20 September 2022

CARAVEL COPPER PROJECT

PRE-FEASIBILITY STUDY UPDATE – SINGLE TRAIN OPTION STUDY

This Pre-Feasibility Update ("PFS Update") announcement is further to the Caravel Copper Project Pre-Feasibility Study and Maiden Ore Reserve announcement ("PFS") reported on 12 July 2022. The PFS outlined opportunities for improvements to the process plant, including consolidation of the plant into a single ~27Mtpa throughput train, the use of High-Pressure Grinding Rolls ("HGPR") to replace Semi-Autogenous Grinding ("SAG") Mills and the adoption of Coarse Particle Flotation ("CPF").

PFS Update studies into these opportunities have been undertaken by the PFS engineers, Ausenco Services Pty Ltd ("Ausenco"). This PFS Update reports on the capital and operating cost savings that may be achieved from adopting these initiatives. Other elements of the Caravel Copper Project as described in the PFS are unchanged. This announcement should be read together with the cautionary statement on page 2 and the PFS released on 12 July 2022 available at www.caravelminerals.com.au or www.asx.com.au.

Key Points

- **HPGR grinding circuits offer improved capital and operating costs for a large throughput single processing train and will be adopted in favour of semi-autogenous grinding mills (SAG) for the purposes of Definitive Feasibility Study (DFS)**
- **Inclusion of Coarse Particle Flotation (CPF) in the process flowsheet has potential to reduce capital and operating costs when compared to the PFS flowsheet**
- **The two train flotation circuit presented in the PFS has been reconfigured into a single train ~27Mtpa throughput plant, simplifying construction, enhancing operability and improving both capital and operating costs**
- **The Single Train design and the adoption of HGPR and CPF are forecast to:**
  - **Reduce processing cash unit costs by up to AUD$1.23/t of ore**
  - **Reduce capital costs by around AUD$100M**
  - **Reduce installed power demand by up to 22MW**
  - **Reduce water consumption by~1.8Glpa**
  - **Reduce C1 costs from US$1.72 to US$1.54/lb**
  - **Reduce AISC cost from US$2.55 to US$2.37/lb**
- **These changes to process plant design are expected to significantly enhance project economics as reported in this update**

Cautionary Statement

The PFS together with this Update is a study of the potential viability of the production of copper from the Caravel Copper Project. It has been undertaken to understand the technical and economic viability of the Project.

The PFS with this Update assumes as a 28-year Project life based largely on Proved and Probable Ore Reserves (81.6%) and partly based on Inferred Mineral Resources (18.4%). There is a lower level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of higher level Resources or Reserves or add to the economics of the Project. The PFS is based on the material assumptions set out in the PFS announcement of 12 July 2022 and updated assumptions set out in this announcement. While the Company considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the feasibility studies will be achieved.

To achieve the range of outcomes indicated in PFS with this Update, funding in the order of A$1.1 billion will likely be required. Investors should note that there is no certainty that the Company will be able to raise the amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of the Company's existing shares.

It is also possible that the Company could pursue other "value realisation" strategies such as a sale, partial sale or joint venture of the Project. If it does, this could materially reduce the Company's proportionate ownership of the Project.

Results of Single Train Option Study

The Caravel Copper Project Pre-Feasibility Study ("PFS") defined a robust copper project capable of producing over 60,000tpa of copper in concentrate at low cost (C1 ~US$1.72/lb Cu), generating strong cashflows over an initial 28-year mine life (refer ASX Announcement 12 July 2022). Technical, environmental and commercial studies completed for the PFS indicate that the Project can be built and operated with low technical risks, minimal environmental impact and positive economic and social outcomes.

The PFS identified a number of options to improve project economics and operability, including:

1. Consolidation of the proposed dual train process plant into a simplified, Single Train design
2. Replacement of Semi-Autogenous Grinding (SAG) mills with High-Pressure Grinding Rolls (HPGR) in the primary comminution circuit
3. Inclusion of Coarse Particle Flotation (CPF) in the flotation circuit.

Ausenco, the engineers to the PFS, have investigated these options and finalised their assessment.

Consolidating the flotation circuit into a single train design provides significant efficiencies in construction and operation, resulting in forecast capital savings of around A$77M and operating costs savings of around A$0.46 /t ore.

