

## AUSTRALIA – Cobar Basin

- Active gold & silver producer at Wonawinta and Mt Boppy
- Exceptional exploration potential within the Cobar Basin
- Valuable production infrastructure, strategically located

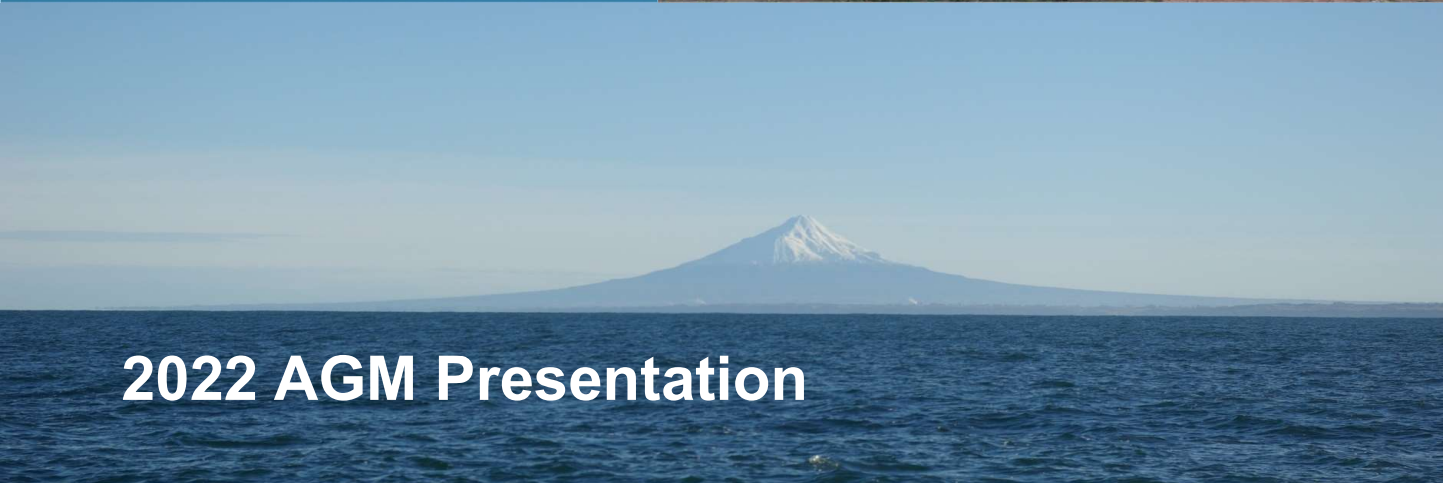
November 2022



## 2022 AGM Presentation

## NEW ZEALAND – Taranaki green VTM project

- World class tier 1 project
- Offshore vanadium titan-magnetite project, west coast, North Island
- Lowest quartile CO2 emissions for bulk project



# Summary of Proxy Voting



Resolution	For		Against		Discretionary		Unusable For		Totals		Exclusions		Abstain	
	Votes	Holders	Votes	Holders	Votes	Holders	Votes	Holders	Votes	Holders	Votes	Holders	Votes	Holders
1 Adoption of Remuneration Report	49,406,882	49	880,425	10	12,187,873	11	0	0	62,475,180	70	91,012,605	6	45,400	3
	79.08%	70.00%	1.41%	14.29%	19.51%	15.71%	0.00%	0.00%						
2 Re-election of Director – Dr Nicholas Lindsay	140,568,585	58	716,165	6	12,192,273	12	0	0	153,477,023	76	0	0	56,162	3
	91.59%	76.32%	0.47%	7.89%	7.94%	15.79%	0.00%	0.00%						
3 Election of Director – Mr Alan Eggers	141,759,731	62	709,724	4	11,007,568	10	0	0	153,477,023	76	0	0	56,162	3
	92.37%	81.58%	0.46%	5.26%	7.17%	13.16%	0.00%	0.00%						
4 Election of Director – Mr John Seton	141,224,532	61	709,724	4	11,542,767	11	0	0	153,477,023	76	0	0	56,162	3
	92.02%	80.26%	0.46%	5.26%	7.52%	14.47%	0.00%	0.00%						
5 Amendment to Constitution	141,691,167	58	259,036	6	11,015,632	11	0	0	152,965,835	75	0	0	567,350	4
	92.63%	77.33%	0.17%	8.00%	7.20%	14.67%	0.00%	0.00%						
6 Grant of Options to Mr Alan Eggers	47,242,354	21	177,772	7	10,598,000	1	0	0	58,018,126	29	91,012,605	6	4,512,453	44
	81.43%	72.41%	0.31%	24.14%	18.27%	3.45%	0.00%	0.00%						

# 2022 Accounts and Reports

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## Receipt and Consideration of Account and Reports

To receive and consider the Financial Report, together with the Directors' Report and the Auditor's Report for the financial year ended 30 June 2022.

## Further information

- Ms Siobhan Hughes, the representative of Ernst & Young, the Company's external auditor is present and available to answer any queries.
- There is no requirement for Shareholders to Approve the Financial Report
- The 2022 Annual Report is available on the Company's website at [www.manukaresources.com.au](http://www.manukaresources.com.au)



# Resolution 1

## Adoption of Remuneration Report

To consider, and if thought fit, to pass, with or without amendment the following advisory only resolution:

*“That, for the purpose of section 250R(2) of the Corporations Act, and for all other purposes, the Remuneration Report, forming part of the Company’s 2022 Annual Report, be adopted.”*

In Favour	Proxy's Discretion	Against	Abstain / Exclude
49,406,882	12,187,873	880,425	91,058,005
79.08%	19.51%	1.41%	

### Further information

- The Directors recommend that Shareholders vote in favour of adopting the Remuneration Report
- The Chair intends to exercise all available proxies in favour of the resolution
- Voting prohibitions apply as set out in the Notice of Meeting
- The 2022 Remuneration Report can be found on pages 25 to 30 of the 2022 Annual Report



## Resolution 2

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Re-election of Director – Mr Nicholas Lindsay

This resolution has been withdrawn.



# Resolution 3

## Election of Director – Mr Alan Eggers

To consider and, if thought fit, to pass, with or without amendment, the following resolution as an **ordinary resolution**:

*“That, for the purposes of clause 13.3 of the Constitution and for all other purposes, Mr Alan Eggers, a Director, who retires after having been appointed a Director by the Board, and being eligible, is elected as a Director, effective on and from the conclusion of the Meeting.”*

In Favour	Proxy's Discretion	Against	Abstain / Exclude
141,759,731	11,007,568	709,724	56,162
92.37%	7.17%	0.46%	

### Further information

- The Directors recommend (with Mr Eggers abstaining) that Shareholders vote in favour of this resolution.
- The Chair intends to exercise all available proxies in favour of the resolution.
- Details of Mr Eggers’ experience and qualifications can be found on page 7 of the Explanatory Memorandum to the Notice of Meeting.



