

#### 9 December 2020

# West Musgrave value and scale uplift in Pre-Feasibility Study Update

• ~25% increase in project Net Present Value to ~A\$1 billion, with IRR of ~20% (post-tax)¹ on minimal capital increase

- ~A\$4.5 billion undiscounted cashflow generated over life of mine
- Processing plant throughput uplift from 10 Mtpa to 12 Mtpa on increased grinding capacity
- ~15% increase in average annual production to ~32,000 tpa copper and of ~20% to ~26,000 tpa nickel in concentrates<sup>2</sup>
- ~6% decrease in operating costs of A\$32/t ore mined
- Ore Reserve tonnes of 253 Mt (100% Probable) at 0.35% Cu and 0.32% Ni<sup>3</sup>
- Off-grid renewable power solution confirmed; focus on developing a roadmap to 100% renewable generation
- \$67 million committed to progress the study ahead of final investment decision expected in 2022, subject to regulatory and other approvals

OZ Minerals today announced it would progress its study of the West Musgrave Project (WMP) following the release of the Pre-Feasibility Study Update (PFSU) for the Nebo and Babel deposits.

The PFSU incorporates strategic and technical updates resulting in an improvement to key project metrics relative to the Pre-Feasibility Study (PFS) released on 12 February 2020, including an increase to the processing plant throughput rate from 10 Mtpa to 12 Mtpa. The throughput increase has been achieved by leveraging additional grinding circuit capacity, based on further pilot plant test work, with minimal increase to capital costs.

An updated Probable Ore Reserve of 253 Mt at 0.35% Cu and 0.32% Ni was also declared, representing ~22 years of the ~26-year life of mine (LOM) demonstrated in the PFSU (with the balance of the mine life underpinned by a combination of Indicated and Inferred Mineral Resources). The changes to the Ore Reserve are due to the net result of updated operating costs based on increased throughput opportunity, metallurgical test work, and changes in metal price and exchange rate assumptions, partially offset by recovery/dilution

<sup>&</sup>lt;sup>1</sup> Assumes a third-party power purchase agreement and therefore no upfront capital associated with the power supply

 $<sup>^2</sup>$  These production targets must be read in conjunction with the Production Targets Cautionary Statement on page 4

<sup>&</sup>lt;sup>3</sup> See OZ Minerals announcement titled 'West Musgrave Project Nebo-Babel Deposits 2020 Mineral Resource and Ore Reserve Statement and Explanatory Notes as at 9 December 2020', released on 9 December 2020 and available at: <a href="https://www.ozminerals.com/operations/resources-reserves/">www.ozminerals.com/operations/resources-reserves/</a>

factors. The Ore Reserve underpinning the project is resilient to metal price and exchange rate fluctuations and, as such, modest fluctuations are unlikely to materially affect the Ore Reserve estimate and subsequent mine life.

OZ Minerals will now invest \$67 million to progress the study with a final investment decision expected in 2022 with the potential for some earlier progressive funding milestones. Key activities of the next stage of study will include advancing regulatory approvals, infill drilling to increase orebody confidence, engineering to increase capital and operating cost certainty and, importantly, ongoing engagement with the Ngaanyatjarra Community to ensure they increase their understanding of the project as it evolves and support its progression.

The key project metrics for the PFSU, compared to the PFS, are shown in Table 1 and are explained in the study summary below.

**Table 1: Key Project Metrics Compared to Pre-Feasibility Study** 

Key Financial and Production Metrics <sup>4</sup>	Unit	PFS February 2020 <sup>5</sup>	PFSU December 2020 <sup>6</sup>		
Processing capacity	Mtpa	10	12		
Life of Operation	Years	~26	~26		
Mineral Resource	Mt %	340 0.36% Cu and 0.33% Ni	390 <b>1</b> 0.34% Cu and 0.31% Ni		
Ore Reserve	Mt %	220 0.36% Cu and 0.33% Ni	253 <b>1</b> 0.35% Cu and 0.32% Ni		
Copper recovery/Nickel recovery	%WA	~78%/~69%	~77%/~69%		
Average Ni Production	ktpa	~22	~26		
Average Cu Production	ktpa	~28	~32		
Operating Cost (including mining costs)	A\$/t ore	~34	~32		
C1 cost payable Cu (net of full by-product credits)	US\$/lb	~(0.90)	~(0.90)		
C1 cost payable Ni (net of full by-product credits)	US\$/lb	~1.30	~1.40		
Pre-production capital (excluding study) <sup>7</sup>	A\$m	~995	~1,100		
Average net cash flow (post tax)	А\$Мра	~190	~220		
Post Tax NPV <sup>7</sup>	A\$m	~800	~1,000		
Post Tax IRR <sup>7</sup>	%	~20	~20		
Project payback from decision to mine <sup>7</sup>	Years	~6	~6		

<sup>&</sup>lt;sup>4</sup> The PFS and PFSU were prepared at a ±25% level of accuracy; these production targets must be read in conjunction with the Production Targets Cautionary Statement on page 4

<sup>&</sup>lt;sup>7</sup> Assumes a third-party power purchase agreement and therefore no upfront capital is associated with the power supply; a Power Purchase Agreement has been included as an operating expense. Ownership options for power infrastructure will be investigated further. Current estimates to build the power solution is circa A\$275 million.



<sup>&</sup>lt;sup>5</sup> All project values in real terms as at 1 January 2020

<sup>&</sup>lt;sup>6</sup> All project values in real terms as at 1 January 2021

OZ Minerals Managing Director and Chief Executive Officer, Andrew Cole, said:

"The PFSU brings together nine months of focussed strategic and technical review which has added significant value and further increased our confidence in the robustness of the project. The project continues to fulfill its ambition as a low carbon, low cost, long life copper and nickel mine, generating ~A\$4.5 billion in undiscounted cashflow over the life of mine.