The use of High-Pressure Grinding Rolls (HPGR) as an alternative to Semi-Autogenous Grinding (SAG) mills reduces consumption of both power and operating consumables and results in a A$0.68/t reduction in operating costs and an estimated A$23m saving in upfront capital.

The inclusion of CPF the circuit will further reduce operating and capital costs through lower power usage due to the coarser grind size and reduced volumes through the flotation plant. Additional benefits will accrue through improved tailings characteristics and better water returns, lowering overall water requirements, but the financial impacts of this have not yet been included in the costings.

The cumulative impact on the Project's financial model is as follows:

- Processing unit costs are reduced by A$1.23/t ore, primarily due to lower power costs relating to the use of HPGR and CPF. This increases annual free cashflow by ~A$35m, or A$870m over life of mine
- Capital costs are reduced by A$100M, primarily due to capital efficiency in the Single Train design
- The operating cost reductions result in a C1 Cost of US$1.54/lb and an AISC of US$2.37/lb (see Table 2)
- The changes to cashflows and capital result in an increase in Project NPV (7%) to A$1.5B (range A$1.3B to A$1.7B) (see Table 3)

The three options studied have all demonstrated substantial benefits to the Project and are now incorporated into the project base case design and financial model to be used in the DFS. There is no change (or delay) to project or mine scheduling resulting from the improvements.

The study outcomes presented in this report are based on changes to the comminution and flotation circuits within the process plant. All other study areas including Ore Reserves, Mineral Resources, Mining Method, Infrastructure studies reported in the July PFS remain unchanged as presented in Figure 1. The material assumptions in respect of these PFS financial forecasts and production targets continue to apply with no material change to these assumptions. 81.6% of the Project's mine life remains in Ore Reserve with 18.4% as Inferred Mineral Resources.

	JULY 2022	SEPTEMBER 2022
STUDY AREA	**PRE-FEASIBILITY STUDY**	**PFS UPDATE**
Tenements	E70/2788, E70/3674, E70/3680, R70/0063, MLA70/1410, MLA70/1411, GPLA70/262, GPLA70/263	No change
Mineralisation	Porphyry-style chalcopyrite sulphide mineralisation associated with foliated granitic gneiss	No change
Ore Reserve	583.4Mt at 0.24% copper	No change
Mineral Resources	1.18 Billion tonnes @ 0.24% Cu and 48 ppm Mo for 2.84Mt of contained copper (0.1% Cu cut-off)	No change
Mining Method	Conventional open-pit using ACE technologies including: diesel-electric haul trucks and electric drills and shovels	No change
Operating Structure	Owner-miner	No change
Processing Capacity	27.8Mtpa throughput	27Mtpa throughput
Processing Flowsheet	Primary crushing, secondary crushing, **grinding by SAG** and ball mill **with a pebble crushing circuit**, followed by conventional rougher and cleaning flotation, thickening and filtering	Primary crushing, secondary crushing, **grinding by HGPR** and ball mill, followed by conventional rougher, **CPF**, cleaning flotation, thickening and filtering
Recovery	~92% Cu	No change
Production	~62,000tpa (copper in concentrate)	~60,000tpa (copper in concentrate)
Power	Existing access to grid-power from WA State (SWIS) grid, with renewable energy mix	No change
Water	Borefield ~60km to the west with associated pipeline	No change
Concentrate Export	Concentrate trucked by public road 340km to Bunbury Port or 400km to Geraldton Port	No change

Figure 1: PFS and PFS Update project comparison including replacement of Semi-Autogenous Grinding (SAG) mills with High-Pressure Grinding Rolls (HPGR) in the primary comminution circuit and inclusion of Coarse Particle Flotation (CPF) in the flotation circuit.

PROCESSING PLANT DESCRIPTION

The processing plant described in the July 2022 PFS is a conventional copper concentrator suitable for treating low sulphur copper porphyry style ores such as the Caravel ores. The following updated processing plant description reflects the replacement of SAG with HPGR and the inclusion of CPF as well as modifications for a single train process plant with 27 Mtpa capacity and is described at the same level of detail as reported in the Pre-Feasibility Study (July) below:

Crushing and Grinding

ROM ore is crushed in two stages using a primary gyratory crusher and secondary crusher, with crushed ore reporting to the crushed ore stockpile. Crushed ore is reclaimed from the stockpile and fed to the HPGR and ball milling circuit, consisting of two HPGR units, two wet screens and two ball mills. HPGR discharge reports to the HPGR discharge screen, with the oversize material recycling back to HPGR feed. HPGR discharge screen undersize is combined with ball mill discharge and flotation collector and is pumped to the primary cyclone cluster. Cyclone underflow reports to ball mill feed for further size reduction whilst cyclone overflow from both ball mill circuits reports to a single flotation circuit.