# Resolution 4

## Election of Director – Mr John Seton

To consider and, if thought fit, to pass, with or without amendment, the following resolution as an **ordinary resolution**:

*“That, for the purposes of clause 13.3 of the Constitution and for all other purposes, Mr John Seton, a Director, who retires after having been appointed a Director by the Board, and being eligible, is elected as a Director, effective on and from the conclusion of the Meeting.”*

In Favour	Proxy's Discretion	Against	Abstain / Exclude
141,224,532	11,542,767	709,724	56,162
92.02%	7.52%	0.46%	

### Further information

- The Directors recommend (with Mr Seton abstaining) that Shareholders vote in favour of this resolution.
- The Chair intends to exercise all available proxies in favour of the resolution.
- Details of Mr Seton’s experience and qualifications can be found on page 8 of the Explanatory Memorandum to the Notice of Meeting.



# Resolution 5

## Amendment to the Constitution

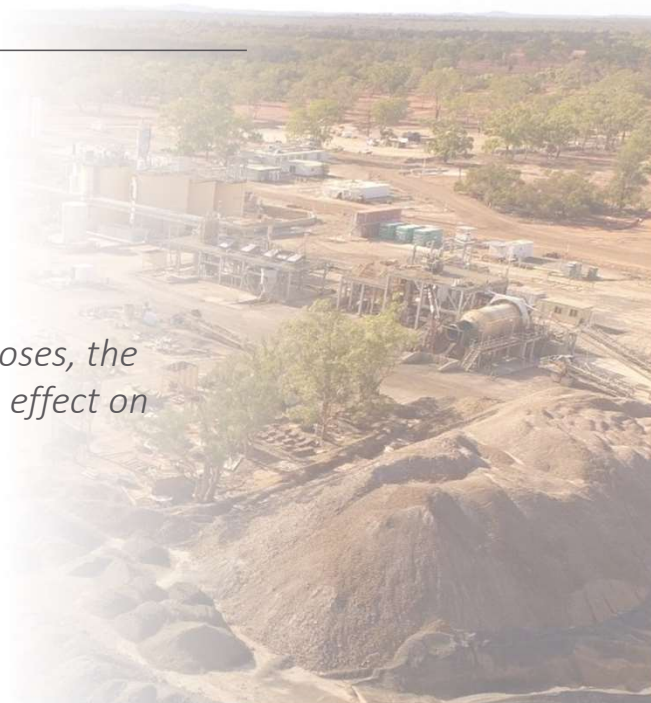
To consider and, if thought fit, to pass, with or without amendment, the following resolution as a **special resolution**:

*“That, for the purposes of section 136(2) of the Corporations Act and for all other purposes, the Constitution be amended in the manner set out in the Explanatory Memorandum, with effect on and from the close of the Meeting.”*

In Favour	Proxy's Discretion	Against	Abstain / Exclude
141,691,167	11,015,632	259,036	567,350
92.63%	7.2%	0.17%	

### Further information

- The Directors recommend (with Mr Eggers abstaining) that Shareholders vote in favour of this resolution.
- The Chair intends to exercise all available proxies in favour of the resolution.
- The proposed amendment will ensure that the Company has the flexibility to conduct virtual meetings if needed.
- This Resolution is a special resolution and requires support for 75% of the votes cast.





# Resolution 6

## Grant of Options to Mr Alan Eggers

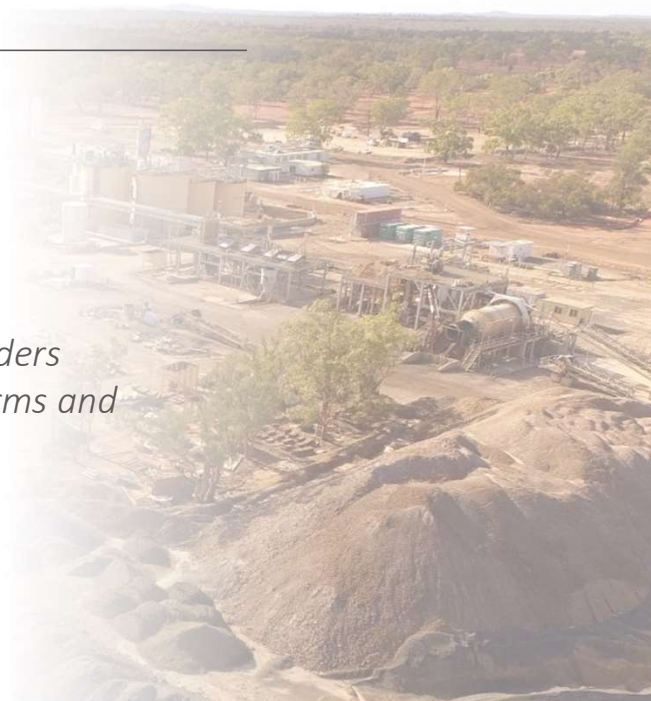
To consider and, if thought fit, to pass, with or without amendment, the following resolution as an **ordinary resolution**:

*“That, for the purposes of ASX Listing Rule 10.11 (and for all other purposes), Shareholders approve the grant of 12,000,000 Options to Mr Alan Eggers (or his nominee) on the terms and subject to the conditions set out in the Supplement to Notice of Meeting.”*

In Favour	Proxy's Discretion	Against	Abstain / Exclude
47,242,354	10,598,000	177,772	95,525,058
81.43%	18.27%	0.31%	

### Further information

- The Directors, other than Dr Alan Eggers, who has a material financial interest in the outcome, recommend that Shareholders vote in favour of this resolution.
- The Chair intends to exercise all available proxies in favour of the resolution
- Voting prohibitions apply as set out on page 2 of the Supplement to the Notice of Meeting.



## AUSTRALIA – Cobar Basin

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November 2022



**MANUKA**  
RESOURCES

## Chairman's address to the AGM

## NEW ZEALAND – Taranaki green VTM project

- World class tier 1 project
- Offshore vanadium titan-magnetite project, west coast, North Island
- Lowest quartile CO2 emissions for bulk project

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The Presentation includes forward-looking statements and comments about future events, including the Company's expectations about the performance of its businesses. Forward-looking words such as "expect", "should", "could", "may", "predict", "plan", "will", "believe", "forecast", "estimate", "target" or other similar expressions are intended to identify forward-looking statements. Such statements involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of the Company and which may cause actual results, performance or achievements to differ materially from those expressed or implied by such statements. Forward-looking statements are provided as a general guide only, and should not be relied on as an indication or guarantee of future performance. Given these uncertainties, recipients are cautioned to not place undue reliance on any forward-looking statement. Subject to any continuing obligations under applicable law, the Company disclaims any obligation or undertaking to disseminate any updates or revisions to any forward-looking statements in the Presentation to reflect any change in expectations in relation to any forward-looking statements or any change in events, conditions or circumstances on which any such statement is based. No Limited Party or any other person makes any representation, or gives any assurance or guarantee that the occurrence of the events expressed or implied in any forward-looking statements in the Presentation will occur.

