EXCEPTIONAL METALLURGICAL TEST RESULTS AT BEHARRA DELIVER GAME CHANGING IMPURITY LEVELS

ASX RELEASE

22nd April 2021

ASX: PEC

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Highlights

- *Continuing testing of white sand horizon at Beharra delivers game changing Iron Oxide (Fe_2O_3) impurity level of 120ppm with an increase in SiO_2 content to 99.8%[1].*
- *These results[1] represent a significant improvement in overall product specifications when compared to levels reported in the recent Pre-Feasibility Study[2] (PFS):*
  - *SiO_2 increase of 0.2% from 99.6% to 99.8%*
  - *Fe_2O_3 reduction of 57% from 276ppm to 120ppm*
  - *Al_2O_3 reduction of 49% from 1,789ppm to 920ppm*
- *Confirmation of these results are likely to catapult Beharra product into a higher pricing segment of the APAC silica sand markets[1].*
- *Potential exists to seek sales of lightly processed yellow sand into domestic or export construction markets.*
- *Comprehensive Feasibility Study-level drilling program planning now underway to selectively develop a white sand mining scenario for Beharra, which has potential to radically improve the economics delivered under the recent PFS.*
- *Drill program and follow-on Feasibility Study-level bulk metallurgical testing program expected to commence imminently.*
- *Offtake discussion anticipated to significantly widen into higher end producers and markets.*

[1] Subject to confirmatory test work in an upcoming bulk sample metallurgical testing program
[2] All references to "Pre-Feasibility Study" or "PFS" in this announcement refer to the Beharra Pre-Feasibility Study that was released to ASX on 17th March 2021, titled "Maiden Ore Reserve and Outstanding Beharra PFS Result Update"

Perpetual Resources Limited (**ASX: PEC**, "PEC" or "the Company") is pleased to announce the game changing metallurgical test results received from the testing of the white sand horizon at Beharra[1]. Test results received reflect the use of a simplified flow sheet (detailed in Figure 5 below), that, while indicative of what may be achieved using scalable equipment and normal production processes, is required to be confirmed through a detailed bulk sample metallurgical program, the planning of which has now commenced.

Test results have confirmed that processing of the Beharra white sand horizon achieved an end product that contained 99.8% SiO_2 with an exceptionally low impurity profile of 120ppm Fe_2O_3 and 920ppm Al_2O_3 (for a detailed discussion as to the differences in flow sheet utilised, please see the section below titled "Details of the White Sand Testing Program Undertaken"). While an extremely high processing yield of 95% was also reported, Perpetual expects a scalable production scenario to lead to lower yields, albeit it is expected they will be materially higher than the 74% that was reported in the recent PFS test work.

These results represent a substantial increase in overall product quality when compared to the PFS results, with 0.2% higher SiO_2 content and, even more importantly, extremely large reductions in the key impurities, with a reduction of 57% in Fe_2O_3 and a reduction of 49% in Al_2O_3 (see graphical representation in Figure 1 below)[1]. These results demonstrate that the white sand horizon at Beharra can produce a very low impurity end product using simple gravity and magnetic separation techniques, with confirmation as to the end product quality that is achievable under a scalable production scenario now to be tested to a Feasibility Study-level with planning for a drilling and metallurgical program currently underway.

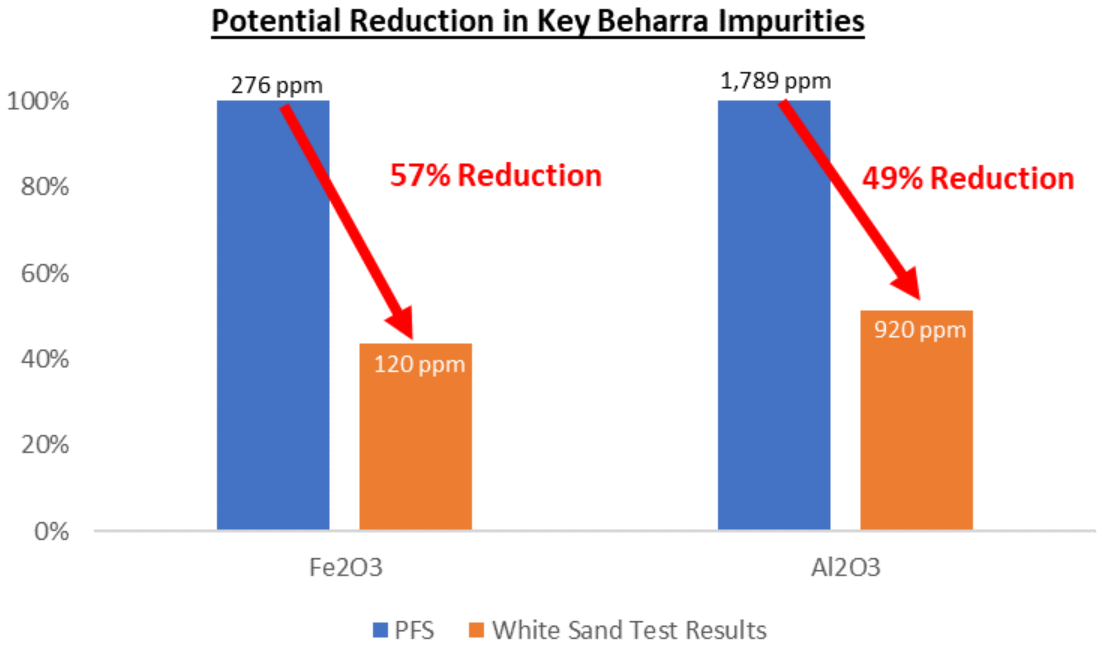

Figure 1 – Reduction in key Beharra silica sand impurities[1]

Perpetual's Executive Chairman, Mr Julian Babarczy, provided the following commentary, "We initially acquired the Beharra project with the geological theory that it contained a pervasive and high purity white sand horizon. Our recent PFS study demonstrated a highly economic and compelling project if we were to mine and process both the white and yellow sand horizons together. These results today suggest that Beharra has clear potential to be a genuine Tier 1 project and we are now considering a development scenario that undertakes selective mining and processing of the white sand horizon that has now been shown to achieve impurity levels that could underpin even higher revenue per ton figures than were contemplated in the recent PFS. We will now launch straight into a drilling and bulk metallurgical program conducted at Feasibility Study-level, which we expect will demonstrate that the PFS numbers we recently reported can be materially enhanced".

Beharra White Sand Endowment

On 9th March 2021, Perpetual announced an updated Mineral Resource Estimate (MRE), prepared by Snowden Mining Consultants, which upgraded the previously Inferred MRE to Indicated status. As shown in Figure 2 below, the Beharra MRE contains >90% white sand, which is overlain by a modest sequence of yellow sand of varying thickness (see Figure 3 underneath).

Sand	Volume (Mm^3)	Density	Tonnes (Mt)	SiO_2	Al_2O_3	TiO_2	Fe_2O_3	LOI
Yellow	8.1	1.64	13.2	98.2	0.50	0.23	0.23	0.51
White	76.7	1.64	125.8	98.6	0.41	0.36	0.23	0.21
Total	**84.8**	**1.64**	**139.0**	**98.6**	**0.42**	**0.35**	**0.23**	**0.24**

Figure 2 – Beharra Indicated Mineral Resource prepared by Snowden (March 2021)

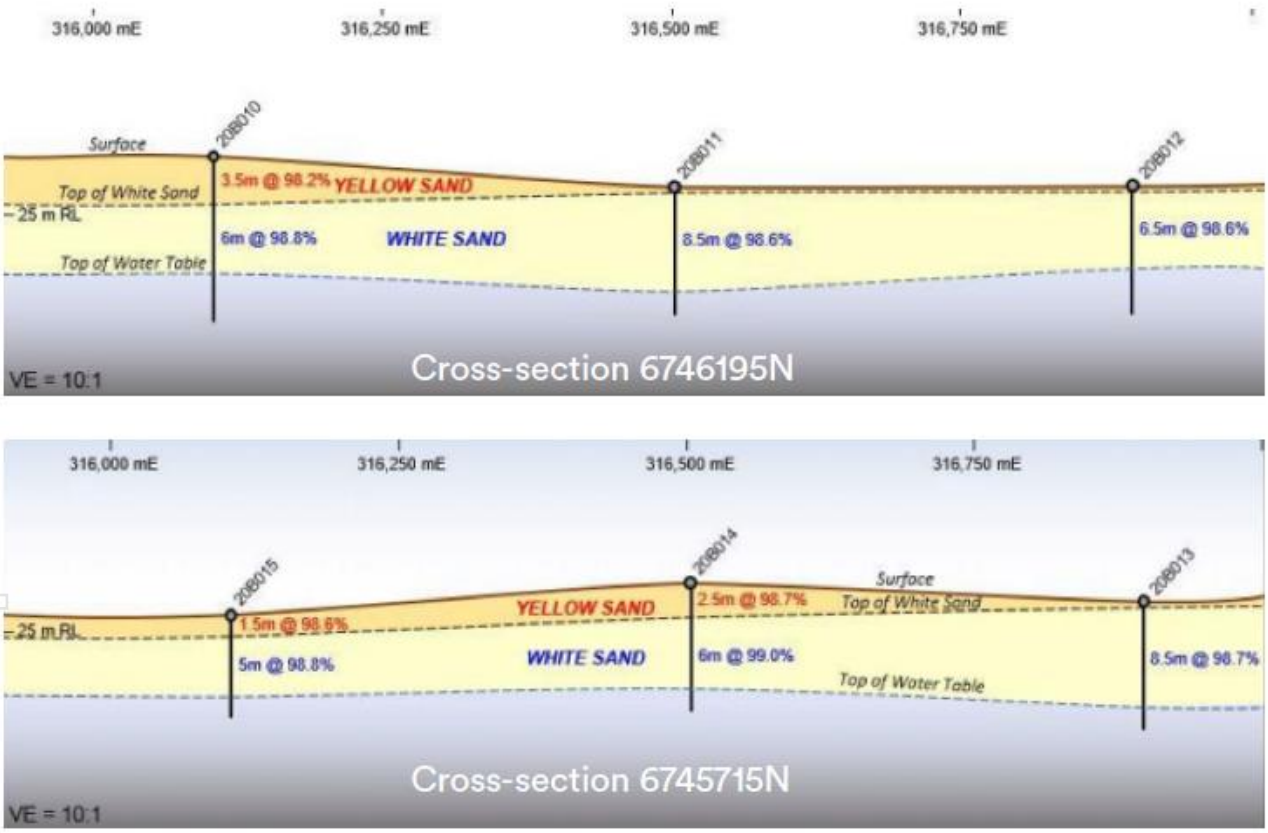

Figure 3 – Cross sections of the Beharra orebody showing orientation of white sand sequence overlain by yellow sand sequence.

