22 June 2021

Excellent Metallurgical Test Results on Cape Flattery Silica Sand

Highlights

- **Bulk sample metallurgical testing confirms high quality silica sand product**
- **The work demonstrated a low contaminant product with an attractive narrow particle size distribution can be produced at a high yield**
- **The test work produced a product with 99.8% SiO_2, 170ppm Fe_2O_3 and 450ppm Al_2O_3**
- **Work included successful test of process to reduce Fe_2O_3 from 170ppm to 70ppm Fe_2O_3**
- **Further metallurgical testing is planned to be undertaken to investigate further enhancement of the processed product**

Metallica Minerals Limited (**Metallica**, ASX: MLM) is pleased to announce that metallurgical testing of the 2 tonne bulk sample acquired from the December 2020 drilling program has produced a high quality silica sand product from its 100% owned Cape Flattery Silica Sand project (CFS).

Metallica Executive Chairman, Theo Psaros, said "these results demonstrate further the world-recognised qualities of Cape Flattery silica sand. To achieve such positive results having blended sand that had an SiO_2 level of greater than 98.5% also supports further work on white sand samples that will be sourced from our upcoming drilling program. These results will also allow us to engage further with potential offtake partners in Australia and throughout Asia."

The metallurgical testing was completed by IHC Robbins at their Brisbane laboratory.

Metallica Minerals' Cape Flattery metallurgical test work sample was derived from drill samples from within the resource envelope which had average silica content of greater than 98.5% SiO_2. Using gravity upgrading, magnetic separation and particle classification methods, typical to silica sands refining, a product was able to be produced containing **99.8% SiO_2, 450ppm Al_2O_3, 170ppm Fe_2O_3, 210ppm TiO_2 and 2.6% -125µm particles.** This product held a **mass yield of 77.4%.**

This is a relatively low contaminant product with an attractive narrow particle size distribution and a high to moderate yield.

Potential exists for Metallica to market products derived from earlier processing streams with higher yield and lower quality, such as the feed preparation sand or the spiral circuit product. Future marketing research is required to enable decision making on the value and of each potential product and the best product mix. The mass yield and product quality of each of these options are summarised as follows:

Potential Product Options	Mass Yield	Assay				
		SiO2	Al2O3	Fe2O3	TiO2	LOI 1000
	%	%	ppm	ppm	ppm	%
Feed Preparation Sand	97.6	99.7	715	760	1225	0.07
Spiral Circuit Product	84.0	99.9	500	240	260	0.10
UCC Product	77.4	99.8	450	170	210	0.05

Table 1 – Potential product options (UCC - Up-Current Classifier)

The bulk sample for the test work was comprised of drill samples from the December 2020 drilling program (see ASX release 2 March 2021: 38 Mt of High Purity Silica Sand Resource at Cape Flattery) and from within the Eastern resource area (see Figure 1 below).