"During the PFS we took an innovative approach to the mineral processing plant with the adoption of vertical roller mills as opposed to the traditional SAG and Ball Mill circuit. By partnering with a market leader of vertical roller mills during the study update we have been able to leverage additional grinding circuit capacity on the back of further pilot plant test work and increase throughput with minimal increase to capital costs.

"The PFSU work showed that increasing throughput from 10 Mtpa to 12 Mtpa reduces the processing operating costs allowing for an increase in the size of the open pits and results in an increase to both the Mineral Resource and Ore Reserve. The Mineral Resource and Ore Reserve also benefited by incorporating updated metal price, exchange rate assumptions and metallurgical test work improvements in the PFSU.

"With the Board approving further investment in the project we will be able to create additional value by progressing the project to the next stage of study prior to making a final investment decision in 2022.

"The value uplift to West Musgrave has further strengthened OZ Minerals' strong pipeline of organic growth opportunities. With 100% ownership of the project we are now in a position to consider opportunities in the context of our pipeline and its timing and funding requirements with the objective of maximising stakeholder value."

OZ Minerals wishes to thank the Project team members, contributing consultants and peer reviewers as well as those involved with the ongoing collaboration events including the Government of Western Australia, Ngaanyatjarra Community, industry partners and others for their input into the study update. A project update video is available at <a href="https://www.ozminerals.com/media/gallery">www.ozminerals.com/media/gallery</a>.



## **Forward Looking Statements**

This ASX Release has been prepared by OZ Minerals Limited (OZ Minerals) and consists of written materials concerning OZ Minerals. By reading this material, you agree to be bound by the following conditions.

No representation or warranty, express or implied, is made as to the fairness, accuracy, or completeness of the information, contained in this material or of the views, opinions and conclusions contained in this material. To the maximum extent permitted by law, OZ Minerals and its related bodies corporate and affiliates, and its respective directors, officers, employees, agents and advisers disclaim any liability (including, without limitation any liability arising from fault or negligence) for any loss or damage arising from any use of this material or its contents, including any error or omission there from, or otherwise arising in connection with it.

Some statements in this material are forward-looking statements. Such statements include, but are not limited to, statements with regard to capacity, future production and grades, projections for sales growth, estimated revenues and reserves, targets for cost savings, the construction cost of new projects, projected capital expenditures, the timing of new projects, future cash flow and debt levels, the outlook for minerals and metals prices, the outlook for economic recovery and trends in the trading environment and may be (but are not necessarily) identified by the use of phrases such as "will", "would", "could", "expect", "anticipate", "believe" and "envisage". By their nature, forward-looking statements involve risk and uncertainty because they relate to events and depend on circumstances that will occur in the future and may be outside OZ Minerals' control. Actual results and developments may differ materially from those expressed or implied in such statements because of a number of factors, including levels of demand and market prices, the ability to produce and transport products profitably, the impact of foreign currency exchange rates on market prices and operating costs, operational problems, political uncertainty and economic conditions in relevant areas of the world, the actions of competitors, activities by governmental authorities such as changes in taxation or regulation.

Given these risks and uncertainties, undue reliance should not be placed on forward-looking statements which speak only as at the date of this ASX Release. Subject to any continuing obligations under applicable law or any relevant stock exchange listing rules, OZ Minerals does not undertake any obligation to publicly release any updates or revisions to any forward looking statements contained in this material, whether as a result of any change in OZ Minerals' expectations in relation to them, or any change in events, conditions or circumstances on which any such statement is based.

Certain statistical and other information included in this material is sourced from publicly available third-party sources and has not been independently verified.

All monetary figures are expressed in Australian dollars unless stated otherwise.

# **Production Targets Cautionary Statement**

The Production Target and forecast financial information derived from the Production Target referred to in this ASX release is based on 83% Probable Ore Reserve, 2% Indicated Mineral Resource and 15% Inferred Mineral Resource. The modifying factors used in the estimation of the Ore Reserve were also applied to the Indicated Resource and Inferred Resource.

There is a low level of geological confidence associated with Inferred Mineral Resource and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resource or that the Production Target itself will be realised.

The material assumptions used in the estimation of the Production Target and associated forecast financial information are set out in West Musgrave Project Nebo-Babel Deposits 2020 Mineral Resource and Ore Reserve Statement and Explanatory Notes as at 9 December 2020 Table 1.

The Mineral Resource and Ore Reserve estimates underpinning the Production Target were prepared by Competent Persons in accordance with the JORC Code 2012.



## West Musgrave Mineral Resources and Ore Reserves

The information on the West Musgrave Mineral Resource and Ore Reserve estimates in this document are extracted from the document entitled "West Musgrave Project Nebo-Babel Deposits 2020 Mineral Resource and Ore Reserve Statement and Explanatory Notes as at 9 December 2020" that was also released today. The West Musgrave Mineral Resource and Ore Reserve estimates in this document should be read in conjunction with that release.

This announcement is authorised for market release by OZ Minerals' Managing Director and CEO, Andrew Cole.