The ability for Perpetual to selectively mine the white sand sequence is considered extremely high, due to the simple geology and also the strong visual break that exists between the yellow and white sand horizons (as can be seen in Figure 4 below).

Figure 4 - >12m intersection of white sand separated into 1m intervals from the September 2020 Beharra drill program.

Details of the White Sand Testing Program Undertaken

Perpetual reported the results of its Beharra bulk sample metallurgical test results on 29th January 2021, which were utilised in the recent Beharra PFS and which undertook testing on a two-ton bulk sample prepared by comingling of the white and yellow sand from previous Beharra drill holes. In ongoing efforts to optimise the Beharra project, Perpetual recently initiated a testing program based on white sand samples only, with the belief that the white sands would exhibit a purer (lower impurity) result due to the likely lower impurity profile in-situ.

In-situ white sand samples were sent to IHC Robbins, which undertook a testing flow sheet configuration as detailed in Figure 5 below. The flow sheet consisted of a vibrating screen, magnetic separation stage, attritioning and then heavy liquid separation. This was considered the most indicative testing flow sheet to enable an interim view on the potential for impurity removal, with the exceptional result of 120ppm Fe_2O_3 now confirmed.

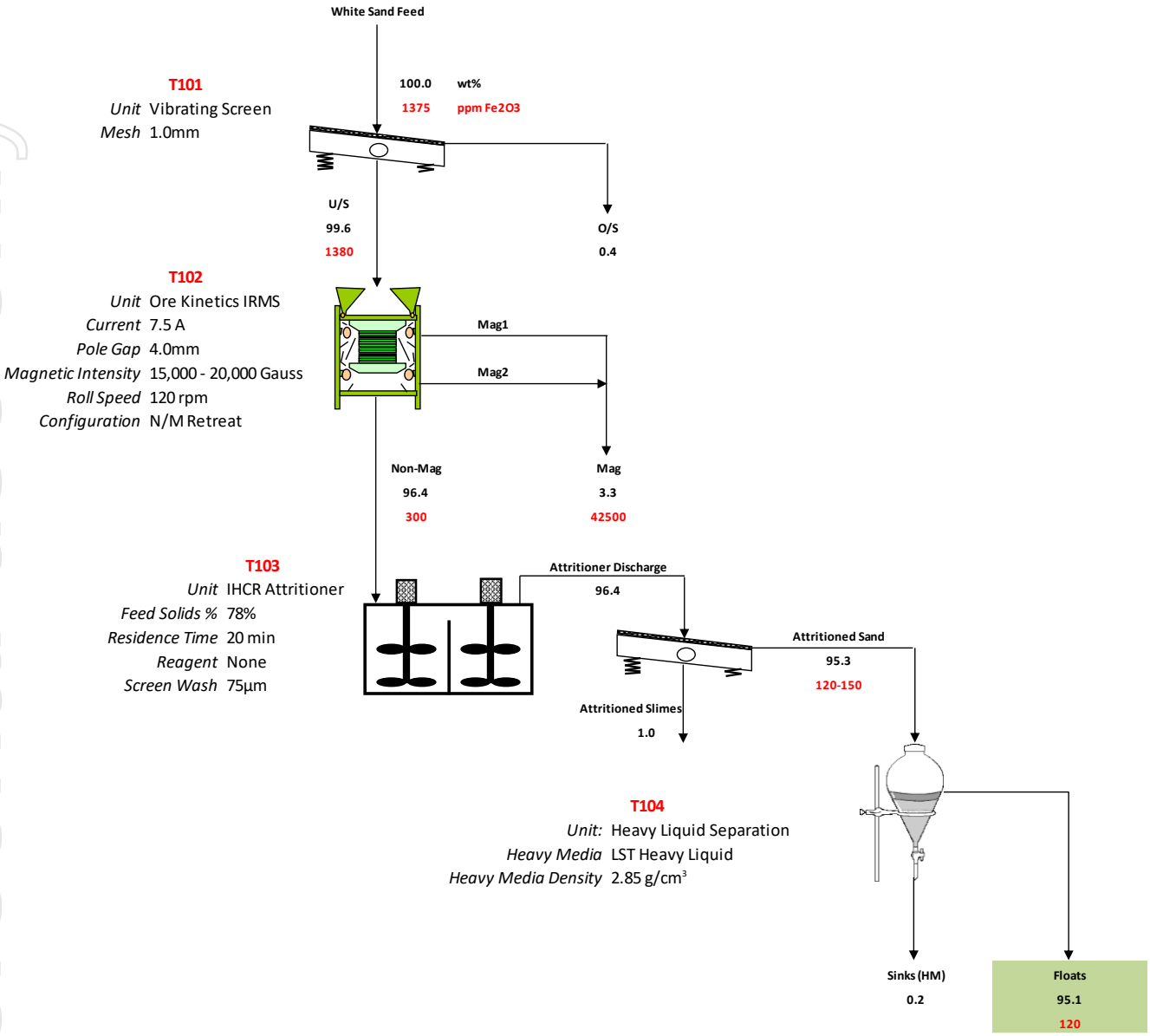

Figure 5 – Metallurgical testing flow sheet undertaken on white sand samples by IHC Robbins.

The main differences between the PFS flow sheet and the white sand only testing program that was undertaken were;

- The sample of white sands was collected was from a single location and only from the upper 0.5 to 2.0mof the orebody.
- White sand only test results utilised lab-scale equipment as opposed to scalable production equipment (which has potential to produce impurity levels that are lower than achievable under a scalable production scenario)

- Magnetic intensity utilised in the white sand only test results was 15,000 – 20,000 gauss, compared with 12,500 in the PFS flow sheet (which has potential to produce impurity levels that are lower than achievable under a scalable production scenario)
- Heavy liquids separation typically achieves near perfect particle separation, as opposed to scalable production equipment that typically achieves less (which has potential to produce impurity levels that are lower than achievable under a scalable production scenario)
- The feed used for the white sand testing result was not subject to a 150µm pre-screen (which has potential to produce impurity levels that are higher than achievable under a scalable production scenario due to the higher iron, titanium and aluminium content residing in the finer particles of the Beharra orebody)

These results are exceptionally encouraging and show that the Beharra orebody can produce a very low impurity product using simple gravity and magnetic separation techniques[1].

The next stage of test work (detailed later in this announcement) aims to replicate these initial results using the full PFS study flow sheet (with potential for minor modifications and enhancements) as detailed in Figure 8, and Perpetual is excited to complete this upcoming testing program due to the potential large positive implications on the value of the Beharra project.

Implications of White Sand Test Results

As detailed in the recent Beharra PFS, there is a clear pricing uplift between silica sand that can achieve >99.5% SiO_2 and improvements in the key impurity of Fe_2O_3. The Beharra PFS modelled a US$50 per ton (A$67 per ton) sales price, which was based on previous testing that showed Beharra silica sand could achieve <300ppm Fe_2O_3 as well as independent market intelligence from IMARC Group that verified various pricing points for silica sand in the APAC region (see Figure 6 below), in addition to ongoing direct discussions with potential off takers and end users in the APAC region.

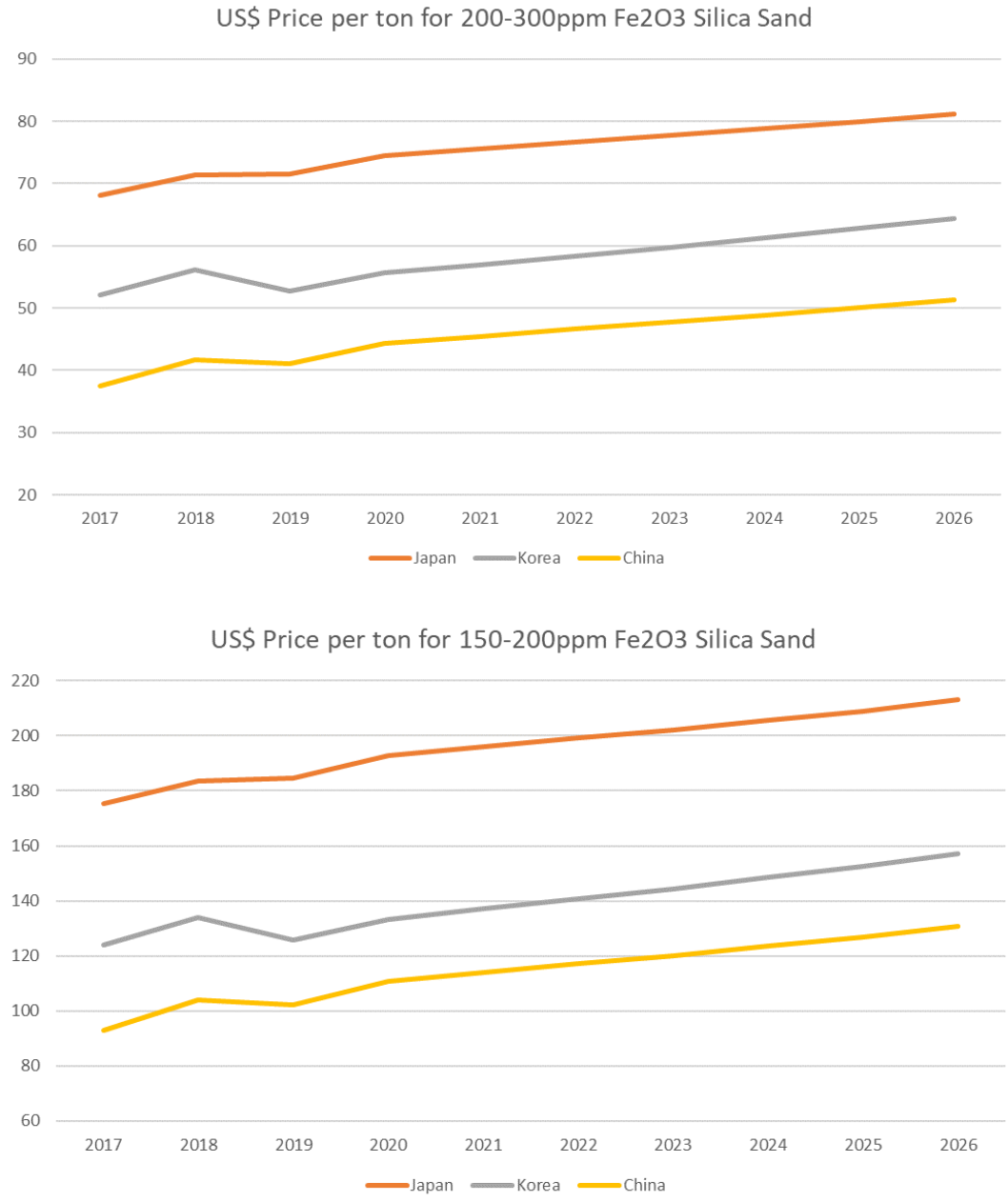

Figure 6 – Silica Sand (min. 99.5% SiO_2) pricing in APAC Markets at varying Fe_2O_3 impurity levels