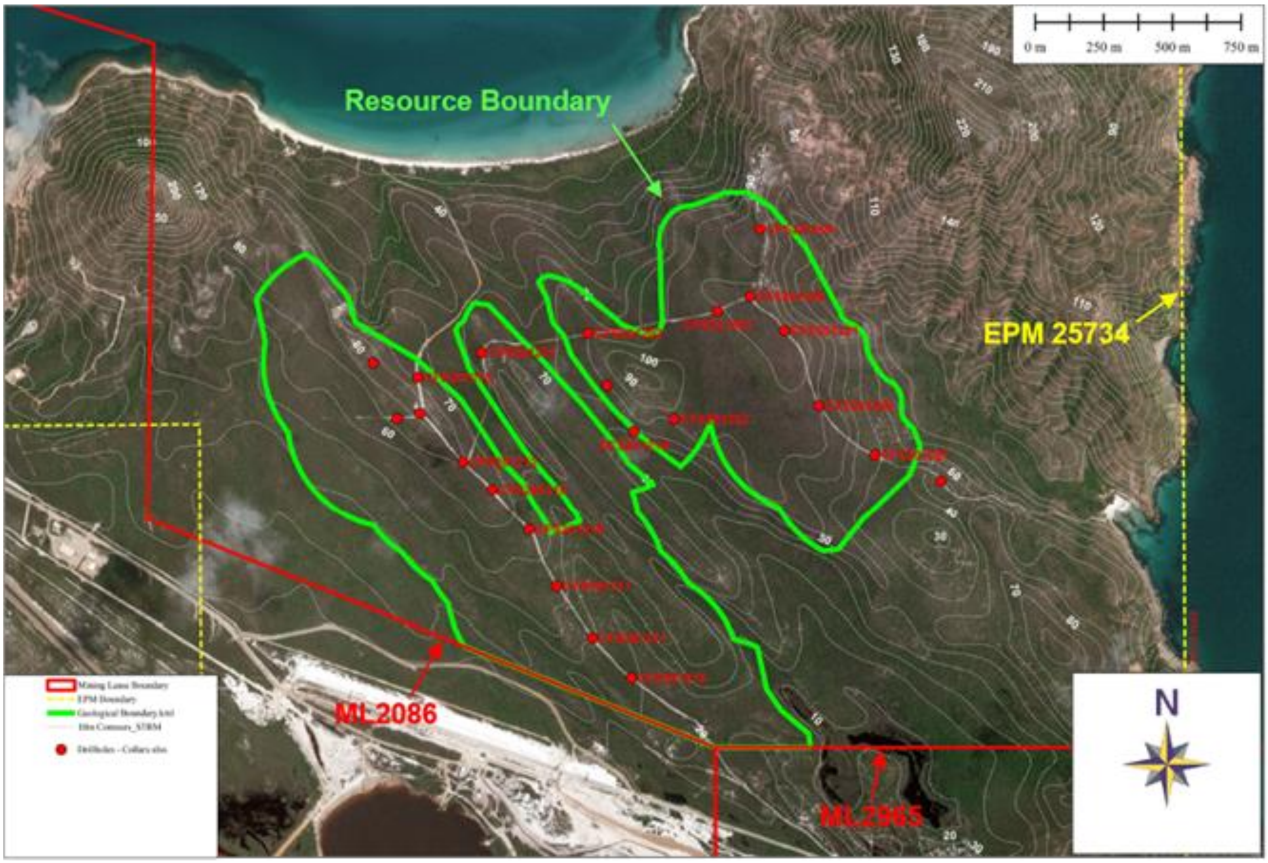


Figure 1. CFS Project - Eastern Resource Area - Surface Dune Boundary (green line)

Metallurgical testing process

The head feed sample was composed of 1.7% slimes and negligible oversize mass. The -2.0mm, +63µm sand fraction represented 98.2% of the as-received sample mass and assayed at:

- 99.7% SiO_2
- 800ppm Al_2O_3
- 885ppm Fe_2O_3
- 1290ppm TiO_2; and
- 0.07% organics (LOI 1000)

The material was screened and deslimed by a typical silica sands feed preparation process to remove +2.0mm particles, -63µm fines and organic content. Flocculent and coagulant was required to achieve an acceptable slimes settling rate and supernatant process water clarity.

Heavy minerals were effectively removed by a simple two-stage spiral separation circuit. The impact of mechanical particle attritioning was assessed and demonstrated evidence of improved product grade via the removal of iron-bearing surface coatings on the quartz grains. Magnetic separation successfully removed residual magnetic and paramagnetic particles, further improving product grade. Up-current classification was successful in selectively rejecting undesirable fine particles while maintaining a high mass yield.

The **final product** achieved a mass yield of 77.4% and assayed as follows (key specifications highlighted in the table below):

SiO2	Al2O3	Fe2O3	TiO2	Cr2O3	CaO	K2O	MgO	MnO	Na2O	P2O5	V2O5	ZrO2	LOI 1000
%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%
99.8	**450**	**170**	**210**	3	50	30	20	0	20	10	0	30	0.05

IHC Robbins also identified that other potentially lower quality saleable products could be taken from earlier process streams (less processing) at points that could result in a higher mass yield as follows:

Potential Product Options	**Mass Yield**	**Assay**			
		SiO2	**Al2O3**	**Fe2O3**	**TiO2**
	%	**%**	**ppm**	**ppm**	**Ppm**
Feed Preparation Sand	97.6	99.7	715	760	1225
Spiral Circuit Product	84.0	99.9	500	240	260

The metallurgical report recommended that further product grade scoping test work, optimisation and market investigations be completed to improve understanding of the number of potentially saleable products that could be produced and to aid in determining the optimum product mix.

UCC Lab Unit

UCC Overflow Port

UCC Products (Overflow left and Underflow right)

A block flow diagram "BFD" of the overall process is summarised in Figure 4 below.

