill samples have an average mass of approx. 10 kg. • All samples were split down to maximum 2.4 kg by a 3-tier rifle splitter for preparatory work at the on-site facility in Pesalai. All samples were transported to the site office / Prep Lab sample prep facility in Pesalai on Mannar Island. The Prep Lab will receive samples up to c 2.4kg in weight / sample. All samples from the drilling program were prepped, even samples perceived to be low grade. Reference / residual samples for samples sent to the analytical laboratory are safely stored at the site office. Permits for the export of the samples were sourced in Sri Lanka, on receipt of the permits the samples were couriered via air freight to Johannesburg where clearance took place for the samples. They were then air freighted to Cape Town where a representative from the laboratory, Scientific Services CC, collected the samples.
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).*	Aircore drilling: • Aircore drilling is considered a standard industry technique for HMS mineralisation. Aircore drilling is a form of reverse circulation drilling where the sample is collected at the face and returned inside the inner tube. • Aircore drill rods used were 3 m in length. • rig utilises HQ gauge (96mm OD, 63.5mmID) drilling rods with inner tubes. • All aircore drill holes were drilled vertically. • The drilling is governed by the Aircore Drilling Guideline procedure to ensure consistency in the application of the method. • At the end of each drill rod, the drill string is cleaned by blowing down with air to remove any clay and silt potentially built up in the sample pipes and cyclone. • The twin-tube aircore drilling technique is known to provide high quality samples from the face of the drill hole (in ideal conditions). •

JORC Code Assessment Criteria	Comments
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.*	Aircore drilling: • All 1 m aircore samples are weighed with a spring scale at the drill rig, if the sample is wet it is air dried at the enclosed storage facility and weighed. • While initially collaring the aircore hole, limited sample recovery can occur in the initial 0 m to 3 m drill depth interval owing to sample and air loss into the surrounding loose soil. The initial 3 m of drilling and sample intervals are drilled very slowly in order to achieve optimum sample recovery. • The entire 1 m sample is collected at the drill rig in large numbered plastic bags for dispatch to the onsite split preparation facility. • All wet and moist sample are placed into large clean open plastic bags to sun-dry prior to riffle splitting the sub-sample.
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.*	Each sample was geologically logged for mineral composition, grain size, sorting, visual Silt%, induration, and a rough visual estimate of the dark heavy mineral % component. Paper log information was transferred every night to an excel spread sheet.
Sub-Sampling 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 sub-sampling 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.*	The Prep Lab will receive samples up to c 2.4kg in weight / sample that have to be dried, sieved on a 1mm aperture vibrating sieve, the +1mm and -1mm fractions weighed, then the –1mm fraction riffle split to a sub-sample of c 125-250g and the remaining material retained in storage. The 125-250g sample is weighed then undergoes rotary light attritioning in a 0.3-0.5% NaOH solution. The subsample will then be wet sieved on a 45-micron vibrating sieve with retained +45 micron material being dried then weighed and packaged for export. A duplicate sample was riffled from every 20th sample, i.e., 5% of the total. The riffler was thoroughly cleaned after each sample.
Quality of Assay Data and Laboratory Tests	
The nature, quality and appropriateness of the assaying and laboratory procedures used and	The initial drying (at between 80 to 105 degrees C via gas oven), de-sliming and oversize removal was conducted at the site Prep Facility on Mannar Island. The procedures are shown below.

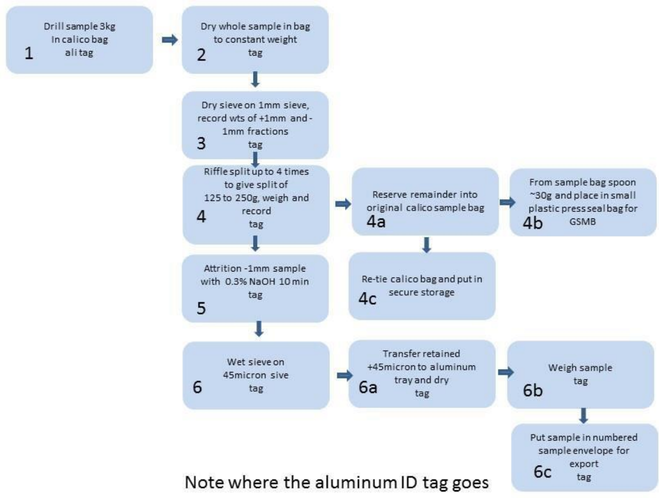
<table>
<tr><th>JORC Code Assessment Criteria</th><th>Comments</th></tr>
<tr><td>

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.

</td><td>



Analytical work on the tetrabromoethane (TBE) based THM determination and subsequent magnetic separation work was done by Scientific Services C.C., Cape Town. XRF work was done on the fractions of the magnetic separation samples.

- The determination of THM% sample concentrate using TBE at a specific gravity (SG) of 2.95, are as follows:
- TBE is placed into the glass flask up to the indicated mark.
- Place approximate 1 scoop of sample into the flask.
- Wash down the sides of the flask and impeller with TBE to ensure all material is in the TBE.
- Run the mixer for about 10 seconds.
- Wash down again to ensure no material is ‘hung’.
- Run the impeller mixer repeatable in 10 second bursts until sure that all heavies have been liberated.
- Allow to stand for 5-10 minutes or until no more material cascades to bottom.
- Once the discharge pipe is clear of suspended material release the tube to allow the concentrate to be captured in the filter paper. Store this labeled filter paper.
- Process any remaining sample as above ensuring no concentrate is lost.
- Finally flush out the floats by opening the tube and allowing the floats to fall into filter paper – allow this to stand capturing all the TBE which will be reused at a later stage.
- Wash all concentrates and floats thoroughly with acetone to reclaim as much TBE as possible.
- After the concentrate filter is acetone rinsed and dried, transfer the concentrate very carefully into a bag by opening the filter paper ensuring nothing is lost.
- Place the floats into the waste drums unless specified by the client to do otherwise.
- Check the SG of the TBE with the density tracers provided and re-use as appropriate.

</td></tr>
</table>

JORC Code Assessment Criteria	Comments
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.*	Kobus Badenhorst did twin and test holes on c 5% of the drilling done during the program. QA/QC of all the work done was performed by Bernhard Siebrits for GeoActiv.
Location of Data Points	Data and work were done in UTM, WGS84. A handheld Garmin GPS was used for the positioning and final position of the auger holes. The X and Y coordinates were collected and entered into the project spreadsheet. The handheld GPS Z data were found to be very inaccurate. Consequently, a GeoEye satellite based Digital Terrain Model (DTM) study that covers the entire Mannar Island was done in 2015, the data interpretation and manipulation for the areas covered by the resource update was done by a highly qualified land surveyor during 20117. The X and Y coordinates of the drill holes was used to elevate the drill holes to the DTM surface prior to resource modelling taking place. This will supply significantly more accurate Z data as the DTM is based on 13 Differential GPS derived points.
Accuracy and quality of surveys used to locate drill holes (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.*	
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.*	The drilling program for the updated resource was conducted at 400m inter-drill line spacing, with 50m inter-drill hole spacing on the lines and further reduced to 200m by 50m. The infill drilling with the aircore holes in Domains 1 and 2 were on a drilling pattern of about 400m by 100m between the auger drilled lines and some on the auger lines to twin the auger holes. The previous drilling pattern of about 800m by 50m has been further reduced to about 200m by 50m in domain 4 with shallow auger holes. .
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.*	Drilling took place in fences perpendicular to the interpreted strike of the mineralized ore bodies; this was confirmed during modelling.
Sample Security	All sampling, prep and packing work took place under supervision of a site geologist. A representative from the Analytical laboratory, Scientific Services CC, collected the samples from the airport in Cape Town, South Africa.
The measures taken to ensure sample security.	

JORC Code Assessment Criteria	Comments
Audits and Reviews	Statistical analyses of the QA/QC samples were conducted by GeoActiv.
The results of any audits or reviews of sampling techniques and data.	A Prep Facility (on Mannar Island) and lab audit at Scientific Services was conducted by Kobus Badenhorst and Bernhard Siebrits of GeoActiv.
Section 2	**Reporting of exploration results**
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 acquisition of the Mannar Island Project and all the exploration licences from Srinel Holdings Ltd by Titanium Sands Ltd (acquired 100% of the Srinel shares) was formally concluded and the Company re-instated to trading on the Australian Stock Exchange on the 18th of December 2018.
Exploration Done by Other Parties	Work post 2015 was all conducted by Srinel staff, supervised by TSL (James Searle).
Acknowledgment and appraisal of exploration by other parties.	
Geology	There is general consensus that the heavy minerals in Sri Lanka were derived from Precambrian (Proterozoic) high-grade metamorphic rocks that account for more than ninety percent of the island. These crystalline basement units are subdivided into 3 major litho-tectonic subdivisions, namely the Highland, Wanni and Vijayan Complexes.
Deposit type, geological setting and style of mineralisation.	The heavy minerals ilmenite, rutile, zircon, sillimanite and garnet commonly occur in the coastal sands. Mineralization is high in the tidal, beach and berm areas, with significant inland mineralization proven on Mannar Island.
Drill hole information	Drill hole information used in this resource update has previously been reported in full to the ASX including: • Drill hole identification, • Collar locations. • Dip, all holes vertical. • Down hole length and intercept depth • Hole length
Data Aggregation Methods	• Weighted averages of intercept length and grade were used. • No cut off grades were applied to drill hole data. • Cut off grades were only applied to the block model of the mineralised zone.
Relationship between mineralisation widths and intercept lengths	Mineralisation a horizontal blanket, drill holes all vertical.
Diagrams	Drill hole diagrams, and sections included with scale and locations.
Balanced reporting	All drill hole results reported
Other substantive exploration data	None

JORC Code Assessment Criteria	Comments
Further work	As stated, further drilling will target depth and lateral extensions to the modelled mineralisation.
Section 3	**Estimation and reporting of mineral resources**
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.*	The data was captured in Excel spread sheets. GeoActiv performed validation checks on all the data and analyses before it was used in modelling.
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.*	A GeoActiv geologist, Pardon Kanyezi, was on site during some of the drilling, also for the drilling of all twin QA/QC holes.
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.*	All the drill hole intersections with the THM above 1% were considered as the mineralization envelope from surface to the end of the auger holes. The domain boundaries of the mineral sand resource were extended to half the drill line spacings. The new floor wireframes were created from the end of auger hole depths for Domain 2 within Surpac. The aircore floor wireframes were created at the bottom of the last sampled interval, section by section in Domain 8 to create its floor below the auger floor wireframe. The current drill spacing provides sufficient degree of confidence in the interpretation and continuity of grade for a Mineral Resource.
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 updated Mineral Resource in Area 2 was divided into 2 Domains. The extents of the mineralization were within **Domain 2**: 9,500m x 1,400m x 2m, and within **Domain 8**: 7,700m x 1,400m x 9m.
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*	The block model with block sizes of 100m X 100m X 2m and minimum sub blocking of 25m X 25m X 0.5m of the previous update was used. Inverse distance to the power of 3 was used for *in situ* grade interpolation for all the variables in the domains. The general aspects of the estimation were as follows for all the estimated variables: • The variogram ranges of the THM%, Silt% and Oversize% were used for Domains 2 and 8; • For the magnetic separation (Yield%), XRF data and XRD garnet data, the variogram ranges of the THM% were used for Domains 2 and 8;

JORC Code Assessment Criteria	Comments
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. ulphur 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.*	• A minimum of 3 samples and a maximum of 15 samples were used for all inverse distance runs, except for the third pass when a minimum of 2 samples and a maximum of 15 samples were used; • Pass 1: search radii set to the ranges of the THM% for the major and 2m for the vertical for all the domains; • Pass 2: search radii set to 1.5x the ranges of the THM% for the major and 3m for the vertical for all the domains; • Pass 3: search radii set to 1000 m for the major and 10m for the vertical for all the domains; • Block discretisation was set to 4(X) by 4(Y) by 4(Z); • An octant search estimation method was used with the maximum of 3 adjacent empty octants in pass 1, a maximum of 5 adjacent empty octants in pass 2 and a maximum of 7 adjacent empty octants in pass 3; and • No sample limits per drill hole were applied. The mineral associations for ilmenite (ilm), leucoxene (leu), rutile (rut), zircon (zir) and garnet (gar) were calculated with an expression as a calculated attribute in the block model. The model was validated visually, statistically and with swath plots. The result of the validations shows that the interpolation has performed as expected and the model was a reasonable representation of the data used and the estimation method applied.
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 were based on dry basis, volume measurements converted to tonnes using a dry bulk density of 1.74 for Domain 2 and 1.75 for Domain 8.
Cut-off Parameters	
The basis of the adopted cut-off grade(s) or quality parameters applied.	The updated tabulated resources for Domains 2 and 8 are based on lower cut-off grades of 2% and 3% THM.
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.*	While the project is at a resource definition stage it is anticipated that it will be mined by dredge operations. The mineralisation has no overburden. The mineralisation at expected cut off grades has continuity along strike of 8 kilometers and cross strike widths of over 1km and as such boundary dilution by sub grade or barren material is expected to be negligible. .

JORC Code Assessment Criteria	Comments
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.	The analytical results and mineralogical analyses could be the basis for the metallurgical extraction methods.
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.	GeoActiv has not investigated and was not aware of any environmental issues that would affect the eventual economic extraction of the deposit. A clay layer that was found in most of the holes during drilling was used as base of drilling as not to affect the water table.
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 (vugs, 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.*	The Relative Density (RD) or specific gravity was determined by digging pits of roughly 0.8m by 0.8m by 0.5m deep at 55 locations throughout the drilling area, then accurately weighing the sand and determining the volume of the holes by inserting and accurately measuring the volume of water inserted in the pits (after using a very thin lining in the pits). RD measurements of between 1.74 of 1.76 were calculated and used in different domain areas for the Mannar deposit.
Classification	

JORC Code Assessment Criteria	Comments
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.*	The resource classification was primarily based on the drill hole density and the variability of the data. The drill hole lines were previously generally 200m apart and the drill holes 50m apart on the drilling lines and with the infill drilling in Domains 2 and 8 the drill holes are now generally 100m by 100m on the infilled lines. This gave a good coverage of the areas to be able to upgrade the classification in Domain 2 and 8. The flagged blocks with the estimation passes 1 to 3 for the THM% and magnetic separation data (CI Yield%) were used together to classify the Mineral Resources to Indicated where the blocks were estimated with the 1st pass.
Audits or Reviews	
The results of any audits or reviews of Mineral Resource estimates.	No independent reviews of the Mineral Resource estimate have been conducted to date. An in-company review by James Searle has taken place.
Discussion of Relative Accuracy/Confidence	This is a global resource with no production data.

Ends-

The Board of Directors of Titanium Sands Ltd authorised this announcement to be given to the ASX.

Further information contact:
James Searle
Managing Director
T: +61 8 9481 0389
E: info@titaniumsands.com.au

Footnotes

[1] ***Previously reported to ASX: 25th of August 2022, "Mannar Island Drilling Program Completed".***

[2] ***Previously Reported to the ASX 24th of September 2020 "Project update and garnet added to resource update".***

Competent Persons Statements

The summary Mineral Resource information and comments above have been compiled by James Searle BSc (hons), PhD, a Competent Person who is a Member of the Australian Institute of Mining and Metallurgy, with over 40 years of experience in metallic and energy minerals exploration and development, and as such has sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Dr Searle is the Managing Director of Titanium Sands Limited and consents to the inclusion of this technical information in the format and context in which it appears.

The JORC 2012 compliant mineral resource estimation report contained in its entirety in Appendix 1 has been compiled as follows:

The Competent Persons responsible for the sampling process, geological interpretation (wireframe model), Mineral Resource estimation and classification of the Mannar Mineral Sand Deposits is Mr Kobus Badenhorst and Mr Bernhard Siebrits. Mr Kobus Badenhorst is a director of GeoActiv (Pty) Ltd. and is registered with the South African Council for Natural Scientific Professionals (SACNASP). Mr Siebrits is a consultant, registered with SACNASP and a Member of the Australasian Institute of Mining and Metallurgy. Mr Badenhorst and Mr Siebrits has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Persons as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Badenhorst and Mr Siebrits consent to the inclusion in this report of the matters based on his information in the form and context in which it appears.

Compliance Statement

This report includes information (Tables 2, 4, 6,7 and 8) that relates in part to Exploration Results and Mineral Resources prepared and first disclosed under JORC Code 2012. The information was extracted from the Company's previous ASX announcement as follows:
*Released to the ASX 24/9/2020 "'**Project update and garnet added to resource estimate**".*
This announcements are available to view on the Company's website www.titaniumsands.com.au

The Company confirms that it is not aware of any new information or data other than that reported in Appendix 1 to this announcement that materially affect the information included in the relevant market announcement and, in the case of estimates of the Company's Mineral Resources that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply with respect to the resource block model and total heavy mineral content and have not materially changed. The Company confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified from the relevant original market announcements.

All new information is reported in a JORC 2012 compliant form in Appendix 1.

Forward Looking Statements

This document may include forward-looking statements. Forward-looking statements include, but are not limited to, statements concerning the Company's planned exploration program and other statements that are not historical facts. When used in this document, the words such as "could," "plan," "expect," "intend," "may", "potential," "should", "further" and similar expressions are forward-looking statements. Although the Company believes that its expectations reflected in these forward-looking statements are reasonable, such statements involve risks and uncertainties and no assurance can be given that further exploration will result in additional Mineral Resources.

Appendix 1

Mineral Resource Estimation Update 4 for Titanium Sands Ltd on the Mannar Mineral Sands Project, Sri Lanka.

GeoActiv
DYNAMIC GEOLOGICAL SERVICES

Suite 32
Bergzicht Office Park
Cnr. Christiaan de Wet Rd
& Rooibok Ave
Allen's Nek, Roodepoort
Johannesburg
South Africa
Reg. No: 2002/006305/07

Postnet Suite 477
Private Bag X09
Weltevreden Park 1715
Johannesburg South Africa
Tel. 011 675-3535
Fax: 011 675-3178
E-mail: info@geoactiv.co.za
Web: www.geoactiv.co.za

Mineral Resource Estimation Update 4 for Titanium Sands Ltd on the Mannar Mineral Sands Project, Sri Lanka.