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# West Musgrave Copper and Nickel Project

December 2020

# Pre-Feasibility Study Update Executive Summary

# West Musgrave Project Pre-Feasibility Study Update

#### Introduction

- The West Musgrave Project (WMP) is a significant greenfield copper and nickel project located in the remote, highly prospective West Musgrave Mineral Province of central Western Australia.
- The Nebo and Babel deposits were discovered in 2000. Since then, the deposits have been extensively drilled and studied progressively by WMC Resources, BHP Billiton, Cassini Resources Limited (Cassini), and a Joint Venture between Cassini and OZ Minerals. This history culminated in a Pre-Feasibility Study (PFS) which was released in February 2020 by the Joint Venture, with a Net Present Value (NPV) of ~A\$800 million based upon open pit mining with a processing throughput of 10 Mtpa and a life of mine of 26 years.
- Since February, OZ Minerals has reviewed a series of potential schedule and scope optimisation initiatives in relation to the WMP. During this same period, OZ Minerals became 100 per cent owner of the project following the acquisition, by Scheme of Arrangement, of Cassini's 30 per cent of the project. The acquisition was based on a desire for development scope and funding flexibility.
- The review of schedule and scope optimisation initiatives has confirmed the economic benefits of increasing the capacity of the processing plant to accommodate an increased processing rate from 10 Mtpa to 12 Mtpa. This optimisation reduces the processing unit operating costs and allows an increase in the size of the open pits, which, in turn, increases both the Mineral Resource and Ore Reserve (MROR) estimate. The updated mine profile generates a higher NPV of ~A\$1 billion and maintains the 26-year mine life.
- A PFS Update (PFSU) was developed to consolidate the findings of the review and is summarised in the following pages.
- Renewable energy for the project continues to be a key focus in the next phase of study, with an ongoing
  commitment to an off-grid renewable power solution. With a future focus on developing a roadmap to
  100% renewable generation, and reducing dependency upon fossil fuels over time, West Musgrave will
  become one of the largest fully off-grid, renewable powered mines in the world.
- A key focus for the next phase of the project is to now progress these items from early 2021 through to supporting a final investment decision.

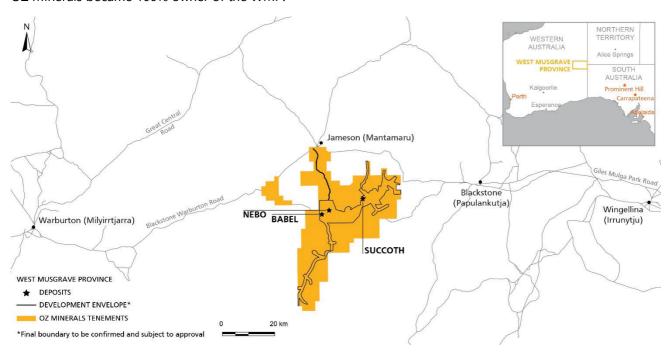


## **Background and Context**

The WMP is a significant greenfield copper and nickel project located in the remote Ngaanyatjarra Aboriginal Lands of central Western Australia. The proposed project represents the first major mining project in the Ngaanyatjarra Lands and within the highly prospective West Musgrave Mineral Province.

The WMP is located in the West Musgrave Ranges of Western Australia, approximately 1,300 km north-east of Perth and 1,400 km north-west of Adelaide, near the intersection of the borders between Western Australia, South Australia and Northern Territory. The nearest towns include the Indigenous Communities of Jameson (Mantamaru) 26 km north, Blackstone (Papulankutja) 50 km east, and Warburton (Milyirrtjarra) 110 km west of the project (Figure 1).

The Nebo and Babel deposits were discovered by WMC Resources in 2000 and acquired by BHP Billiton in 2005. In 2014 Cassini Resources Limited (Cassini) acquired the project and undertook an extensive drilling and study program, completing a Scoping Study in 2015. In 2016, OZ Minerals entered into a Joint Venture Agreement with Cassini. A Further Scoping Study was completed by the Joint Venture in late 2017 and a PFS in 2020, a summary of which was released on 12 February 2020. With the acquisition of Cassini on 5 October 2020 OZ Minerals became 100% owner of the WMP.



**Figure 1: West Musgrave Project Location** 

# **Project Overview**

A summary of the key technical features of the WMP open pit mine is provided in Table 2. The PFSU is an incremental increase to the project provided in the PFS released to the ASX on 12 February 2020, whilst retaining a large number of common components.



**Table 2: West Musgrave PFS and PFSU Project Features Comparison** 

Component	WMP PFS <sup>8</sup>	WMP PFSU <sup>9</sup>
Mining		
Mineral Resource	280 Mt Indicated and 63 Mt Inferred at a combined grade of 0.33% Ni and 0.36% Cu	310 Mt Indicated and 82 Mt Inferred at a combined grade of 0.31% Ni and 0.34% Cu
Pits	Nebo and Babel to a maximum depth of ~500 m	Nebo and Babel to a maximum depth of ~520 m
Ore Reserve	220 Mt (100% Probable) at 0.33% Ni and 0.36% Cu	253 Mt (100% Probable) at 0.32% Ni and 0.35% Cu
Mining Rate	~31 Mtpa (pre-strip and stockpiling), ~34 Mtpa (Yr1–5), ~43 Mtpa (Yr6–LOM)	~32 Mtpa (pre-strip and stockpiling), ~50 Mtpa (Yr1–5), ~20 to 65 Mtpa (Yr6–LOM)
Strip Ratio	~3.3 LOM average	~3.4 LOM average
Life of Mine	~25 Years	~26 Years
Mining Profile	~0.5-year pre-strip and stockpiling, ~25 years from first production	~0.5-year pre-strip and stockpiling, ~26 years from first production
Operations	Contractor Mining Yr1–5, Owner Operate Yr6–LOM	Contractor Mining Yr1–5, Owner Operate Yr6–LOM
Processing		
Flowsheet	10 Mtpa, crushing, vertical roller mill, flotation producing separate nickel and copper concentrates	12 Mtpa, crushing, vertical roller mill, flotation producing separate nickel and copper concentrates
Operation Life	~26 years from first production	~26 years from first production
Nickel Grade	~0.42% (Yr1–5) ~0.31% (Yr6–LOM)	~0.39% (Yr1–5) ~0.31% (Yr6–LOM)
Copper Grade	~0.45% (Yr1–5) ~0.34% (Yr6–LOM)	~0.42% (Yr1–5) ~0.34% (Yr6–LOM)
Recoveries	~69% Ni and ~78% Cu LOM	~69% Ni and ~77% Cu LOM