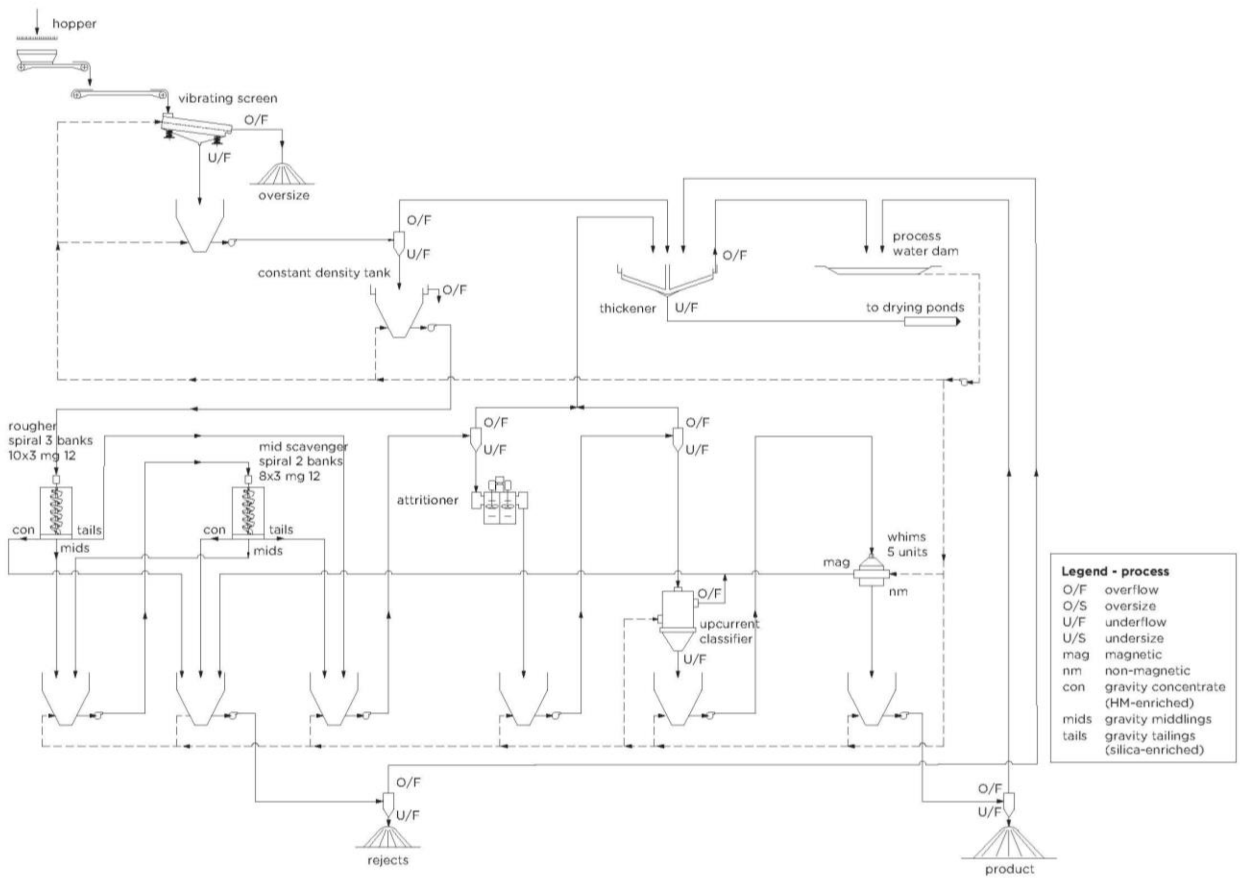


Figure 4 – block flow diagram "BFD" of the overall process

A summary metallurgical balance, based on outflow mass and Inductively Coupled Plasma (ICP) method assay data, is listed in Table 2 below.

Summary	Mass	Mass Yield	Assay					Approximate Distribution			
			SiO2	Al2O3	Fe2O3	TiO2	LOI 1000	SiO2	Al2O3	Fe2O3	TiO2
	tph	%	%	ppm	ppm	ppm	%	%	%	%	%
Feed Preparation Oversize	0.1	0.1						0.0	0.0	0.0	0.0
Feed Preparation Slimes	5.6	2.3						0.0	0.0	0.0	0.0
Spiral Concentrate	32.9	13.6	98.6	1884	3613	6318	0.10	13.9	38.3	71.6	78.5
Attritioning Slimes	2.3	1.0						0.0	0.0	0.0	0.0
WHIMS Mag	4.2	1.7	99.0	2380	3015	3400	0.09	1.8	6.1	7.6	5.4
UCC Fines	9.5	3.9	99.8	615	290	360	0.09	4.1	3.6	1.7	1.3
UCC Product	187.2	77.4	99.8	450	170	210	0.05	80.2	52.0	19.2	14.9
ROM	241.7	100.0	96.3	670	686	1094	0.06	100.0	100.0	100.0	100.0

As can be seen above, producing a final product via the as-developed process with a mass yield of 77.4% can result in a product grade of 99.8% SiO_2, 450ppm Al_2O_3, 170ppm Fe_2O_3, 210ppm TiO_2 and 0.05% LOI 1000. This process rejects approximately 50% of the Al_2O_3 content, 80% of the Fe_2O_3 content and 85% of the TiO_2 content, while only rejecting approximately 23% of the ROM feed mass.

Positive particle sizing

Another very pleasing result from the testing program in addition to the relatively low contaminant product is the attractive narrow particle size distribution that is demonstrated by the following.

Photomicrographs of the up-current classifier (UCC) underflow product, Figure 3 below, shows that very few discrete/liberated contaminant particles remain in the sample and that the quartz grains appear, by majority, free of surface coatings or inclusions.

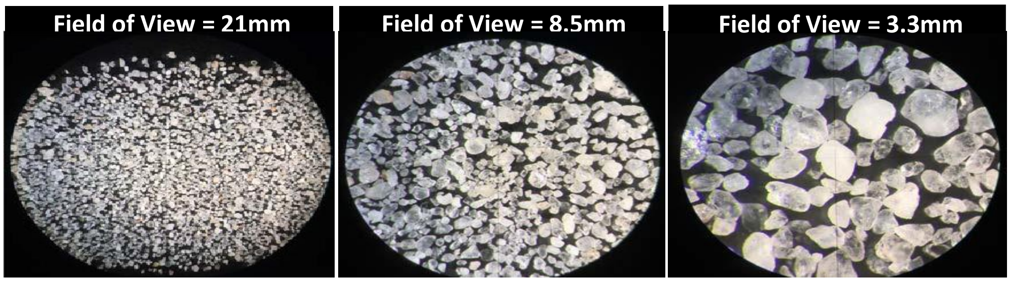


Figure 3 – UCC underflow product photomicrographs

The final product (UCC underflow) was a successful fines control point. As shown in Figure 5, the final silica product was left with 2.6% -125µm particles, correlating to a rejection of approximately 50% of the -125µm particles from the UCC feed, while only losing 2.5% of the +125µm particles from the UCC feed. Of note, the Retained UCC Silica Product in the table below highlights that only 5.7% of this product is outside the sizing range (retained UCC silica product totalling 94.3% highlighted in column 5 below).