Source: IMARC Group, Report Title: "Asia Pacific Silica Sand Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026", Report Date: February 2021

The results released today, in conjunction with data detailed in Figure 6 above from IMARC Group, suggest Beharra silica sand may compete in a much higher pricing bracket that previously expected[1].

Follow Up Feasibility Study Drilling and Metallurgical Program

Perpetual has commenced planning for a follow up drilling and metallurgical testing program, which will underpin and guide efforts for the next phase of project studies at Beharra. It is proposed to commence an air core drilling program over an area representing the first ten years of the planned mining area at Beharra, which are represented by mining panels 3 and 4 as detailed in the recent Beharra PFS report as released to the ASX on March 17th 2021 and shown in Figure 7 below.

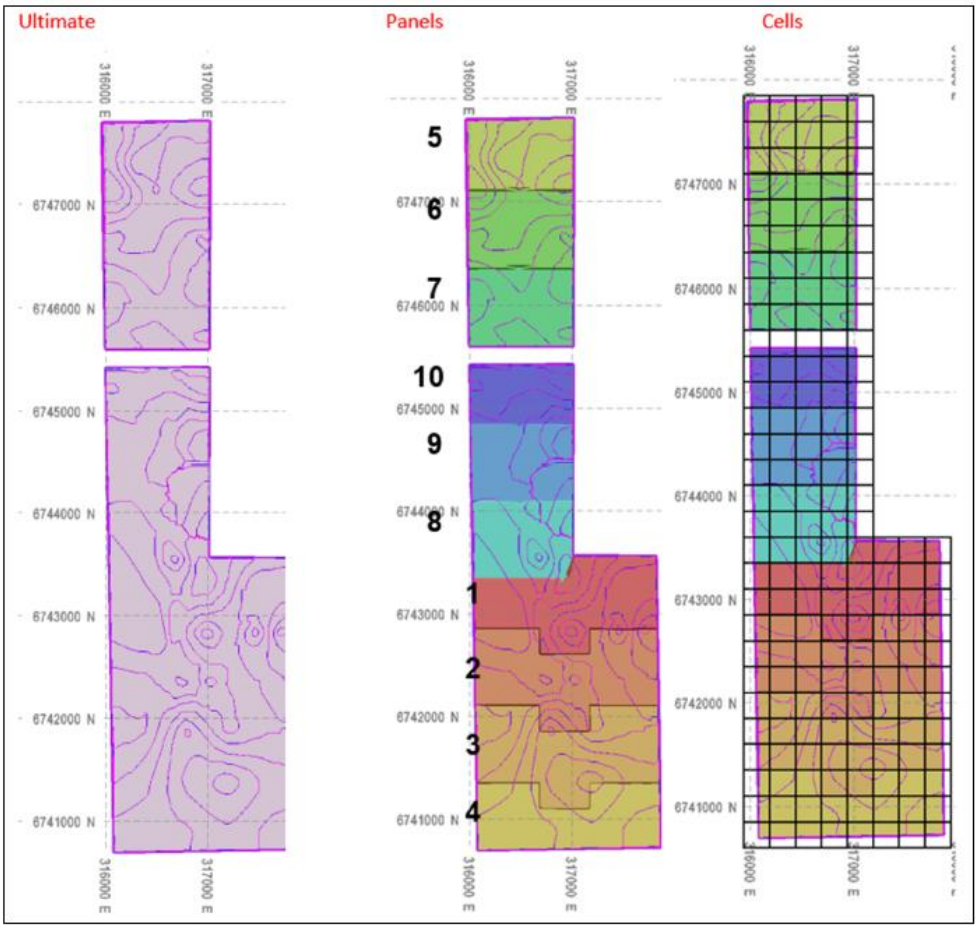

Figure 7 – Schematic of the Beharra mining area showing location of individual mining panels.

The drill samples to be recovered from mining panels 3 and 4 from the proposed air core program will then be subject to a rigorous metallurgical program, which will provide even greater certainty of the ultimate metallurgical characteristics of the Beharra orebody under the scenario of a selective mining and processing of the white sand horizon.

The drilling program is anticipated to be commenced in May 2021, with drilling contractor and rig selection already underway. The drill program should take approximately 2 weeks to complete, including mobilisation and demobilisation efforts.

Samples will then be sent to IHC Robins in Brisbane for full metallurgical evaluation, based on the previously defined flow sheet that formed part of the Beharra PFS study (shown below in Figure 8), with subsequent test work expected to further refine the likely processing flow sheet for use in the subsequent Beharra project study, enhancing the estimation of process plant capital and operating costs.

Other goals of the metallurgical test work include determination of high purity silica sand final product specifications that will be utilised for ongoing marketing efforts of the Beharra end product.

This metallurgical testing program is expected to take 6-8 weeks to complete with results expected to be announced by the end of July 2021.

IHC Robbins was responsible for all metallurgical test work undertaken as part of the recent Beharra PFS study and are a globally renowned minerals testing group with specific expertise in mineral sands and other sand based mineral testing.

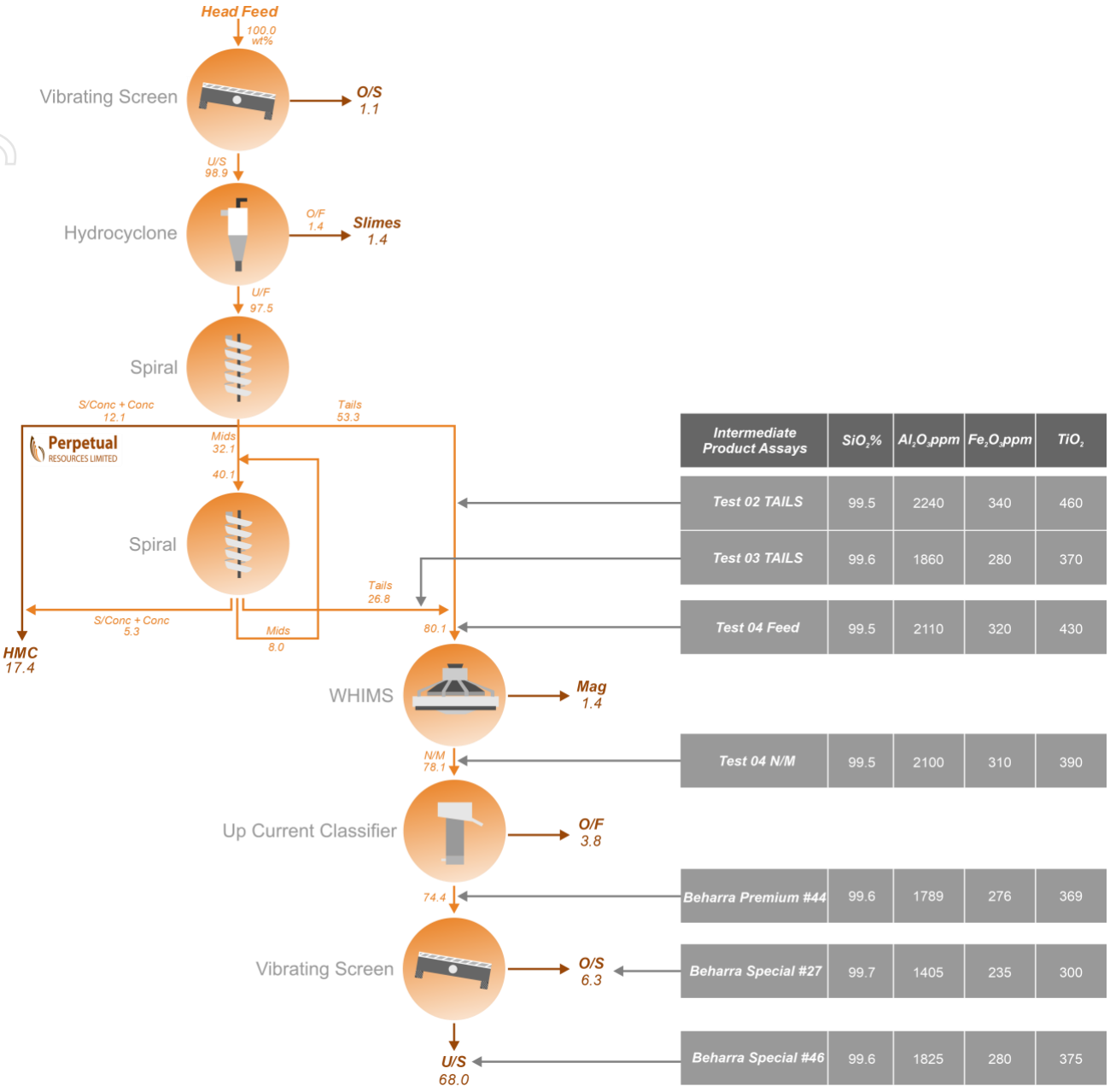

Figure 8 – Processing flow sheet developed by IHC Robbins from the recent Beharra PFS.