<sup>&</sup>lt;sup>8</sup> All project values in real terms as at 1 January 2020

<sup>&</sup>lt;sup>9</sup> All project values in real terms as at 1 January 2021



Component	WMP PFS <sup>8</sup>	WMP PFSU <sup>9</sup>
Concentrate Grades	~10–11% Ni in Ni Concentrate, ~25–26% Cu in Cu Concentrate	~12–13% Ni in Ni Concentrate, ~29–30% Cu in Cu Concentrate
Nickel Production <sup>10</sup>	~27,000 tpa (Yr1–5) ~22,000 tpa (Yr6–LOM)	~29,000 tpa (Yr1–Yr5) ~25,000 tpa (Yr6–LOM)
Copper Production <sup>10</sup>	~33,000 tpa (Yr1–5) ~27,000 tpa (Yr6–LOM)	~37,000 tpa (Yr1–Yr5) ~31,000 tpa (Yr6–LOM)
Infrastructure		
Roads	Upgrade of existing ~30 km road from site to Jameson	Upgrade of existing ~30 km road from site to Jameson
Tailings Storage Facility	Two cells with water recycled back to process Upstream raises with downstream buttressing with mine waste rock	Two cells with water recycled back to process Upstream raises with downstream buttressing with mine waste rock
Village and Airstrip	400-person operations village and airstrip located at site	450 permanent ensuite rooms for operations village and airstrip located at site
Water	7 GL/a Northern Borefield ~15 km from site	7.5 GL/a Northern Borefield ~15 km from site
Power	50 MW Power Purchase Agreement, Hybrid Renewables (wind, solar, battery, plus diesel or gas)	50 MW Power Purchase Agreement, Hybrid Renewables (wind, solar, battery, plus diesel or gas)
Logistics	Containerised road transport to Leonora, rail to Esperance for bulk shipping to customers	Containerised road transport to Leonora, rail to Esperance for bulk shipping to customers
Customers	Nickel and copper smelters in Australia, Asia and Europe Potential to expand customer base to include battery manufacturers subject to results of future study into production of nickel-cobalt mixed hydroxide precipitate	Nickel and copper smelters in Australia, Asia and Europe Potential to expand customer base to include battery manufacturers subject to results of future study into production of nickel-cobalt mixed hydroxide precipitate

 $<sup>^{10}</sup>$  These production targets must be read in conjunction with the Production Targets Cautionary Statement on page 4

## **Risk-Based Thinking**

The WMP PFSU was completed using a risk-based approach and an opportunity and threat mindset. The risks identified throughout the PFSU have been used as the foundation for the work planned in the next phase of the study. The opportunities and threats to be advanced in the next phase of the project include:

- Increased mineral resource confidence and conversion
- Expansion roadmap including future minerals processing capacity
- Early customer engagements, logistics and marketing strategy
- Roadmap to net-zero carbon operation and energy cost reduction
- West Musgrave Mineral Province strategy including nearby Succoth deposit
- Downstream value-add options including Mixed Hydroxide Precipitate (MHP) containing nickel and cobalt
- Regulatory approvals, Mining Agreement and Land Access negotiations
- Improved cost certainty and execution planning
- Detailed scheduling and preparation for long-lead procurement
- Finalisation of various technical aspects, including water supply and management, and the grade control strategy.

# **Financial Analysis**

A robust financial analysis has been undertaken on the updated project for the PFSU. Relative to the PFS, the outcome of the analysis provides evidence of an increase in NPV of ~A\$200 million, as detailed below.

#### **Cost Estimate**

The estimate was compiled by OZ Minerals using inputs from a range of engineering consultants, in particular GR Engineering Services (GRES) for process plant and elements of the infrastructure costs. As this PFSU is a PFS-level estimate it has an accuracy of circa +/- 25%. The cost estimate has a base date of January 2021. Engineering has been completed on packages to an advanced PFS-level of definition including sufficient drawings to allow material take off for bulk materials. All major equipment and bulk materials have been quoted directly for this project, while minor equipment costing, and labour rates have been sourced from current industry rates. Contingencies have been determined through risk assessment, with an allowance of ~A\$65 million for inherent risks (uncertainties due to estimate immaturity) built into each package and a further project contingency of A\$50 million determined for contingent risks that may eventuate during construction (a total contingency of circa 12% of capital cost estimate).

A summary of the capital cost by project component is provided in Table 3, with an average operating cost for the Life of Mine provided in Table 4.

**Table 3: Capital Cost** 

Capital Cost Estimate*	PFS (A\$m)	PFSU (A\$m)
Mining	~90	~90
Process Plant	~285	~340
Infrastructure	~265	~335
Project Execution	~170	~140
Owners Costs	~70	~80
Contingency	~115	~115
Total	~995	~1,100

<sup>\*</sup> Excludes study costs and assumes a third-party power purchase agreement and therefore no upfront capital associated with the power supply

**Table 4: LOM Average Operating Cost** 

Operating Cost Estimate	PFS (A\$/t Ore)	PFSU (A\$/t Ore)		
Mining	~12.70	~11.40		
Process Plant	~13.90	~13.30		
G&A	~0.80	~1.50		
Concentrate Logistics	~6.90	~6.00		
Total	~34.30	~32.20		

Post-production growth capital of \$105 million is assumed in year six to year seven and is related to the purchasing of the owner-operator fleet, realising a lower mining cost. Life of mine sustaining capital of \$295 million has been determined, covering tailings storage facility lifts, process plant and mining fleet.