Particle Size Distribution						
Sample:	**UCC O/F**			**UCC U/F (Silica Product)**		
Size	**Retained**	**Cum. Retained**	**Passing**	**Retained**	**Cum. Retained**	**Passing**
µm	**%**	**%**	**%**	**%**	**%**	**%**
1000	0.0	0.0	100.0	0.0	0.0	100.0
850	0.0	0.0	100.0	0.0	0.0	100.0
710	0.0	0.0	100.0	0.2	0.2	99.8
600	0.0	0.0	100.0	0.9	1.0	99.0
500	0.0	0.0	100.0	2.0	3.1	96.9
425	0.0	0.0	100.0	**4.7**	7.8	92.2
355	0.1	0.1	99.9	**8.4**	16.2	83.8
300	0.1	0.2	99.8	**10.3**	26.5	73.5
250	0.2	0.4	99.6	**16.0**	42.5	57.5
180	1.7	2.1	97.9	**29.4**	71.9	28.1
125	47.0	49.2	50.8	**25.5**	97.4	2.6
90	43.1	92.3	7.7	2.6	100.0	0.0
63	6.6	99.0	1.0	0.0	100.0	0.0
0	1.0	100.0	0.0	0.0	100.0	0.0
Total	100.0	-	-	100.0	-	-

P_{01} (µm)	<63	102
P_{50} (µm	124	230
P_{80} (µm)	157	334
P_{99} (µm)	224	603

Figure 5.1– Up-Current Classifier (UCC) product particle size distributions

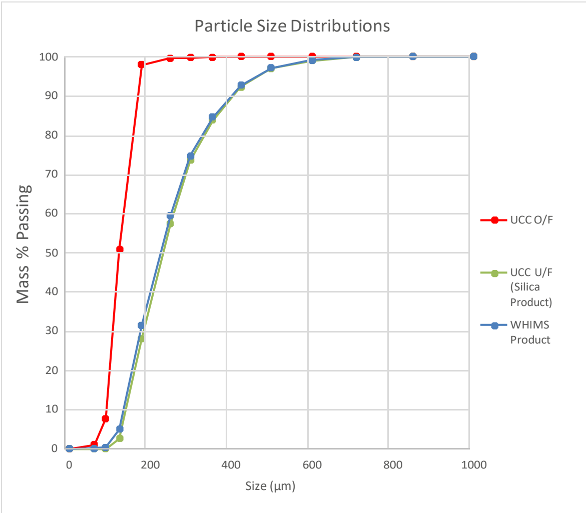
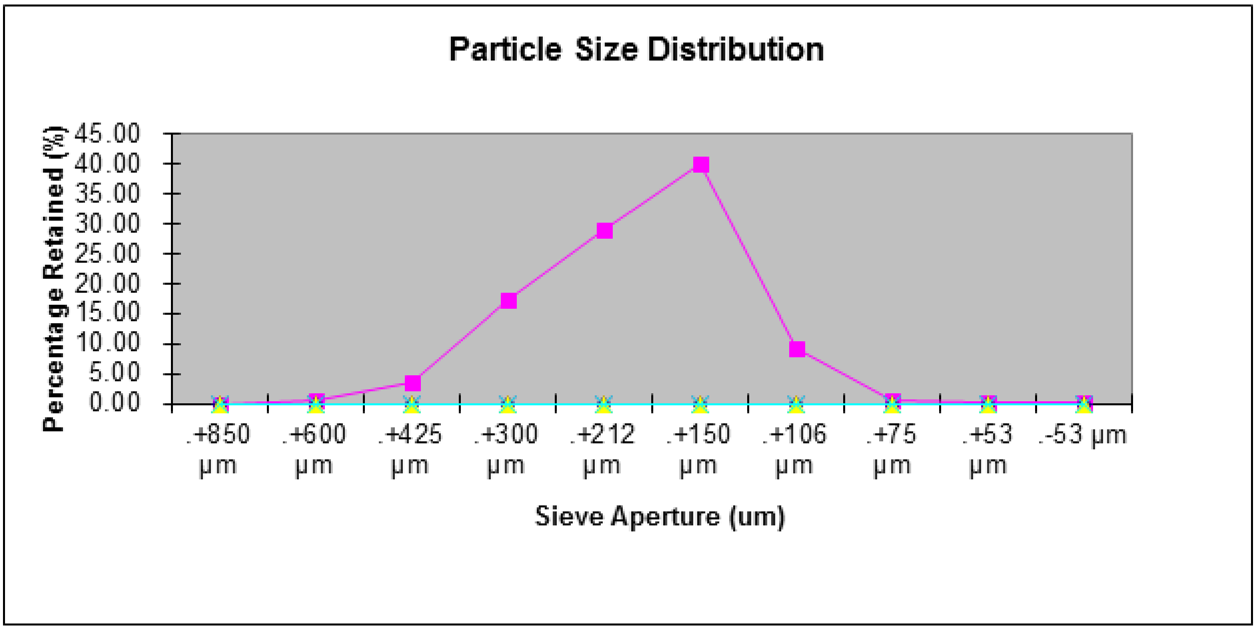


Figure 5.2– Up-Current Classifier (UCC) product particle size distributions

To place the above results in some perspective, Mitsubishi's Cape Flattery Silica Sand project promotes the following average quality specifications (Source: www.cfsm.com.au/product):



Further product upgrading

In addition to the metallurgical testing above, bench top testing was conducted to assess the potential to further improve or optimise the product quality once the product has been transported off site. This bench top testing achieved a significant reduction in Fe_2O_3 from 170ppm to 70ppm. These results indicate that further processing offsite can produce an exceptionally low-iron silica sand product.

Next phase of Metallurgical testing
The results of this metallurgical test work is planned to be incorporated in the Scoping Study which is currently underway.

It is planned to undertake further metallurgical test work on additional bulk samples to be sourced from the exploration drilling programme planned to commence in the 3rd quarter of 2021.