Flotation

The copper flotation circuit consists of six forced air mechanical rougher/scavenger flotation cells followed by rougher concentrate regrind and three stages of cleaner flotation. For rougher flotation, Huntsman W22 frother and SIBX collector are added. Copper rougher tailings report to a coarse particle flotation circuit (CPF). The copper rougher tailings first reports to a cyclone cluster in the CPF circuit. CPF cyclone overflow reports to a combined CPF tailings stream. The CPF cyclone underflow is fed to two HydroFloat® aerated fluidised bed flotation cells, where Huntsman W22 frother and PAX and diesel collectors are used to recover a coarse particle concentrate. The coarse particle concentrate is dewatered in a cyclone cluster and reground in a ball mill before being circulated back to copper rougher feed. The combined coarse particle flotation tailings and scavenger tailings report to the tailings thickener.

Copper rougher and scavenger concentrate reports to the regrind circuit where a tower mill regrinds the concentrate to affect further mineral liberation. The regrind circuit product is fed to the copper cleaner flotation circuit.

The copper cleaner circuit consists of three stages of cleaning and one bank of cleaner scavenger cells. The first and second cleaners together with the cleaner scavenger cells are forced air mechanical tank cells. The third cleaning stage consists of a single Jameson Cell with 70% tailings recycle. Hydrated lime slurry, SIBX collector and Huntsman W22 frother addition is adjusted across the cleaning circuit to maximise recovery. Concentrate recovered from the first copper cleaner is pumped to the second copper cleaner flotation cells for further upgrading, with the first cleaner tailings gravitating to the cleaner scavenger cells. The copper cleaner scavenger cells recover a low-grade concentrate which is pumped to the regrind circuit. The cleaner scavenger tailings stream reports to the flotation tailings thickener.

The second copper cleaner concentrate is pumped to the Jameson cell for further upgrading, producing final copper concentrate. The tailings from the second copper cleaner cells report back to the head of the first copper cleaner bank and the tailings from the Jameson cell reports to the head of the second copper cleaner bank. The Jameson cell final copper concentrate reports to a copper concentrate thickener with the underflow product reporting to agitated filter feed tanks. This slurry is then pumped to a pressure filter to produce a copper concentrate filter cake product which is loaded into covered containers for transportation by road to port.

Tailings Thickening

Flotation tailings report to the tailings thickener and the thickened tailings are then pumped to the tailings management (TMF) facility. Water reclaimed from TMF is returned to the process water storage pond.

A schematic diagram of the process flowsheet is illustrated in Figure 2.