The capital cost excludes inflation and sunk costs up to 1 January 2021. Given the current assumption that power is purchased under a Power Purchase Agreement arrangement, the capital cost excludes any capital associated with power generation (current estimate is circa A\$275 million) but does include capital for power distribution on site.

The financial analysis includes an estimate of \$105 million for closure costs and a \$7 million per year corporate charge.

#### **Key Financial Metrics**

A summary of the key financial metrics and sensitivities is provided in Table 5 and Table 6, all in real terms. A comparison of the key financial metrics for the PFSU relative to the PFS is provided in Table 7.



**Table 5: Key Financial Metrics** 

Metric	Unit	PFS	PFSU
Nickel Price	US\$/lb	7.60	7.60
Copper Price	US\$/lb	2.91	2.91
Exchange Rate	A\$:\$US	0.67	0.70
Discount Rate		8.5%	8.5%
Net Present Value <sup>(1)</sup>	A\$m	~800(2)	~1,000 <sup>(3)</sup>
Internal Rate of Return <sup>(1)</sup>		~20%	~20%

<sup>(1):</sup> Assumes a third-party power purchase agreement and therefore no upfront capital associated with the power supply

**Table 6: Financial Sensitivities** 

Base Case NPV: ~\$1b*	-25%	+25%
Nickel Price	~\$300m	~\$1,800m
Copper Price	~\$600m	~\$1,400m
Exchange Rate	~\$2,400m	~\$140m
Capital Cost	~\$1,200m	~\$800m
Operating Cost	~\$1,600m	~\$400m

<sup>\*</sup> Assumes a third-party power purchase agreement and therefore no upfront capital associated with the power supply

**Table 7: Summary of Key Project Metrics** 

<b>Key Financial and Production Metrics</b> 11	Unit	PFS	PFSU
Processing capacity	Mtpa	10	12
Life of Operation	Years	~26	~26
Min and Dagguer	Mt	340	390
Mineral Resource	%	0.36% Cu and 0.33% Ni	0.34% Cu and 0.31% Ni
One Personal	Mt	220	253
Ore Reserve	%	0.36% Cu and 0.33% Ni	0.35% Cu and 0.32% Ni
Copper recovery/Nickel recovery	%WA	~78%/~69%	~77%/~69%
Average Ni Production	ktpa	~22	~26
Average Cu Production	ktpa	~28	~32
Operating Cost (including mining costs)	A\$/t ore	~34	~32
C1 cost payable Cu (net of full by-product credits)	US\$/lb	~(0.90)	~(0.90)
C1 cost payable Ni (net of full by-product credits)	US\$/lb	~1.30	~1.40
Pre-production capital (excluding study)	A\$m	~995	~1,100
Average net cash flow (post tax)	А\$Мра	~190	~220
Post Tax NPV	A\$m	~800	~1,000
Post Tax IRR	%	~20	~20
Project payback from decision to mine	Years	~6	~6

<sup>&</sup>lt;sup>11</sup> Refer to Footnotes 8 and 9

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<sup>(2):</sup> Valuation Date is 1 January 2020

<sup>(3):</sup> Valuation Date is 1 January 2021



#### **Project Funding**

Funding for the project's next phase of study of \$67 million has been approved by the OZ Minerals Board. The availability of funding to support the capital requirement for the development of the WMP is assumed in the PFSU. OZ Minerals has the capacity to fund the expected project commitments through to final investment decision from net operating cash and existing facilities. The funding of final project capital will continue to be influenced by a variety of factors including the level of participation, the final strategy for development of power infrastructure, and additional portfolio options. Discussions continue with a range of interested parties covering a variety of funding options including debt financing, offtake and other funding mechanisms. Investors should continue to note that there is no certainty that OZ Minerals will be able to raise the funding required, or that funding may only be available on terms that may be dilutive to or otherwise affect the value of existing shares on issue.

## West Musgrave Mineral Resources and Ore Reserves

Associated with the PFSU is an update to the MROR Statement, which is summarised below. For the full MROR Estimate, refer to the updated West Musgrave Project Nebo-Babel Deposits Mineral Resources and Ore Reserves Statement and Explanatory Notes as at 9 December 2020, released with this PFSU Summary.

## **West Musgrave Mineral Resources**

A detailed explanation of the Nebo-Babel geology can be found in the MROR Statements<sup>12</sup>.

The West Musgrave December 2020 Mineral Resources (Table 8) for the combined Nebo-Babel deposits has been estimated at 390 million tonnes of nickel and copper mineralisation grading 0.31% nickel and 0.34% copper. This Mineral Resource estimate update supersedes the previously reported Mineral Resource estimated for the West Musgrave's Nebo-Babel deposits released on 12 February 2020 as part of the West Musgrave PFS (Table 2). The updated Mineral Resource has been reported at a Net Smelter Return (NSR) cut-off of A\$20/t. The A\$20/t value represents the PFSU mill limited break-even cut-off of A\$17 per ore tonne mined, plus an all-inclusive mining cost of A\$2.76 per total tonne mined. Mineral Resources were further constrained within optimised pit shells utilising a 1.2 revenue factor. Within the optimised pit shells, OZ Minerals' assumed metal prices are multiplied by 1.2 on a block-by-block basis, to allow for potential higher future revenue values and reasonable prospects for eventual economic extraction. The Mineral Resource estimates have been reported in accordance with the 2012 edition of the JORC Code.