This announcement has been approved in accordance with the Company's published continuous disclosure policy and has been approved by the Board.

For further information, please contact:

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About the Cape Flattery Silica Sand (CFSS) Project
Metallica's 100% owned Cape Flattery Silica Sands (CFSS) project is adjacent to the world class Cape Flattery Silica Sand mining and shipping operation owned by Mitsubishi. Exploration drilling to date has now confirmed that the sand dunes within EPM 25734 contain high purity silica sands with an in-situ quality which is understood to be comparable to Mitsubishi's Cape Flattery Silica Mine.

On 2 March 2021, the Company released an upgraded resource in the CFSS Eastern Resource Area estimated and summarised in Table 1, as follows:

Classification	Silica Sand (Mt)	Silica Sand (Mm^3)	Density (t/m^3)	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	TiO_2 %	LOI %
Indicated Resource	5.4	3.4	1.6	99.1	0.04	0.09	0.13	0.13
Inferred Resource	32.9	20.5	1.6	99.0	0.07	0.12	0.15	0.11
Total	38.3	23.9	1.6	99.0	0.06	0.12	0.15	0.12

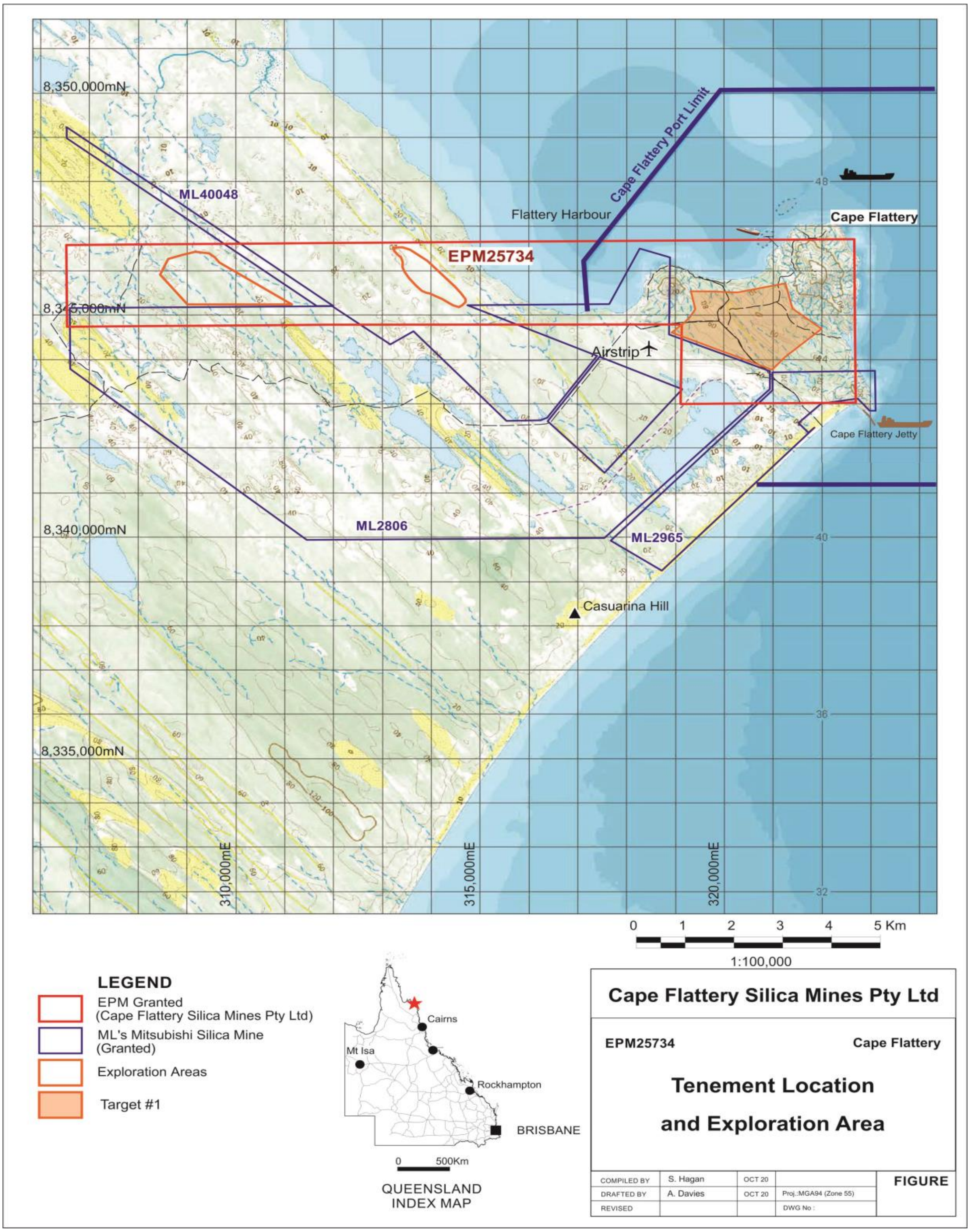
[1] **Table 1 – EASTERN RESOURCE Area Cape Flattery Silica Project**

For further details, see ASX Release on 2 March 2021 titled "38 Mt of High Purity Silica Sand Resource at Cape Flattery Silica Sands Project".

The Resource has been prepared in accordance with the JORC Code 2012 – A cut-off grade 98.5% has been defined based on the surrounding data. These results show there is good potential to produce a premium grade silica product using standard processing techniques.