REVISED PROCESS FLOWSHEET

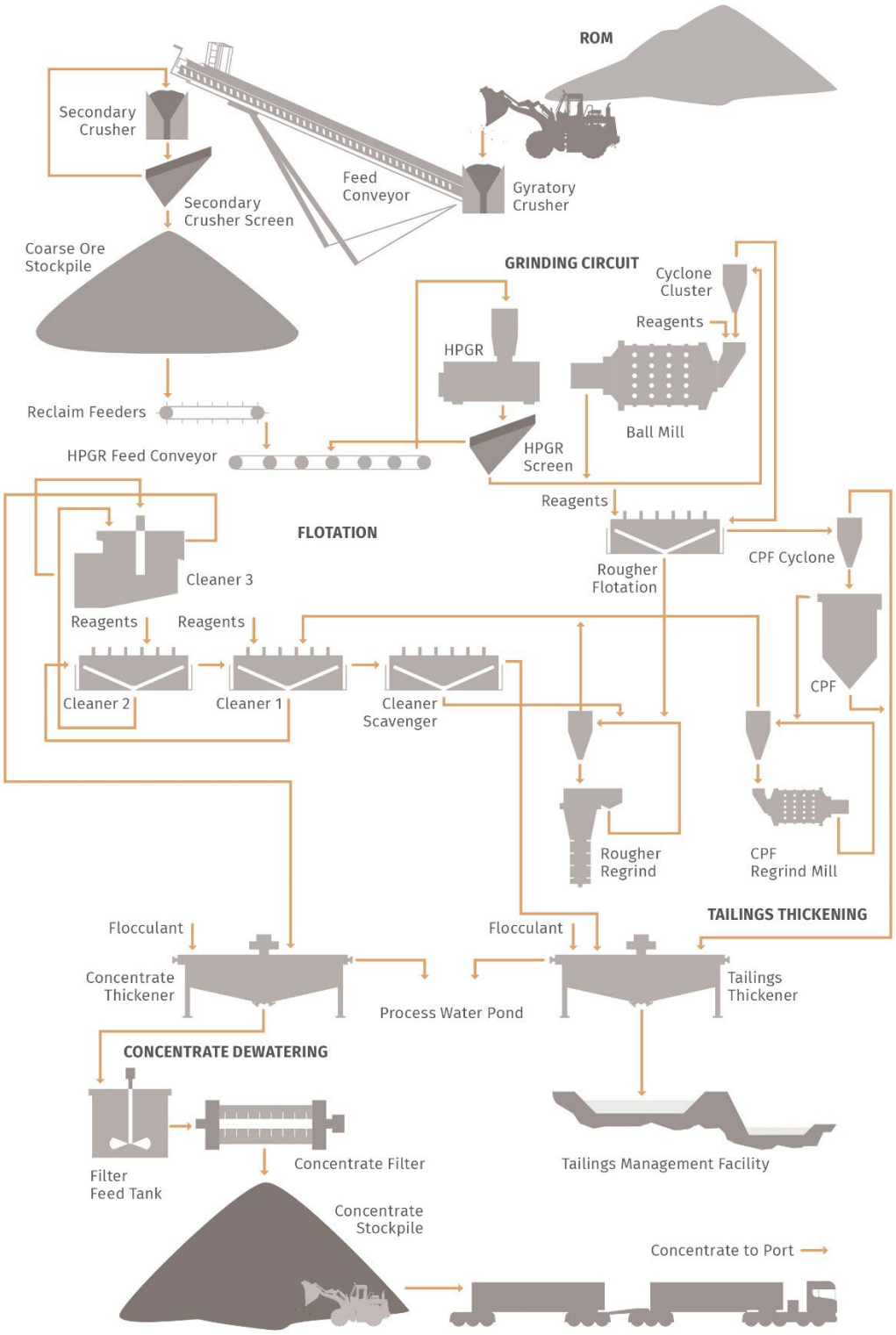


Figure 2: Updated process flowsheet incorporating High-Pressure Grinding Rolls (HPGR) in the primary comminution circuit, inclusion of Coarse Particle Flotation (CPF) in the float circuit as well as Single Train modifications.

Material Assumptions and Financial Modelling

(All amounts quoted in Australian Dollars unless otherwise stated)

Capital Expenditure

The adoption of the Single Train processing plant with revised comminution and flotation circuits have resulted in savings of approximately $100M in capital expenditure compared with what was reported in the July 2022 PFS. Initial capital expenditure is now estimated to total $1.1B (PFS: $1.205M) for the construction of the process plant, site infrastructure, tailings storage and borefield.

Capital expenditure in relation to the comminution circuit have been estimated to an accuracy of -30% to +50%, equivalent to an AACE Class 5 estimate. Other capital expenditure is unchanged from the PFS and is estimated to an accuracy of ±25% and is equivalent to an AACE Class 4 estimate.

Table 1: Caravel Copper Project Initial Capital costs

Initial Capital Expenditure A$M	PFS Update (September 2022) Year 0 to 3	PFS (July 2022) Year 0 to 3
Process plant and site infrastructure		
Plant direct costs	585	680
Site infrastructure	112	113
Tailings storage management	51	51
Water supply	66	69
Owner costs and indirects	176	172
Contingencies	101	111
Mine infrastructure	8	8
	1,100	**1,205**
Mining equipment	309	309
Mining pre-strip	176	189
Total Initial Capital Expenditure	**1,584**	**1,702**

Operating Costs

The modification of the flow sheet from SAGB to HPGRB, and the addition of CPF, have reduced C1 Processing costs by ~ 11% to an estimated US$1.54 /lb of copper (PFS: US$1.72/lb). Reduced costs are primarily from lower consumption of power and operating consumables.