Implications on Offtake Discussions

Perpetual expects the test results achieved and reported today to have a material impact on its current offtake discussions and efforts. The confirmation that Beharra silica sand can achieve sub 150ppm Fe_2O_3 impurity levels with simple gravity and magnetic separation techniques is considered a game changer[1], with a significant increase in interest for Beharra product likely. Perpetual aims to update the market in coming months on its offtake discussions and efforts.

Yellow Sand Potential

As detailed in Figures 2 and 3, the Beharra Indicated MRE also contains a significant volume of yellow sand. Under a scenario where a white sand only mining and processing operation is pursued, this leaves potential for the yellow sand horizon to be targeted for sale into domestic and export construction markets. Perpetual also intends to undertake separate test work on the yellow sand horizon with a view to determining whether a simple organic screen and wash can generate a sand product that can be economically sold into various domestic and export markets.

About Perpetual Resources Limited:

Perpetual Resources Limited (Perpetual) is a focussed explorer of silica sands, aiming to produce high purity silica and construction sands for domestic and international markets.

Perpetual's flagship asset, the Beharra Project is located 300km north of Perth and is 96km south of the port town of Geraldton in Western Australia. Access to the Project from Geraldton (to the north) and Perth (to the South) is via the sealed Brand Highway, thence the Mt Adams unsealed road providing access to the centre of the tenure.

Mt Adams Road which Intersects the Beharra Tenement

Brand Highway Proximal to Beharra

The port of Geraldton is utilised as a bulk material handling facility and is currently utilised for the export of bulk materials, minerals and concentrates. Grains, copper concentrates, zinc concentrates, nickel concentrates, mineral sands, talc, and iron ore are currently being exported from the port. Extensive heavy mineral sands mining occurs to the south of the Project area, lime sands mining to the west and natural gas production to the south of the Project.

The Beharra Project comprises of a single exploration licence, E70/5221, covering an effective land area of 56.8km^2. Auger and air core drilling has confirmed the presence of extensive, high purity silica sands, with a maiden Mineral Resource Estimate completed in July 2020. A detailed Pre-Feasibility Study and Maiden Ore Reserve for Beharra was released to the ASX on March 17th, 2021.

Silica Sands Market

Silica sands have an extensive range of uses including lower purity and grade applications such as construction sand, proppant sand used in well fracturing, and foundry sand. With increasing purity (>99.5% SiO_2) uses includes glass making including clear glass. Uses for purity >99.8% includes semi-conductor fillers, LCD screens, and optical glass.

This announcement has been approved for release by the Board of Perpetual.

-ENDS-

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Forward-looking statements

Certain statements contained in this document may be 'forward-looking' and may include, amongst other things, statements regarding production targets, economic analysis, resource trends, pricing, recovery costs, and capital expenditure. These 'forward–looking' statements are necessarily based upon a number of estimates and assumptions that, while considered reasonable by Perpetual, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies and involve known and unknown risks and uncertainties that could cause actual events or results to differ materially from estimated or anticipated events or results reflected in such forward-looking statements.

Forward-looking statements are often, but not always, identified by the use of words such as 'believe', 'expect', 'anticipate', 'indicate', 'target', 'plan', 'intends', 'budget', 'estimate', 'may', 'will', 'schedule' and others of similar nature.

Perpetual does not undertake any obligation to update forward-looking statements even if circumstances or management's estimates or opinions should change. Investors should not place undue reliance on forward-looking statements as they are not a guarantee of future performance.

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COMPETENT PERSONS STATEMENTS

The scientific and technical information in this report that relates to process metallurgy is based on information reviewed and work completed by Arno Kruger (MAusIMM), who is a metallurgical consultant and employee of IHC Robbins. The metallurgical factors including process flowsheet design and costs and assumptions for the bulk aircore sample that relate to Mineral Resources have been reviewed and accepted by Mr Kruger. 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.

The information in this report that relates to the January 2021 bulk sample and the March 2020 Exploration information for the Beharra Project is based on information compiled and fairly represented by Mr Colin Ross Hastings, who is a Member of the Australasian Institute of Mining and Metallurgy and consultant to Perpetual Resources Limited. Mr Hastings is also a shareholder of Perpetual Resources Limited. Mr Hastings has sufficient experience relevant to the style of mineralisation and type of deposit under consideration, and to the activity which he has undertaken, to qualify as a Competent Person as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Hastings consents to the inclusion in this report of the matters based on this information in the form and context in which it appears.

PEC confirms in the subsequent public report that all the material assumptions underpinning the production target, or the forecast financial information derived from a production target, in the initial public report referred to in rule 5.16 or rule 5.17 (as the case may be) continue to apply and have not materially changed.

JORC CODE (2012) TABLE 1 REPORTING (SECTIONS 1, 2, 3, and 4)

Section 1: Sampling Techniques and data

Criteria	JORC Code explanation	Commentary
Sampling techniques	Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling. Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.	Aircore drilling and sampling referred to in this report occurred in two separate programs: March 2020 and September 2020. March 2020: Aircore samples were collected via a cyclone, the entire sample for each 1 m drill interval was collected and placed in a calico sample bag. No splitting on the rig was undertaken. The sample was labelled with the drillhole number and sample interval, and a waterproof tag nominating a sample number was placed in the bag and then sealed with a tie. September 2020: Aircore samples were collected via a cyclone, the entire sample for each 1 m drill interval was collected and placed in a calico sample bag, labelled with the drillhole number and sample interval, and weighed by a spring balance. A 1 kg split was taken by spear and placed in a smaller calico bag, labelled with a sample number. Aircore samples were collected from each metre drilled or part metre if the hole was not ended on a full metre. For the September program, separate samples were taken for 0–0.5 m and for 0.5–1 m. Only the latter had a 1 kg split taken from it. Representative samples of each interval drilled were placed in a chip tray for reference. Auger drilling and sampling referred to in this report and reported previously were obtained from hand auguring to a maximum depth of 2 m. Three auger samples were collected from each hole being surface to 0.5 m, 0.5–1.0 m, and 1.0–2.0 m. The top metre of the hole was split into two samples to allow a separate sample of the top 0.5 m that contains organic matter associated with native ground cover. If sand mining operations were to be carried out, this top 0.5 m would be stockpiled for future rehabilitation, so at this time treating it separately is appropriate. The shallow auger program was carried out to obtain representative sand samples to a maximum depth of 2 m for the reasons as described in the Company release of 12 February 2019. A single bulk white sample and a single bulk yellow sand sample were collected by hand excavation of pits that including sample recovery by multiple hand auger

Criteria	JORC Code explanation	Commentary
		samples within the pit and by hand shovel. The samples were taken over an interval of 1.5m to a maximum depth of 2m below surface with the surface layer to 0.5m excluded. The sample mass taken from each pit was approximately 300kg. These samples were taken in January 2021.
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).	March 2020: A total of 32 aircore drillholes were completed to an average depth of 12.3 m, with the deepest hole ending at 17 m. September 2020 aircore drilling was undertaken using a track mounted KL170 hydraulic top drive rig coupled to a 250 psi compressor. An 84 mm vacuum bit was fitted to a 76 mm outside diameter twin tube rod string. The internal diameter was 51 mm. All holes were drilled vertically. March 2020: A total of 40 aircore drillholes were completed for an average depth of 12.7 m, with the deepest hole ending at 20 m. March 2020 aircore drilling was undertaken using a track mounted Hitachi hydraulic top drive rig coupled to a 130 cfm/100 psi compressor. A 76 mm aircore bit was fitted to 70 mm twin tube rod string. All holes were drilled vertically. Auger drilling consisted of a manually hand operated 75 mm diameter sand auger (Dormer Sand Auger) with PVC casing utilised to reduce contamination potential as the auger is withdrawn from the hole. The auger was driven about 300 mm then retracted and the sample was placed in a UV resistant plastic bag and this continued until the sample interval was completed. The sample was labelled with the drillhole number and sample interval, then placed in a second plastic bag and sealed and removed from site for logging and sample preparation.
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.	March 2020: Aircore – each sample bag was weighed to determine the actual sample recovery, which resulted in an average sample weight of approximately 7.5 kg/m of sample. September 2020: Aircore – each sample bag was weighed to determine the actual sample recovery, which resulted in an average sample weight of approximately 4 kg/m of sample. March 2020: Aircore sampling was typically terminated on reaching the water table, which occurred around 10–12 m below surface level. September 2020: Aircore sampling was typically terminated 2 m below the water table. Hole depths ranged from 9 m to 17 m. The cyclones were cleaned regularly to ensure maximum and representative recovery.

Criteria	JORC Code explanation	Commentary
		For auger sampling, each sample bag was weighed to determine the actual sample recovery, which resulted in an average sample weight of 7.5 kg/m of sample. The type of sand auger used provided a clean sample with less possibility of contamination compared to a flight auger.
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.	The samples have been sufficiently logged including estimates of grain size, sorting and texture, and colour. Particular attention has been taken to ensure a more scientific and less subjective approach to colour has been adopted because colour (white to grey shades, and pale yellow shades) is one of the targeting features. Chip tray samples for each hole were photographed.
Subsampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken. If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry. For all sample types, the nature, quality and appropriateness of the sample preparation technique. Quality control procedures adopted for all subsampling stages to maximise representivity of samples. Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling. Whether sample sizes are appropriate to the grain size of the material being sampled.	Aircore samples were transported to Welshpool in Perth and locked in a secure storage shed. March 2020: Further check logging was undertaken, and representative subsamples were taken for duplicate analysis. Subsampling was carried out by spearing the samples selected and collecting approximately 400 g of sample. The duplicates have been utilised at the rate of 1:20. September 2020: Duplicate 1 kg subsamples were taken in a ratio of 1:18 at site. Blanks were generated from a publicly available washed sand product and taken by spearing a 20-bulk sample: March 2020 approx.400 g samples; September 2020 approx. 1 kg samples. The blanks have been utilised at the rate of 1:20 in March and 1:18 in September. March 2020: The prepared subsamples (duplicates and blanks) plus all the bulk drill samples were submitted to Nagrom Metallurgical Analytical Laboratories located in Kelmscott in Western Perth for drying, further splitting, and pulverisation in a zircon bowl. A subsample of 100 g with a P90 -75 µm particle size was utilised for analysis. September 2020: The 1 kg subsamples, including duplicates and blanks, were submitted to Intertek Genalysis analytical laboratory located in Maddington in Western Perth for drying, splitting to 100 g for pulverisation to a P90 -75 µm particle size in a zircon bowl. Auger samples were submitted to Intertek Laboratory in Maddington for drying, splitting, pulverisation in a zircon bowl. A subsample of 200 g with a 75 µm particle size is utilised for analysis.