According to industry research firm IMARC Group, high-purity silica sands are becoming more sought after, with the global market growing at a compound annual growth rate (CAGR) of around 6% between 2010 and 2017. In 2017, a total of 188 Mt of silica sand was produced globally.
This growth has been driven by silica sand's applications across a broad range of industries including glass-making, foundry casting, water filtration, chemicals and metals, hydraulic fracturing and an

increasing number of hi-tech products, including solar panels. For example, in the global glass-making industry, one of the major consumers of high-purity silica has experienced significant growth recently from the construction and automotive industries. IMARC also estimated the global silica sand market could grow from US$7 billion in 2019 to US$20 billion in 2024.



Competent Person Statements

The information in this announcement that relates to the Cape Flattery Silica Sand Project-Eastern Exploration Target and this Resource Estimation was based on results and data collected and complied by Mr Neil Mackenzie-Forbes, who is a Member of the Institute of Geoscientists and is a Consulting Geologist employed by Sebrof Projects Pty Ltd and engaged by Metallica Minerals Ltd. Mr Mackenzie-Forbes has more than 20 years mining and exploration experience in Australia with major mining and junior exploration companies. Mr Neil Mackenzie-Forbes consents to the inclusion of this information in the form and context in which it appears in this release/report.

The information in this announcement that relates to the Cape Flattery Silica Sand Project - Eastern Resource Area is based on information and modeling undertaken by Mr Chris Ainslie, Geotechnical Engineer, who is a full-time employee of Ausrocks Pty Ltd and a Member of the Australasian Institute of Mining & Metallurgy. The work was supervised by Mr Carl Morandy, Mining Engineer who is Managing Director of Ausrocks Pty Ltd and a Member of the Australasian Institute of Mining & Metallurgy and also by Mr Brice Mutton who is a Senior Associate Geologist for Ausrocks Pty Ltd. Mr Mutton is a Fellow of the Australasian Institute of Mining & Metallurgy and a Fellow of the Australian Institute of Geoscientists. Mr Morandy and Mr Ainslie and Mr Mutton are employed by Ausrocks Pty Ltd who have been engaged by Metallica Minerals Ltd to prepare this independent report, there is no conflict of interest between the parties. Mr Morandy, Mr Ainslie and Mr Mutton consent to the disclosure of information in the form and context in which it appears in this release/report.

The overall resource work for the Cape Flattery Silica Sand Project - Eastern Resource Area is based on the direction and supervision of Mr Mutton who has sufficient experience that is relevant to the style of mineralisation and type of deposits under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves".

The technical information in this report that relates to process metallurgy is based on information reviewed by Arno Kruger (MAusIMM) and work completed by IHC Mining. Mr Kruger is a metallurgical consultant and an employee of IHC Mining. Mr Kruger has sufficient experience that is relevant to the type of processing under consideration and to the activity being undertaken to qualify as a Competent Person as defined by the JORC Code 2012. Mr Kruger consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

Forward-looking statements

Forward-looking statements are based on assumptions regarding Metallica, business strategies, plans and objectives of the Company for future operations and development and the environment in which Metallica may operate.

Forward-looking statements are based on current views, expectations and beliefs as at the date they are expressed and which are subject to various risks and uncertainties. Actual results, performance or achievements of Metallica could be materially different from those expressed in, or implied by, these forward-looking statements. The forward-looking statements contained in this presentation are not guarantees or assurances of future performance and involve known and unknown risks, uncertainties and other factors, many of which are beyond the control of Metallica, which may cause the actual results, performance or achievements of Metallica to differ materially from those expressed or implied by the forward-looking statements. For example, the factors that are likely to affect the results of Metallica include general economic conditions in Australia and globally; ability for Metallica to funds its activities; exchange rates; production levels or rates; demand for Metallica's products, competition in the markets in which Metallica does and will operate; and the inherent regulatory risks in the businesses of Metallica. Given these uncertainties, readers are cautioned to not place undue reliance on such forward-looking statements.

JORC Code, 2012 Edition – Table 1 Report

EASTERN RESOURCE AREA – CAPE FLATTERY SILICA PROJECT

Resource Upgrade – Indicated & Inferred. 2021

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg 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 (eg '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 (eg submarine nodules) may warrant disclosure of detailed information.*	• Drilling samples ranging from 0.5 to 1.0m down hole intervals of vacuum drill rig cuttings collected from a cyclone. 100% of sample was collected with a mass of 2-3kg. • A 0.5 to 1.0 kg "spear" of the sample is collected for geochemical analysis. The balance is retained for possible metallurgical analysis. • Sample was submitted to commercial laboratory for drying, splitting (if required), pulverization in tungsten carbide bowl, and XRF analysis. • Sampling techniques are mineral sands "industry standard" for dry beach sands with low levels of induration and slime. • As the targeted mineralization is silica sand, geological logging of the drill material is a primary method for identifying mineralisation. • Metallurgical samples are composited intervals of white and cream sands logged in drilling with collection of the entire volume of air-core drill cuttings from the cyclone/hand auger samples into large plastic samples bags.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg 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).*	• The drilling technique used was vacuum, which was undertaken by Yearlong Contractors using a tractor mounted drill rig. The drill bit diameter was 48mm equivalent to NQ sample size. • Holes were terminated in a clayey sand layer or when the water table