## **Past performance**

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## **Previously reported information**

The information in this presentation that relates to previously reported exploration results, Mineral Resources and Ore Reserves is extracted from the Company's ASX announcements noted in the text of the presentation and are available to view on the Company's website. The Company confirms that, other than mining depletion, it is not aware of any new information or data that materially affects the information included in the original announcements and, in the case of estimates of Mineral Resources and Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially altered.



*“Manuka intends to grow shareholder value by optimising quality resource assets. The emerging green energy fuelled global economy is providing such opportunities.”*

# Corporate Summary

## ASX: MKR

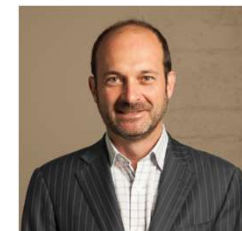
Share price (14 November 2022)	A\$0.16
Shares on issue	466m
Market capitalisation (undiluted)	A\$75m
Options (exp. April & July 2023 @ 25c)	22.25m
Options (exp. March 2023 @ 50c)	32m
Options (exp. December 2024 @ 35c)	12m
Total debt (as at 30 June 2022)	~A\$11.0m
Cash at bank (as at 30 September 2022)	~A\$0.5m

## Board of Directors & Senior Management

Executive Chairman	Dennis Karp
Executive Director (TTR)	Alan Eggers
Non-executive Director	Anthony McPaul
Non-executive Director	Nick Lindsay
Non-executive Director	John Seton
Company Secretary	Toni Gilholme
Chief Operating Officer	Haydn Lynch

# Board of Directors & Management

(the management team has a combined shareholding in Manuka Resources exceeding 30%)



**Dennis Karp – Executive Chairman**

Dennis commenced his career in the Australian financial markets in 1983. He was the Head of Trading at HSBC Australia prior to joining Tennant Limited in 1997, one of Australia's largest physical commodities trading companies with operations in Asia and Europe. He was a principal shareholder of Tennant Metals until 2010, and a director until December 2014,

He led the syndicate which purchased the Manuka assets in 2016. He holds a Bachelor of Commerce from the University of Cape Town

**Alan Eggers – Executive Director**

Alan is a geologist with over 40 years of local & international experience. He brings with him exceptional commercial expertise and was a founding director of Summit Resources Ltd which they built from listing on the NZX in 1987 into an ASX top 200 company and an ultimate takeover by Paladin Energy for A\$1.2B in 2007. He holds a number of private directorships.

Alan holds Bachelor of Science, Honours and Masters of Science degrees from Victoria University of Wellington. He's a Fellow of the Society of Economic Geologists, & a member of AusIMM, & Australian Institute of Geoscientists

**Nick Lindsay – Non-Executive Director**

Dr Lindsay is a mining executive who brings strong experience and a mix of commercial, technical and academic qualifications. He has worked directly for a range of major and mid-tier mining companies over his career, and led juniors in copper, gold and silver through listings and mergers. Nick is a geologist by profession, specialising in process mineralogy, and has postgraduate degrees from the University of Otago (NZ), the University of Melbourne and the University of the Witwatersrand (South Africa). He is a member of the AusIMM and Australian Institute of Geoscientists

**Anthony McPaul – Non-Executive Director**

Tony is a senior mining executive with over 35 years' experience in mining operations and mineral processing, (both underground & opencut operations). He was most recently the general manager for Newcrest's Cadia Valley Operations, in Orange NSW, and formally retired from Newcrest in 2016.

Tony has sat on a range of Boards and industry bodies including the Minerals Council Executive Committee and Mineral Industry Advisory Council. He qualified in automotive engineering from Goulburn TAFE.

**John Seton – Non-Executive Director**

John is an Auckland based lawyer with extensive experience in commercial law and the mineral resources sector. He was a director of Summit Resources Limited until its sale in 2007, as well as being a director of a number of other ASX and NZX listed private companies. He was a former Chairman of the Vietnam/New Zealand Business Council.

John holds a Bachelor of Laws from Victoria University, Wellington, and a Masters of Law (Honours) from the University of Auckland and is a Chartered Fellow of the New Zealand Institute of Directors.

**Toni Gilholme – Company Secretary & Financial Controller**

Toni is an experienced Financial Controller and a Chartered Accountant with over 15 years experience in Financial Accounting and Company Secretarial matters as well as an additional 10 years of experience in a variety of roles in Public Practice. She has worked in a range of senior positions both in the UK and in Australia and has a strong focus on efficiency gains through improving processes and strengthening internal controls.

She holds a Bachelor of Business from the University of Technology, Sydney.

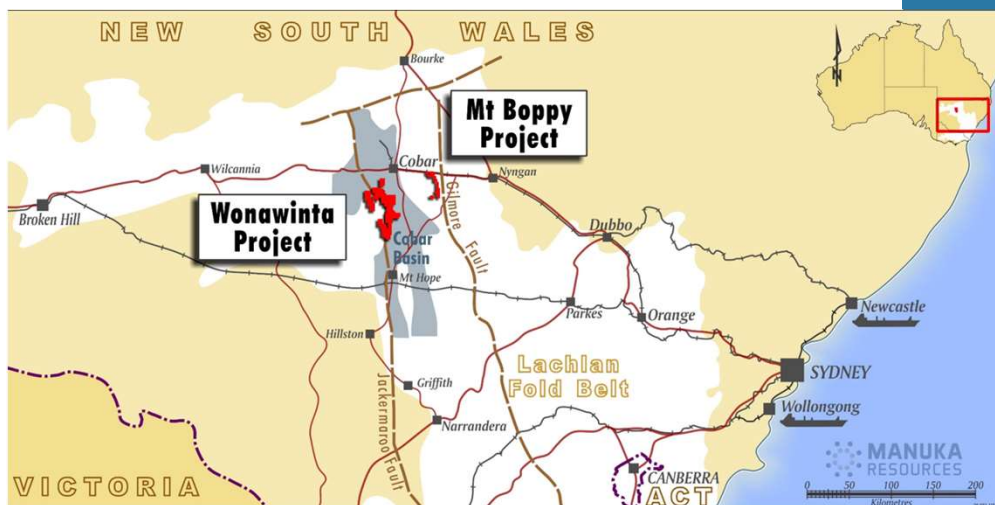
**Haydn Lynch – Chief Operating Officer**

Over 25 years of experience in M&A, financial markets and private equity, and with a substantive track record in the origination and execution of domestic & cross-border transactions in metals & mining in Australia, Africa, Japan, China, and Mongolia.