<sup>&</sup>lt;sup>12</sup> See OZ Minerals announcement titled 'West Musgrave Project Nebo-Babel Deposits 2020 Mineral Resource and Ore Reserve Statement and Explanatory Notes as at 9 December 2020', released on 9 December 2020 and available at: <a href="https://www.ozminerals.com/operations/resources-reserves/">www.ozminerals.com/operations/resources-reserves/</a>

Table 8: Nebo-Babel Mineral Resource as at 9th December 2020

Category	Deposit	Tonnes	Ni	Cu	Au	Ag	Со	Pd	Pt	Ni metal	Cu metal
	•	(Mt)	(%)	(%)	ppm	ppm	ppm	ppm	ppm	(kt)	(kt)
	Babel	260	0.30	0.34	0.06	1.0	120	0.09	0.08	780	880
Indicated	Nebo	52	0.36	0.32	0.04	0.73	140	0.08	0.06	180	170
	Sub- total	310	0.31	0.34	0.06	0.96	120	0.09	0.08	970	1,000
	Babel	79	0.32	0.37	0.06	1.2	120	0.10	0.09	250	290
Inferred	Nebo	2.3	0.32	0.33	0.04	0.53	120	0.08	0.06	7.5	7.7
	Sub- total	82	0.32	0.37	0.06	1.1	120	0.10	0.09	260	300
la de la f	Babel	340	0.31	0.35	0.06	1.1	120	0.10	0.08	1,000	1,200
Ind + Inf	Nebo	54	0.36	0.32	0.04	0.72	140	0.08	0.06	190	170
Total		390	0.31	0.34	0.06	1.0	120	0.09	0.08	1,200	1,300

Table is subject to rounding errors. Data is reported to significant figures to reflect appropriate precision in the estimate and this may cause some apparent discrepancies in totals.

The updated West Musgrave Mineral Resource estimate for the combined Nebo-Babel deposits is a restatement of the existing Mineral Resource estimations at a lower NSR cut-off grade. The decrease in reporting cut-off is driven by decreased operating costs based on an increased throughput opportunity, metallurgical test work and favourable changes in metal price assumptions that support MROR estimates, resulting in an expansion of the reportable pit shell.

The decrease in reporting NSR cut-off to A\$20/t (-13%) and the increased size of the optimised reporting pit shell has resulted in a significant increase in the estimated Mineral Resource tonnage. The West Musgrave Mineral Resource estimate for the combined Nebo-Babel deposits increased by 50 million tonnes (~15%) and ~100 kilotonnes of nickel and copper metal (~9% and ~8%, respectively) relative to the previous combined Mineral Resource estimates for Nebo and Babel in February 2020.

All NSR assumptions including metal prices, recoveries, royalties, concentrate payability, concentrate transport and penalties are based on the PFSU at December 2020 and align with December 2020 PFSU optimisation inputs. Further details of the NSR calculation can be found in the MROR Statements<sup>13</sup>.

#### West Musgrave Ore Reserve

The Updated West Musgrave Ore Reserve estimate supersedes the February 2020 estimates released on 12 February 2020. The Ore Reserve estimates have been reported in accordance with the 2012 edition of the JORC Code.

The Ore Reserve estimate for West Musgrave as at 9 December 2020 is summarised in Table 9 and reported between the final open pit design and the original topography.

<sup>&</sup>lt;sup>13</sup> See footnote 12 above



Ore tonnes, contained nickel metal and contained gold metal, increased by 33 million tonnes, 90 thousand tonnes and 100 thousand tonnes respectively. The changes are due to the net result of updated operating costs based on the increased throughput opportunity, metallurgical assumptions and favourable changes in metal price assumptions and exchange rate assumptions supporting MROR estimates, partially offset by recovery/dilution factors.

In addition to the Ore Reserves, which are entirely based on Indicated Resources, the mine plan includes an additional 51 Mt at 0.33% Ni and 0.37% Cu derived from Indicated and Inferred Resources which are mined predominantly towards the end of the current mine plan. Production targets and forecast financial information set out in the PFSU are based on 83% Probable Ore Reserve, 2% Indicated Mineral Resource and 15% Inferred Mineral Resource. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the Production Target itself will be realised. The quantity of Inferred material within the mine plan is minimal, will be mined at the back end of the mine life and is not considered material to the project.

Table 9: Nebo-Babel Ore Reserve as at 9th December 2020<sup>14</sup>

Deposit	Classification	Ore (Mt)	Ni (%)	Cu (%)	Au (ppm)	Ag (ppm)	Co (ppm)	Pd (ppm)	Pt (ppm)	Ni Metal (kt)	Cu Metal (kt)
Nebo	Probable	33	0.41	0.36	0.04	0.8	150	0.10	0.10	140	120
Babel	Probable	220	0.31	0.35	0.06	1	120	0.10	0.10	680	770
Total	Probable	253	0.32	0.35	0.06	1	120	0.10	0.10	820	890

Table is subject to rounding errors. Data is reported to significant figures to reflect appropriate precision in the estimate and this may cause some apparent discrepancies in totals.

#### Mining

The deposits are near-surface and easily accessible by open pit mining with a pre-strip and initial ore stockpile for processing plant commissioning of approximately 32 Mt, some of which will be free dig. Processing rates between 10 Mtpa and 12 Mtpa have been thoroughly examined and an optimised rate of 12 Mtpa selected. Stockpile strategies and in-pit dumping of waste have all been optimised to minimise operating cost and maximise mill feed grade. Figure 2 shows the updated open pit designs for Nebo and Babel, with the PFS pit extent shown as a dotted line for comparison.

Mining continues to be modelled as conventional drill, blast, load and haul (Figure 3) and assumed to be contractor operated during the first five years of operation, transitioning to owner operate in year six. The haulage fleet will comprise up to 25, 220 t haul trucks and optionality is being maintained to allow for these trucks to be fully autonomous in the future.