Criteria	JORC Code explanation	Commentary
		Allowance was made for duplication by drilling a twin auger hole located within 1 m of each other. Three twin holes were drilled representing 8% duplicate sample. The sample preparation methods are considered industry standard for silica sands. Records were kept describing whether the samples were submitted wet or dry. The laboratory sample size taken is appropriate for the sand being targeted.
Quality of assay data and laboratory tests	The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total. For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc. Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	March 2020: All the aircore samples prepared by Nagrom were analysed at the same facility. The assay method for multi-element analysis consisted of prepared samples fused in a lithium borate flux with lithium nitrate additive then analysed by XRF (test method XRF001). LOI was also carried out on each sample out at 1,000°C (test method TGA002). Auger samples were submitted to the Intertek Laboratory in Maddington, Perth, Western Australia. The assay method for multi-element analysis consisted of four-acid digest including hydrofluoric, nitric, perchloric and hydrochloric acids in Teflon beakers with inductively coupled plasma (ICP)-optical (atomic) emission spectrometry finish. Silica is reported by difference. March 2020: Inter-laboratory checking was carried out by submitting 28 prepared representative pulps (umpire samples) to the Intertek Laboratory located in Maddington. The samples were analysed by two methods, XRF (test method FB1/XRF20) and ICP-optical (atomic) emission spectrometry (test method 4ABSi/OE901). Samples for ICP analysis consisted of a four-acid digest including hydrofluoric, nitric, perchloric and hydrochloric acids in Teflon beakers. Silica is reported by difference. March 2020: The same 28 samples analysed by Intertek were also analysed by ICP at Nagrom' s laboratory. For analysis of Al_2O_3 and SiO_2 the samples were fused with sodium peroxide and digested in dilute hydrochloric acid and then analysed by ICP (test method ICP005). All other elements were determined by ICP after dissolution in an acid mixture (test method ICP003). March 2020: Final analyses of the aircore samples were carried out at Intertek's laboratory using four-acid digest followed by ICP determination. The samples used consisted of pulps that were prepared by Nagrom. September 2020: Intertek's analysis method for silica sands analysis consisted of four-acid digestion followed by silica sands 17-element ICP/OE analysis plus LOI at 1,000°C with SiO_2 reported by difference. September 2020: Inter-laboratory umpire analysis was carried out by submitting 20 pulps, and 20 non-pulverised portions of the same samples, from Intertek

Criteria	JORC Code explanation	Commentary
		Genalysis to the Bureau Veritas laboratory located in Canning Vale, Perth. The samples were analysed by mixed acid digest (MA100) followed by 17 elements by ICP-OES (MA101) and LOI (TG001). Silica was reported by difference. The extensive analysis by different laboratories and different methods are industry standard procedures and methods producing high level of confidence on the results produced. The ICP method is considered industry standard for reporting sand grades. No geophysical tools were utilised for the process.
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.	March 2020: There were no twin aircore holes. Twin holes were completed for three out of the 38 auger holes. September 2020: One of the September aircore holes was twinned; two of the March 2020 aircore holes were twinned. All drilling and sampling procedures were monitored on site by an independent geologist on a hole-by-hole basis. All primary information was initially captured in a written log on site by a geologist, data entered, imported then validated and stored in a geological database. March 2020: Additional check logging was carried by an independent geologist in Perth prior to samples being submitted to Nagrom for analysis. No adjustments to assay data have been performed. External review of umpire samples reported by Intertek and Bureau Veritas was carried out.
Location of data points	Accuracy and quality of surveys used to locate drillholes (collar and downhole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. Specification of the grid system used. Quality and adequacy of topographic control.	The position of the aircore hole locations was determined by a Trimble R6 RTK global positioning system (GPS) in RTK mode. The survey was carried out by Heyhoe Surveys from Geraldton. Accuracy of 0.05 m relative to SSM Dongara 49. The position of the auger hole locations was determined by a GPS model Garmin GPS Map 64s with an accuracy of 5 m. The CRS used was GDA94/MGA Zone 50 (ex SSM DON49). The topography at the project site currently under exploration is flat to gentle undulating terrain. Site survey (Heyhoe Surveys) have produced a ± 50 cm DTM across the entire project area. The January 2021 white and yellow bulk samples were taken adjacent (within 1m) of existing September 2020 aircore drill holes being yellow sand adjacent to hole 20B009, and white sand adjacent to hole 20B011. These hole locations were determined by a Trimble R6 RTK global positioning system (GPS) in RTK mode.

Criteria	JORC Code explanation	Commentary
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 aircore drillholes were spaced on an approx. 350–600 m (east west) x 480 m along strike (north-south) grid. The auger drillholes were spaced on an approx. 400 m (east-west) x 800 m (north-south) grid. The adopted spacing at this time is sufficient based on the geological continuity of the sand formation being tested, and sufficient to be applied in Mineral Resource estimation. No sample compositing of holes has been applied.
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 orientation utilised for the aircore drilling campaign represents the entire strike length of the aeolian dune within the initial prospective target area and as such is not expected to introduce any particular bias.
Sample security	The measures taken to ensure sample security.	All samples have been bagged and removed from site and are under the care of the contract senior geologist and field sampling supervisor. March 2020: Aircore samples initially stored a secure facility in Welshpool where sample reconciliation was undertaken before delivery to Nagrom Laboratory. March 2020: Aircore samples were delivered to Nagrom in Kelmscott. The laboratory carried out a sample reconciliation which was audited against the sample submission sheet. September 2020: Aircore samples and returned samples and pulps from Intertek Genalysis are in the Welshpool facility along with chip trays from both the March and September drill programs. Auger samples were delivered to Intertek Maddington. The laboratory provided a sample reconciliation report which was audited against the sample submission sheet. Bulk pit samples were placed in a sealed bulker bag for shipment from site to the laboratory.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	Guidance was provided by an independent consultant, Andrew Scogings, on sampling lengths and hole spacings who carried out a site visit to inspect the drilling and sampling operations.

Section 2: Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and	Type, reference name/number, location and ownership including agreements or material	Miscellaneous licence L70/219 comprises an effective land area of 10.36 km^2 and was granted

Criteria	JORC Code explanation	Commentary
land tenure status	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.	on 18 November 2020 for a period of 21 years. The holder is Perpetual Resources Limited. A 1% vendor royalty applies minerals sold from the Licence. The licence area exploration is covered by Crown Land. No impediments on a licence to operate at time of reporting.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Past exploration by others targeting heavy mineral sands. Refer to ASX release dated 6 February 2019, historical exploration.
Geology	Deposit type, geological setting and style of mineralisation.	Unconsolidated Quaternary coastal sediments, part of the Perth Basin. Aeolian quartz sand dunes overlying Pleistocene limestones and paleo-coastline.
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 drillholes: • easting and northing of the drillhole collar • elevation or RL (Reduced Level – elevation above sea level in metres) of the drillhole collar • dip and azimuth of the hole • downhole length and interception depth • hole length. If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	Exploration Results are not being reported here; however, drillhole information can be found in ASX release dated 1 April 2020 and 7 December 2020. White bulk test pit sample labelled 20B011-MET was located at 316,504mE, 6,746,194mN, and yellow bulk pit sample was labelled 20B009-MET located at 316,101mE and 6,746,673mN
Data aggregation methods	In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated. Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. The assumptions used for any reporting of metal equivalent values should be clearly stated.	Single bulk samples of white and yellow sands had no aggregation applied..
Relationship between mineralisation widths and	These relationships are particularly important in the reporting of Exploration Results.	Bulk samples confined to established previously defined (by drilling) white and yellow horizons.

Criteria	JORC Code explanation	Commentary
intercept lengths	If the geometry of the mineralisation with respect to the drillhole angle is known, its nature should be reported. If it is not known and only the downhole lengths are reported, there should be a clear statement to this effect (e.g. 'downhole length, true width not known').	
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 drillhole collar locations and appropriate sectional views.	Refer to figures incorporated in the body of the report.
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.	Exploration Results are not being reported, however bulk pit sample grades of white and yellow sands over the interval sampled are in line with previous assays obtained from adjacent aircore hole samples .
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.	Groundwater was intersected in all holes that exceeded 10 m depth. Water table generally occurred between 10 m and 12 m. Average in situ density (dry) determined to be 1.64 t/m^3 from six sites. Density locations were hand excavated to 0.4 m deep. The Instrument used was an Instrotek model Explorer. Tests were performed by Western Geotechnical & Laboratory Services. For the March 2020 program particle size distribution analysis was carried out on eight representative samples. Tests were undertaken by Western Geotechnical & Laboratory Services. Previous metallurgical testwork was undertaken by Nagrom to establish possible process methods to provide a beneficiated product. Refer to ASX releases of 30 January 2020 and 24 February 2020. Petrological examination by Paul Ashley undertaken and reported on 18 February 2020. An approximate two tonnes bulk sample from the March aircore drilling was process tested by IHCR with results received in December 2020. In-situ PSD was determined for 12 aircore holes from the March 2020 program south of the Mount Adams Road and for six holes from the September 2020 program to the north. The March 2020 samples were tested using a dry sieving method by Diamantina Laboratories, Malaga and the September 2020 samples were tested by Nagrom, Kelmscott using a wet screening method.