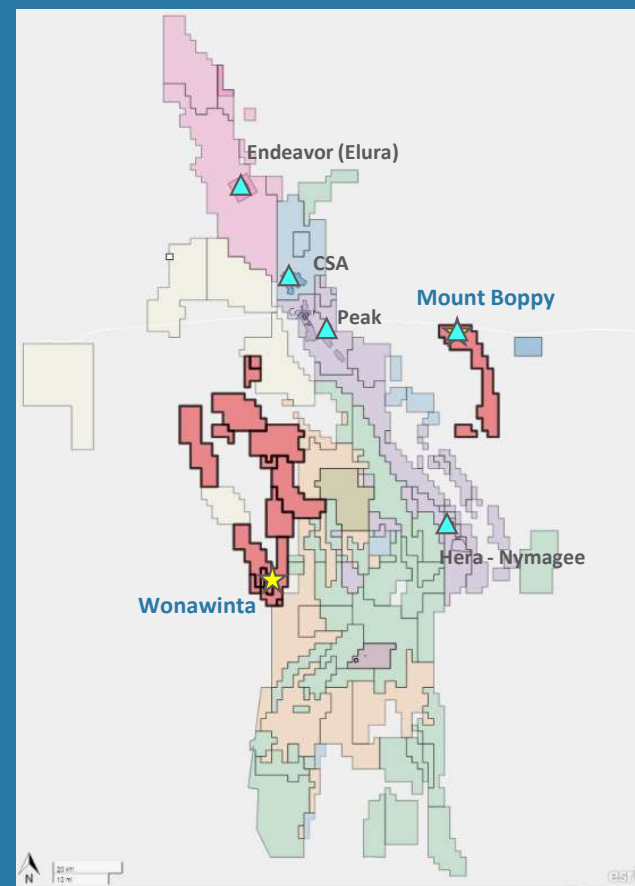
Senior management experience includes Bankers Trust Australia, Investec Bank, RBC Capital Markets and Southern Cross Equities. Haydn has degrees in Mechanical Engineering and Economics from the University of Qld and a Masters in Commerce from the University of New South Wales.

# Major Producers, substantial discoveries within Cobar Basin

Manuka currently exploring for:  
 copper – gold  
 zinc – silver - lead

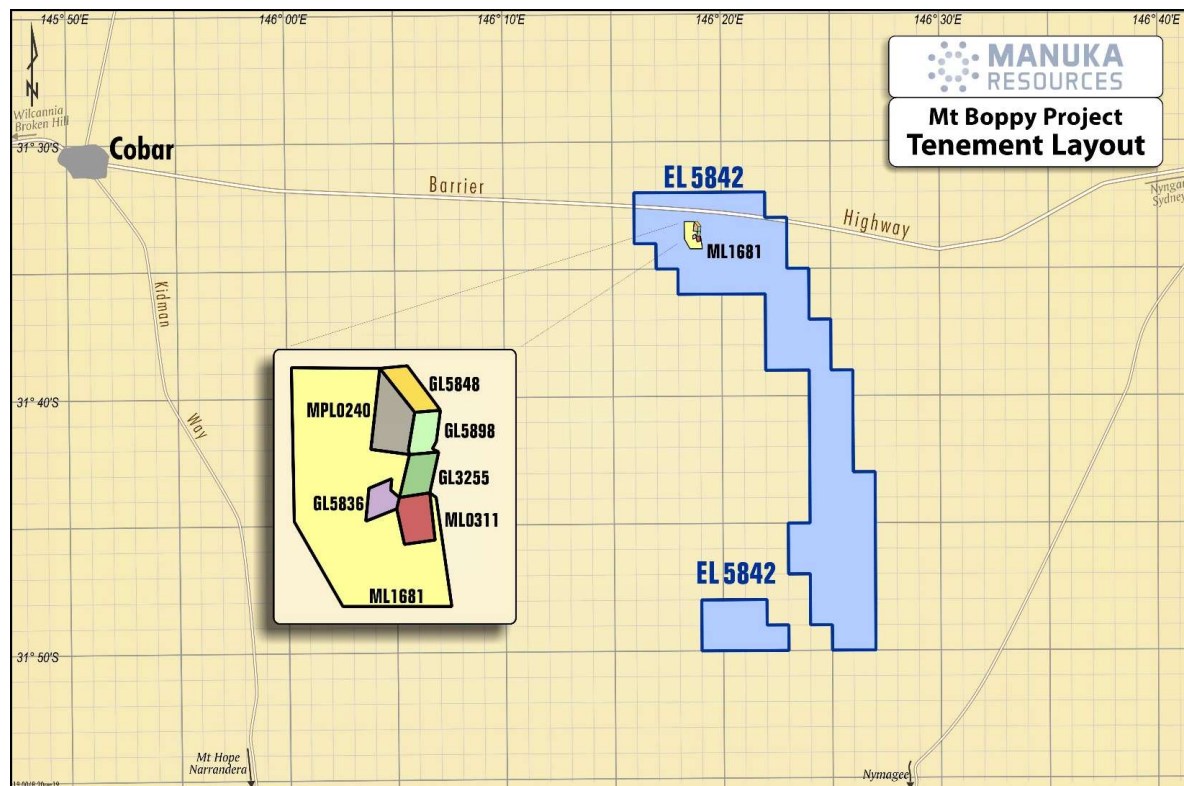
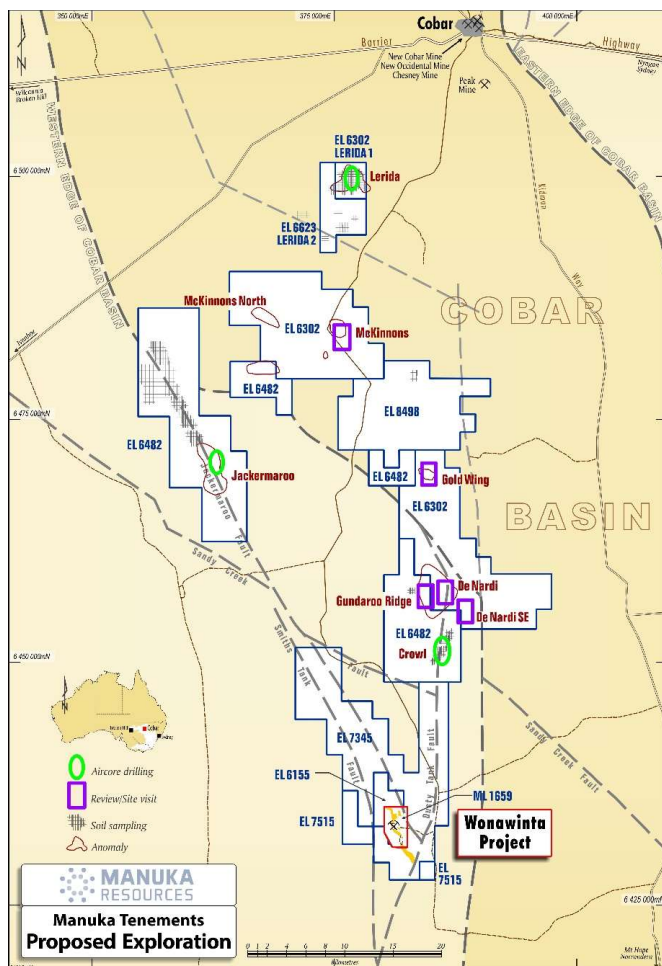


- Manuka
- ▲ Operating mines
- Peel Mining
- Aurelia Metals
- Anchor Resources
- Toho Zinc
- Glencore
- Sandfire Resources