Report prepared by GeoActiv (Pty) Ltd on behalf of:	Titanium Sands Ltd (ASX: TSL)
Lead Consulting Author and Mineral Resource:	Bernhard Siebrits
Additional Author:	Kobus Badenhorst

Date of Report: February 2023

Author and Mineral Resource Consultant

Additional Author

This Competent Person's Report has been prepared in accordance with the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'.

Executive Summary

The Mannar Mineral Sand Resources was updated again in February 2023 for Titanium Sands Ltd ("the Company", ASX: TSL), after the last update in April 2020 (Siebrits and Badenhorst, 2020b).

In Area 2, 315 additional aircore holes were drilled. This leads to this update 4 within Domains 2 and 8.

The updated February 2023 Mineral Resource statement for Domains 2 and 8 in Area 2 are shown in the table below, with a lower THM% cut-off of 2% and with the mineral assemblage.

The February 2023 Mineral Resources estimation for the Domains 2 and 8 on Mannar with a 2% THM lower cut-off.

Resource Category	Domain	Licence	Volume (Mm³)	Tonnes (M)	THM %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	2	**EL180**	0.93	1.63	4.50	1.02	10.19	1.60	0.27	0.07	0.07	0.59
		EL327	2.64	4.59	7.37	0.82	23.27	3.43	0.65	0.11	0.16	1.10
		EL328	6.17	10.73	6.03	1.22	19.86	2.52	0.45	0.08	0.09	0.91
		EL351	1.59	2.77	7.19	0.79	25.98	3.25	0.91	0.13	0.14	1.04
		EL352	4.64	8.08	6.88	1.00	20.54	3.37	0.40	0.09	0.12	0.91
		EL370	2.78	4.84	6.36	1.07	26.41	2.41	0.94	0.12	0.17	0.89
		EL372	0.13	0.23	11.05	1.06	16.70	6.36	0.72	0.14	0.24	1.20
		Sub Total	**18.89**	**32.87**	**6.53**	**1.04**	**21.48**	**2.88**	**0.57**	**0.10**	**0.13**	**0.93**
	8	**EL180**	0.39	0.68	2.90	2.58	21.27	1.32	0.15	0.05	0.06	0.34
		EL327	5.95	10.41	3.95	1.88	22.17	1.83	0.32	0.07	0.10	0.36
		EL328	14.51	25.40	3.13	2.50	20.33	1.39	0.21	0.05	0.06	0.32
		EL351	2.27	3.97	3.13	1.77	30.00	1.20	0.33	0.07	0.08	0.39
		EL352	11.39	19.93	3.69	2.89	22.82	1.82	0.20	0.06	0.08	0.40
		EL370	8.88	15.54	2.99	2.48	30.06	1.12	0.35	0.06	0.08	0.32
		EL372	0.15	0.26	5.71	2.68	20.77	3.23	0.36	0.08	0.14	0.60
		Sub Total	**43.54**	**76.19**	**3.37**	**2.48**	**23.73**	**1.50**	**0.26**	**0.06**	**0.08**	**0.35**
	Sub Total		**62.43**	**109.06**	**4.32**	**2.04**	**23.05**	**1.92**	**0.35**	**0.07**	**0.09**	**0.53**
Inferred	2	**EL180**	0.86	1.49	4.43	0.75	9.66	1.68	0.28	0.07	0.07	0.66
		EL182	0.05	0.08	3.67	4.96	27.39	1.54	0.56	0.08	0.11	0.47
		EL327	0.23	0.39	9.98	0.70	20.31	5.44	0.95	0.14	0.27	1.23
		EL328	1.68	2.93	7.87	0.81	23.34	3.56	0.60	0.10	0.13	1.09
		EL351	0.39	0.68	11.88	0.91	28.91	5.92	1.49	0.21	0.24	1.58
		EL352	0.95	1.65	9.28	1.49	22.70	5.38	0.56	0.12	0.21	1.02
		EL370	0.59	1.03	4.88	1.35	24.64	1.93	0.72	0.10	0.14	0.66
		EL372	2.02	3.51	8.90	2.47	28.32	4.64	0.55	0.11	0.17	1.06
		Sub Total	**6.76**	**11.76**	**7.95**	**1.47**	**23.37**	**3.94**	**0.61**	**0.11**	**0.16**	**1.01**
	8	**EL180**	0.31	0.54	2.48	2.97	21.82	1.17	0.14	0.05	0.06	0.18
		EL327	0.25	0.43	2.23	2.84	20.32	1.00	0.16	0.05	0.06	0.18
		EL328	5.48	9.59	3.75	2.10	24.43	1.66	0.27	0.07	0.08	0.41
		EL351	1.34	2.34	3.34	2.69	24.01	1.37	0.32	0.07	0.09	0.33

Resource Category	**Domain**	**Licence**	**Volume (Mm³)**	**Tonnes (M)**	**THM %**	**Silt %**	**Ovz %**	**Ilm %**	**Leu %**	**Rut %**	**Zir %**	**Gar %**
		EL352	1.97	3.45	4.26	2.99	21.74	2.18	0.25	0.07	0.10	0.46
		EL370	4.11	7.20	2.87	2.46	30.77	1.06	0.32	0.06	0.08	0.30
		EL372	0.70	1.22	4.32	2.63	24.34	2.15	0.30	0.07	0.11	0.47
		Sub Total	**14.15**	**24.77**	**3.50**	**2.44**	**25.73**	**1.53**	**0.28**	**0.07**	**0.08**	**0.37**
	Sub Total		**20.92**	**36.53**	**4.93**	**2.13**	**24.97**	**2.31**	**0.39**	**0.08**	**0.11**	**0.58**
Grand Total			**83.34**	**145.59**	**4.48**	**2.07**	**23.53**	**2.02**	**0.36**	**0.07**	**0.10**	**0.54**

Contents

List of Figures

List of Tables

APPENDICES

APPENDIX A
QAQC

APPENDIX B
BLOCK MODEL VALIDATIONS

1.0 INTRODUCTION

1.1 Terms of reference

GeoActiv Pty. Ltd. (GeoActiv), a geological consultancy based in Johannesburg, South Africa, has been involved in heavy mineral sands (HMS) exploration on Mannar Island, Sri Lanka, since March 2014. Several phases of exploration, initially all based on drilling via hand-held auger to the water table and more recently aircore drilling, has been undertaken and reported on since 2014. A resource model, a Mineral Resource statement and report were provided by GeoActiv in April 2015 to Srinel Holdings Limited (Srinel) on the HMS project (Siebrits and Badenhorst, 2015) on completion of twin and infill hand-auger exploration based on historic data.

A 100% shareholding acquisition by Titanium Sands Ltd ("the Company", ASX: TSL) of the Mannar Island Project from Srinel was formally concluded and the Company re-instated to trading on the Australian Stock Exchange on the 18th of December 2018.

The Mannar Mineral Sand Resources was updated in 2018 for Area 1 for Titanium Sands Ltd (Siebrits and Badenhorst, 2019a) and Area 2 for Bright Angel Ltd (Siebrits and Badenhorst, 2019b) on completion of a hand-held auger drilling program. The two areas were estimated together, the Mineral Sand Resources were reported separately within their respective licence areas.

The Mannar Mineral Sand Resources was updated in January 2020 for Area 1 and Area 2 for Titanium Sands Ltd (TSL) on completion of infill and extension hand-held auger drilling (Siebrits and Badenhorst, 2020a).

TSL completed the acquisition tenure of Area 2 from Bright Angel Ltd in March 2020.

After the update in January 2020, the Mannar Mineral Sand Resources was updated in April 2020 with 216 additional auger drill holes and 473 new aircore drill holes that were drilled in both areas (Siebrits and Badenhorst, 2020b).

Since the last update in April 2020, 315 new aircore drill holes were drilled in Area 2. This leads to this update 4 in Domains 2 and 8 with the new data added to all the previous drilling data.

This report only covers additional information to the previous reports of Siebrits and Badenhorst (2015, 2019a, 2019b, 2020a, 2020b).

1.2 Qualifications, experience and independence

GeoActiv is a geological consulting and contracting company based in Johannesburg, South Africa. Since 1999 the company has offered a broad spectrum of geological services to the minerals industry in Southern Africa as well as internationally. The Directors and consultants are professional Geologists with many years of experience in various geological disciplines and they ensure confidential and reliable services of a high standard.

The authors of this report, Bernhard Siebrits (Pr.Sci.Nat. MGSSA MAusIMM) and Kobus Badenhorst (Pr.Sci.Nat. MGSSA), are both experienced HMS geologists with the applicable experience and expertise relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Persons as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'.

Neither authors, nor any other GeoActiv employee or consultant, have, or have ever had, any material interest in TSL or the exploration licences of TSL. GeoActiv's relationship with TSL is solely one of professional association between independent geological consultant and client. This report was prepared in return for professional fees based upon agreed commercial rates and the payment of those fees is in no way contingent on the results of this report.

1.3 Sources of data, data verification and reliance on other experts

A GeoActiv geologist, Pardon Kanyezi, was on site for a c 4 weeks period when the aircore drilling program was taking place, in this period 15 twin aircore holes were also drilled under his supervision. The additional aircore drilling was conducted by the TSL team, but under direction of Kobus Badenhorst. The analytical laboratory used for the analysis, Scientific Services based in Cape Town, South Africa, is a reputable HMS laboratory. All other input into the report was via GeoActiv employees or GeoActiv consultants.

2.0 PROPERTY LOCATION AND DESCRIPTION

2.1 Location overview

The project area is found on Mannar Island, Sri Lanka. Sri Lanka lies in the Indian Ocean southwest of the Bay of Bengal, between latitudes 5° and 10° North and longitudes 79° and 82° East and is separated from the Indian subcontinent by the Gulf of Mannar and the Palk Strait. A land bridge between India and Sri Lanka was reportedly passable on foot up to 1480 AD until abnormal storm activity of the time deepened the channel. As can be see from Figure 1 and Figure 2, Mannar Island is situated on this previous land bridge that now exists as a 50km long zone of sandy shoals overlying corralline limestone bathymetric highs between the Tamil Nadu shores in India and Sri Lanka.

Figure 1: Location of the TSL Mannar Island heavy mineral sands project.

2.2 Licenses and Tenure

The Company completed the acquisition of Bright Angel Limited in March 2020. Bright Angle, through its wholly owned subsidiaries, held a 38km² tenure package (blue Area 2 licenses in previous resource and exploration work, see

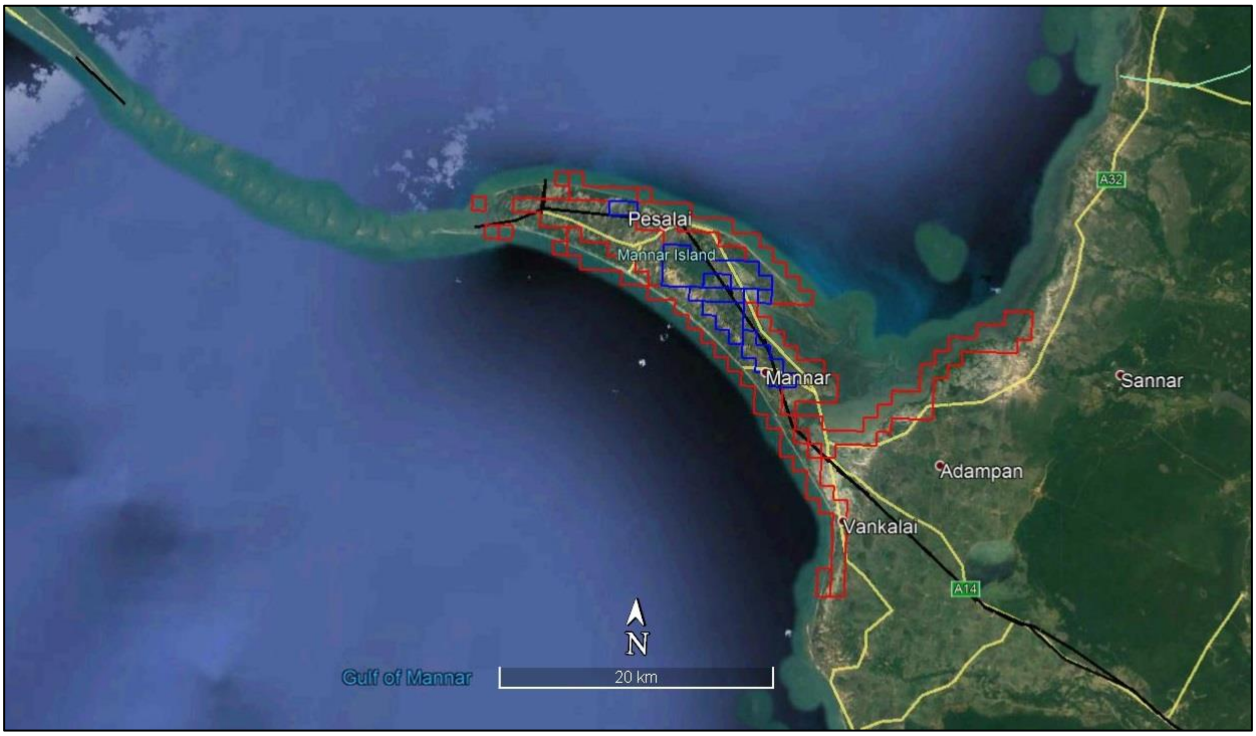


Figure 2). The company structure and license holding can be seen in Figure 3.

Figure 2: TSL (Srinel) exploration licenses in red (Area 1) and Bright Angel license in blue (Area 2).

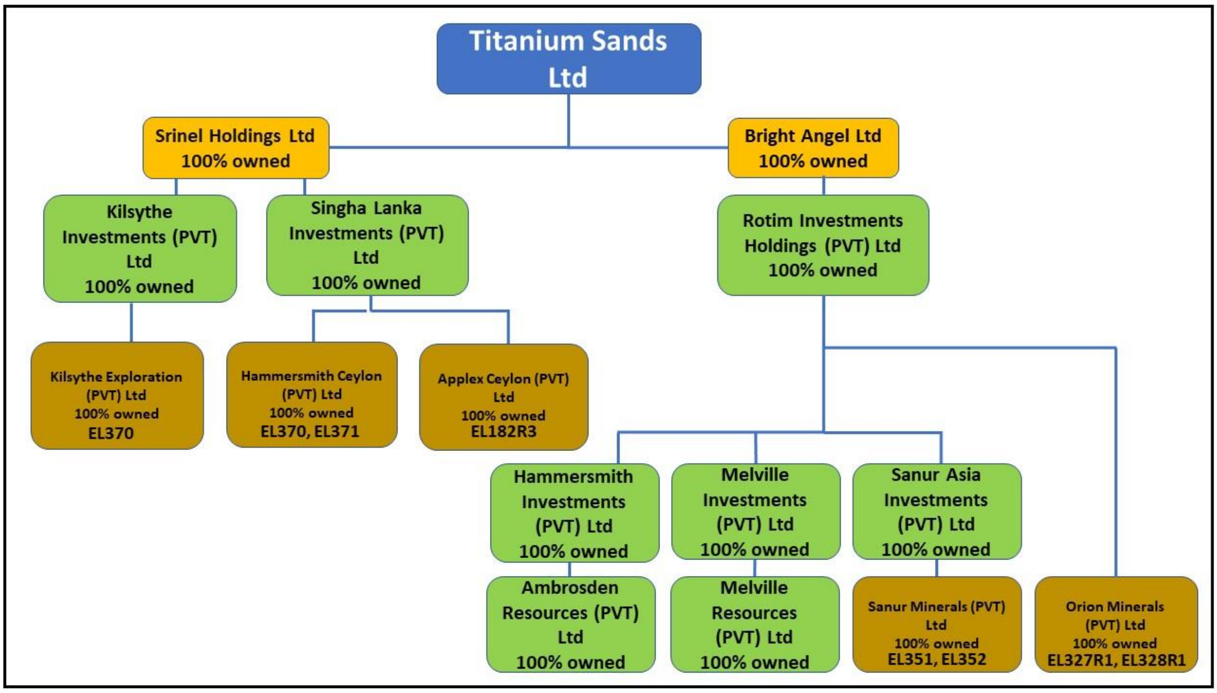


Figure 3: Company structure after the acquisition of Bright Angel Limited.

On the tenure and reporting:

- Final exploration reports were submitted to and accepted by the GSMB in September 2022 and final exploration presentations also made at the same time.
- The numbers for EL327, EL328 and EL352 have been changed to EL423, 424 and 425 respectively, new licence numbers reflected in Figure 3.
- All licence blocks/areas remain unchanged.
- The Renewals are still pending on other 4 licenses (EL 180/R/3; EL 182/R/3; EL 371 and EL 372).

Table 1: Exploration Licenses, their reporting and tenure status.

Exploration Licence	**Holder**	**EL**	**Validity**	**Area (km²)**	**Status**
EL 370	Kilsythe Exploration (PVT) LTD	4/05/2021	3/05/2023	31	Current
EL 351	Sanur Minerals (PVT) LTD	13/12/2021	12/12/2023	15	Current
EL 425	Sanur Minerals (PVT) LTD	19/11/2021	18/11/2023	10	Current
EL 423	Orion Minerals (PVT) LTD	15/11/2021	14/11/2023	5	Current
EL 424	Orion Minerals (PVT) LTD	15/11/2021	14/11/2023	8	Current
EL 180/R/3	Applex Ceylon (PVT) LTD	5/03/2019	4/03/2021	45	Renewal Pending
EL 182/R/3	Applex Ceylon (PVT) LTD	5/03/2019	4/03/2021	26	Renewal Pending
EL 371	Hammersmith Ceylon (PVT) LTD	26/02/2018	25/02/2020	4	Renewal Pending
EL 372	Hammersmith Ceylon (PVT) LTD	26/02/2018	25/02/2020	51	Renewal Pending

3.0 CURRENT EXPLORATION

3.1 Aircore Drilling

A total of an 315 additional infill aircore holes were drilled within Area 2 (see blue area in Figure 2 and red dots in Figures 4 and 5 of the aircore drilling within Area 2), in the central portion of Mannar Island on Bright Angle licences. A total of 3,438m of aircore drilling took place, an additional 15 aircore holes were drilled as twin holes spread throughout the drilled area. A senior GeoActiv geologist, Pardon Kanyezi, was on site for a c 4 weeks period to manage the drilling of the 15 twin aircore holes, while planned infill drilling was also taking place.