Babel will be mined for the first two years to access higher grade, near-surface mineralisation, with Nebo to begin mining in year three.

<sup>&</sup>lt;sup>14</sup> See footnote 12 above



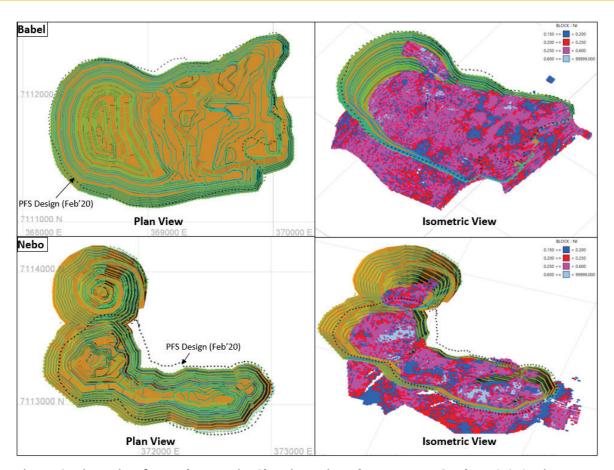
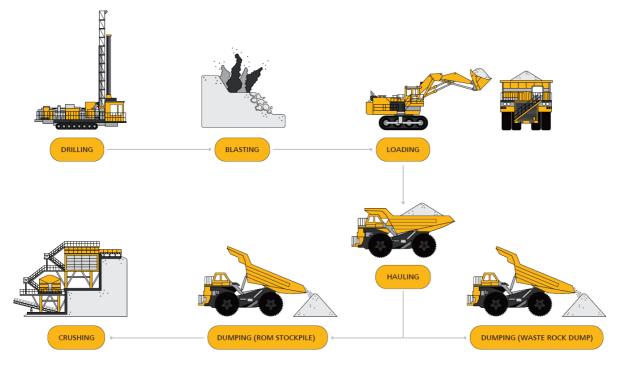


Figure 2: Pit Design for Both Deposits Showing Minerals Resources Grades >0.15%Ni



**Figure 3: Conventional Mining Flow Chart** 

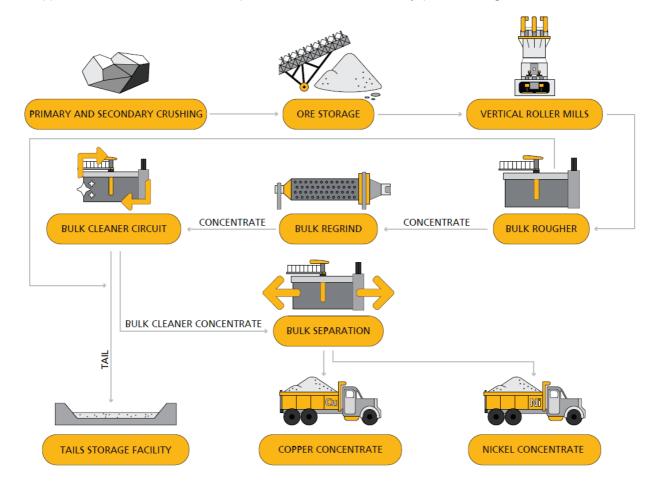


# **Metallurgy and Processing**

A technology-focused innovative mineral processing plant will be built on site. The comminution circuit consists of primary and secondary crushing followed by two parallel vertical roller mills treating nominally 6 Mtpa each. The application of the Vertical Roller Mill technology has been peer reviewed for West Musgrave by an independent expert and has been substantially de-risked through a series of pilot tests. The flotation flowsheet uses bulk rougher flotation, regrinding, two stages of bulk cleaning, then copper nickel separation at elevated pH. The principal component of the bulk flowsheet will be the Direct Flotation Reactor<sup>®</sup>, further reducing energy consumption and improving concentrate grade quality. The flowsheet was thoroughly tested via locked cycle testing and piloting.

The overall flowsheet remains largely equivalent to that in the PFS. The capacity of the processing plant has been increased to accommodate a 12 Mtpa throughput.

The nickel concentrate is a high-quality product with a low MgO content, is low in arsenic and other impurities. The copper concentrate is also low in impurities and includes minor by-products of gold and silver.



**Figure 4: Simplified Processing Flowsheet** 



### **Tailings Storage Facility**

The design of the Tailings Storage Facility (TSF) remains the same as that presented in the PFS, however a siting study and geotechnical review is ongoing to determine a potentially more favourable location. The design is a two-cell TSF built as a hybrid system which includes upstream raises and downstream buttressing using mine waste. The facility will be unlined with underdrainage designed to capture seepage for return to the process plant during operations. The Nebo pit will be utilised for tailings disposal from year 20 onwards. Utilising the Nebo pit will have an added benefit in minimising long-term groundwater drawdown by avoiding the development of a pit lake. The final design of the TSF will depend on demonstrating to the Regulator that all risks are adequately managed and as such the design is subject to change.

Mine waste rock will be stored adjacent to each pit with potentially acid forming material fully encapsulated. Inpit dumping of waste will be utilised for Babel in years eight to 10 to minimise haulage distances and improve environmental outcomes.

#### Surface Infrastructure

## **Water Supply**

Groundwater drilling will continue in 2021 to progress the understanding of the water supply available. The groundwater drilling and subsequent groundwater modelling completed to date demonstrates a sustainable, high quality water supply from local paleochannels of 7.5 GL/a, sufficient to supply the 12 Mtpa processing plant. The Nebo pit intersects one such palaeochannel and as such requires dewatering prior to mining. The borefield will be located to the north-east, approximately 15 to 25 km from the operation, and be supplemented by water recovered during pit dewatering. Alternate water supply has also been considered with paleochannels immediately south of the proposed development area having confirmed water supply.