Source: S&P Global Market Intelligence

# Manuka's Tenement Package



# Mt Boppy (past, present & future)

Mt Boppy historically produced 500koz @ 15 g/t from a very contained area

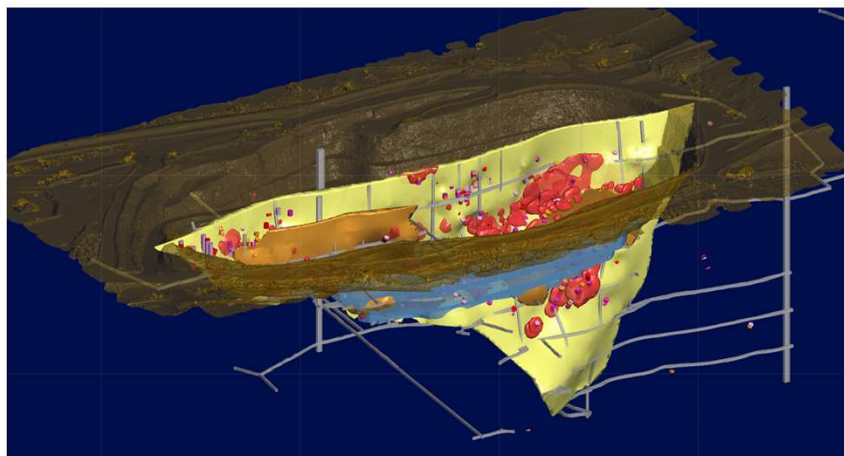
Manuka commenced production of Mt Boppy in April 2020, our IPO estimated Phase 1 production of 22-24koz Au but delivered >41,000koz. (560,00t @ 3 g/t).

Higher grades + plant operating efficiencies combine to drive Phase 1 production to nearly double original forecast\*

Mt Boppy is open at depth with possible along-strike extensions to the North and South. The project is fully approved with mine camp, tailings storage facility & power.

Updated resource of ~45,000oz at 4.95g/t Au

Await mine plan (expected late Q4 2022) to confirm recommencement of operations



Perspective view looking south-east. West lode is shown in orange, east lode shown in yellow and current pit design in blue, and high-grade zone (5 g/t Au) shown in red. Historical workings are shown in grey

\* Refer ASX releases dated 4 March 2022



Au



# Silver production at Wonawinta

- Wonawinta produced approx. 3.0Moz silver during 2012-2015
- JORC mineral resource estimate following extensive infill drilling ~51M oz silver (also 207Kt Pb not included as silver equivalent)\*
- Substantial plant capacity >850kt pa, significant refurbishment in early 2020, new modular elution circuit installed for gold phase (now removed from flowsheet)
- Fully approved with 84 person mine camp, office infrastructure, TSF & water supply
- Manuka commenced silver production on 31 March 2022 on 515,000t stockpiles containing 70g/t Ag\* (to continue until end 2022 and produce ~800,000oz Ag)

\* Refer ASX releases dated 1 April 2021



Ag

# A very deep basin

The major producers in the Cobar basin all operate at substantial depth:

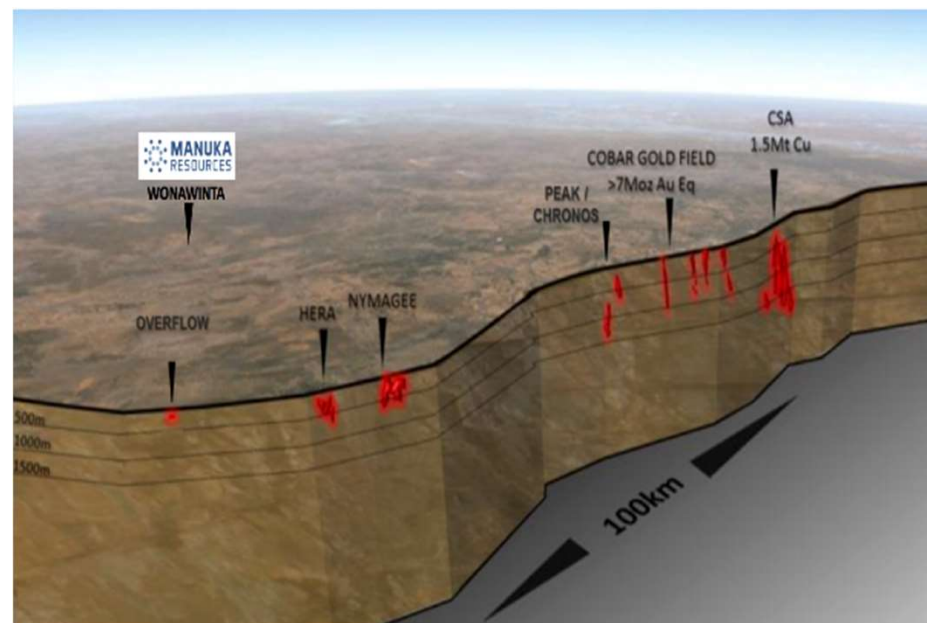
- CSA copper gold mine (Glencore owned) >2.0km deep
- Peak gold mine (Aurelia owned) >1.0km deep
- Endeavour lead, zinc, silver mine (now on C&M) >1km deep

**But Wonawinta silver oxide project is just 60m deep.**

**\*Wonawinta Deeps ‘proof-of-concept’ diamond drill program, initially drilled in Feb 2021 successfully highlights lead-zinc-silver mineralisation over 3km strike**

- 18 hole 5,000m drilling program (2,400mt diamond drill) drilled beneath existing open pits over 3km in length, supports existence of lead-zinc-silver sulphide mineralization with Mississippi Valley Type (MVT) affinities
- The 3km strike (beneath the pits) is part of a total 15km strike length along the Winduck Shelf strata held by Manuka on western flank of Cobar Basin
- Geophysics survey commenced in May 2022 along entire Wonawinta Trend. Initial indications very promising. To be followed by further drilling in Sept quarter
- Mineralisation intervals to date include:
  - 4m @3.20% Pb, 3.20% Zn, and 63g/t Ag\*
  - 5m @1.7% Pb, 0.82% Zn, and 128 g/t Ag\*