Criteria	JORC Code explanation	Commentary
		In-situ particle size is predominantly within the range of 0.15 mm to 0.6 mm. About 70% of the sand grains are between 0.125 mm and 0.6 mm. Calculated AFS numbers for the March 2020 samples are predominantly in the range 40–50. The sands appear to become finer grained with depth. This is illustrated by P50 which decreases from about 400 µm to 300 µm for the March 2020 samples. The September 2020 aircore results are generally finer than the March 2020 aircore samples. It appears that there is a general trend of decreasing grain size going north. The apparently finer size of the September 2020 samples may be due to the wet screening method used, compared with dry screening for the March 2020 samples. Wet screening is likely to be more efficient than dry screening. Snowden is of the opinion that the PSD results from both programs need verification, by umpire testing of September 2020 Nagrom samples at Diamantina. Twins 20B019 and 20B032 should be included for testing at both Robbins and Nagrom. Infill holes should also be tested for PSD. A bulk sample of 300kg of white sand was recovered by from an open pit excavated by hand shovelling and multiple auger holes on the 18th of January 2021. The location of the pit was 316,504mE, 6,746,194mN and the sample was labelled as 20B011-MET. Initially a hand auger hole was drilled to 2m depth to confirm continuity and sand colour being targeted which was white sand only. An area of approximately 3mx3m was cleared by hand of the surface material to a depth of 0.5m. The pit was advanced to 2m depth at the centre of the pit with sloping sides maintained. A total of 300kg of white sand was collected and placed into large plastic sample bags and sealed. These samples were then placed in a bulker bag and dispatched to IHC Robbins in Brisbane for metallurgical testing. The relevant 300kg samples of each yellow and white sands were received in multiple plastic bags containing approximately 20-25kg with markings identifying their source. The bagged samples were sorted into their relevant bulk sample type, emptied into a stockpiled and blended. The bulk material was passed through a riffle splitter to recover each a 1kg head sample for characterisation and a 20kg sample for metallurgical processing. The residual material is

Criteria	JORC Code explanation	Commentary
		retained for any further works.The metallurgical testwork on white sand including methods and results are the subject of this release, as described.
Further work	The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling). Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	The Company will carry out further metallurgical testwork.

Section 3: Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes. Data validation procedures used.	Selected checks by Snowden of drillhole data against original assay certificates were completed with no errors identified. Statistical checks completed to ensure all assays fall within acceptable limits. Checks on overlapping or duplicate intervals completed. Checks were completed on all samples which fell below analytical detection limits to ensure samples were assigned half detection limit grades in estimation.
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.	The Competent Person, Andrew Scogings, visited the site during the aircore drilling program in March 2020.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit. Nature of the data used and of any assumptions made. The effect, if any, of alternative interpretations on Mineral Resource estimation. The use of geology in guiding and controlling Mineral Resource estimation. The factors affecting continuity both of grade and geology.	Snowden believes the local geology is well understood as a result of work undertaken by Perpetual and other companies working in the region. Surfaces of the sand layers were interpreted based on a combination of geochemistry and the geological logging. Each layer was treated as a hard boundary for resource modelling. Alternative interpretations of the mineralisation are unlikely to significantly change the overall volume of the layers in terms of the reported classified material.
Dimensions	The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	The deposit has an extent of approx. 7.1 km north-south x 1.9 km east-west in the south and 1.2 km east-west in the north. The deposit is restricted by tenement boundaries and the Yardanogo Nature Reserve in the west. The deposit is open outside of these limits.

Criteria	JORC Code explanation	Commentary
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 MRE takes appropriate account of such data. The assumptions made regarding recovery of by-products. Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation). In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed. Any assumptions behind modelling of selective mining units. Any assumptions about correlation between variables. Description of how the geological interpretation was used to control the resource estimates. Discussion of basis for using or not using grade cutting or capping. The process of validation, the checking process used, the comparison of model data to drillhole data, and use of reconciliation data if available.	Ordinary kriging estimation using a parent cell size of 200 mE x 240 mN x 2 mRL to estimate for SiO_2, Al_2O_3, TiO_2, Fe_2O_3 and LOI. Sample selection honoured geological domains which were developed considering the vertical chemical and geological trends of the profile. Five layers were modelled: Yellow, White Upper, White Lower, Light Grey Pod, Grey Pod and Grey. Statistical analysis by domain was completed. Top cuts were applied to some elements in some layers where appropriate to control sporadic extreme values during estimation; however, no top cut was applied for SiO_2. Variography was completed for all elements. Due to the low number of samples for individual layers, data was combined for variogram modelling. Correlations were largely maintained by using similar estimation parameters. Validation of block estimates included visual and statistical checks, both global and local. Checks were completed against original and de-clustered drillhole samples. The validations show that while smoothed, the block estimates reproduce the trends observed in the drillhole data.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	All tonnages have been estimated as dry tonnages.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	No cut-off parameters have been applied as the yellow and white sand being reported appears to be readily amenable to beneficiation to a suitable product specification through relatively simple metallurgical processes as demonstrated by initial reported metallurgical testing results.
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	It is assumed that the deposit will be mined using conventional open cut mining methods. No assumptions regarding minimum mining widths and dilution have been made. No mining has occurred.

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td>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.</td><td></td></tr>
<tr><td>Metallurgical factors or assumptions</td><td>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.</td><td>Eight composites were made of three sand types from the 2020 aircore drill program and tested for particle size distribution at Western Geotechnical in Welshpool during April 2020. The samples were described as light grey-white sand, grey clayey sand and yellow sand. The in-situ PSD is fairly consistent irrespective of the type of sand, with approximately 85% of the sand between 0.15 mm and 0.6 mm.

A composite sample weighing 178.6 kg from nine shallow auger holes drilled in 2019 was submitted to Nagrom of Kelmscott, WA for process test work which was reported in February 2020. The process flowsheet included screening at 1 mm, washing, attritioning, spiral separation, medium intensity magnetic separation, acid leaching and calcination. Gravcon Consultancy PL was commissioned by Perpetual in June 2020 to review the Nagrom results and the following notes are derived from the Gravcon report.

The percentage of SiO_2 in the samples increased during the test process while Fe_2O_3, TiO_2, Al_2O_3 and LOI decreased relative to the head grade. Attritioning and washing the material removed fines and silt, which increased the SiO_2 content. The spirals test produced samples where the largest fraction of SiO_2 was in the light and middlings fractions.

Magnetic separation indicated that the largest fraction of SiO_2 was in the middlings and non-magnetic fractions. Acid leach tests showed that hydrochloric acid reduced Al_2O_3 and Fe_2O_3. Repeat leaching had minimal impact and the use of sulphuric acid alone or combined with hydrochloric acid had minimal impact. Calcination tests indicated limited improvement to product quality.

Examples of SiO_2 and Fe_2O_3 results for each process stage are summarised as:
<table>
<tr><th>Process stage</th><th>SiO_2% (XRF)</th><th>Fe_2O_3% (XRF)</th></tr>
<tr><td>Feed -1 mm</td><td>99.037</td><td>0.127</td></tr>
<tr><td>Deslimed +75 micron</td><td>99.297</td><td>0.111</td></tr>
<tr><td>Spiral lights + middlings</td><td>99.594</td><td>0.045</td></tr>
</table>
</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
		<table><tr><td>MIMS non-magnetics</td><td>99.647</td><td>0.030</td></tr><tr><td>HCl leach</td><td>99.746</td><td>0.009</td></tr></table> The particle size distribution (aircore samples) and process testwork (auger composite sample) indicate that the Beharra deposit may be suitable for the production of silica sand for markets such as glass, ceramics and foundry. However, it is noted that the composite auger sample was from shallow holes less than 2 m depth, that the composite may not be truly representative of the Beharra deposit and that further metallurgical testwork on, for example, aircore drill samples is recommended to verify the auger sample results and to provide samples for potential customers in the target markets.
Environmental factors or assumptions	Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	It is assumed that no environmental factors exist that could prohibit any potential mining development at the deposit.
Bulk density	Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples. The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vughs, porosity, etc), moisture and differences between rock and alteration zones within the deposit. Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	Six in-situ bulk density measurements were completed by Western Geotechnical & Laboratory Services using a nuclear densometer and reported on 16 April 2020. The sites were sampled in accordance with AS 1289.1.2.1-6.5.1 and tested in accordance with AS 1289.2.1.1. and AS 1289.5.8.1. The results from the seven measurements are corrected based on the measured moisture factor. The dry density ranged from 1.57 t/m^3 to 1.68 t/m^3 with an average dry in situ density result of 1.64 t/m^3 which was applied to the estimate. The Competent Person is of the opinion that the bulk density determined using recovered sample weight, and nominal aircore or vacuum hole diameter, supported the results from the nuclear densometer method (1.64 t/m^3) and the loose and tapped methods (1.66 t/m^3). Based on all data, an average density of 1.64 t/m^3 as determined by the nuclear densometer has been assumed for the Project.

Criteria	JORC Code explanation	Commentary
Classification	The basis for the classification of the Mineral Resources into varying confidence categories. Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). Whether the result appropriately reflects the Competent Person's view of the deposit.	The Mineral Resource was classified based on data quality, sample spacing, grade continuity, geological continuity of the domains and metallurgical/process test results into Inferred material. The grey sands are considered uneconomic at this stage and have been excluded. The reported Mineral Resource does not include any material within the Yardanogo Nature Reserve which occupies a strip approximately 300 m wide on the western side of the tenement and excludes a buffer of 50 m south and north of Mount Adams Road. The Mineral Resource classification appropriately reflects the view of the Competent Person.
Audits or reviews	The results of any audits or reviews of MREs.	Snowden is not aware of any independent reviews of the MRE. Snowden's internal review process ensures all work meets quality standards.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the MRE using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The Mineral Resource has been validated both globally and locally against the input sample data. Estimates are considered to be accurate to a level which supports mine planning – Indicated. There is no operating mine at the Project, and as such, no production data is available.

Section 4: Estimation and Reporting of Ore Reserves

Item	JORC Code explanation	Comments
Mineral Resource for conversion to Mineral Reserves	Description of the MRE used as a basis for the conversion to an Ore Reserve. Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	Mineral Resources for the Beharra deposit were reported in February 2021 from a Datamine model "beharra_20210210.dm". No cut-off grade is applied for the silica sand Mineral Resources and is commensurate with other deposits. Mineral Resources are reported inclusive of the Ore Reserves.