Criteria	JORC Code explanation	Commentary
		was intersected, and wet sand affected sampling.
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.*	• Visual assessment and logging of sample recovery and sample quality. • Vacuum drilling is low disturbance and low impact minimising drill hole wall impact and contamination. • Sample is collected in cyclone which has clear Perspex casing allowing visual inspection of sample. • Regular cleaning of cyclone and drill rods was utilised to prevent sample contamination. • No sample bias occurred between sample recovery and grade.
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.*	• Geological logging of the total hole by field geologist, with retention of sample in chip trays to allow subsequent re-interpretation of data if required. • The total hole is logged in 1m intervals; logging includes qualitative descriptions of colour, grain size, sorting, induration and estimates of HM, slimes and oversize utilising panning. • Logging has been captured through field drill log sheets and transferred through to an excel spreadsheet with daily update of field database and regular update of master database.
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*	• Drilling samples are 'speared' on site (Approximately 20% subsample drilling), resulting in approximately 0.5 – 1kg of dry sample. • Where bulk sample is collected, sampling is done by "spear" to the 100% recovered sample. • Sample size is considered appropriate for the grain size of material, average grain size (87% material by weight between 0.125mm and 0.5mm). • Bulk sample (~2 tonnes) for metallurgical process development test work was derived from selected drill core samples representing a >98% SiO_2. Selected samples were mixed/homogenised and a

Criteria	JORC Code explanation	Commentary
	duplicate/second-half sampling. • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	representative head sample removed for characterisation by grid sampling, drying and splitting by riffle splitter.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• Drilling samples were submitted to ALS Townsville, where they were dried, weighed and split. • Analysis was undertaken by ALS Brisbane utilising a Tungsten Carbide pulverization, ME-XRF26 (whole rock by Fusion/XRF) and ME-GRA05 (H_2O/LOI by TGA furnace). • Samples were assayed primarily for SiO_2, Fe_2O_3, Al_2O_3 and TiO_2 and a range of other elements. • Analysis undertaken determined by a sample code which correlates to drill logs to ensure no sample bias. • Metallurgical samples have submitted to IHC Robbins for characterization testwork (screening, de-sliming, sizing, HLS and XRF analysis) and wet-tabling (two stage).
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.*	• Significant intersections validated against geological logging and local geology/ geological model. • As this is the first phase of drilling, no holes have been twinned. • All data captured and stored in both hard copy and electronic format. • No assay data had to be adjusted.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• All holes initially located using handheld GPS with an accuracy of 5m for X, Y. • UTM coordinates, Zone 55L, GDA94 datum. • Topographic surface generated from processing STRM data.
Data	• *Data spacing for reporting of Exploration Results.*	• Drilling was completed on existing tracks lines holes were spaced

Criteria	JORC Code explanation	Commentary
spacing and distribution	• *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.*	approximately 200 meters apart. • Drill spacing, and distribution is sufficient to allow valid interpretation of geological and grade continuity for an Inferred Mineral Resource and potentially an Indicated Mineral Resource where specified.
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.*	• The dune field has ridges dominantly trending 320º - 330°. • The drill access tracks typically run along or sub-parallel to dune ridges which suggest unbiased sampling, some cross-dune tracks linking the ridges were also drilled. • Silica deposition occurs as windblown with angle of rest approximately 35º. Drilling orientation is appropriate for the nature of deposition.
Sample security	• *The measures taken to ensure sample security.*	• Sample collection and transport from the field was undertaken by company Personnel following company procedures. • Samples were aggregated into larger polyweave bags and sealed with plastic zip ties, Bags were labelled and put into palette-crates and sealed prior to being shipped to ALS Townsville. • Samples were delivered direct to ALS in Townsville.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• A review was conducted internally by Metallica Minerals Ltd and third-party consultants Ausrocks Pty Ltd. And they were found to be consistent.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The Cape Flattery Silica Sands Project occurs within EPM 25734 in Queensland and is held by Metallica Minerals Ltd through subsidiary company Cape Flattery Silica Pty Ltd. • The tenement is in good standing. • A compensation and conduct agreement is in place with the landholder (Hopevale Congress) and native title party.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Previous exploration has been carried out in the area during the 1970's and 80s by Cape Flattery Silica Mines (CFSM). CFSM reported seven (7) holes drilled for 84 meters. These holes intersected sand dunes between 10 and 20 meters in thickness. • The historical exploration data is of limited use since but never assayed for SiO_2 and there is poor survey control to determine exact locations of historical holes.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The geology comprises variably re-worked aeolian sand dune deposits associated with Quaternary age sand-dune complex. • Mineralisation occurs within aeolian dune sands.

Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*
	  ○ *easting and northing of the drill hole collar*
	  ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*
	  ○ *dip and azimuth of the hole*
	  ○ *down hole length and interception depth*
		• A tabulation of the material drill holes is attached to this JORC Table 1, as required by the Table 1.

Criteria	JORC Code explanation	Commentary
	○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Downhole compositing of samples using weighed averages of Silica content and interval length to determine floor and ceiling of material that exceeded 98.5% SiO_2 content. • No minimum or maximum grade truncations have been used.
Relationship between mineralisation on widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• As the mineralisation is associated with aeolian dune sands the majority sub-horizontal, some variability will be apparent on dune edges and faces.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• A plan showing drill collar locations is provided relative to the EPM is incorporated in the main body of the resource report. • Drill hole collar locations are located on diagrams showing topographical overlay, regional geology, and relevant tenure boundaries. • Cross-sections have been generated and have been included in the Resource report.