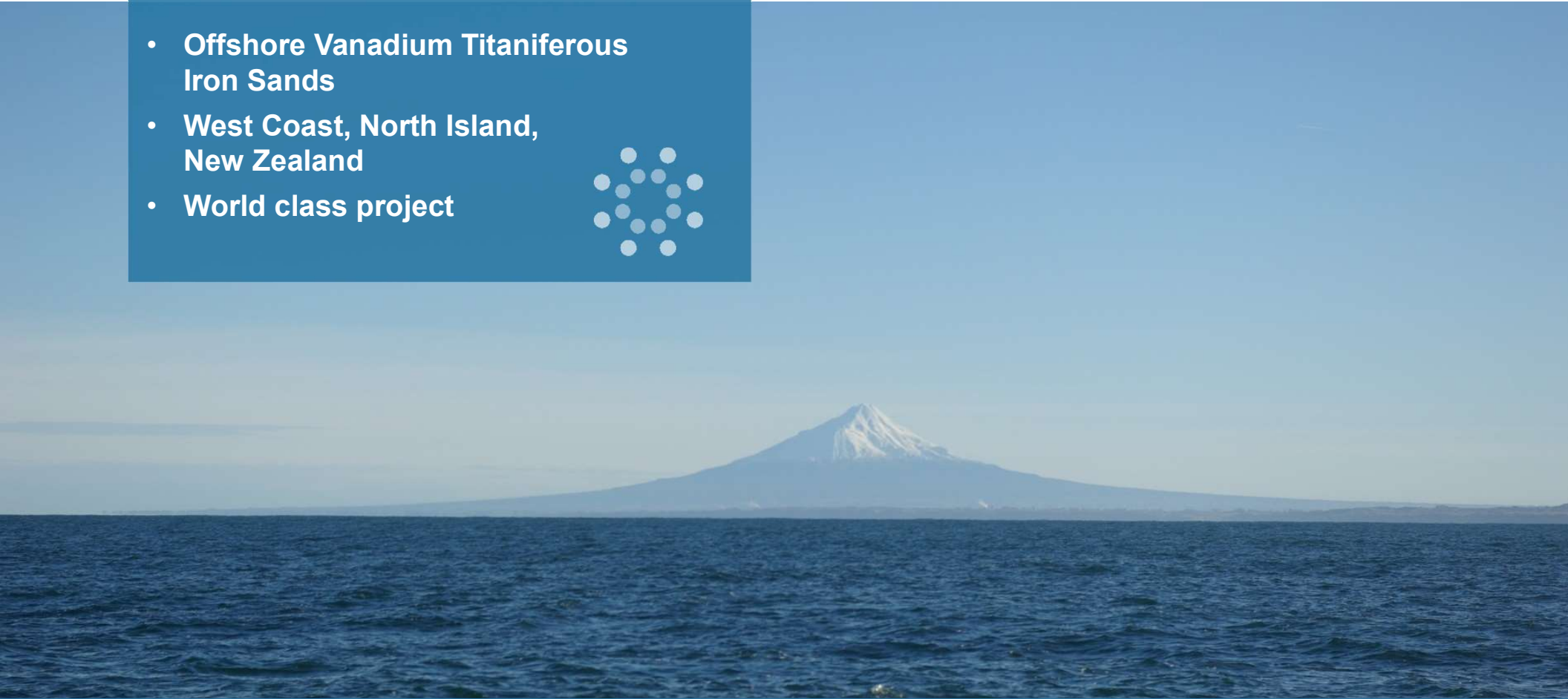
- Refer ASX release dated 1 June 2021



# Taranaki VTM Project

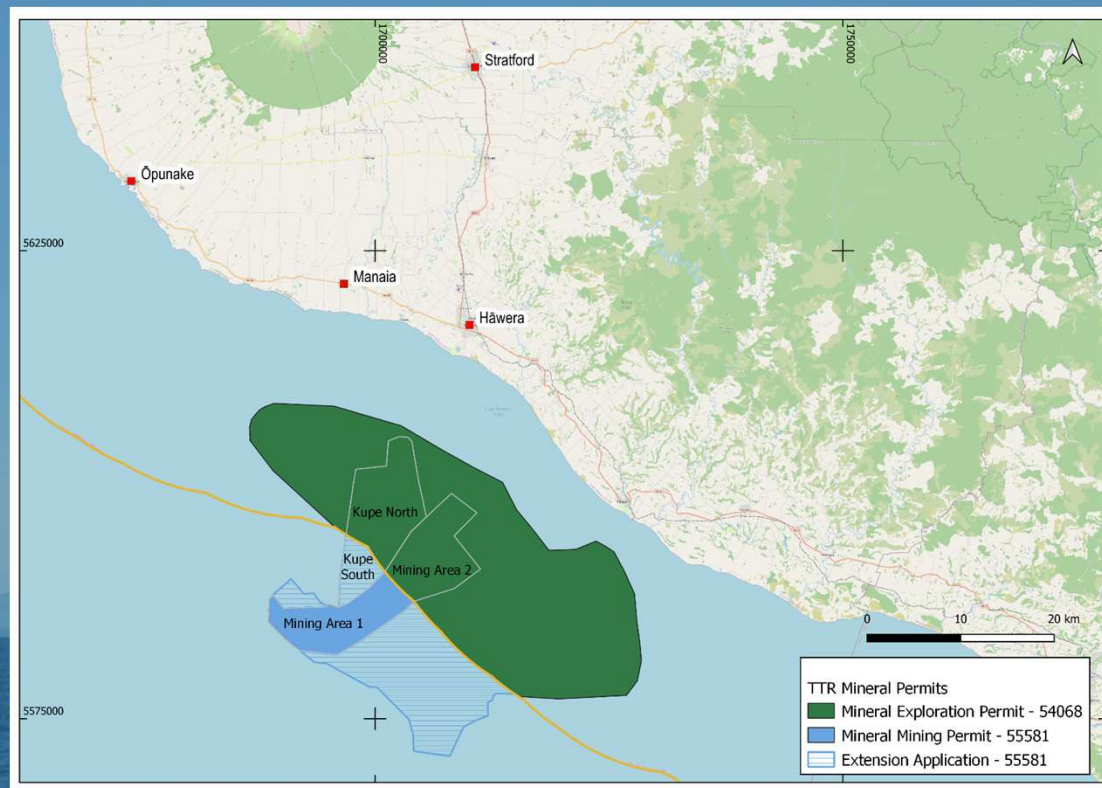
(Vanadium, titanomagnetite)

- Offshore Vanadium Titaniferous Iron Sands
- West Coast, North Island, New Zealand
- World class project



# Taranaki VTM Project location:

(vanadium, titano-magnetite) outside territorial waters, in exclusive economic zone (EEZ)



# Our core projects – the world class Taranaki VTM project (vanadium, titano-magnetite)

## Taranaki VTM Project – project highlights

- World class resource 3.8bt vanadium, titanium & magnetite (iron ore)
- Targeted lowest quartile carbon emissions\* of Fe producers globally (62kg CO<sub>2</sub>/t vs 125-250kg CO<sub>2</sub>/t)
- Anticipated lowest quartile costs for Fe producers\* US\$20-23/t FOB (PFS 2013 adj. inflation) EXCLUDING credits from vanadium or titanium
- Located within NZ EEZ (exclusive economic zone targeting gas, oil, mining)
- NZD\$85m invested to date (>US\$50m)
- Mining Licence granted 2014 (MP55581) – 5Mt pa production for 20 years
- Granted initial EPA environmental consents to operate 2017 with final review process underway post New Zealand High Court directions hearing
- New Zealand government focused on implementing mining code subject to appropriate environmental safeguards

\* based on TTR PFS: <https://www.manukaresources.com.au/site/investor-centre/pending-acquisitions>

# Taranaki VTM (vanadium titano-magnetite) Iron Sands Project Features



Forecast to be in the bottom quartile of the global iron ore operating cost curve



Mining licence approved for recovery of 5Mt of iron ore per annum for minimum 20-year life of mine .