<table>
<tr><th>Item</th><th>JORC Code explanation</th><th>Comments</th></tr>
<tr><td>Site visits</td><td>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.</td><td>Site visits were completed by the following Competent Persons:
<table>
<tr><th>Competent Persons</th><th>Items</th><th>Date of site visit</th></tr>
<tr><td>Frank Blanchfield</td><td>Mining</td><td>Dec 2020</td></tr>
<tr><td>Arno Kruger</td><td>Metallurgy</td><td>Feb 2021</td></tr>
</table></td></tr>
<tr><td>Study status</td><td>The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.
The Code requires that a study to at least PFS level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.</td><td>The Beharra Silica Project has been under technical investigation as a PFS completed in March 2021.</td></tr>
<tr><td>Cut-off parameters</td><td>The basis of the cut-off grade(s) or quality parameters applied.</td><td>The ore inventory was required to have a Fe_2O_3 average below 2000 ppm for plant feed consideration.</td></tr>
<tr><td>Mining factors and assumptions</td><td>The method and assumptions used as reported in the PFS or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).
The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.
The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc), grade control and pre-production drilling.
The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).
The mining dilution factors used.
The mining recovery factors used.
Any minimum mining widths used.
The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.</td><td>Snowden completed a mining prefeasibility study for the Beharra Project in 2021. The study reflects the latest understanding of the Project.
An evaluation using pit optimisation to produce an economic mining shell followed by detailed pit design was used to convert the Mineral Resource to an Ore Reserve. A mine layout was developed for mining of staged designs mine layout development. Mine equipment requirements were determined by contractors, who provided pricing using the Snowden mine production schedule as a basis. Selective mining using an open pit load and haul mining cycle is used for mining activities.
Geotechnical
Snowden completed a geotechnical analysis to recommended pit slope design parameters for Beharra for 80 m deep pit as summarised as:
<table>
<tr><th>Batter angle (°)</th><th>Berm width at base of batter (m)</th><th>Batter height (m)</th><th>Inter-ramp slope angle (crest to crest, °)</th><th>Overall slope angle (crest to toe, °)</th></tr>
<tr><td>30</td><td>NA</td><td>10</td><td>NA</td><td>30</td></tr>
</table>
Grade control
The drill density for Indicated Resources is sufficient to define the flat ore basement. As the mining floor limit is elevated by 0.5 m and the grade control in the basement will be visual. There is a 0.5 m roof ore loss and this will be sufficient to maximise or guarantee the quality of the ore.
Dilution</td></tr>
</table>

<table>
<tr><th>Item</th><th>JORC Code explanation</th><th>Comments</th></tr>
<tr><td></td><td>The infrastructure requirements of the selected mining methods</td><td>Dilution was essentially zero, however there were ore losses from boundary losses (neighbouring nature reserve, Mount Adams Road and 10 m lease offset corridor that were about 5% of the available resources and floor and roof loses and internal waste that was about 8% of the available resources.
Schedule
Snowden identified a LOM schedule of 33 years suitable for Ore Reserve assessment.
No in-pit Inferred Resources were used to quantify Ore Reserves.</td></tr>
<tr><td>Metallurgical factors and assumptions</td><td>The metallurgical process proposed and the appropriateness of that process to the style of factors or mineralisation.
Whether the metallurgical process is well-tested technology or novel in nature.
The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.
Any assumptions or allowances made for deleterious elements.
The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.
For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications</td><td>Metallurgical testwork
To date, metallurgical testing has been carried out in two phases. The first phase of mineralogical examination, PSD of aircore samples and process testing of hand auger samples was reported on previously by Haren and Scogings (2020).
The initial Phase 1 process testwork program was conducted on the composite auger drill samples and indicated that the Beharra deposit was suitable for producing silica sand for markets such as glass, ceramics and foundry.
The second phase of metallurgical test work commenced in Q3 2020 with Perpetual supplying approximately two tonnes of sand samples from the March 2020 aircore drill program to IHCR of Brisbane, a specialist mineral sands laboratory, for bulk process testwork. This programme was conducted using full size or genuinely scalable equipment and the results are demonstrated in IHCR report 1959-PM-REP-0000-8002.
The resultant products derived from the IHCR 2.0T bulk metallurgical test program were of high quality as demonstrated in the table below.
<table>
<tr><th rowspan="3">Testwork Classification</th><th rowspan="3">Product Classification</th><th rowspan="3">Mass by ROM</th><th colspan="5">Assay</th></tr>
<tr><th>%</th><th>ppm</th><th>ppm</th><th>ppm</th><th>%</th></tr>
<tr><th>SiO2</th><th>Al2O3</th><th>Fe2O3</th><th>TiO2</th><th>LOI</th></tr>
<tr><td></td><td></td><td>%</td><td>97.9</td><td>9990</td><td>680</td><td>910</td><td>0.26</td></tr>
<tr><td>UCC Underflow (calc)</td><td>Beharra Premium #44</td><td>74.4</td><td>99.6</td><td>1789</td><td>276</td><td>369</td><td>0.14</td></tr>
<tr><td>Screen O/S</td><td>Beharra Premium #27</td><td>6.3</td><td>99.7</td><td>1405</td><td>235</td><td>300</td><td>0.13</td></tr>
<tr><td>Screen U/S</td><td>Beharra Premium #46</td><td>68</td><td>99.6</td><td>1825</td><td>280</td><td>375</td><td>0.14</td></tr>
</table>
Calculation and determination of Ore Reserves is based on producing Beharra Premium silica sand product #44, which will have a SiO_2 of >99.5% and a Fe_2O_3 of <280 ppm. Mass yield into this product as per test work is calculated at 74.4%. (Ref: 1959-PM-REP-0000-8001 Rev 2).
Mineral Processing
The mineral processing flowsheet and plant required for the upgrading of the mined material at Beharra is commonly seen and used both in the quarrying and aggregates and mineral sands industry. The separation techniques employed are commonplace and include screening and desliming, gravity, magnetic and physical separation.
Given the relatively small throughput requirement and simplicity, traditional package plant suppliers were</td></tr>
</table>

Item	JORC Code explanation	Comments
		approached for an all-inclusive turnkey solution, based on the provided sound engineering documentation and the proposed flowsheet provided by Perpetual.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste drum s should be reported.	**Environment** Considerable baseline environmental studies, commissioned by Tiwest (now Tronox) for its Dongara titanium minerals project, immediately adjacent to the Beharra Project have been procured from Tronox via a data share arrangement. This data significantly contributes to the environmental impact assessment process to support approvals for Beharra and covers factors including groundwater and groundwater-dependent ecosystems, surface water, flora, vegetation, weeds and dieback, terrestrial and subterranean fauna, soil profiles and acid sulphate soils and indigenous heritage. In addition, studies conducted to date by Perpetual to complement the extensive Tronox dataset and cover the following areas: flora and vegetation, terrestrial fauna, groundwater and groundwater-dependent ecosystems and heritage. **Mine rehabilitation** A comprehensive study was undertaken to determine the most suitable progressive rehabilitation method for the Beharra Project based on the existing environment. Consultation and benchmarking with other extractive sand miners in the local area as well as expert rehabilitation practitioners was undertaken to assist in developing the method.
Infrastructure	The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided or accessed.	The Project site is easily accessed via the sealed Brand Highway and unsealed Adams Road. There will be a requirement for some road and intersection upgrade works to support the volume of haul trucks required to transport the final product to Geraldton. An on-site power station and water supply infrastructure will need to be constructed. Labour will be sourced from the nearby towns of Dongara and Geraldton, removing the requirement for onsite accommodation.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study. The methodology used to estimate operating costs. Allowances made for the content of deleterious elements. The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co-products. The source of exchange rates used in the study.	The capital cost estimate prepared by Perpetual includes direct plant and supporting infrastructure, indirect costs and is to an accuracy level of ±25% with a contingency of 10% included. Budget pricing was received from a process plant supply and install contractor (inclusive of engineering, process and materials handling equipment, E, I & C, process water circuit, and associated structure and piping). Budget pricing was also received for civil works, concrete, fuel storage, power station, administration, amenities and workshop infrastructure. The operating cost estimate was developed as a bottom-up estimate over the 32-year LOM to obtain average