The aircore drilling rig utilized for the infill drilling is company owned (Kilsythe Investments) and especially modified for the drilling conditions on Mannar island. The drilling rig is mounted on a standard 100hp agricultural tractor readily available locally. The drilling rig has been optimised for drilling 2 to 12m thick dry unconsolidated sands, and to explore in some situations up to 20m or more below the water table. The rig will operate with a 120psi/90cfm air compressor.

The drilling rig is operated by a crew of four, consisting of a driller, two driller's assistants and a sample handler. All permanent personnel will be Sri Lankan. A specialist drilling trainer from Australia was on site during the drilling program to provide additional training in all aspects of drilling rig operation and safety to the local team. The aircore rig utilises HQ gauge (96mm OD, 63.5mmID) drilling rods with inner tubes. Compressed air passes down the annulus between the outer drill tube and the liner tube. Air is injected just behind the bit face to lift sample from the substrate being drilled up through the inner tube to the surface. Sample passes out of the drill stem through a swivel assembly to a cyclone that allows the sample material to drop into a sample bag. Drilling progresses with the rotation of the drill string from a hydraulic powered top swivel and controlled downward pressure. The drilling rod/inner tube sets are 3m long and are added progressively as penetration is achieved. Hydraulic 'break out clamps' enable connection and disconnection of the drilling rods without the need for the rig crew to use unsafe manual wrenches.

4.0 ANALYSES

Initial primary sample preparatory work was done at the office setup in Pesalai. The Oversize removal (+1mm) and desliming (-45µm), resulting in the Oversize% and Silt% values, work took place here again. Samples were collected at 1m intervals during the drilling program, with 3,260 samples treated at Pesalai.

Samples were then couriered to Scientific Services CC (SS) in Cape Town, South Africa for final THM% analysis. SS also conducted magnetic separations (MagSep) work on selected heavy mineral concentrates. A total of 254 composite samples from 100 aircore holes were then sent to SS for MagSep work.

Additionally, 140 samples from 15 twin aircore holes were not sent to the Pesalai facility for initial work, but sent to SS for analysis on the Oversize%, Silt% and THM% analysis.

4.1 CARPCO magnetic separation of minerals and XRF analysis

The heavy mineral concentrates of approximately 28% of the all the new THM sample population were separated into magnetic and non-magnetic fractions (Figure 4). The magnetic separations (MagSep) were run on all the individual 3m to 4m samples composites of each of the highlighted drill holes in Figure 4. Holes were selected to give a representative spread aerially as well as of different mineralised domains. In total 254 samples with 3.7m averaged in length from 103 drill holes on Mannar were used for CARPCO separation, XRF and XRD analysis.

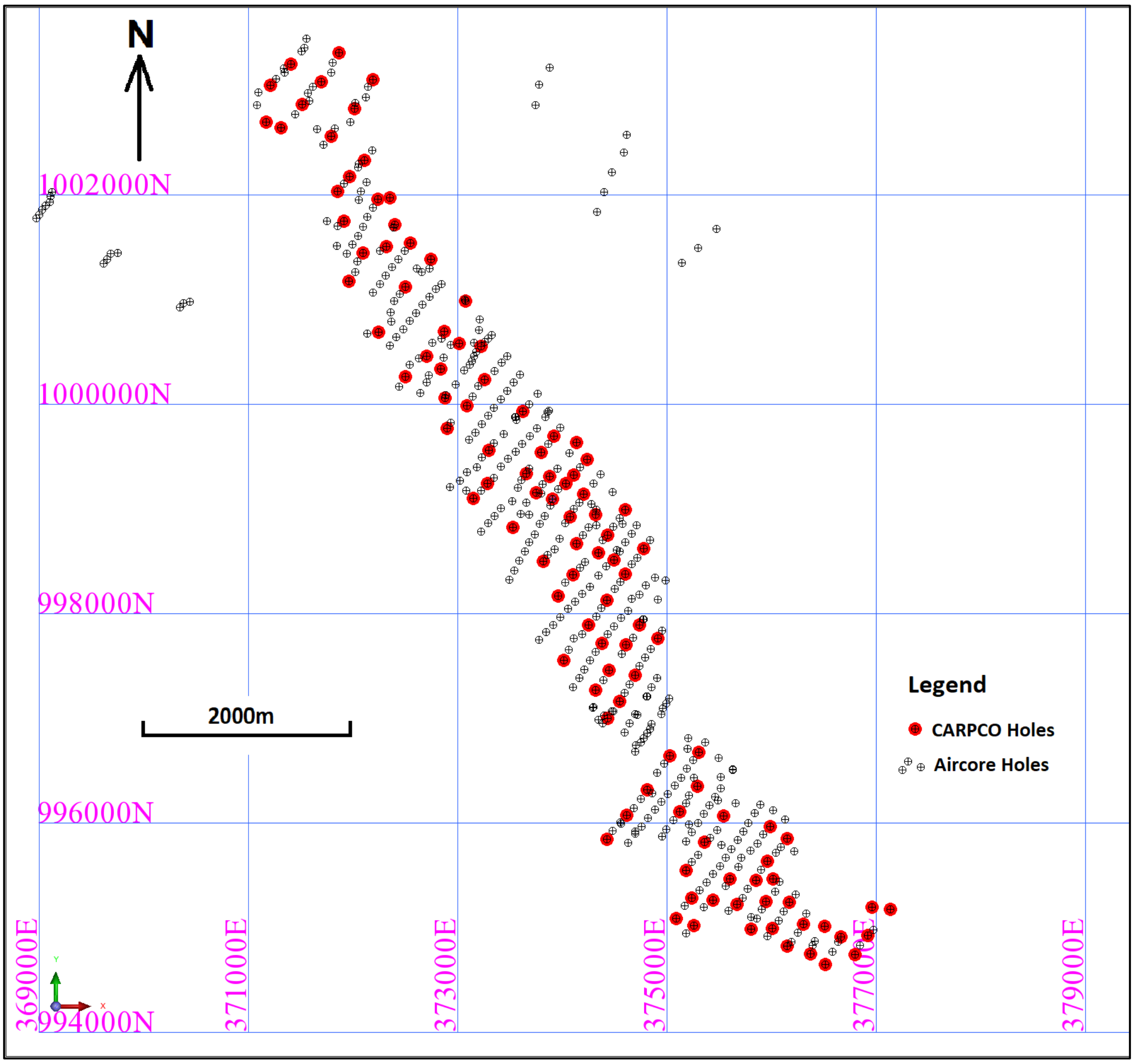


Figure 4: Samples positions (red dots) for the CARPCO high intensity magnetic separation on the drill positions (black dots) on Mannar.

4.2 Quality Assurance and Quality Control (QA/QC)

A total of 140 twinned drill hole duplicates (aircore with aircore holes), 107 laboratory standards and 43 laboratory blanks were inserted in the 3259 samples and this QA/QC samples represent 7% of the samples. The QA/QC analyses were done on the duplicates, standards and blanks and the results are shown in Appendix A.

The twinned drill hole duplicates were analysed, and the results are shown in Table 2 below. The 140 samples show marginal precision for the THM% and poor precision for the Silt% and the Oversize%. The cumulative HARD plots show 80% of the duplicate pairs HARD value below a 30% precision limit for the THM%. For the Silt% and the Oversize% it is only about 60% duplicate pairs HARD value that plotted below the 30% precision limit. The results show that the mean of the twinned duplicates of the THM% is about 0.2% higher, the mean of the Silt% is about 0.4% lower and the Oversize% is about 4.6% lower. (Appendix A).

Table 2: Result of the analysis of the twinned drill holes.

Field	HRD%	HARD%	No. Samples	Comment
THM %	-2.37	16.29	140	No obvious bias, marginal precision
Silt %	-2.40	29.34	140	No obvious bias, poor precision
Oversize %	8.53	29.85	140	Slight positive bias, poor precision

Laboratory standards (107) and blanks (43) were inserted for the THM%, the MagSep and the XRF analyses at Scientific Services. The results are shown in Appendix A and shows excellent to acceptable precision and accuracy except for the Magnetic fractions with poor precision.

The marginal to poor precision of the twinned drill holes could be the result of the high variability of the Oversize%, Silt% and THM% in the mineral sands. The poor precision of the Magnetic fractions is mainly the very low quantities of these fractions.

5.0 DATA VALIDATION

During 2021 and 2022, 315 new aircore drill holes were drilled in Area 2 on Mannar Island. The infill drilling with the aircore holes in Domains 2 and 8 reduce the previous drilling pattern of about 200m by 50m to about 100m by 100m on the infilled lines (Figure 5).

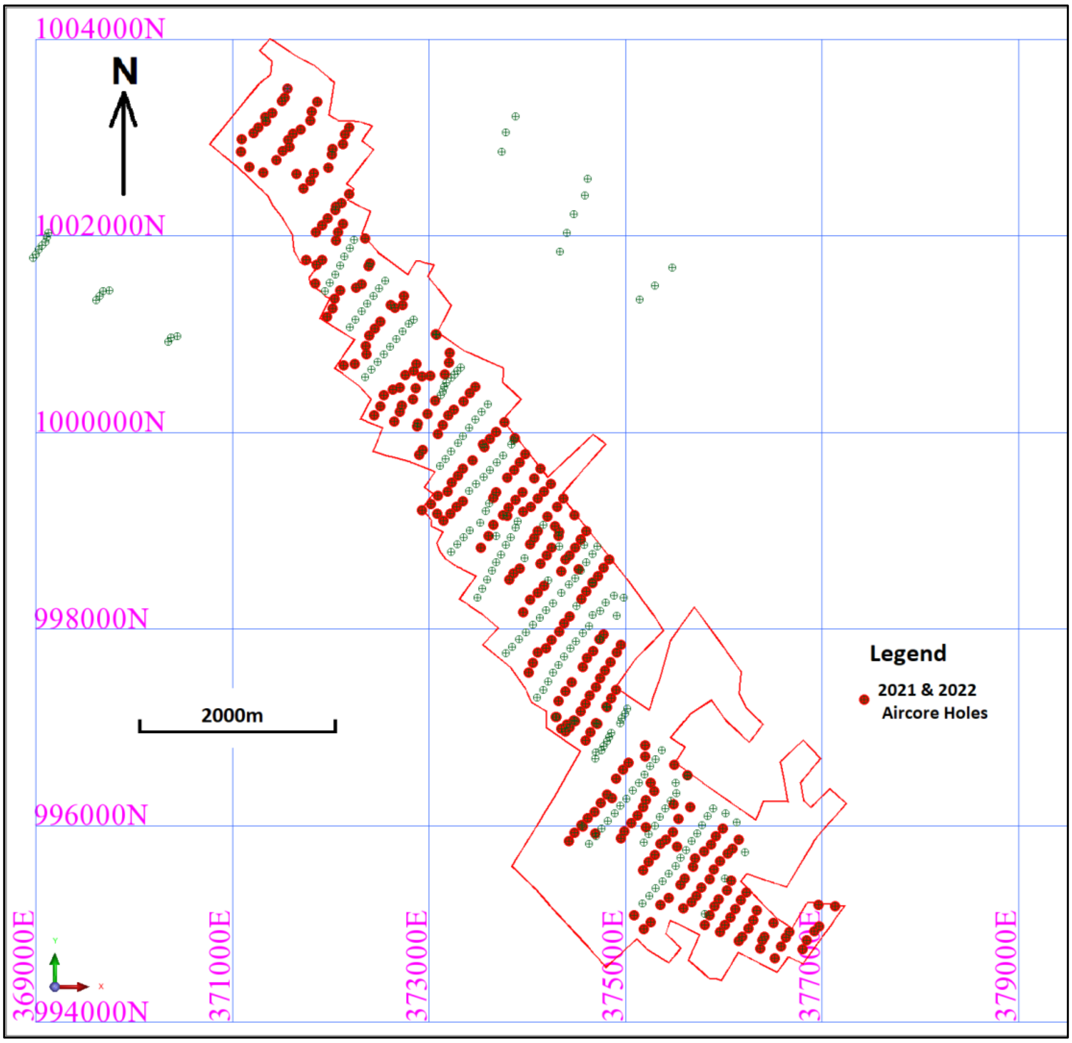


Figure 5. Plan location of the new 2021 and 2022 aircore drill holes (red dots) and older aircore drill holes (green dots) in domains 2 and 8 on Mannar.

All the new aircore drill hole data were imported into the previous Surpac Access database that validate the data for overlaps, duplicates, and depths.

With the importing of the drill hole data into the Surpac modelling software, the data validation criteria are included to check for overlapping sample intervals, end of hole match between ‘Collar’, ‘Assay’, ‘Survey’ files and other common errors. One minor error was encountered at MAC648 where the ‘from’ and ‘to’ were null and corrected to ‘11’ and ‘12’ respectively.

6.0 MODELLING

The domain 2 and 8 strings of the mineralised and drilled areas were adjusted according to the drill density and THM% > 1 (Figure 6 and Figure 7). The mineralized area was generally extended to half the distance of the distance between the drilling lines. The domain boundaries were imported into Google Earth and were further adjusted to exclude build-up areas.

The topographical DTMs from the 2014 and 2017 survey that covered the exploration areas was used for the top of the mineralization. The new floor wireframes were created from the end of auger hole depths for Domain 2 within Surpac. The aircore floor wireframes were created at the bottom of the last sampled interval, section by section in Domain 8 to create its floor below the auger floor wireframe. The end part of the sections (northwest and southeast) of the floor wireframes were extended to half the distances between the section lines and the end of section lines to half the distances between the drill holes on the drill lines. The auger floor and the aircore floor wireframes were then constrained within the boundaries of Domain 2 and 8 respectively.

The intersections of the drill holes with the topographical DTMs and the auger floor wireframes were coded into the database for Domains 2. The intersections of the drill holes with the auger floor wireframes and the aircore floor wireframes were coded into the database for Domain 8. Composites of 0.5m were created for Domain 2 and composites of 1m were created for Domain 8. These were used for all the estimations in their respective domain.

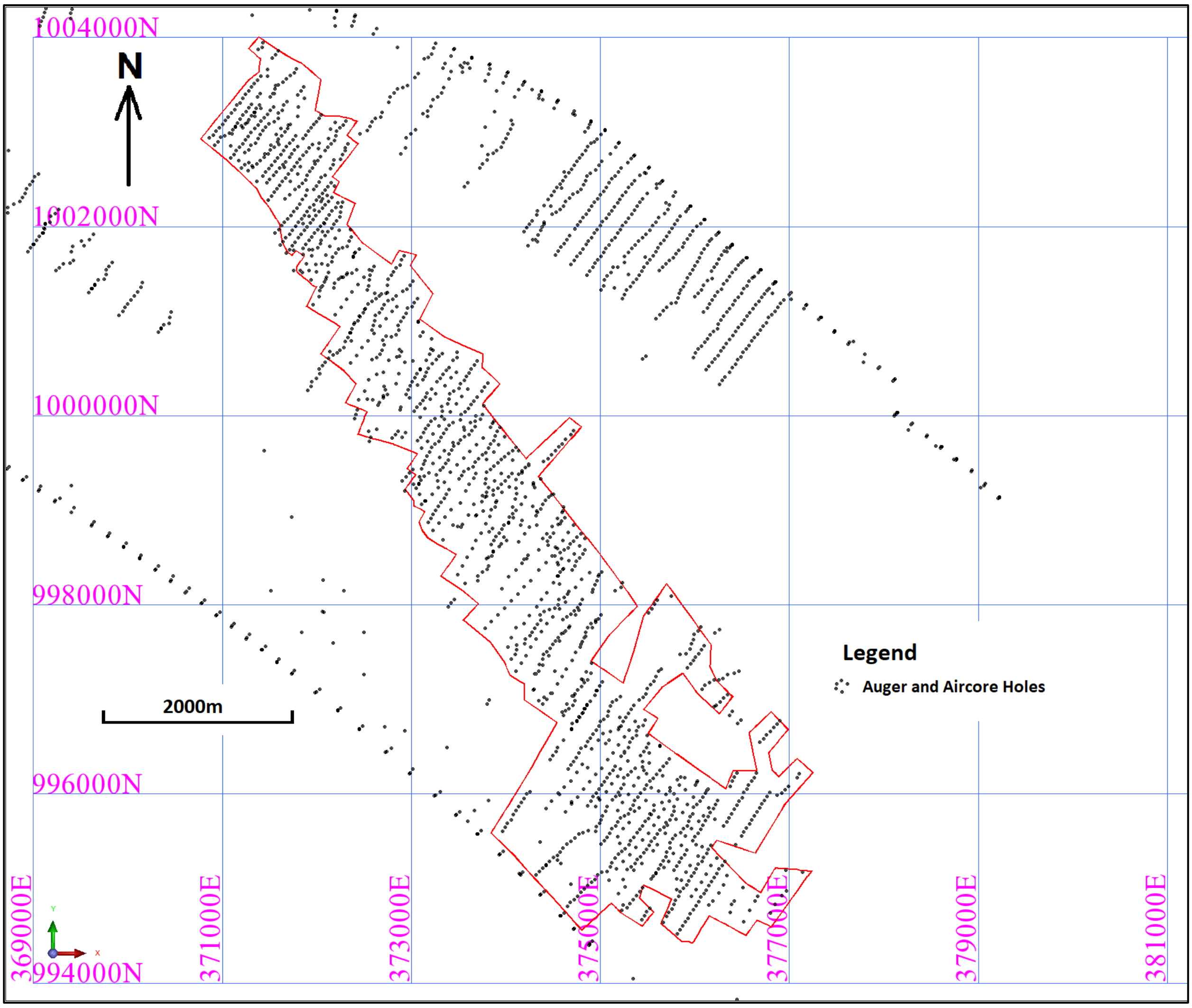


Figure 6. Plan showing all the auger and aircore drill holes and the boundary of the mineralised area of Domain 2.