**VTM Concentrate Grade**  
0.5%V<sub>2</sub>O<sub>5</sub> 8.5%TiO<sub>2</sub> 56% - 57%Fe



**Total 3.8Bt JORC Resource Base\***



**Anticipated lowest quartile CO<sub>2</sub> emitter for iron ore producers**

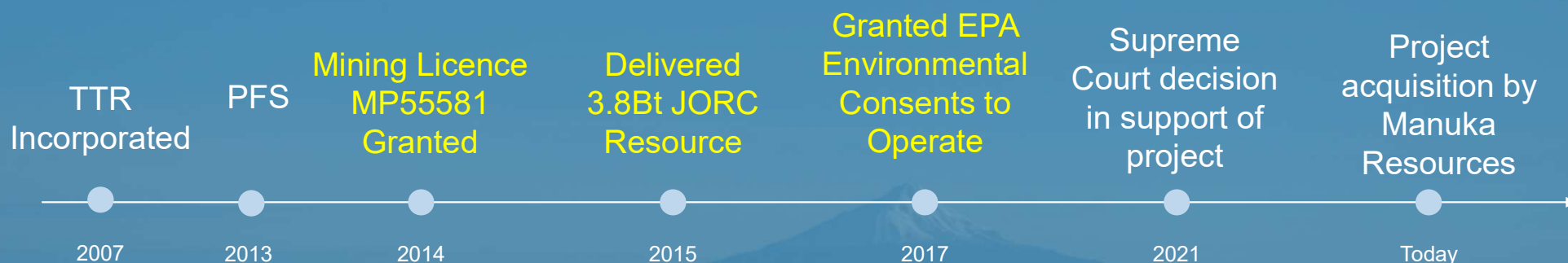
The Taranaki project is headed by Alan Eggers and a team who have a proven track record of building resource companies in New Zealand and internationally

0.5% V<sub>2</sub>O<sub>5</sub> = 55 million pounds/year of vanadium pentoxide in concentrate.  
Metallurgical test work completed to date recovers ~84%

# Achievements to Date

**Initial Objective: To discover & develop VTM (vanadium titano-magnetite) Iron Sands Project offshore North Island, NZ**

Project Expenditure to date: NZD\$85m (US\$50m equivalent)



**Final EPA approval & BFS required to commence finance, commissioning and concentrate production**

**Operation deploys existing mineral recovery and shipping technologies**

# Taranaki VTM Project (vanadium titano-magnetite): Environmental Advantages



- Operation has small environmental footprint with only 300m x 900m area of disturbance at any time
- **Very low carbon emissions compared to other hard rock iron ore deposits with no:**
  - **Heavy machinery mining fleet**
  - **Open pits**
  - **Waste dumps**
  - **Haul roads**
  - **Grinding circuits**
  - **Railroad or ports**
- No chemical additives in processing or tailings
- Natural processes delivers rapid rehabilitation of mined areas
- Short term confined environmental impact with rapid recovery
- **No impact on fish, whales or dolphins**
- **No legacy issues with rehabilitation part of recovery process**
- Taranaki VTM concentrate has 11lbs/tonne vanadium & 8.5% titanium metal in concentrate
- Fe, V & Ti metals in demand for the “green economy” and renewable energy
- High grade steel, alloys, batteries, solar & wind technology, electronics, health, science, aerospace & white goods



# Integrated Mining Vessel (IMV)



Length 335m

Breadth 60m

Depth 26.25m

Design Draught 12m

Technology has been developed and utilised by De Beers Marine for over 40 years in their mining for diamonds off west coast of Southern Africa. De Beers Marine have provided a commissioning and operating solution for the first two years of production, also providing us with an option for extension. This is a tried and tested recovery solution. See YouTube hyperlink below.

[\(2655\) Trans Tasman Resources Offshore Iron Ore project HD 20150925 - YouTube](#)

# Summary of Estimated Costs/t (concentrate)

## Commodity Prices 5 September 2022

- Iron Ore (62%Fe): **US\$105t**
- Vanadium Pentoxide: **US\$7.50lb**
- Titanium Dioxide: **US\$3,200t**

## Taranaki VTM Metal in Concentrate Value per Tonne

- Iron Ore (57%Fe): **US\$89.25** (15% discount)
- Vanadium (0.5%): **US\$82.50**
- Titanium (8.5%): **US\$272**

Manuka envisages the Taranaki Project being a low cost producer with C1 costs approximately **US\$20 - US\$23<sup>[1]</sup>** per tonne of concentrate.

<sup>[1]</sup> Based upon the TTR PFS (2013) updated to 2022 economics  
See ASX release 1 August 2022

Summary Estimated Operating Costs (C1) of STB Project (subject to completion of BFS).  
(Based on 72% operational availability after allowing for inclement weather in South Taranaki Bight.)

4.9Mtpa (concentrate production scenario)**	\$US	Unit cost/tonne (concentrate) \$	Percentage %
Labour	23,790,000	4.86	24%
Fuel*	32,079,661	6.55	33%
Maintenance	14,375,000	3.00	15%
FSO Operation	13,415,000	3.00	14%
Consumables	5,000,000	1.00	5%
Insurance	5,000,000	1.00	5%
Sales costs	4,900,000	1.00	5%
<b>Total</b>	<b>98,559,661</b>	<b>\$20.41</b>	<b>100%</b>