Mining and other processes are unchanged and costs remain as reported in the PFS.

Table 2: Caravel Copper Project C1 Costs

Life of Mine Unit C1 Costs	PFS Update (September 2022) US$/lb Sold	PFS (July 2022) US$/lb Sold
Mining Costs	0.44	0.44
Processing Cost	0.82	1.01
Site & General Administration	0.09	0.09
Logistics	0.21	0.21
Treatment and Refining Costs	0.16	0.16
By-Product Credits	(0.19)	(0.19)
Total	**1.54**	**1.72**

Project Financial Assumptions and Analysis

This PFS Update is based on the same financial assumptions as the July 2022 PFS, utilising a USD$4.00 /lb copper price and USD/AUD 0.72 exchange rate the reduced costs result in an additional $1.0B in net pre-tax Project cashflows, which over 28-years mine life are estimated to be $5.6B (PFS: $4.622B) on revenues of $17.6B (unchanged from PFS).

At a 7% real discount rate the Project cashflows generate a pre-tax Net Present Value (NPV) of $1.5B (within a range of $1.3B to $1.7B) (PFS: $1.066B) and pre-tax IRR of 18% (within a range of 16% to 20%) (PFS:14.7%).

The Project is forecast to repay up-front development capital in 5.6 years (PFS: 6.8 years) from the start of production.

Table 3: Life of Mine Financial Economics

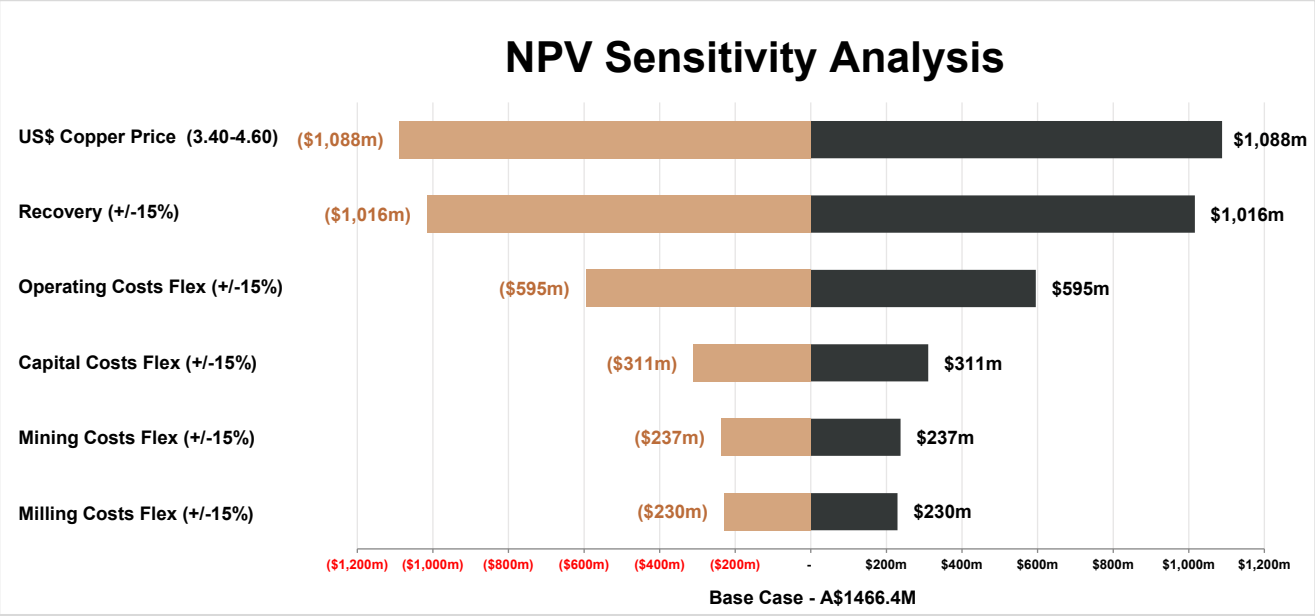
Life Of Mine Financial Economics (A$)	PFS Update (September 2022)	PFS (July 2022)
Cu Revenue (net of payability and TCs/RCs)	**$17.6B**	**$17.555B**
Net cash flow (pre-tax)	**$5.6B**	**$4.622B**
Pre-tax NPV (7% discount rate)	**$1.5B (range from 1.3B to 1.7B)**	**$1.066B**
Pre-tax IRR	**18% (range of 16% to 20%)**	**14.7%**
Capital payback period	**5.6 years**	**6.8 years**

Assumptions remain consistent with the PFS unless noted.