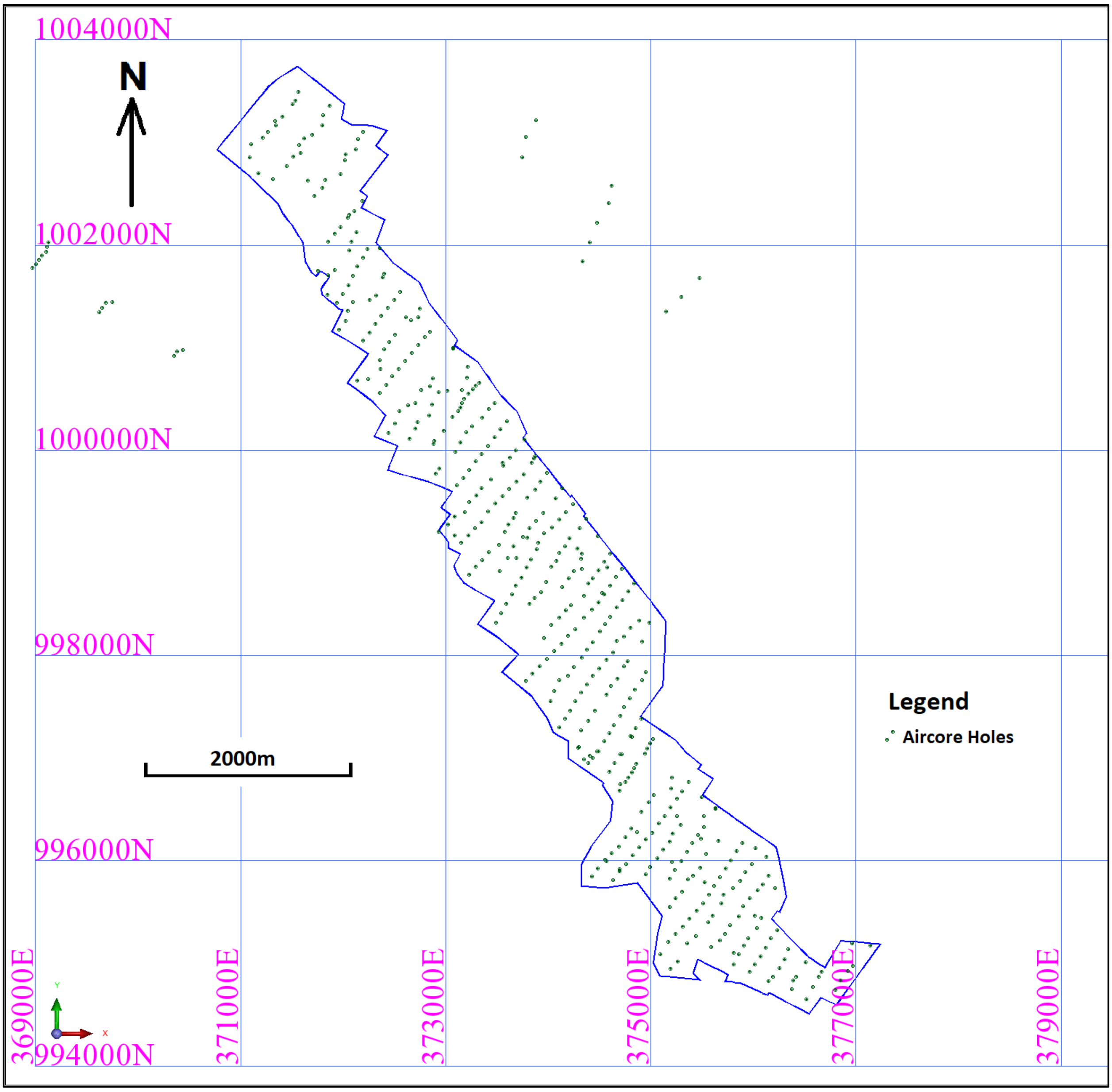


Figure 7. Plan showing all the aircore drill holes and the boundary of the mineralised area of Domain 8.

7.0 STATISTICAL ANALYSIS

Univariate statistical analysis was carried out on all the estimated variables (THM%, Silt%, Oversize%, CI yield%, MO yield%, NM yield%, CI TiO_2%, MO TiO_2%, NM TiO_2% and NM ZrO_2%) on all the composited drill hole data, using Excel.The sample data in Domain 2 was composited to 0.5m as the average sample lengths were 0.5m within the auger holes. The sample data in Domain 8 was composited to 1m as the average sample lengths were 1m within the aircore holes. Univariate statistical analysis was carried out on the all the composited drill hole data per domain. The statistics of the aircore and auger 0.5m composite drill hole data in Domain 2 are shown in Table 3 and the aircore 1m composite drill hole data in Domains 2 and 8 are shown in Table 4 and Table 5 respectively.

Table 3. Statistics of the aircore and auger 0.5m composite drill hole data in Domain 2.

Field	THM %	Silt %	Oversize %
Number	6843	6839	6839
Min	0.00	0.00	0.03
Max	49.98	14.96	92.68
Mean	5.57	1.03	26.43
Median	3.63	0.64	19.51
Variance	32.67	1.83	462.59
Std. Dev.	5.72	1.35	21.51
CV	1.03	1.31	0.81

Table 4. Statistics of the aircore 1m composite drill hole data in Domain 2.

Field	THM %	Silt %	Oversize %
Number	1011	1011	1011
Min	0.15	0.09	0.35
Max	35.58	11.22	87.60
Mean	4.72	1.32	30.23
Median	3.48	0.84	27.09
Variance	16.80	2.65	393.38
Std. Dev.	4.10	1.63	19.83
CV	0.87	1.24	0.66

Table 5. Statistics of the aircore 1m composite drill hole data in Domain 8.

Field	THM %	Silt %	Oversize %
Number	3309	3309	3309
Min	0.12	0.02	0.45
Max	20.67	22.96	83.02
Mean	2.73	2.47	27.07
Median	2.28	1.36	24.14
Variance	3.35	8.48	224.72
Std. Dev.	1.83	2.91	14.99
CV	0.67	1.18	0.55

The statistics of the CARPCO magnetic separation fractions of the 0.5m composites for Domain 2 and the 1m composites for Domain 8 are shown in Table 6 and

Table 7 respectively.

Table 6: Statistics of the CARPCO magnetic separation fractions of the 0.5m composites for Domain 2.

Field	CI YIELD %	MO YIELD %	NM YIELD %
Number	501	501	501
Min	6.50	15.40	6.34
Max	78.12	68.88	42.85
Mean	46.76	36.60	16.64
Median	46.48	37.92	16.02
Variance	248.62	127.95	36.57
Std. Dev.	15.77	11.31	6.05
CV	0.34	0.31	0.36

Table 7: Statistics of the CARPCO magnetic separation fractions of the 1m composites for Domain 8.

Field	CI YIELD %	MO YIELD %	NM YIELD %
Number	792	792	792
Min	14.21	9.75	8.09
Max	75.97	61.11	42.85
Mean	49.10	30.34	20.56
Median	51.20	29.53	19.93
Variance	114.89	84.20	30.35
Std. Dev.	10.72	9.18	5.51
CV	0.22	0.30	0.27

The statistics of the XRF analyses of the 0.5m composites for Domain 2 and the 1m composites for Domain 8 are shown in Table 8 and Table 9 respectively.

Table 8: The statistics of the XRF analyses of the 0.5m composites for Domain 2.

Field	CI TiO_2 %	MO TiO_2 %	NM TiO_2 %	NM ZrO_2 %
Number	486	486	485	485
Min	23.70	3.87	1.77	1.18
Max	49.82	34.26	17.80	25.33
Mean	42.60	14.93	9.49	8.24
Median	44.48	13.86	9.60	6.89
Variance	34.84	52.29	9.91	23.94
Std. Dev.	5.90	7.23	3.15	4.89
CV	0.14	0.48	0.33	0.59

Table 9: The statistics of the XRF analyses of the 1m composites for Domain 8.

Field	CI TiO_2 %	MO TiO_2 %	NM TiO_2 %	NM ZrO_2 %
Number	792	792	790	790
Min	23.70	3.87	3.09	1.34
Max	50.38	42.10	17.80	20.53
Mean	44.14	15.92	9.06	7.85
Median	44.77	14.87	8.96	7.58
Variance	17.23	45.07	2.84	6.83
Std. Dev.	4.15	6.71	1.69	2.61
CV	0.09	0.42	0.19	0.33

The statistics of the XRD analyses of garnet of the 0.5m composites for Domain 2 and the 1m composites for Domain 8 are shown in Table 10 and Table 11 respectively.

Table 10: The statistics of the XRD analyses of garnet of the 0.5m composites for Domain 2.

Field	CI Garnet %	MO Garnet %	NM Garnet %
Number	355	301	345
Min	0.00	12.90	0.00
Max	20.10	52.30	5.70
Mean	6.07	32.90	1.20
Median	5.60	32.10	1.00
Variance	17.92	56.39	1.40
Std. Dev.	4.23	7.51	1.18
CV	0.70	0.23	0.99

Table 11: The statistics of the XRD analyses of garnet of the 1m composites for Domain 8.

Field	CI Garnet %	MO Garnet %	NM Garnet %
Number	739	614	727
Min	0.00	6.10	0.00
Max	20.10	52.30	8.80
Mean	4.52	24.69	0.68
Median	4.10	24.00	0.40
Variance	8.05	56.93	1.06
Std. Dev.	2.84	7.55	1.03
CV	0.63	0.31	1.51

8.0 VARIOGRAPHY

New variograms were modelled for the THM%, Silt% and Oversize% for Domains 2 and 8. The 1m composite aircore data for Domains 2 and 8 were combined for the variogram calculations. Variograms were calculated in Surpac with the composite data and the following is a summary of the procedures followed:

- Down hole variograms were used to define the nugget effect.
- Variograms were calculated on all the 1m composite data of Domains 2 and 8 combined.
- The variogram directions or ellipsoid bearings were chosen as the best fit variogram with their plunges and dip as horizontal.

The down hole variograms modelled to define the nuggets for the THM%, Silt% and Oversize%, are shown in Figure 8 to Figure 10. The variograms modelled for the THM%, Silt% and Oversize% to find the major directions, are shown in Figure 11 to Figure 13.

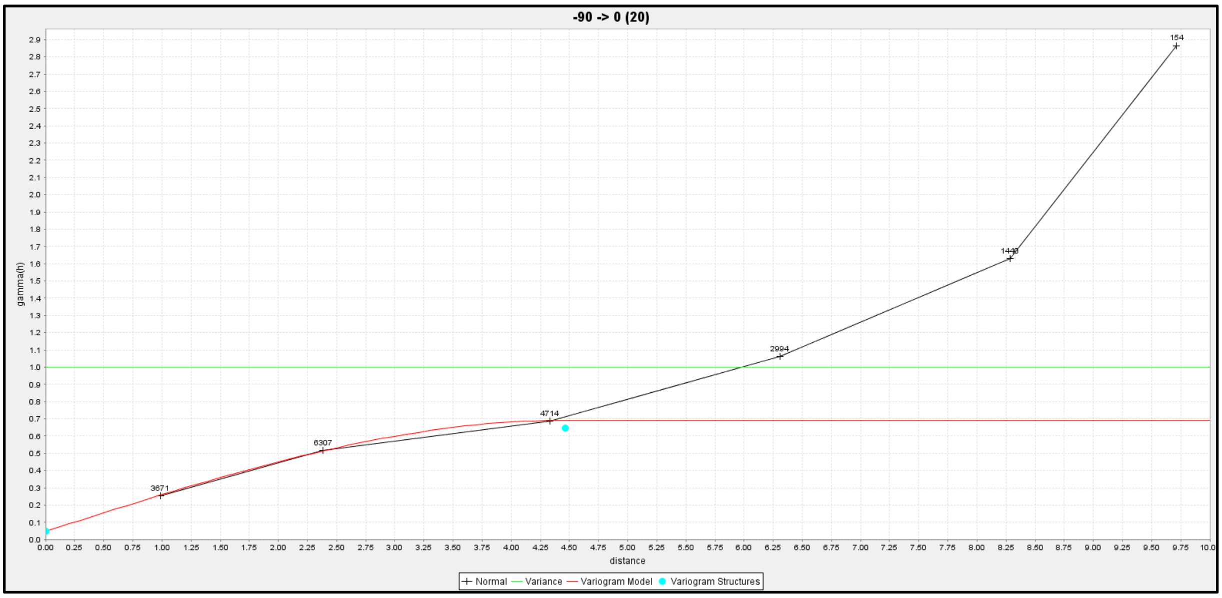


Figure 8: Down hole variogram to define the nugget for the THM%.

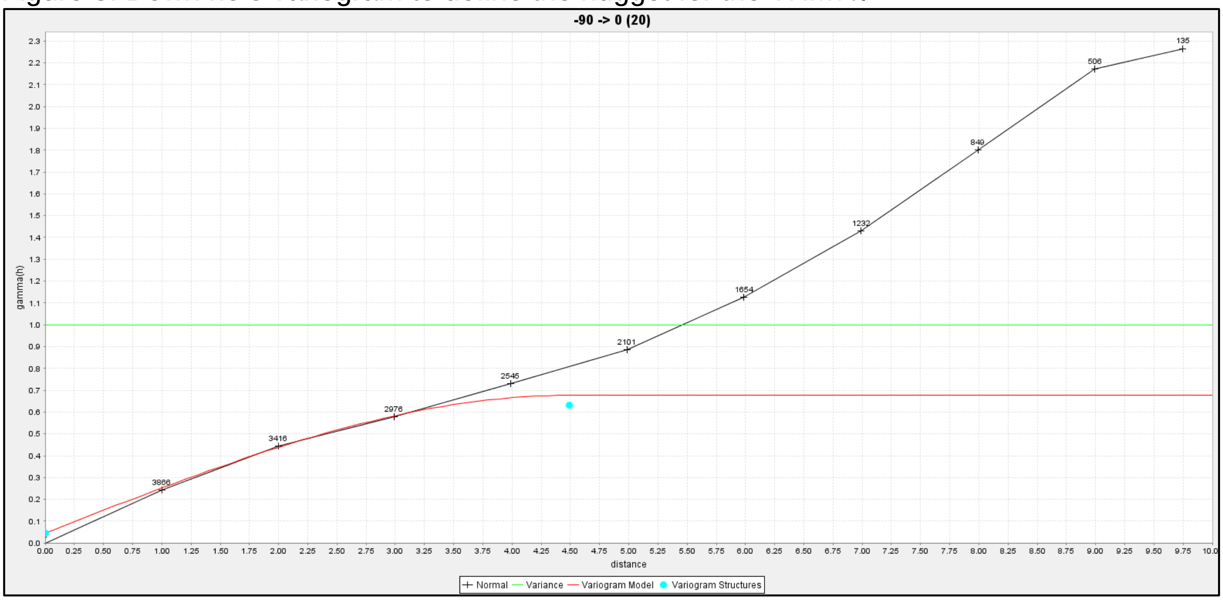


Figure 9. Down hole variogram to define the nugget for the Silt%.

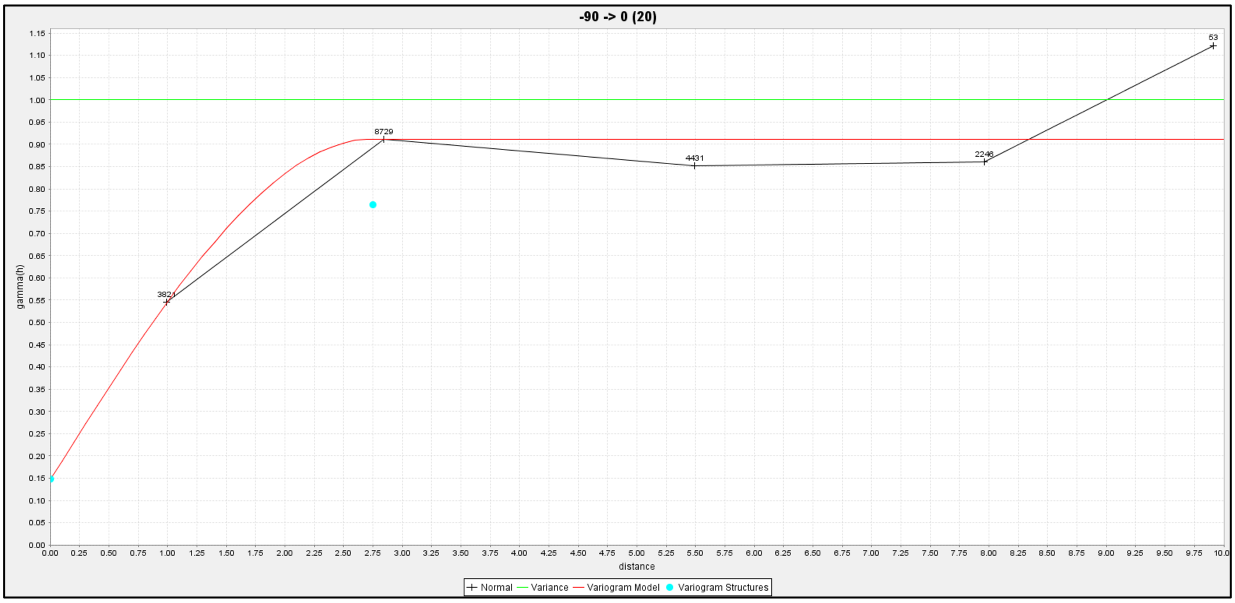


Figure 10. Down hole variogram to define the nugget for the Oversize%.