<table>
<tr><th>Item</th><th>JORC Code explanation</th><th>Comments</th></tr>
<tr><td></td><td>Derivation of transportation charges.
The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.
The allowances made or royalties payable, both government and private.</td><td>operating costs. All significant and measurable items are itemised, with smaller items estimated based on other silica sand operations and the experience/expertise of project consultants.
Mining costs were derived from tenders fielded to appropriately qualified contract mining companies using pit models provided by Snowden. A contract mining model has been adopted and the raw mining cost provided by the selected tenderer, has been included in the operating cost estimate. This rate has then been brought forward into the mining model.
Rehabilitation costs have been provided by Tetris (Trajectory) based on a $/ha breakdown.
Specific consumption rates for reagents and consumables were estimated through a combination of equipment operating data, bench-scale testwork and modelling software.
Current market pricing was obtained for all major consumables and reagents based on supplier budget pricing as of December 2020. A small general allowance was made for minor miscellaneous consumables based on historical data from similar operations.
Power station supply and install is included as a $kw/hr, BOOM operational cost – supplying power and sized according to the drawn loads on the equipment list.
Maintenance costs were estimated based on projected capital estimates for the plant using industry benchmarked factors.
Remuneration rates typically expected in this area for discipline personnel were used to establish operating costs, with labour rates being sourced from three contributors: AMMA, Gravcon, and Allied PD.
Perpetual has elected to use a flat A$:US$ exchange rate of 75c across the forecast period, which is considered a reasonable estimation of a likely long run average level. Perpetual acknowledges that wide exchange rate fluctuations are possible and could positively or negatively affect the profitability and economic viability of the Beharra Project at any single point in time. This risk will be managed by the management team and Board of Directors who may utilise an exchange rate hedging strategy should it be considered appropriate at the time.
Annual operating costs – average years 1-5 at full production
An average summary of annual operating costs forecast for the first five years of full production are set out below:
<table>
<tr><th>OPEX (A$)</th><th>Cost per annum ($'000)</th><th>A$/t ore</th><th>A$/t product concentrate</th></tr>
<tr><td>Mining (ROM+OB)</td><td>10.6</td><td>5.18</td><td>6.97</td></tr>
</table>
</td></tr>
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<table>
<tr><th>Item</th><th>JORC Code explanation</th><th>Comments</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Processing</td><td>5.0</td><td>2.46</td><td>3.31</td></tr>
<tr><td>Reject haulage</td><td>0.6</td><td>0.29</td><td>0.36</td></tr>
<tr><td>Administration</td><td>2.4</td><td>1.18</td><td>1.58</td></tr>
<tr><td>Transport + Port/ ship loading</td><td>39.4</td><td>19.40</td><td>26.09</td></tr>
<tr><td>Rehabilitation</td><td>1.8</td><td>0.43</td><td>0.58</td></tr>
<tr><td>Contingency</td><td>2.8</td><td>1.40</td><td>1.88</td></tr>
<tr><td>Royalty</td><td>3.5</td><td>1.71</td><td>2.30</td></tr>
<tr><td>Total OPEX</td><td>66.1</td><td>32.05</td><td>43.07</td></tr>
</table>
Pre-production capital costs
A summary of the pre-production capital estimate is set out below:
<table>
<tr><th>CAPEX (A$)</th><th>Cost ($'000)</th></tr>
<tr><td>Process plant (incl. water distribution)</td><td>19,287</td></tr>
<tr><td>Services and onsite infrastructure</td><td>3,537</td></tr>
<tr><td>Offsite infrastructure</td><td>9,272</td></tr>
<tr><td>Indirect, PCM and site office costs</td><td>2,338</td></tr>
<tr><td>Total development capital</td><td>34,434</td></tr>
<tr><td>Owners' costs</td><td>1,343</td></tr>
<tr><td>Owner's contingency (10%)</td><td>3,443</td></tr>
<tr><td>Total pre-production capital</td><td>39,220</td></tr>
</table>
</td></tr>
<tr><td>Revenue factors</td><td>The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.
The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.</td><td>The grade of the process feed and iron content is supported by the information in the MRE and driven by the mining and production schedule. Processing recoveries were estimated based on a metallurgical test program completed during the PFS, using scalable processing equipment.
Perpetual engaged IMARC, to prepare an independent market assessment of the APAC region, specifically targeting selected countries and product grades.
Beharra metallurgical testwork to date has confirmed that Beharra end-product to be suitable for sale into the 200–300 ppm Fe_2O_3 markets in the APAC region. In 2019, silica sand with 200–300 ppm Fe_2O_3 recorded a price of between US$41.10 in China and US$71.60 per metric ton in Japan.
Sell prices, in US$, have been forecast out to 2026 by IMARC.
Based on the above and advice provided by industry experts, Perpetual is confident that a sell price of US$50 per metric ton and above is achievable.</td></tr>
<tr><td>Market assessment</td><td>The demand, supply and stock situation for the particular commodity, consumption trends assessment and factors likely to</td><td>The APAC market assessment revealed the APAC region to be amongst the largest consumers of silica sand in the world based on increasing utilisation in the glass and foundry industries, reaching a value of US$5,133.7 million in 2020.</td></tr>
</table>

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	affect supply and demand into the future. A customer and competitor analysis along with the identification of likely market windows for the product. Price and volume forecasts and the basis for these forecasts. For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	The forecast market value is expected to reach US$7,638.1 million by 2026, exhibiting a CAGR of 7.1% during this period. The forecast market consumption volume is expected to reach 174.25 million metric tons by 2026, exhibiting a CAGR of 4.8% during the 2021–2026 period. In 2020, the glass industry represented the largest end use sector for silica sand accounting for 37.6% of the total APAC market volume, with foundry sand accounting for 27.1%. Perpetual's marketing strategy therefore is focussed on targeting the APAC glass sand industry in the higher end market based on products, initially in the 200–300 ppm range in relation to iron, where prices range from US$41.10/t in China to US$71.60/t in Japan. Pricing for silica sand products in the APAC region vary by a number of factors, mostly dictated by country of purchase and impurity levels. In China, silica sand prices for higher purity grades sell for between US$45/t and US$115/t, in Korea this price range is US$55/t to US$130/t, and in Japan the range is US75/t to US$190/t. Perpetual has conservatively chosen a price of US$50/t FOB Geraldton which provides significant scope for pricing upside as marketing channels are developed. Perpetual has sent a number of samples to potential customers in the APAC region, and has signed one Memorandum of Understanding for offtake for up to 250,000 tons per annum with a Chinese end user called Yaoguo Solar Science & Technology Co. Ltd (Yaoguo). Yaoguo has already tested samples of Beharra silica sand and have provided a positive response, with further samples being sent to develop deeper discussions. Strong indications have been provided by Yaoguo that Beharra silica sand is suitable for the Asian market.
Economic	The inputs to the economic analysis to produce the NPV in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc. NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Financial modelling was completed by Perpetual, Snowden is reliant on the commodity price projections advised by Perpetual. Snowden is not an expert in the forecasting of commodity prices, and other than to draw attention to the sensitivity of the project to these projections, is not able to comment on the risk that these projections will change over time. However the commodity price estimate is based on the 2019 price outlook provided by IMARC and also the professional opinion of Stratum Resources, which is a specialist industrial mineral consultancy that provides advice and trading in the silica sand markets regionally. The key financial metrics for just the reserve portion of the project are the IRR 54.6% and NPV 230.9 million @ %10 discount rate. A real, pre-tax discount rate of 10.0% was applied based on Perpetual's calculated weighted average cost of capital and also a comparison to other similar projects.

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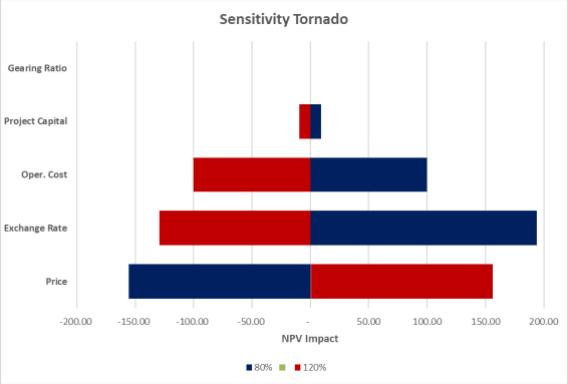
		A long-term AUD: USD FX rate averaging 0.75:1 over the LOM was applied, reflecting an approximation of the average exchange rate over the last 40 years. A sensitivity analysis on the NPV is provided below, which looks to analyse the economic impact of key variables for the Beharra Pproject, including: • Revenue per tonne • Changes in operating costs • Changes in capital costs • Exchange rate fluctuations • Changes in levels of project gearing. 
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Perpetual has undertaken an assessment of its key stakeholders that have a (statutory) interest in the Project, including local government authorities, government agencies, and other interested parties, i.e. Shires, traditional owners etc). Perpetual will maintain a program of engagement throughout the life of the project. Consultation will be aimed at developing relationships that are mutually beneficial to both parties. Stakeholders will be engaged early in the planning process, primarily in the interests of achieving a collaborative approach to raise any concerns and provide Perpetual with the means to respond to feedback and to ensure that local knowledge is considered in the design and management of the project. A stakeholder register and records of engagement are maintained.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories. Whether the result appropriately reflects the Competent Person's view of the deposit. The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	The Beharra Ore Reserves are classified using the guidelines of the JORC Code (2012). In-pit Indicated Mineral Resources were used as the basis for Probable Ore Reserve.
Other	The status of agreements with key stakeholders and matters leading to social licence to operate.	Perpetual recognises there is a potential human health exposure risk to RCS at Beharra. RCS could be produced as an airborne dust when silica sand is disturbed through

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	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves: • Any identified material naturally occurring risks. • The status of material legal agreements and marketing arrangements. • The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary government approvals will be received within the timeframes anticipated in the PFS or feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.	mineral extraction, stockpiling, transportation and handling and is dry enough to generate dust particles. These particles can be small enough to lodge deep in the lungs and cause illness or disease such as bronchitis, silicosis and lung cancer. A WES exists for crystalline silica and represents the concentration of an airborne hazardous chemical within a worker's breathing zone that should not cause adverse health effects or undue harm. The current WES for RCS is 0.1 mg/m^3 over an eight-hour working day in Western Australia, with the WES likely to be lowered to 0.05 mg/m^3 by the end of 2020 to meet national standards. RCS exposure and safety requirements are governed by the following Western Australian Legislation: • Occupational Safety and Health Act 1984 • Occupational Safety and Health Regulations 1995 • Mines Safety and Inspection Act 1994 • Mines Safety and Inspection Regulations 1995. Prior to the commencement of any extraction activities at the Project, a HRA will be undertaken to define key sources and the pathways of RCS. With this information, defined dust management procedures to reduce the risk of exposure to personnel above the WES will be developed using the hierarchy of controls – substitution, isolation, engineering, administrative, PPE. Additionally, the HRA will be a key input to the preparation of a HHMP in accordance with the DMIRS Guideline 'Preparation of health and hygiene management plan – guide' (2018) and approved by DMIRS prior to operations commencing at the Project. The HHMP will define as a minimum the sources, pathways management and monitoring of RCS. The HHMP will be reviewed annually to ensure it meets current standards and capture any changes to operational circumstances or procedural controls. This will enable Perpetual to maintain continual compliance with its legislative health and safety obligations. Currently, final product samples of Beharra Premium have been provided from the resultant bulk metallurgical test program to a variety of potential off takers. Perpetual has not entered into any binding agreements or arrangements with marketing agencies or consultants at this time.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	There have not been no external audits ore reviews of the 2021 PFS. The MRE, pit optimisation, design and schedule as developed for the Beharra PFS were reviewed internally by Snowden.
Relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the	The capital cost estimates in this study relating to mining, processing and cost performance are underpinned by a pre-feasibility level study. The capital cost estimate has an assessed accuracy of ±25% and complies with the AusIMM Class 4 PFS criteria.

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	Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which 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. Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage. It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	