Criteria	JORC Code explanation	Commentary
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• All relevant exploration assay results have been reported.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Geological observations are consistent with aeolian dune mineralisation. • Groundwater was intersected during drilling at the base of holes, as expected given the dune complex is an aquifer and drilling was undertaken to considerable depth. • The mineralisation is unconsolidated sand. • IHC Robbins are tasked to complete a bulk laboratory sample to determine viability of product through a one stage of Mineral Technologies MG12 spiral, • There are no known deleterious substances. • 554 SiO_2 assays were completed on downhole composites over various drilling programs. • Metallurgical test work completed on a 2 tonne bulk sample confirmed material to be amenable to typical silica sand process methodologies, producing a potential silica sand product containing 99.8% SiO_2, 170ppm Fe_2O_3, 210ppm TiO2 and low levels of other contaminants. Yield into this potential silica sand product is calculated at 77.4%.
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• The next stage of exploration drilling will require the establishment of drill tracks to allow drilling at closer spacing across the observable dune field to confirm sand quality and continuity. • Further metallurgical test work evaluating potential additional processing stages and methodologies to reduce the Fe_2O_3 is currently being managed by IHC Robbins. • Process confirmation and optimisation test work using full-scale or scale-able equipment to be completed as part of the next phase of development.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• The database was validated through Micromine 2021, which was used to complete the resource modeling. Micromine 2021 requires 3 files to create a drill hole database which are the (Collar, Survey and Interval File) these files cross-reference the data to ensure there are no errors in the database prior to modeling.
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 site visit was completed by the Competent Person (B Mutton) 13th -18th Dec 2021 during the drilling program. The visit enabled an appraisal of the dune geology and setting.
Geological interpretatio n	• *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.*	• The target mineral deposit is clean white to cream aeolian sands which are readily determined from drilling. The depth of these sands varies depending on their location to the dune profile but range from several metres up to +20m in thickness. These sands progressively and at times sharply pass vertically into coloured sands (orange-brown-red) of the "B" horizon. Similarly, the coloured sands ranged in thickness up to 38m. Holes were terminated mainly when damp clays and water was intersected (refusal). • In several places thin interburdens (several metres) of coloured sand interrupted the white-cream sands. Their occurrence and continuity require further drill definition. • The interpretation is considered robust to any alternative interpretations for a Mineral Resource estimation.
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 Resource is approximately 2,200m long by and averages 800m wide covering a surface area of approx. 240 hectares. The clean white -cream high silica grade sands extend up to 27m below surface. • The resource boundary is constrained by the regional

Criteria	JORC Code explanation	Commentary
		geology to the north, existing Mining Leases to the South and by the extent of the reconnaissance level of drill holes.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	• All resource modelling was completed in Micromine 2021. • Due to the relatively low number of drill holes and assayed samples Kriging was not deemed appropriate and Inverse Distance Weighting (IDW) was used to populate the block model. • Blocks of 50m (L) x 50m (W) x1m (H) with sub blocks 2m (L) x 2m (W) x 1m (H) were used to generate the block model. All sub-blocks have the same interpolated values as their parent blocks. • A search ellipse was used in Micromine 2021 based on the geometry of the sand dunes. • The block model was populated using IDW, with each block being assigned a value for Al_2O_3, Fe_2O_3, SiO_2 and TiO_2 • The block model was constrained to the base of white-cream sands and the base of the soil/humus surface layer (0.3m below topography). • Assayed values that were used for resource estimation underwent statistical analysis for basic statistics (min, max, range), variance.co-variance, Q-Q Plots and histograms for all assayed variables. All variables showed there were no requirements for top or bottom cutting. • The block model was validated by comparing basic statistics and histograms of modelled data (block model) against the input data (drilling data) which showed similar means, range of data and data distribution. Additionally, cross-section throughout the block model were compared with the same sections through the drillhole data showing that the modelling completed was indicative of the input data and the mineralisation.

Criteria	JORC Code explanation	Commentary
		• Grade cutting or capping was not applicable as no SiO_2 values exceeded 100%.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• All samples were placed into bags and sealed so samples would be received with slightly less than in-situ moisture.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• A cut-off grade of 98.5% SiO_2 was used based on sample statistics.
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.*	• The size of the resource would be suited to mining the deposit as a bulk commodity however no specifics have been factored into this resource estimate.
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 resource is assessed as high-grade silica sand. • No metallurgical factors have been included or deemed required at this stage of the resource estimation.
Environmen-tal 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.*	• Environmental considerations were made by referencing overlays as provided by the Queensland Government including Category A, B & C Environmentally sensitive areas as well as wetland areas.
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.*	• Nineteen density measures have been completed over the wider resource area in Feb 2021 returning an average density of 1.6 t/m^3 which has been used to convert all

Criteria	JORC Code explanation	Commentary
	• *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.*	volumes to tonnes.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie 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.*	• Sufficient drilling supports and increased and upgraded total resource estimation for the project, from the maiden resource estimate based on shallow auger holes. Closer spaced drilling (in two separate clusters) has enabled two areas to be classified as Indicated Resource, the remained staying as Inferred. It expected the Inferred category can be readily upgraded upon the completion of a semi- grided drill program that adequately tests the wider dune profiles. • The result appropriately reflects the Competent Persons view of the deposit.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• All calculations have been reviewed internally by Ausrocks.
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.*	• It is the opinion of the Competent Person that the relative accuracy and confidence level across the reported geological intervals is adequate, given the drill density and the continuity of geochemical samples. • No production data is available at present as this is a Greenfields Project. However, Cape Flattery Silica Mines lies directly to the south of the resource area, suggesting potential viability.