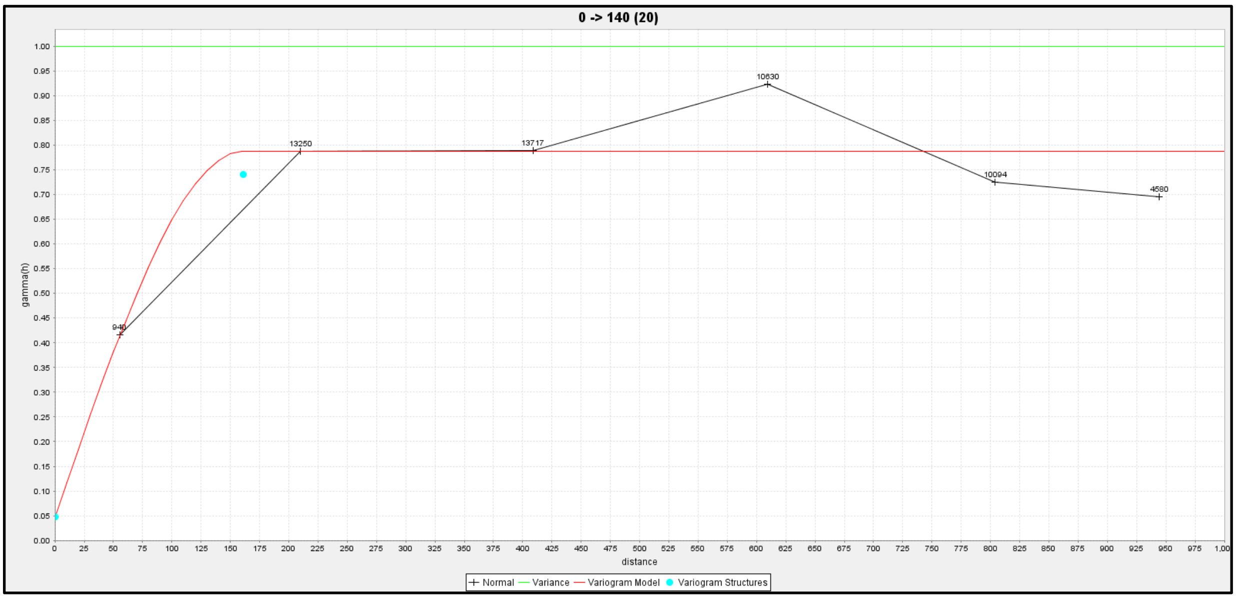


Figure 11: Variogram for the major direction for the THM%.

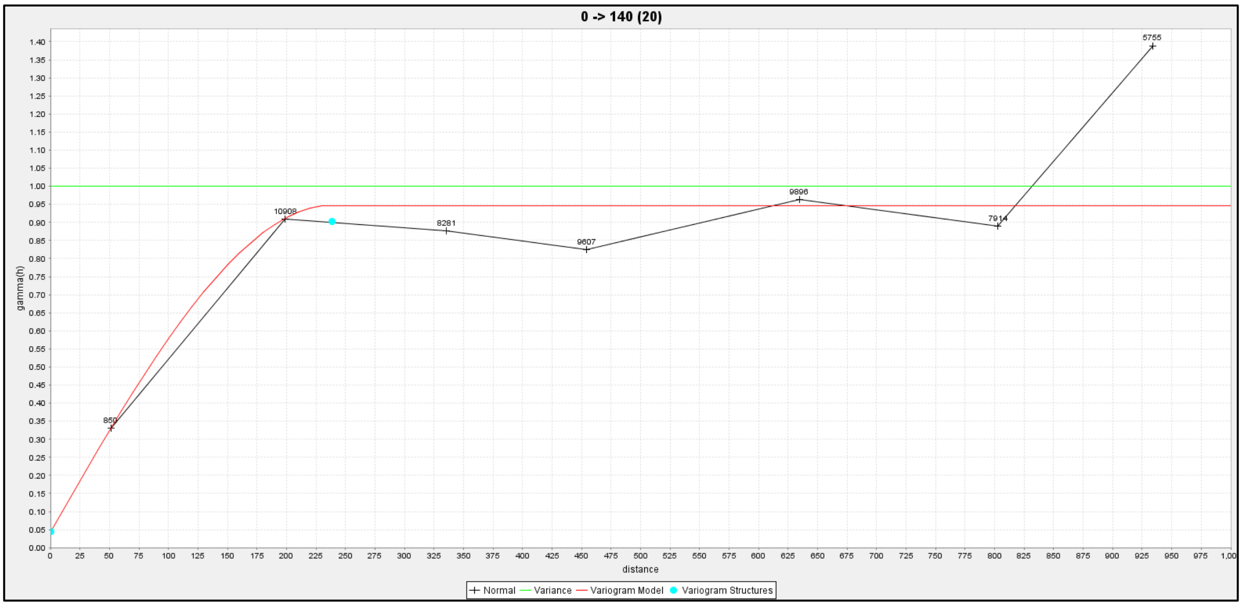


Figure 12. Variogram for the major direction for the Silt%.

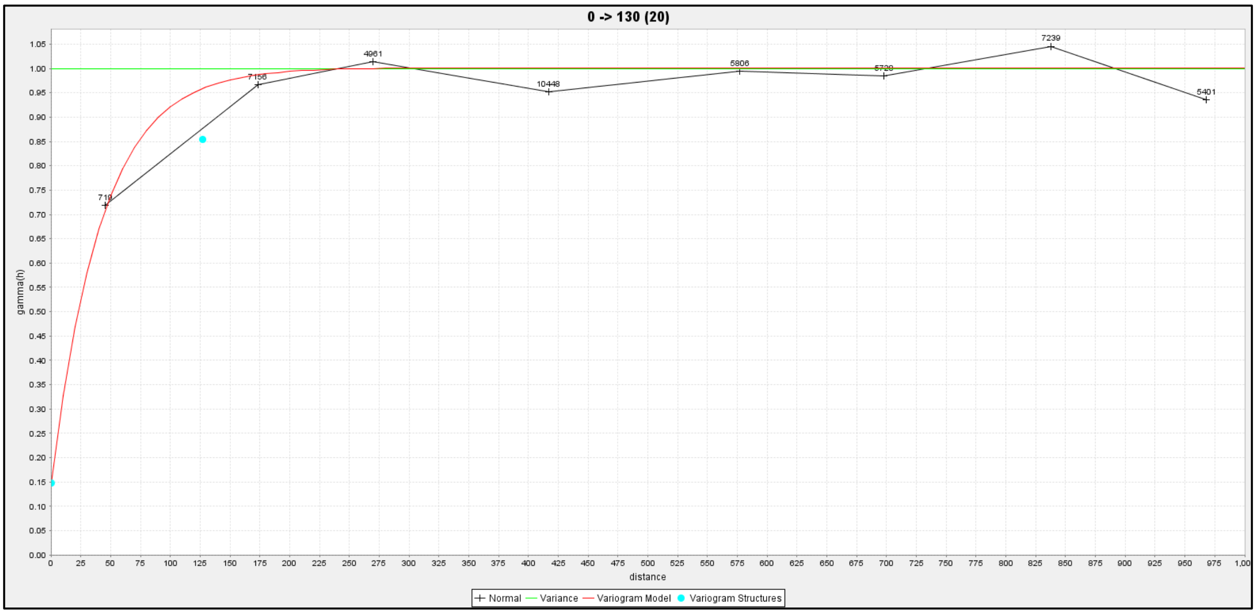


Figure 13. Variogram for the major direction for the Oversize%.

The estimation parameters derived from the above variograms are listed in Table 13.

9.0 MINERAL ASSEMBLAGES

The mineralogical analyses and results for the mineral assemblages were described in the previous update reports (Siebrits and Badenhorst, 2019a, 2019b and 2020b).

The following conversion factors were applied to convert TiO_2 and ZrO_2 values from the XRF chemical assays on the magnetic separation fractions to mineral data (Siebrits and Badenhorst, 2019a 2019b and 2020b):

- For M fractions: TiO_2 x 2 = ilmenite
- For MO fractions: TiO_2 x 1.6 = leucoxene
- For NM fractions: TiO_2 x 1 = rutile
- For NM fractions: ZrO_2 x 1.5 = zircon

The Iron-aluminum Garnet, Almandine was identified in all the XRD assays of the magnetic separation fractions. These percentages were used for the garnet estimations.

10.0 BLOCK MODELLING AND GRADE ESTIMATION

The block model with block sizes of 100m X 100m X 2m and minimum sub blocking of 25m X 25m X 0.5m of the previous update was used (Siebrits and Badenhorst, 2020b).

The attributes in the Domains 2 and 8 were reset and the garnet estimation attributes were added. The attributes that were used in the block model are shown below in Table 12. The mineralized Domain areas 2 and 8 above the floor DTMs were assigned to the block model as material "hm_sand" and to their respective domains.

Table 12: Attributes used in the block model.

Attribute Name	Type	Decimals	Background	Description
area	Integer	-	0	1,2
ci_gar	Float	2	-99	garnet % in CI
ci_tio2	Float	2	-99	
ci_yield	Float	2	-99	
domain	Integer	-	0	1,2,3,4,5,6,7,8
flag	Integer	-	0	flag=1(pass1),flag=2(pass2),flag=3(pass3)
flag_ma	Integer	-	0	flag_ma=1(pass1),flag_ma=2(pass2),flag_ma=3(pass3)
gar	Calculated	-	-	((ci_yield/100*thm/100*ci_gar/100)*100)+((mo_yield/100*thm/100*mo_gar/100)*100)+((nm_yield/100*thm/100*nm_gar/100)*100)
gar_near_samp_dist	Float	3	-99	
ilm	Calculated	-	-	(ci_yield/100*thm/100*ci_tio2/100*2)*100
leu	Calculated	-	-	(mo_yield/100*thm/100*mo_tio2/100*1.6)*100
licence	Character	-	none	EL180,EL182,EL327,EL328,EL351,EL352,El370,EL371,EL372
material	Character	-	air	air,waste,hm_sand
mo_gar	Float	2	-99	garnet % in MO
mo_tio2	Float	2	-99	
mo_yield	Float	2	-99	
nm_gar	Float	2	-99	garnet % in NM
nm_tio2	Float	2	-99	
nm_yield	Float	2	-99	
nm_zro2	Float	2	-99	
oversize	Float	2	-99	
rd	Float	2	-99	relative density
res	Character	-	none	resource,target
res_class	Character	-	none	measured,indicated,inferred
rut	Calculated	-	-	(nm_yield/100*thm/100*nm_tio2/100*1)*100
samp_avg_dist	Float	3	-99	
samp_avg_dist_ma	Float	3	-99	
samp_near_dist	Float	3	-99	
samp_near_dist_ma	Float	3	-99	
samp_no	Integer	-	-99	
samp_no_ma	Integer	-	-99	
silt	Float	2	-99	
thm	Float	2	-99	total heavy minerals
zir	Calculated	-	-	(nm_yield/100*thm/100*nm_zro2/100*1.5)*100

10.1 Grade Estimation Plan and Parameters

Grade interpolation was implemented with hard boundary conditions by domain area. All the composite data per domain was used for the estimation of the THM%, Silt% and Oversize%. The composite data of the magnetic separation, the XRF and the XRD garnet data were used for the estimation of the variables: CI_yield%, MO_yield%, NM_yield%, CI_TiO_2%, MO_TiO_2%, NM_TiO_2%, NM_ZrO_2% CI_gar%, MO_gar%, and NM_gar%. Inverse distance to the power of 3 was used for *in situ* grade interpolation for all the variables in the domains.

Calculated attributes were created in the block model for the calculating of the minerals; ilmenite, leucoxene, rutile, zircon and garnet according to the ratios in section 9.0.
The general aspects of the estimation were as follows for all the estimated variables:

- The variogram ranges (Table 13) of the THM%, Silt% and Oversize% were used for Domains 2 and 8;
- For the magnetic separation (Yield%), XRF data and XRD garnet data, the variogram ranges of the THM% in Table 13 were used for Domains 2 and 8;
- A minimum of 3 samples and a maximum of 15 samples were used for all inverse distance runs, except for the third pass when a minimum of 2 samples and a maximum of 15 samples were used;
- Pass 1: search radii set to the ranges in Table 13 for the major and 2m for the vertical for all the domains;
- Pass 2: search radii set to the ranges in Table 13 for the major and 3m for the vertical for all the domains;
- Pass 3: search radii set to 1000 m for the major and 10m for the vertical for all the domains;
- Block discretisation was set to 4(X) by 4(Y) by 4(Z);
- An octant search estimation method was used with the maximum of 3 adjacent empty octants in pass 1, a maximum of 5 adjacent empty octants in pass 2 and a maximum of 7 adjacent empty octants in pass 3; and
- No sample limits per drill hole were applied.

The mineral associations for ilmenite (ilm), leucoxene (leu), rutile (rut) zircon (zir) and garnet (gar) were calculated with an expression as a calculated attribute in the block model and are shown in the description column in Table 12 (see also section 9.0). The estimated THM% in the block model is shown in Figure 14 for Domains 2 and Figure 15 for Domains 8 below.

Table 13. The estimation parameters derived from the variography.

			THM %	Silt %	Oversize %
	Field		**THM %**	**Silt %**	**Oversize %**
Anisotropy Parameters	**ellipsoid bearing**		140	140	130
	ellipsoid plunge		0	0	0
	ellipsoid dip		0	0	0
	major:semi-major		1.50	3.10	1.70
	major:minor		42.70	137.00	29.00
Variogram Model Parameters	**Structure**	**Field**	**THM %**	**Silt %**	**Oversize %**
		nugget	0.04	0.04	0.15
	1	**sill**	0.74	0.90	0.85
	2	**sill**			
	1	**range**			
	2	**range**	1270	1183	2019
	Model Type*		Sph	Sph	Exp
	horizontal ranges for pass 1		161	239	127
	vertical ranges for pass 1		2	10	10
	ranges for pass 2		242	359	191
	vertical ranges for pass 2		3	15	15
	ranges for pass 3		1000	1000	1000
	vertical ranges for pass 3		10	30	30

* Model Type = Spherical or Exponential

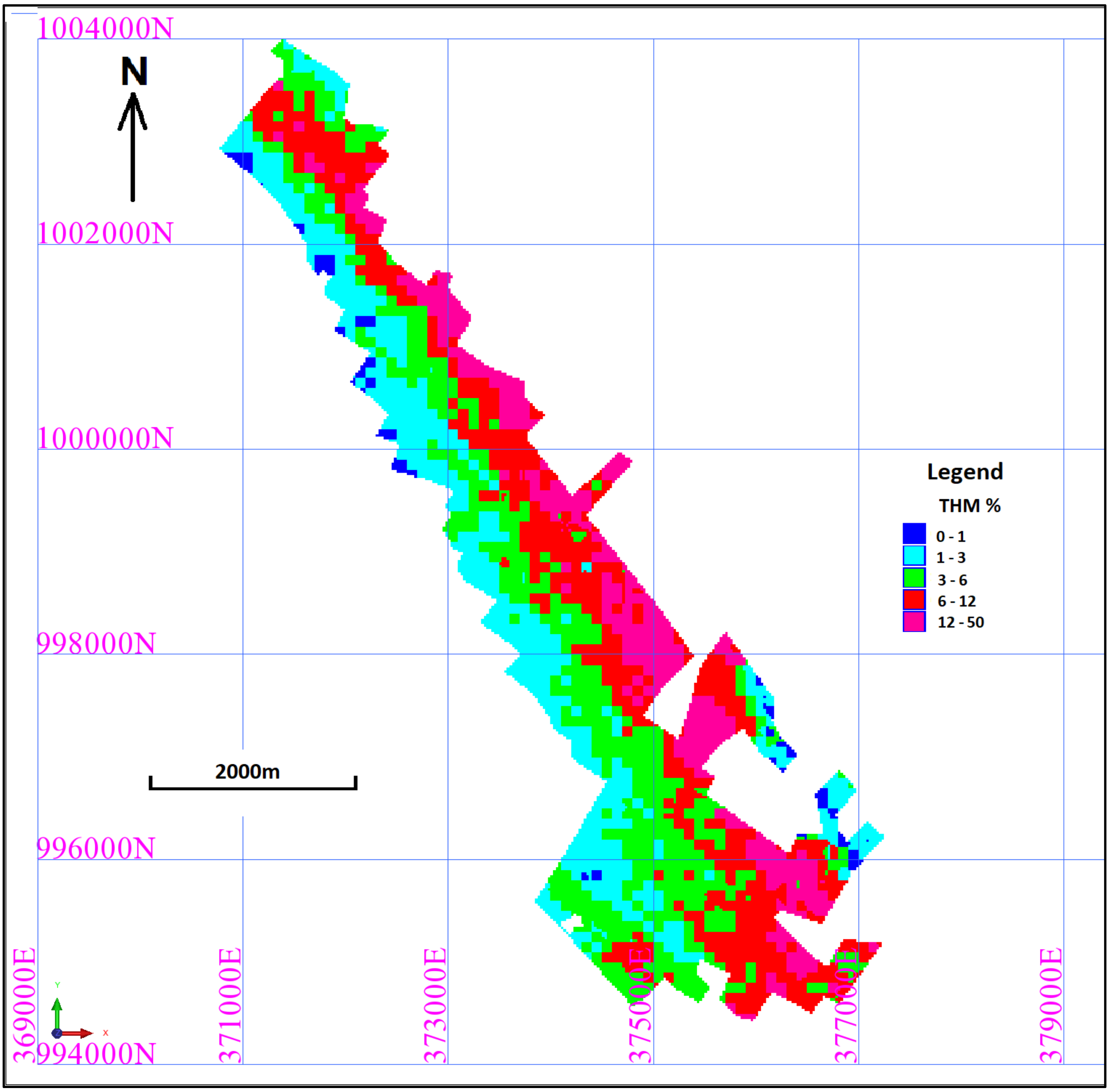


Figure 14: The THM% estimates in the block model showing Domain 2.