#### **Power Supply**

The 50 MW power supply (with a Build-Own-Operate-Maintain (BOOM) capital estimate of circa A\$275 million) proposed in the PFS, utilising a hybrid solar-wind-battery-diesel solution, continues to be the base case for the PFSU. The base case continues to assume a Power Purchase Agreement which is included in operating costs and therefore not in the capital estimate. The final ownership structure for the power assets will continue to be assessed during the next phase of project.

Modelling has demonstrated that circa 70–80% renewables penetration can be achieved for the site, with the current modelled to be an optimised mix of wind, solar and diesel supported by a battery installation. There remains considerable upside in power cost through matching plant power demand with the availability of renewable supply (load scheduling), haulage electrification to maximise the proportion of renewable energy utilised and the continued improvement in the efficiency of renewable energy solutions.

Should the renewables option be implemented, this innovative power supply solution would make West Musgrave one of the largest fully off-grid, renewable powered mines in the world. The solution would result in the avoidance of in excess of 220,000 tpa of carbon dioxide emission compared to a fully diesel-powered operation.

### **Logistics Route**

The logistics route assessment from the PFS remains unchanged, with the logistics route to market including road transport along the Great Central Road to a central hub at Leonora, followed by rail transport to Esperance. Super Quad road trains are proposed to be used to transport concentrate in half height containers, with empty concentrate trucks returning to site being utilised for backhaul of reagents, diesel and other consumables. The capital cost estimate includes an upgrade of the existing 30 km access track from site to Jameson.

## **Execution Strategy**

The capital cost estimate has continued to be developed assuming an Engineering, Procurement, Construction Management (EPCM) delivery model, however, OZ Minerals will further investigate execution models in the next phase of the project. An indicative project timeline is shown in Figure 5 which continues to see production potentially commencing in 2024.

2021	2022	2023	2024	
Next Study Phase	Engineering, Procu	rement and Construction		
Regulatory Approvals			Prestrip	

**Figure 5: Indicative Project Timeline** 

#### **Operating Philosophy**

The project will operate as a fly-in-fly-out operation. An airstrip and 450 permanent ensuite rooms in the operations village will be constructed at the site and are aligned with the increase in the scale of the project. Approximately 60 personnel are to be employed in operations monitoring, control and planning functions located in an offsite Remote Operations Centre (ROC).

# Community

The WMP has been studied with a view to creating opportunities across the West Musgrave Mineral Province for OZ Minerals' stakeholders today, and for future generations of the Traditional Owners of the land. The WMP is located entirely within the Ngaanyatjarra Lands of central Western Australia, within Class A Aboriginal Reserve held by the Ngaanyatjarra Land Council on behalf of the Traditional Owners for the use and benefits of Aboriginal inhabitants, and within the Yarnangu Ngaanyatjarraku Parna (Aboriginal Corporation) Native Title Determination. The Ngaanyatjarra Aboriginal People who have the strongest connection with the land live in the nearest towns which are the Indigenous Communities of Jameson (Mantamaru), Blackstone (Papulankutja) and Warburton (Milyirrtjarra) (Figure 1). Jameson (Mantamaru) is located 26 km north of the WMP, Warburton (Milyirrtjarra) is 110 km west and Blackstone (Papulankutja) is 50 km east of the WMP.

A *Lurrtju (Together) Partnering Statement* was developed between OZ Minerals and the Ngaanyatjarra Group and finalised on 25 October 2019. The Partnering Statement documents how the two parties will work together to achieve shared value. The Partnering Statement is a prelude to the mining agreement-making process which will continue in 2021.



During the PFSU four days of consultation with relevant West Musgrave Traditional Owners was undertaken. This consultation consisted of on-country bush trips with groups of relevant Traditional Owners to explain the outcomes of the environmental study program and impact assessment for the project prior to submission of the Referral under Section 38 of Part IV of the *Environmental Protection Act, 1986* (WA) (EP Act).

Although regular in-person meetings with the Steering Committee have not been possible due to COVID-19 related travel restrictions, OZ Minerals has continued to provide project updates, seek feedback and check-in on the health of the community by remote means.

## **Government Engagement**

The dedicated government engagement strategy developed during the PFS is ongoing and consistent. The key objectives of this strategy include building OZ Minerals and the West Musgrave Project profile in Western Australia, working with government stakeholders to realise shared value opportunities for the West Musgrave region and maintaining momentum for the project's regulatory pathway as a priority.

OZ Minerals continues to have regular interactions with the key contacts of the Government of Western Australia. via remote means due to COVID-19 related travel restrictions and continue to grow a positive relationship.

### **Regulatory Approvals**

The first of three primary approvals submissions, assessment under Section 38 of Part IV of the EP Act was submitted to the Government of Western Australia on 23 October 2020. Information obtained in the environmental baseline work program to date does not indicate any material threats to the obtainment of this approval.

The remaining two primary approval submissions are a Mining Proposal under the *Mining Act, 1978* (WA) (Mining Act) and a Works Approval under Part V of the EP Act. These two submissions are planned for submission in 2021 when further detailed engineering and design have been completed. To date the planned approvals schedule indicates that all required regulatory approvals will be obtained in advance of the planned decision to mine.

## **Next Steps**

The next phase of the project will include critical path activities such as government approvals, Mining Agreement discussions, engineering partner selection and field activity preparation. The next phase of study assessment will continue through 2021 towards developing a full evaluation to inform a final investment decision expected in 2022.



# **Key Contributors**

OZ Minerals would like to thank the following organisations for their contribution in the development of the Pre-Feasibility Study Update:

- AMC Consultants
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- GR Engineering Services
- Loesche
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- Noble Environs.