Sensitivity

The following are the major sensitivities of the project.

Sensitivity Analysis of NPV Outcome (A$M- pre-tax basis @ 7%)							
Sensitivity Analysis	**-15%**	**-10%**	**-5%**	**Base**	**+5%**	**+10%**	**+15%**
Cu Price	378	741	1,104	1,466	1,829	2,192	2,554
Cu Grade	450	789	1,128	1,466	1,805	2,144	2,482
All Operating Costs	871	1,070	1,268	1,466	1,665	1,863	2,062
Capital Costs	1,156	1,259	1,363	1,466	1,570	1,673	1,777
Milling Costs	1,237	1,313	1,390	1,466	1,543	1,619	1,696
Mining Costs	1,229	1,308	1,387	1,466	1,545	1,625	1,704



This announcement is authorised for release by Executive Director, Alasdair Cooke.

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Competent Persons Statements

The information in this report that relates to Exploration Results is based on and fairly represents information compiled by Mr Peter Pring. Mr Pring is a Senior Exploration Geologist with Caravel Minerals. Mr Pring is a shareholder of Caravel Minerals and is a member of the Australasian Institute of Mining and Metallurgy. Mr Pring has sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities 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 Pring consents to the inclusion in this report of the matters based on information in the form and context in which they appear.

The information in this report that relates to Mineral Resources is based on and fairly represents information compiled by Mr Lauritz Barnes, (Consultant with Trepanier Pty Ltd). Mr Barnes is a shareholder of Caravel Minerals. Mr Barnes is a member of both the Australasian Institute of Mining and Metallurgy and the Australasian Institute of Geoscientists. Mr Barnes has sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities 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 Barnes consents to the inclusion in this report of the matters based on information in the form and context in which they appear.

The information in this report that relates to Ore Reserves is based upon information and supporting documentation prepared by and mine planning work prepared by Mr Steve Craig (CEO of Orelogy Consulting Pty Ltd). Mr Craig is a member of the Australasian Institute of Mining and Metallurgy and has sufficient experience relevant to the style of mineralization and type of deposit under consideration 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 Craig consents to the inclusion in this report of the matters based on their information in the form and context in which they appear.

Forward Looking Statements

This document may include forward looking statements. Forward looking statements include, but are not necessarily limited to, statements concerning Caravel Minerals planned exploration programmes, studies and other statements that are not historic facts. When used in this document, the words such as "could", "indicates", "plan", "estimate", "expect", "intend", "may", "potential", "should" and similar expressions are forward looking statements. Such statements involve risks and uncertainties, and no assurances can be provided that actual results or work completed will be consistent with these forward-looking statements.

Previous Disclosure

The information in this report is based on the following Caravel Minerals ASX Announcements, which are available from the Caravel Minerals website www.caravelminerals.com.au and the ASX website www.asx.com.au:

- *25 August 2021 "Bindi Deposit – Updated Geological Model"*
- *23 November 2021 "Major Mineral Resource Upgrade – Caravel Copper Project"*
- *12 July 2022 "Caravel Copper Project Pre-Feasibility Study Highlights Robust, Executable Project and Reports Maiden Ore Reserve"*

ABOUT CARAVEL MINERALS

Caravel Minerals Limited (ASX:CVV) is advancing Definitive Feasibility Studies for the Caravel Copper Project, a large-scale, long-life (>28-year) copper project located 150km north-east of Perth in Western Australia's Wheatbelt region. The Project's PFS (July 2022) demonstrates a robust, executable project generating strong cash flows based on low operating costs, a low life-of-mine strip ratio, bulk mining methods, excellent metallurgy and low-cost grid power. Using automation and electrification technologies (ACE) for conventional open-pit mining and processing operations, Caravel will produce copper in a clean concentrate to be exported via existing public roads though local ports.