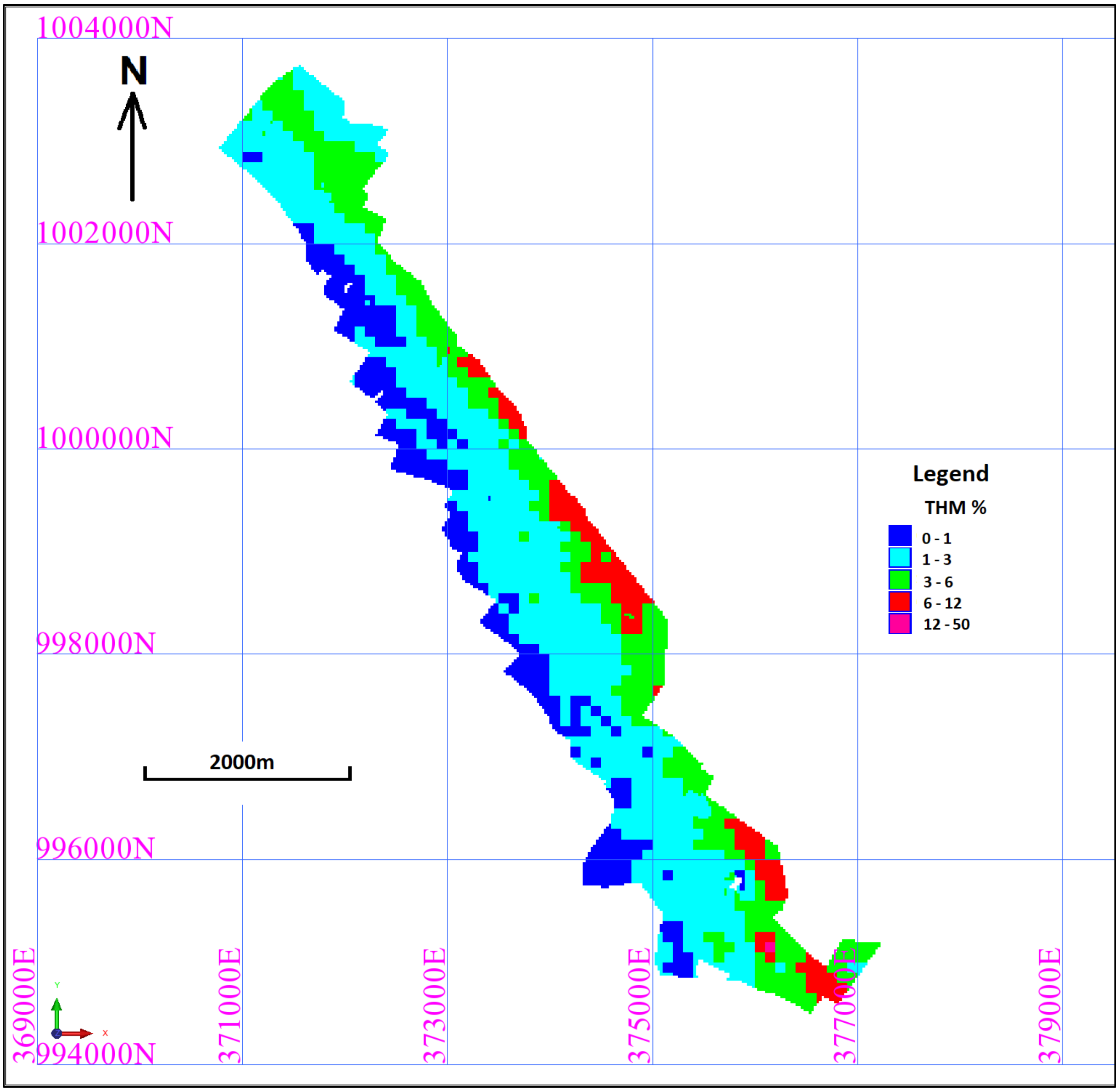


Figure 15. The THM% estimates in the block model showing Domain 8.

10.2 Relative Density

The mean relative densities were determined with the previous drilling campaign (Siebrits and Badenhorst, 2019a and 2019b). For the hm_sand mineral type in the Mannar block model for Domain 2 was 1.74 assigned, and 1.75 for Domain 8.

10.3 Block Model Validations

10.3.1 Visual Validation

The visual check on the block model sections generally correlates well with the input data. A section are shown below in Figure 16 for Domains 2 and 8.

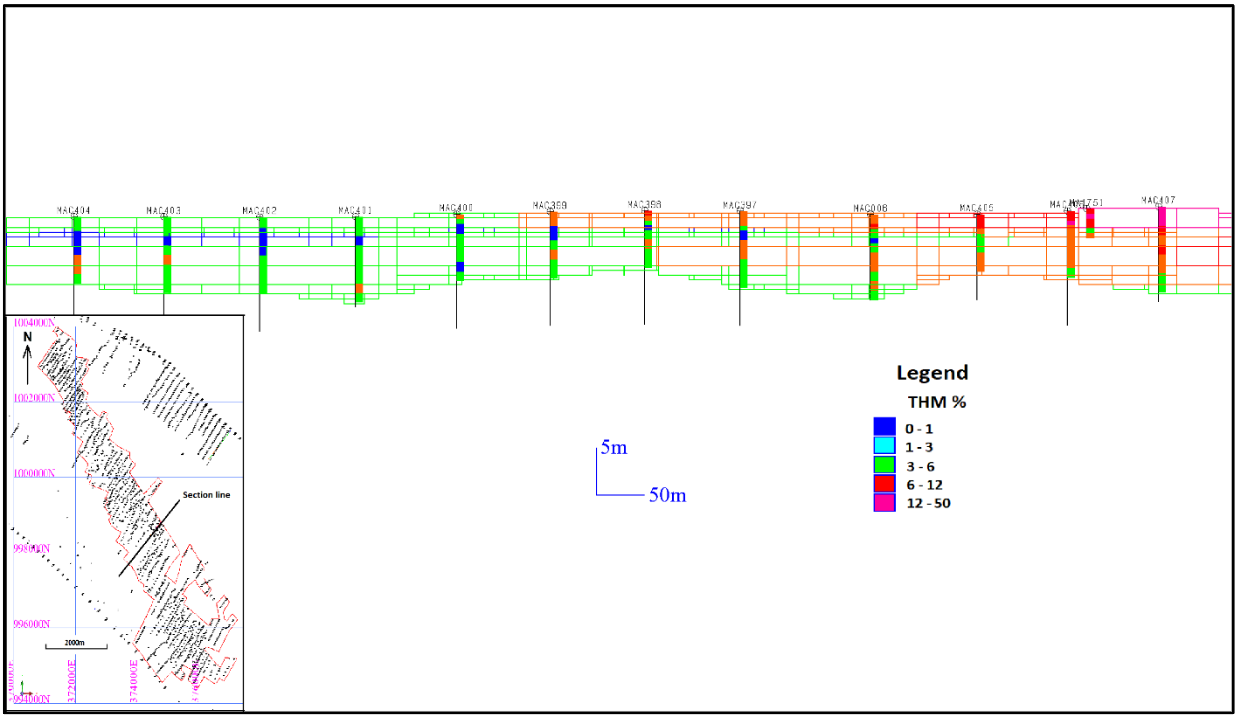


Figure 16: Section on Domain2 and 8 on Mannar showing the input drill hole values of the THM% correlate well with the block model estimates. Vertical exaggerations 10X.

10.3.2 Average Grade Conformance

Comparisons of global average input composite data (section 7.0) with the block model estimated grades of the block model exports per domain (Table 14 and Table 15) compare reasonably well. The percentage differences are shown in Table 16.

Table 14. Statistics of the Domain 2 export estimates in the block model.

Field	THM %	Silt %	Ovz %	CI Yield %	MO Yield %	NM Yield %	CI TiO_2 %
Number of samples	105602	105602	105602	105602	105602	105602	105602
Minimum value	0.18	0.11	0.85	7.41	15.40	8.13	23.70
Maximum value	32.53	10.35	78.47	75.97	68.83	42.10	49.58
Mean	5.66	1.20	25.00	45.09	37.78	17.11	41.60
Median	4.17	0.84	20.28	43.82	38.33	16.90	43.56
Variance	21.48	1.34	289.02	215.81	112.18	26.42	34.10
Standard Deviation	4.63	1.16	17.00	14.69	10.59	5.14	5.84
Coefficient of variation	0.82	0.96	0.68	0.33	0.28	0.30	0.14

Field	MO TiO_2 %	NM TiO_2 $\%_2$	NM ZrO_2 %	CI Gar %	MO Gar %	NM Gar %
Number of samples	105602	105602	105602	105602	105602	105602
Minimum value	3.87	2.08	1.22	0.00	12.90	0.00
Maximum value	34.22	17.80	22.99	20.10	52.30	5.70
Mean	13.86	9.02	7.70	6.44	32.67	1.22
Median	12.90	9.23	6.98	6.28	33.48	1.09
Variance	41.31	7.88	18.52	16.37	40.26	0.79
Standard Deviation	6.43	2.81	4.30	4.05	6.35	0.89
Coefficient of variation	0.46	0.31	0.56	0.63	0.19	0.73

Table 15. Statistics of the Domain 8 export estimates in the block model.

Field	THM %	Silt %	Ovz %	CI Yield %	MO Yield %	NM Yield %	CI TiO_2 %
Number of samples	278418	278418	278418	278418	278418	278418	278418
Minimum value	0.38	0.14	1.46	14.21	13.33	8.46	23.72
Maximum value	13.12	17.99	67.07	73.91	61.08	42.85	50.38
Mean	2.75	2.36	27.28	47.52	31.69	20.80	43.57
Median	2.40	1.52	25.90	48.64	30.99	19.94	44.26
Variance	2.35	5.02	119.08	94.03	59.67	23.42	15.32
Standard Deviation	1.53	2.24	10.91	9.70	7.72	4.84	3.91
Coefficient of variation	0.56	0.95	0.40	0.20	0.24	0.23	0.09

Field	MO TiO_2 %	NM TiO_2 $\%_2$	NM ZrO_2 %	CI Gar %	MO Gar %	NM Gar %
Number of samples	278418	278418	278418	278418	278418	278418
Minimum value	3.87	3.23	1.52	0.13	6.10	0.00
Maximum value	42.10	16.33	19.87	19.13	50.35	8.80
Mean	15.21	8.87	7.59	4.75	24.22	0.77
Median	14.42	8.84	7.44	4.50	23.72	0.50
Variance	29.49	1.90	4.37	6.31	43.93	0.96
Standard Deviation	5.43	1.38	2.09	2.51	6.63	0.98
Coefficient of variation	0.36	0.16	0.28	0.53	0.27	1.28

Table 16: The percentage differences between the composite data mean and block model estimates mean per domain.

Domain	Means	THM %	Silt %	Ovz %	CI Yield %	MO Yield %	NM Yield %	CI TiO_2 %	MO TiO_2 %	NM TiO_2 %	NM ZrO_2 %	CI Gar %	MO Gar %	NM Gar %
2	Composite	5.57	1.03	26.43	46.76	36.60	16.64	42.60	14.93	9.49	8.24	6.07	32.90	1.20
	Block Model	5.66	1.20	25.00	45.09	37.78	17.11	41.60	13.86	9.02	7.70	6.44	32.67	1.22
	Difference %	1.6	16.2	-5.4	-3.6	3.2	2.8	-2.3	-7.1	-4.9	-6.6	6.2	-0.7	2.1
8	Composite	2.73	2.47	27.07	49.10	30.34	20.56	44.14	15.92	9.06	7.85	4.52	24.69	0.68
	Block Model	2.75	2.36	27.28	47.52	31.69	20.80	43.57	15.21	8.87	7.59	4.75	24.22	0.77
	Difference %	0.5	-4.4	0.8	-3.2	4.4	1.1	-1.3	-4.5	-2.2	-3.4	5.1	-1.9	13.2

The relative high percentage differences of the Silt% in Domain 2 and of the NM-Garnet% in Domain 8 is the result of the very low values.

10.3.3 Distribution Comparisons

Composite and estimate grade distributions were compared to ensure that the block estimates represented the original data distribution. These were found to be reasonably compatible. For example, the comparison of THM% for the 0.5 m composites and the estimates of domain 1 are shown in Figure 17. The same comparisons can be made for THM% in Domain 2 as shown in Figure 18.

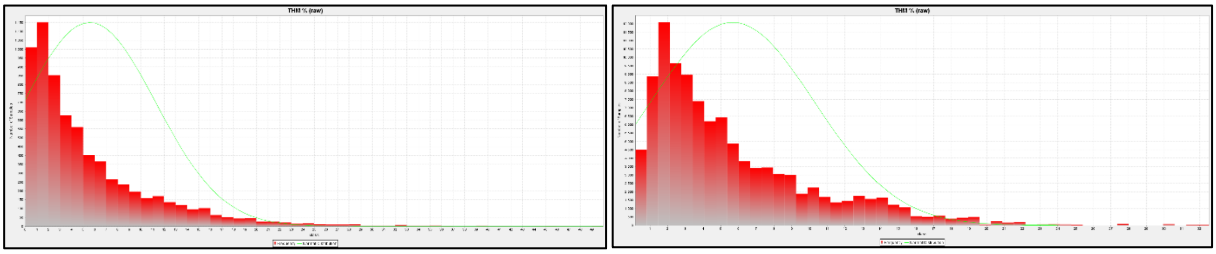


Figure 17: Distributions of the 0.5m composites (left) and the block model estimates (right) of the THM% for Domain 2.

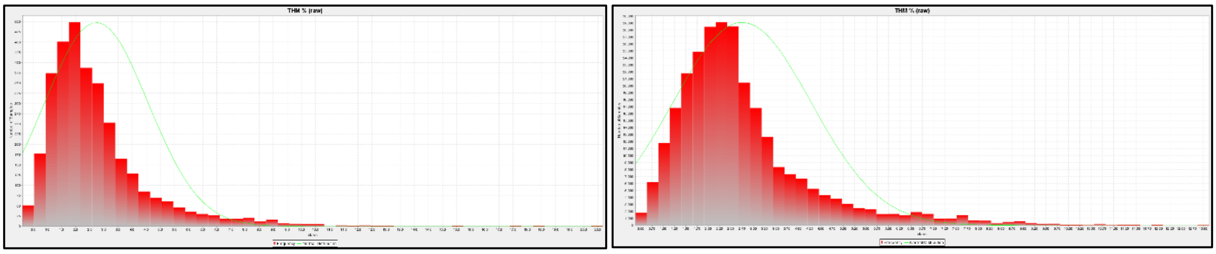


Figure 18: Distributions of the 1m composites (left) and the block model estimates (right) of the THM% for Domain 8.

10.3.4 Swath Plot Check

The average grade conformance is a global representation over the entire domain. To assess average grade conformance progressively across the deposits, swath plots were used. In these plots, both data and model estimates are averaged into Easting, Northing and RL slices and the conformance of grade is assessed for each slice, in a particular direction.

Swath plots, QQ plots and Scatter plots were run for Domains 2 and 8 with plots provided in Appendix B. The overall grade conformance on the swath plots is acceptable and it can be seen in the plots that the trends of the block means follow the sample means closely.

11.0 RESOURCE CLASSIFICATION

The resource classification was primarily based on the drill hole density and the variability of the data. The drill hole lines were previously generally 200m apart and the drill holes 50m apart on the drilling lines and with the infill drilling in Domains 2 and 8 the drill holes are now generally 100m by 100m on the infilled lines. This gave a good coverage of the areas to be able to upgrade the classification in Domain 2 and 8. The flagged blocks with the estimation passes 1 to 3 for the THM% and magnetic separation data (CI Yield%) were used together to classify the Mineral Resources to Indicated where the blocks were estimated with the 1st pass. The resource classification for Domain 2 is shown in (Figure 19) and for Domain 8 in Figure 20.

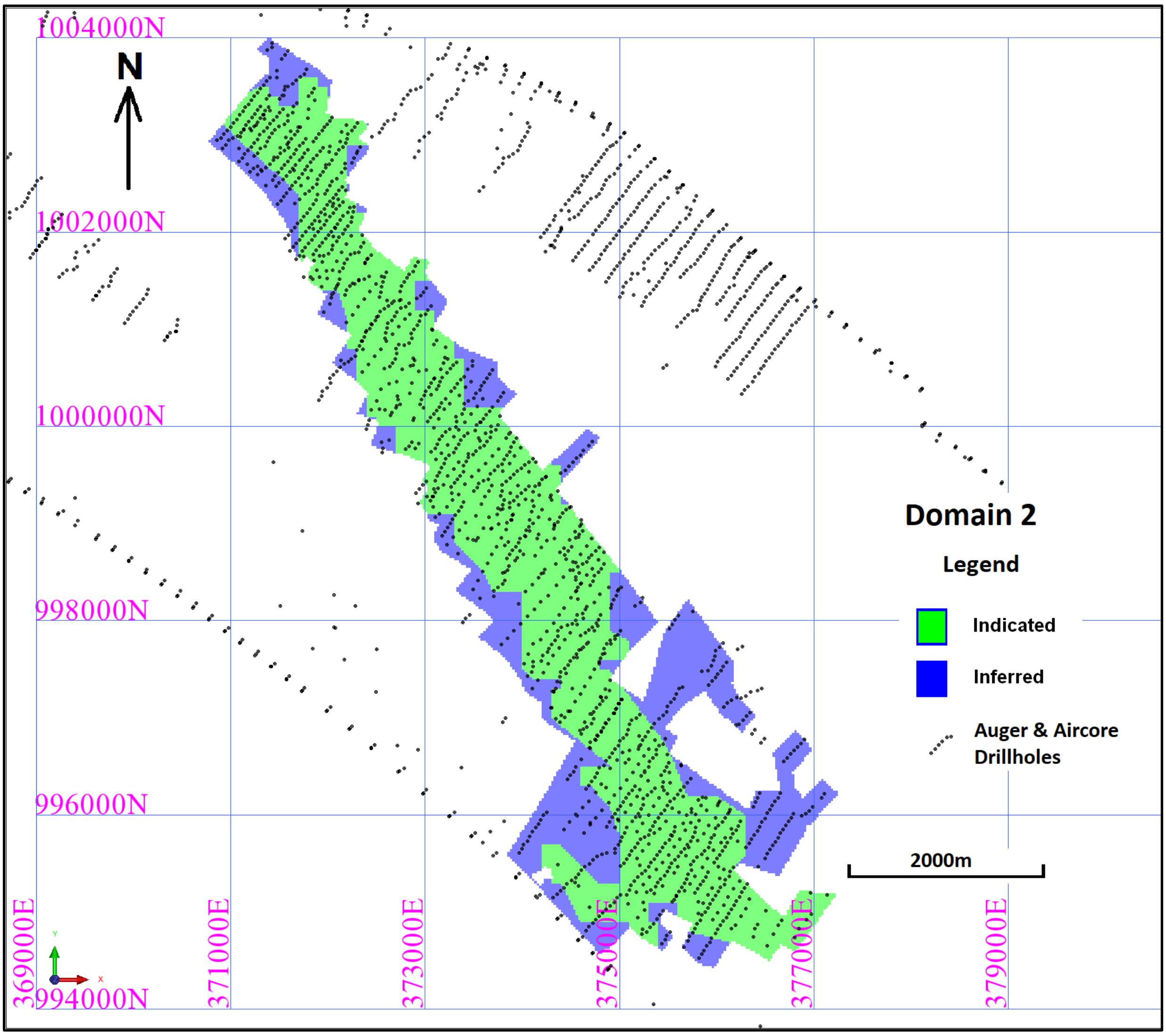


Figure 19: The resource classification in plan of Domain 2 with the auger and aircore drill holes in black.

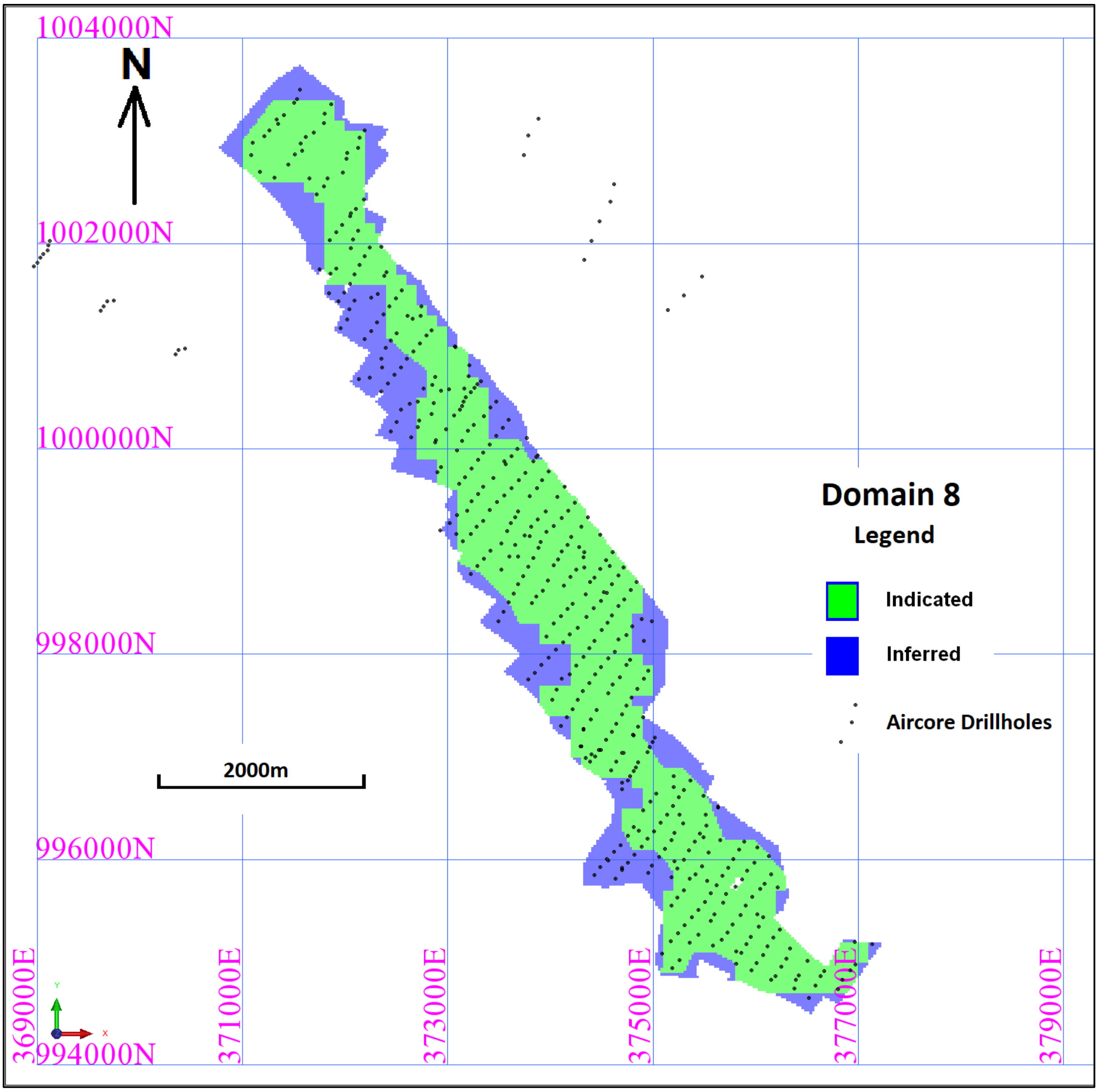


Figure 20. The resource classification in plan of Domain 8 with the aircore drill holes in black.

12.0 RESOURCE REPORTING

The *in-situ* updated Mineral Resource estimations of Domains 2 and 8 are shown below in Table 17 with a 2% lower THM cut-off and in Table 18 with a 3% lower THM cut-off.

Table 17. The Mineral Resource estimations of Domains 2 and 8 with a 2% lower THM cut-off.

Resource Category	Domain	Licence	Volume (Mm³)	Tonnes (M)	THM %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	2	**EL180**	0.93	1.63	4.50	1.02	10.19	1.60	0.27	0.07	0.07	0.59
		EL327	2.64	4.59	7.37	0.82	23.27	3.43	0.65	0.11	0.16	1.10
		EL328	6.17	10.73	6.03	1.22	19.86	2.52	0.45	0.08	0.09	0.91
		EL351	1.59	2.77	7.19	0.79	25.98	3.25	0.91	0.13	0.14	1.04
		EL352	4.64	8.08	6.88	1.00	20.54	3.37	0.40	0.09	0.12	0.91
		EL370	2.78	4.84	6.36	1.07	26.41	2.41	0.94	0.12	0.17	0.89
		EL372	0.13	0.23	11.05	1.06	16.70	6.36	0.72	0.14	0.24	1.20
		Sub Total	**18.89**	**32.87**	**6.53**	**1.04**	**21.48**	**2.88**	**0.57**	**0.10**	**0.13**	**0.93**
	8	**EL180**	0.39	0.68	2.90	2.58	21.27	1.32	0.15	0.05	0.06	0.34
		EL327	5.95	10.41	3.95	1.88	22.17	1.83	0.32	0.07	0.10	0.36
		EL328	14.51	25.40	3.13	2.50	20.33	1.39	0.21	0.05	0.06	0.32
		EL351	2.27	3.97	3.13	1.77	30.00	1.20	0.33	0.07	0.08	0.39
		EL352	11.39	19.93	3.69	2.89	22.82	1.82	0.20	0.06	0.08	0.40
		EL370	8.88	15.54	2.99	2.48	30.06	1.12	0.35	0.06	0.08	0.32
		EL372	0.15	0.26	5.71	2.68	20.77	3.23	0.36	0.08	0.14	0.60
		Sub Total	**43.54**	**76.19**	**3.37**	**2.48**	**23.73**	**1.50**	**0.26**	**0.06**	**0.08**	**0.35**
	Sub Total		**62.43**	**109.06**	**4.32**	**2.04**	**23.05**	**1.92**	**0.35**	**0.07**	**0.09**	**0.53**
Inferred	2	**EL180**	0.86	1.49	4.43	0.75	9.66	1.68	0.28	0.07	0.07	0.66
		EL182	0.05	0.08	3.67	4.96	27.39	1.54	0.56	0.08	0.11	0.47
		EL327	0.23	0.39	9.98	0.70	20.31	5.44	0.95	0.14	0.27	1.23
		EL328	1.68	2.93	7.87	0.81	23.34	3.56	0.60	0.10	0.13	1.09
		EL351	0.39	0.68	11.88	0.91	28.91	5.92	1.49	0.21	0.24	1.58
		EL352	0.95	1.65	9.28	1.49	22.70	5.38	0.56	0.12	0.21	1.02
		EL370	0.59	1.03	4.88	1.35	24.64	1.93	0.72	0.10	0.14	0.66
		EL372	2.02	3.51	8.90	2.47	28.32	4.64	0.55	0.11	0.17	1.06
		Sub Total	**6.76**	**11.76**	**7.95**	**1.47**	**23.37**	**3.94**	**0.61**	**0.11**	**0.16**	**1.01**
	8	**EL180**	0.31	0.54	2.48	2.97	21.82	1.17	0.14	0.05	0.06	0.18
		EL327	0.25	0.43	2.23	2.84	20.32	1.00	0.16	0.05	0.06	0.18
		EL328	5.48	9.59	3.75	2.10	24.43	1.66	0.27	0.07	0.08	0.41
		EL351	1.34	2.34	3.34	2.69	24.01	1.37	0.32	0.07	0.09	0.33
		EL352	1.97	3.45	4.26	2.99	21.74	2.18	0.25	0.07	0.10	0.46
		EL370	4.11	7.20	2.87	2.46	30.77	1.06	0.32	0.06	0.08	0.30
		EL372	0.70	1.22	4.32	2.63	24.34	2.15	0.30	0.07	0.11	0.47
		Sub Total	**14.15**	**24.77**	**3.50**	**2.44**	**25.73**	**1.53**	**0.28**	**0.07**	**0.08**	**0.37**
	Sub Total		**20.92**	**36.53**	**4.93**	**2.13**	**24.97**	**2.31**	**0.39**	**0.08**	**0.11**	**0.58**
Grand Total			**83.34**	**145.59**	**4.48**	**2.07**	**23.53**	**2.02**	**0.36**	**0.07**	**0.10**	**0.54**

Table 18. The Mineral Resource estimations of Domains 2 and 8 with a 3% lower THM cut-off.

Resource Category	Domain	Licence	Volume (Mm³)	Tonnes (M)	THM %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	2	EL180	0.64	1.12	5.39	1.06	8.59	1.99	0.33	0.09	0.09	0.73
		EL327	2.27	3.95	8.16	0.80	22.99	3.87	0.72	0.12	0.18	1.21
		EL328	4.86	8.46	6.97	1.22	18.38	3.01	0.52	0.09	0.11	1.03
		EL351	1.25	2.17	8.47	0.78	24.72	3.93	1.08	0.16	0.17	1.20
		EL352	4.32	7.51	7.21	1.03	19.95	3.56	0.42	0.09	0.13	0.95
		EL370	2.21	3.85	7.37	1.11	24.33	2.81	1.10	0.14	0.20	1.02
		EL372	0.13	0.22	11.34	1.08	15.71	6.54	0.74	0.14	0.25	1.23
		Sub Total	**15.68**	**27.29**	**7.36**	**1.05**	**20.40**	**3.32**	**0.64**	**0.11**	**0.14**	**1.04**
	8	EL180	0.17	0.30	3.51	2.24	22.92	1.71	0.19	0.05	0.07	0.45
		EL327	3.23	5.65	5.22	1.94	21.19	2.48	0.44	0.09	0.13	0.49
		EL328	5.12	8.96	4.35	1.97	17.41	2.04	0.28	0.07	0.09	0.48
		EL351	0.96	1.68	4.16	1.40	25.41	1.50	0.47	0.09	0.11	0.59
		EL352	6.40	11.21	4.61	2.46	20.51	2.35	0.25	0.07	0.11	0.51
		EL370	3.31	5.79	3.86	1.88	25.72	1.44	0.47	0.08	0.10	0.42
		EL372	0.11	0.18	7.09	1.84	17.86	4.01	0.45	0.10	0.18	0.75
		Sub Total	19.29	33.77	4.50	2.08	20.95	2.09	0.34	0.08	0.10	0.49
	Sub Total		**34.98**	**61.06**	**5.78**	**1.62**	**20.70**	**2.64**	**0.48**	**0.09**	**0.12**	**0.73**
Inferred	2	EL180	0.63	1.10	5.15	0.78	9.95	2.01	0.33	0.08	0.09	0.77
		EL182	0.03	0.06	4.05	5.65	28.42	1.73	0.62	0.09	0.12	0.52
		EL327	0.18	0.31	12.04	0.72	18.03	6.68	1.16	0.17	0.33	1.48
		EL328	1.16	2.02	10.28	0.76	23.53	4.87	0.81	0.13	0.17	1.37
		EL351	0.36	0.63	12.61	0.92	27.18	6.31	1.59	0.23	0.26	1.66
		EL352	0.86	1.49	9.97	1.39	21.55	5.80	0.60	0.13	0.22	1.09
		EL370	0.36	0.62	6.53	1.22	23.23	2.69	1.01	0.13	0.19	0.83
		EL372	1.68	2.92	10.21	2.34	24.04	5.32	0.63	0.13	0.19	1.22
		Sub Total	**5.26**	**9.15**	**9.52**	**1.44**	**21.82**	**4.82**	**0.74**	**0.13**	**0.19**	**1.19**
	8	EL180	0.04	0.07	3.30	4.03	20.73	1.77	0.16	0.06	0.08	0.21
		EL328	2.72	4.75	5.11	1.56	23.51	2.24	0.36	0.09	0.11	0.62
		EL351	0.69	1.20	4.21	2.15	21.92	1.63	0.43	0.09	0.11	0.50
		EL352	1.33	2.32	5.11	2.29	20.07	2.65	0.31	0.08	0.12	0.56
		EL370	1.47	2.58	3.57	2.17	26.57	1.30	0.41	0.08	0.10	0.38
		EL372	0.50	0.88	5.00	1.74	21.68	2.47	0.34	0.08	0.12	0.56
		Sub Total	**6.74**	**11.80**	**4.66**	**1.92**	**23.19**	**2.07**	**0.37**	**0.08**	**0.11**	**0.54**
	Sub Total		**12.00**	**20.95**	**6.78**	**1.71**	**22.59**	**3.27**	**0.53**	**0.10**	**0.14**	**0.82**
Grand Total			**46.98**	**82.00**	**6.03**	**1.64**	**21.18**	**2.80**	**0.49**	**0.09**	**0.13**	**0.75**

13.0 COMPETENT PERSON'S STATEMENT

The Competent Persons responsible for the sampling process, geological interpretation (wireframe model), Mineral Resource estimation and classification of the Mannar Mineral Sand Deposits is Mr Kobus Badenhorst and Mr Bernhard Siebrits. Mr Kobus Badenhorst is a director of GeoActiv (Pty) Ltd. and is registered with the South African Council for Natural Scientific Professionals (SACNASP). Mr Siebrits is a consultant, registered with SACNASP and a Member of the Australasian Institute of Mining and Metallurgy. Mr Badenhorst and Mr Siebrits has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Persons as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Badenhorst and Mr Siebrits consent to the inclusion in this report of the matters based on his information in the form and context in which it appears.

14.0 COMPLIANCE WITH THE JORC CODE ASSESSMENT CRITERIA

The JORC Code (2012) describes a number of criteria, which must be addressed in the Public Report of Mineral Resource estimates for significant projects. These criteria provide a means of assessing whether or not parts of or the entire data inventory used in the estimate are adequate for that purpose. The resource estimate stated in this document was based on the criteria set out in Table 1 of that Code. These criteria are discussed in the table below.

JORC Code Assessment Criteria	Comments
Section 1	**Sampling techniques and data**
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 down hole 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.*	Aircore drilling: Samples collected at 1 m intervals for the most recent aircore drilling programme. The following covers the aircore sampling process: • A sample of sand, approx. 20 g is scooped from the sample bag for visual THM% and SLIMES% estimation and logging. The same sample mass is used for every pan sample for visual THM% and SLIMES% estimation. • The standard sized sample is to ensure calibration is maintained for consistency in visual estimation. • A sample ledger is kept at the drill rig for recording sample intervals. • The 1 m aircore drill samples have an average mass of approx. 10 kg. • All samples were split down to maximum 2.4 kg by a 3-tier rifle splitter for preparatory work at the on-site facility in Pesalai. All samples were transported to the site office / Prep Lab sample prep facility in Pesalai on Mannar Island. The Prep Lab will receive samples up to c 2.4kg in weight / sample. All samples from the drilling program were prepped, even samples perceived to be low grade. Reference / residual samples for samples sent to the analytical laboratory are safely stored at the site office. Permits for the export of the samples were sourced in Sri Lanka, on receipt of the permits the samples were couriered via air freight to Johannesburg where clearance took place for the samples. They were then air freighted to Cape Town where a representative from the laboratory, Scientific Services CC, collected the samples.
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).*	Aircore drilling: • Aircore drilling is considered a standard industry technique for HMS mineralisation. Aircore drilling is a form of reverse circulation drilling where the sample is collected at the face and returned inside the inner tube. • Aircore drill rods used were 3 m in length. • rig utilises HQ gauge (96mm OD, 63.5mmID) drilling rods with inner tubes. • All aircore drill holes were drilled vertically. • The drilling is governed by the Aircore Drilling Guideline procedure to ensure consistency in the application of the method. • At the end of each drill rod, the drill string is cleaned by blowing down with air to remove any clay and silt potentially built up in the sample pipes and cyclone. • The twin-tube aircore drilling technique is known to provide high quality samples from the face of the drill hole (in ideal conditions). •

JORC Code Assessment Criteria	Comments
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.*	Aircore drilling: • All 1 m aircore samples are weighed with a spring scale at the drill rig, if the sample is wet it is air dried at the enclosed storage facility and weighed. • While initially collaring the aircore hole, limited sample recovery can occur in the initial 0 m to 3 m drill depth interval owing to sample and air loss into the surrounding loose soil. The initial 3 m of drilling and sample intervals are drilled very slowly in order to achieve optimum sample recovery. • The entire 1 m sample is collected at the drill rig in large numbered plastic bags for dispatch to the onsite split preparation facility. • All wet and moist sample are placed into large clean open plastic bags to sun-dry prior to riffle splitting the sub-sample.
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.*	Each sample was geologically logged for mineral composition, grain size, sorting, visual Silt%, induration, and a rough visual estimate of the dark heavy mineral % component. Paper log information was transferred every night to an excel spread sheet.
Sub-Sampling 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 sub-sampling 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.*	The Prep Lab will receive samples up to c 2.4kg in weight / sample that have to be dried, sieved on a 1mm aperture vibrating sieve, the +1mm and -1mm fractions weighed, then the –1mm fraction riffle split to a sub-sample of c 125-250g and the remaining material retained in storage. The 125-250g sample is weighed then undergoes rotary light attritioning in a 0.3-0.5% NaOH solution. The subsample will then be wet sieved on a 45-micron vibrating sieve with retained +45 micron material being dried then weighed and packaged for export. A duplicate sample was riffled from every 20th sample, i.e., 5% of the total. The riffler was thoroughly cleaned after each sample.
Quality of Assay Data and Laboratory Tests	
The nature, quality and appropriateness of the assaying and laboratory procedures used and	The initial drying (at between 80 to 105 degrees C via gas oven), de-sliming and oversize removal was conducted at the site Prep Facility on Mannar Island. The procedures are shown below.

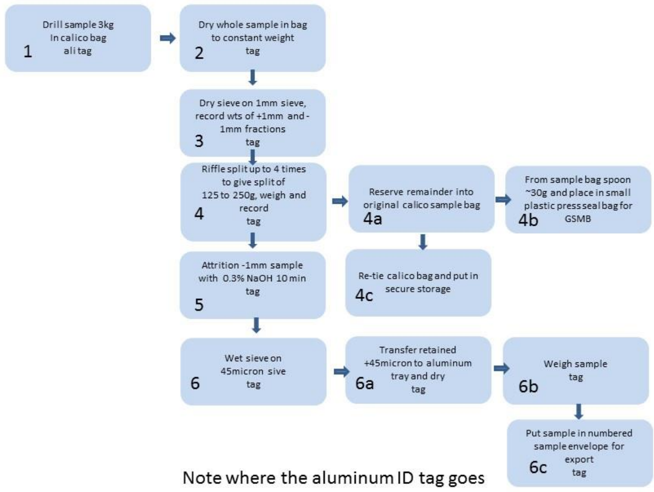
<table>
<tr><th>JORC Code Assessment Criteria</th><th>Comments</th></tr>
<tr><td>

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.

</td><td>



Analytical work on the tetrabromoethane (TBE) based THM determination and subsequent magnetic separation work was done by Scientific Services C.C., Cape Town. XRF work was done on the fractions of the magnetic separation samples.

- The determination of THM% sample concentrate using TBE at a specific gravity (SG) of 2.95, are as follows:
- TBE is placed into the glass flask up to the indicated mark.
- Place approximate 1 scoop of sample into the flask.
- Wash down the sides of the flask and impeller with TBE to ensure all material is in the TBE.
- Run the mixer for about 10 seconds.
- Wash down again to ensure no material is ‘hung’.
- Run the impeller mixer repeatable in 10 second bursts until sure that all heavies have been liberated.
- Allow to stand for 5-10 minutes or until no more material cascades to bottom.
- Once the discharge pipe is clear of suspended material release the tube to allow the concentrate to be captured in the filter paper. Store this labeled filter paper.
- Process any remaining sample as above ensuring no concentrate is lost.
- Finally flush out the floats by opening the tube and allowing the floats to fall into filter paper – allow this to stand capturing all the TBE which will be reused at a later stage.
- Wash all concentrates and floats thoroughly with acetone to reclaim as much TBE as possible.
- After the concentrate filter is acetone rinsed and dried, transfer the concentrate very carefully into a bag by opening the filter paper ensuring nothing is lost.
- Place the floats into the waste drums unless specified by the client to do otherwise.
- Check the SG of the TBE with the density tracers provided and re-use as appropriate.

</td></tr>
</table>

JORC Code Assessment Criteria	Comments
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.*	Kobus Badenhorst did twin and test holes on c 5% of the drilling done during the program. QA/QC of all the work done was performed by Bernhard Siebrits for GeoActiv.
Location of Data Points	Data and work were done in UTM, WGS84.
Accuracy and quality of surveys used to locate drill holes (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.*	A handheld Garmin GPS was used for the positioning and final position of the auger holes. The X and Y coordinates were collected and entered into the project spreadsheet. The handheld GPS Z data were found to be very inaccurate. Consequently, a GeoEye satellite based Digital Terrain Model (DTM) study that covers the entire Mannar Island was done in 2015, the data interpretation and manipulation for the areas covered by the resource update was done by a highly qualified land surveyor during 20117. The X and Y coordinates of the drill holes was used to elevate the drill holes to the DTM surface prior to resource modelling taking place. This will supply significantly more accurate Z data as the DTM is based on 13 Differential GPS derived points.
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.*	The drilling program for the updated resource was conducted at 400m inter-drill line spacing, with 50m inter-drill hole spacing on the lines and further reduced to 200m by 50m. The infill drilling with the aircore holes in Domains 1 and 2 were on a drilling pattern of about 400m by 100m between the auger drilled lines and some on the auger lines to twin the auger holes. The previous drilling pattern of about 800m by 50m has been further reduced to about 200m by 50m in domain 4 with shallow auger holes. .
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.*	Drilling took place in fences perpendicular to the interpreted strike of the mineralized ore bodies; this was confirmed during modelling.
Sample Security	All sampling, prep and packing work took place under supervision of a site geologist.
The measures taken to ensure sample security.	A representative from the Analytical laboratory, Scientific Services CC, collected the samples from the airport in Cape Town, South Africa.

JORC Code Assessment Criteria	Comments
Audits and Reviews	Statistical analyses of the QA/QC samples were conducted by GeoActiv.
The results of any audits or reviews of sampling techniques and data.	A Prep Facility (on Mannar Island) and lab audit at Scientific Services was conducted by Kobus Badenhorst and Bernhard Siebrits of GeoActiv.
Section 2	**Reporting of exploration results**
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 acquisition of the Mannar Island Project and all the exploration licences from Srinel Holdings Ltd by Titanium Sands Ltd (acquired 100% of the Srinel shares) was formally concluded and the Company re-instated to trading on the Australian Stock Exchange on the 18th of December 2018.
Exploration Done by Other Parties	
Acknowledgment and appraisal of exploration by other parties.	Work post 2015 was all conducted by Srinel staff, supervised by TSL (James Searle).
Geology	There is general consensus that the heavy minerals in Sri Lanka were derived from Precambrian (Proterozoic) high-grade metamorphic rocks that account for more than ninety percent of the island. These crystalline basement units are subdivided into 3 major litho-tectonic subdivisions, namely the Highland, Wanni and Vijayan Complexes.
Deposit type, geological setting and style of mineralisation.	The heavy minerals ilmenite, rutile, zircon, sillimanite and garnet commonly occur in the coastal sands. Mineralization is high in the tidal, beach and berm areas, with significant inland mineralization proven on Mannar Island.
Drill hole information	Drill hole information used in this resource update has previously been reported in full to the ASX including: • Drill hole identification, • Collar locations. • Dip, all holes vertical. • Down hole length and intercept depth • Hole length
Data Aggregation Methods	• Weighted averages of intercept length and grade were used. • No cut off grades were applied to drill hole data. • Cut off grades were only applied to the block model of the mineralised zone.
Relationship between mineralisation widths and intercept lengths	Mineralisation a horizontal blanket, drill holes all vertical.
Diagrams	Drill hole diagrams, and sections included with scale and locations.
Balanced reporting	All drill hole results reported
Other substantive exploration data	None

JORC Code Assessment Criteria	Comments
Further work	As stated, further drilling will target depth and lateral extensions to the modelled mineralisation.
Section 3	**Estimation and reporting of mineral resources**
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.*	The data was captured in Excel spread sheets. GeoActiv performed validation checks on all the data and analyses before it was used in modelling.
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.*	A GeoActiv geologist, Pardon Kanyezi, was on site during some of the drilling, also for the drilling of all twin QA/QC holes.
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.*	All the drill hole intersections with the THM above 1% were considered as the mineralization envelope from surface to the end of the auger holes. The domain boundaries of the mineral sand resource were extended to half the drill line spacings. The new floor wireframes were created from the end of auger hole depths for Domain 2 within Surpac. The aircore floor wireframes were created at the bottom of the last sampled interval, section by section in Domain 8 to create its floor below the auger floor wireframe. The current drill spacing provides sufficient degree of confidence in the interpretation and continuity of grade for a Mineral Resource.
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 updated Mineral Resource in Area 2 was divided into 2 Domains. The extents of the mineralization were within **Domain 2**: 9,500m x 1,400m x 2m, and within **Domain 8**: 7,700m x 1,400m x 9m.
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*	The block model with block sizes of 100m X 100m X 2m and minimum sub blocking of 25m X 25m X 0.5m of the previous update was used. Inverse distance to the power of 3 was used for *in situ* grade interpolation for all the variables in the domains. The general aspects of the estimation were as follows for all the estimated variables: • The variogram ranges of the THM%, Silt% and Oversize% were used for Domains 2 and 8; • For the magnetic separation (Yield%), XRF data and XRD garnet data, the variogram ranges of the THM% were used for Domains 2 and 8;

JORC Code Assessment Criteria	Comments
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. ulphur 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.*	• A minimum of 3 samples and a maximum of 15 samples were used for all inverse distance runs, except for the third pass when a minimum of 2 samples and a maximum of 15 samples were used; • Pass 1: search radii set to the ranges of the THM% for the major and 2m for the vertical for all the domains; • Pass 2: search radii set to 1.5x the ranges of the THM% for the major and 3m for the vertical for all the domains; • Pass 3: search radii set to 1000 m for the major and 10m for the vertical for all the domains; • Block discretisation was set to 4(X) by 4(Y) by 4(Z); • An octant search estimation method was used with the maximum of 3 adjacent empty octants in pass 1, a maximum of 5 adjacent empty octants in pass 2 and a maximum of 7 adjacent empty octants in pass 3; and • No sample limits per drill hole were applied. The mineral associations for ilmenite (ilm), leucoxene (leu), rutile (rut), zircon (zir) and garnet (gar) were calculated with an expression as a calculated attribute in the block model. The model was validated visually, statistically and with swath plots. The result of the validations shows that the interpolation has performed as expected and the model was a reasonable representation of the data used and the estimation method applied.
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 were based on dry basis, volume measurements converted to tonnes using a dry bulk density of 1.74 for Domain 2 and 1.75 for Domain 8.
Cut-off Parameters	
The basis of the adopted cut-off grade(s) or quality parameters applied.	The updated tabulated resources for Domains 2 and 8 are based on lower cut-off grades of 2% and 3% THM.
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.*	While the project is at a resource definition stage it is anticipated that it will be mined by dredge operations. The mineralisation has no overburden. The mineralisation at expected cut off grades has continuity along strike of 8 kilometers and cross strike widths of over 1km and as such boundary dilution by sub grade or barren material is expected to be negligible.

JORC Code Assessment Criteria	Comments
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.	The analytical results and mineralogical analyses could be the basis for the metallurgical extraction methods.
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.	GeoActiv has not investigated and was not aware of any environmental issues that would affect the eventual economic extraction of the deposit. A clay layer that was found in most of the holes during drilling was used as base of drilling as not to affect the water table.
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 (vugs, 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.*	The Relative Density (RD) or specific gravity was determined by digging pits of roughly 0.8m by 0.8m by 0.5m deep at 55 locations throughout the drilling area, then accurately weighing the sand and determining the volume of the holes by inserting and accurately measuring the volume of water inserted in the pits (after using a very thin lining in the pits). RD measurements of between 1.74 of 1.76 were calculated and used in different domain areas for the Mannar deposit.
Classification	

JORC Code Assessment Criteria	**Comments**
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.*	The resource classification was primarily based on the drill hole density and the variability of the data. The drill hole lines were previously generally 200m apart and the drill holes 50m apart on the drilling lines and with the infill drilling in Domains 2 and 8 the drill holes are now generally 100m by 100m on the infilled lines. This gave a good coverage of the areas to be able to upgrade the classification in Domain 2 and 8. The flagged blocks with the estimation passes 1 to 3 for the THM% and magnetic separation data (CI Yield%) were used together to classify the Mineral Resources to Indicated where the blocks were estimated with the 1st pass.
Audits or Reviews	
The results of any audits or reviews of Mineral Resource estimates.	No independent reviews of the Mineral Resource estimate have been conducted to date. An in-company review by James Searle has taken place.
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.*	This is a global resource with no production data.

15.0 CONCLUSION AND RECOMMENDATIONS

Based on the resource estimations reported in Table 17 and Table 18, the averaged mineral assemblage percentages for the valuable heavy minerals (VHM) are shown in Table 19 and Table 20 per domain and exploration licence. The VHM are expressed as a percentage of the THM.

Table 19. Mineral assemblage percentages of the VHM based on the resource estimation with a 2% lower THM cut-off.

		VHM Mineral Assemblage % of the THM				
Domain	**Licence**	**Ilm %**	**Leu %**	**Rut %**	**Zir %**	**Gar %**
2	EL180	36.7	6.3	1.6	1.6	14.1
	EL182	42.0	15.3	2.2	3.0	12.8
	EL327	47.4	8.8	1.5	2.2	14.6
	EL328	42.6	7.5	1.2	1.6	14.8
	EL351	46.6	12.6	1.8	2.0	14.2
	EL352	50.9	5.9	1.4	1.9	12.8
	EL370	38.2	14.8	2.0	2.8	13.9
	EL372	52.6	6.2	1.2	1.9	11.8
	Sub Total	**45.7**	**8.4**	**1.4**	**1.9**	**13.7**
8	EL180	46.3	5.1	1.8	2.2	9.9
	EL327	46.4	8.2	1.8	2.3	9.3
	EL328	44.2	6.7	1.5	2.1	10.3
	EL351	39.3	10.3	2.2	2.5	11.5
	EL352	49.6	5.3	1.6	2.4	10.9
	EL370	37.3	11.5	2.0	2.7	10.8
	EL372	51.2	6.8	1.5	2.4	10.7
	Sub Total	**44.4**	**7.6**	**1.8**	**2.4**	**10.6**
Grand Total		**45.1**	**8.0**	**1.6**	**2.2**	**12.1**

Table 20. Mineral assemblage percentages of the VHM based on the resource estimation with a 3% lower THM cut-off.

		VHM Mineral Assemblage % of the THM				
Domain	**Licence**	**Ilm %**	**Leu %**	**Rut %**	**Zir %**	**Gar %**
2	EL180	38.0	6.3	1.7	1.7	14.2
	EL182	42.7	15.3	2.2	3.0	12.8
	EL327	48.3	8.9	1.4	2.3	14.6
	EL328	44.3	7.6	1.3	1.6	14.5
	EL351	47.6	12.8	1.9	2.0	13.9
	EL352	51.2	5.9	1.3	1.8	12.6
	EL370	38.6	15.0	1.9	2.8	13.6
	EL372	52.5	6.2	1.3	1.9	11.9
	Sub Total	**46.7**	**8.5**	**1.5**	**2.0**	**13.5**
8	EL180	49.6	5.2	1.4	2.0	11.5
	EL327	47.5	8.4	1.7	2.5	9.4
	EL328	45.7	6.7	1.5	1.9	11.5
	EL351	37.1	10.8	2.2	2.6	13.2
	EL352	51.1	5.5	1.5	2.3	11.1
	EL370	36.9	12.2	2.1	2.7	10.9
	EL372	50.9	6.7	1.7	2.4	11.0
	Sub Total	**45.8**	**7.7**	**1.8**	**2.4**	**11.0**
Grand Total		**46.4**	**8.1**	**1.5**	**2.2**	**12.4**

The variances of the Oversize percentages are remarkably high in Domains 2 and 8. The relative high Oversize percentages influence the THM% and Silt% and can also increase their variances. QA\QC on the Oversize% was only with the twinned drill holes and that showed poor precision.

GeoActiv recommends the following:

1. To utilize a drilling technique during future exploration that allows significantly deeper penetration and accurate sample collection e.g., sonic drilling.
2. To conduct accurate sample splitting of the whole sample before sending splits to be able to include the Oversize% also in the QA\QC checks.
3. To quantify areas with human activities (predominantly fishing), settlements and infrastructures within the licence areas.

16.0 REFERENCES

JORC (2012), The JORC code. Australasian code for reporting of exploration results, mineral resources and ore reserves. 2012 edition. Joint Ore Reserves Committee Code.44 p.

Siebrits, B. and Badenhorst, K. (2015). The Mineral Resource Estimation on the Mannar Mineral Sands, Sri Lanka, GeoActive Report.

Siebrits, B. and Badenhorst, K. (2019a). Mineral Resource Update Estimation for Titanium Sands Ltd on the Mannar Mineral Sands Project, Sri Lanka, GeoActiv Report.

Siebrits, B. and Badenhorst, K. (2019b). The Mineral Resource Estimation of Bright Angel Ltd on the Mineral Sands Project, Sri Lanka, GeoActiv Report.

Siebrits, B. and Badenhorst, K. (2020a). The Mineral Resource Estimation Update 2 for Titanium Sands Ltd on the Mannar Mineral Sands Project, Sri Lanka.

Siebrits, B. and Badenhorst, K. (2020b). The Mineral Resource Estimation Update 3 for Titanium Sands Ltd on the Mannar Mineral Sands Project, Sri Lanka.