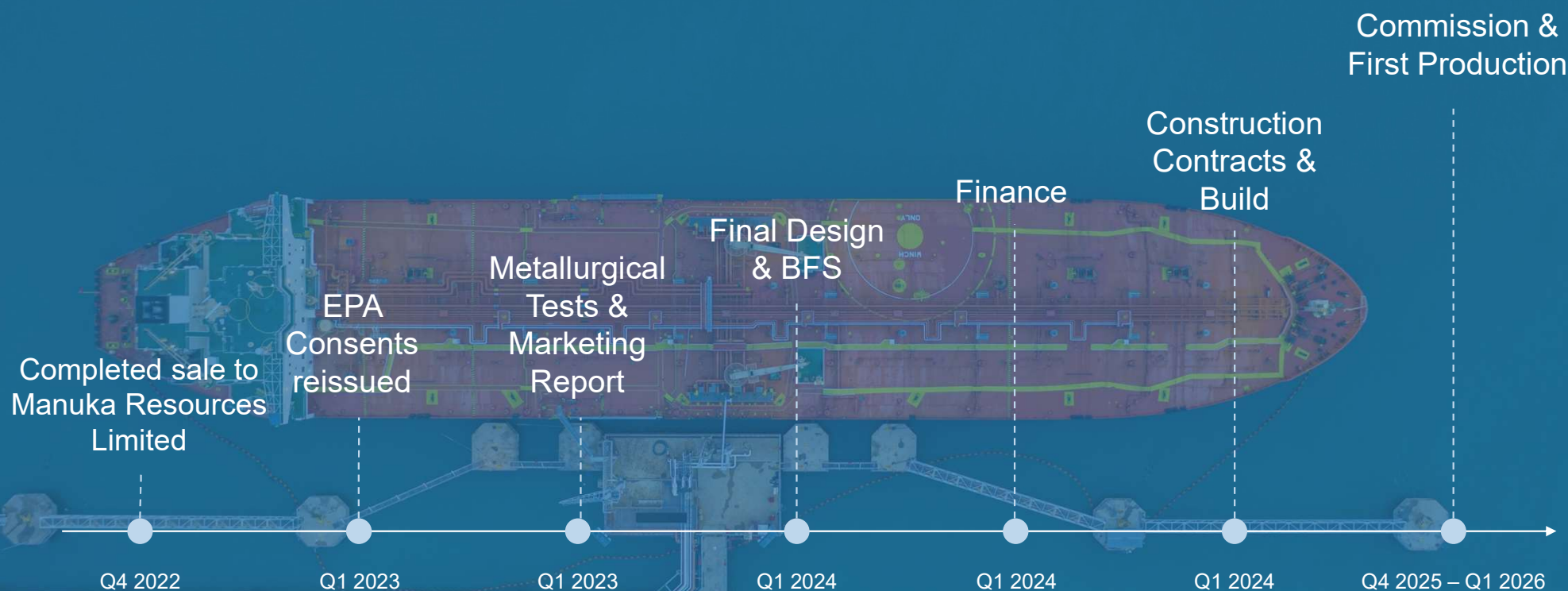
\*based on IFO380 bunker fuel at 26 July 2022 of US\$495.50/t ex Singapore

\*\* subject to validation in BFS

*Note: Vanadium metallurgical test work still to be finalised but >84% recoverable.  
Titanium credits not currently included in revenue estimates.*

# Taranaki Iron Sands Project: Business Milestones & Working Assumptions regarding Timing

(based on all NZ regulatory consents/permitting being granted and availability of finance)



## Appendix 1

# Manuka's Gold and Silver Resource Base

On 29<sup>th</sup> July 2022 a Resource Update was announced for the Mt Boppy gold project through the ASX. On 1<sup>st</sup> April 2021 a Resource Upgrade was provided for Wonawinta Silver Project reflecting a 43% increase in the Measured and Indicated Resource Categories.

### Mineral Resource Summary 19 May 2022 Mt Boppy Resources

Resource Category	Tonnes	Grade Au (g/t)	Contained gold ounces
Measured	106,850	5.25	18,020
Indicated	150,000	4.85	24,700
Inferred	17,000	3.93	2,100
<b>Total</b>	<b>281,850</b>	<b>4.95</b>	<b>44,820</b>

### JORC Resources Wonawinta Silver Project as at 1 April 2021\*

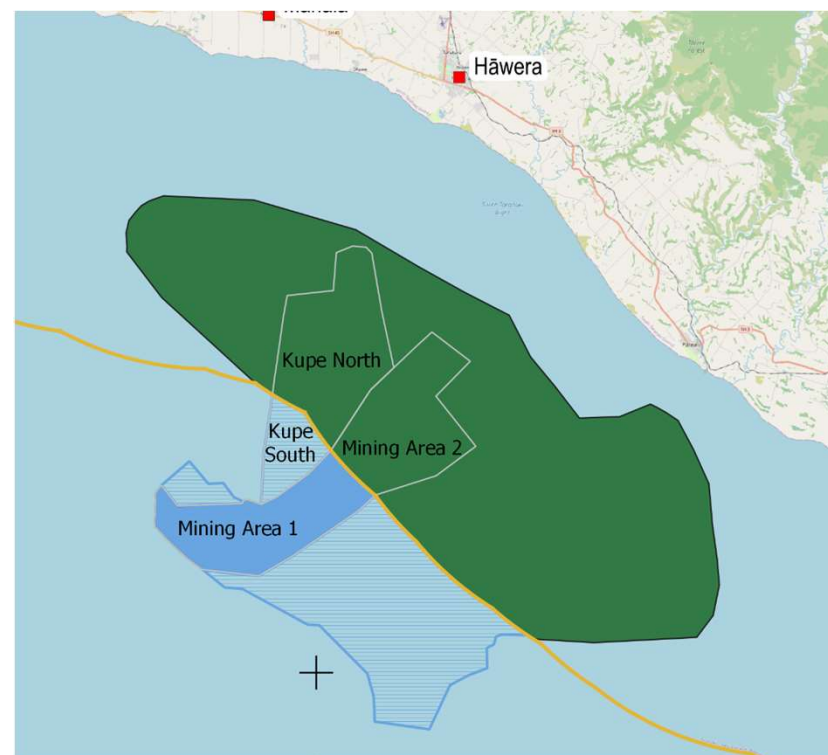
Resource Category	Material (Mt)	Ag (g/t)	Ag Moz	Pb (%)	Pb kt
Measured	1.1	47.3	1.65	0.69	7.5
Indicated	12.3	45.5	18.04	0.83	102.8
Inferred	24.9	39	31.25	0.39	96.9
<b>Total</b>	<b>38.3</b>	<b>41.3</b>	<b>50.94</b>	<b>0.54</b>	<b>207.2</b>
Stockpile	0.515	70	1.16		

## Appendix 2

# Taranaki VTM Project (vanadium titano-magnetite): JORC Resource Estimates

STB Mineral Resource Estimates					
	Mineral Resources			Concentrate	
	Cut-Off Grade	Mt	Fe <sub>2</sub> O <sub>3</sub> %	Mt	Fe %
Mining Area Stage 1	3.5% DTR*	1,043	11.28	75	56.31
Kupe Blocks North & South	3.5% DTR*	655	10.97	45	56.73
Mining Area Stage 2 & Outside 1 & 2	7.5% Fe <sub>2</sub> O <sub>3</sub>	2,137	9.66		

- DTR is David Tube Recovery of the magnetic fraction of the sample
- DTR Estimate is based on analytical DTR & calculated DTR values
- JORC (2012) compliant



# Taranaki VTM Project advantages

(vanadium titano-magnetite)



An emerging vanadium, titanium & iron ore project with a substantial resource. Lowest quartile cost and CO2 emissions for bulk projects, presents potential to realise greater value over medium to long term

<p>✓ <b>Early mover advantage</b> on bulk, scalable marine mining IP</p>	<p>✓ <b>Low sovereign risk</b> low-royalty regime</p>	<p>✓ <b>Experienced board and management</b> operating to the highest governance standards</p>	<p>✓ <b>DeBeers Marine SA +30 years experience</b> operating partner</p>
<p>✓ <b>Technology solution (IHC)</b> has cross commodity application in heavy mineral marine deposits</p>	<p>✓ <b>Bulk shipping freight advantage</b> located close to markets</p>	<p>✓ <b>TTR iron sands lowest carbon intensity</b> 62kgCO2/t versus 120-250kgCO2/t for competitors world wide</p>	<p>✓ <b>New Zealand is well placed</b> to develop a new long-term export industry</p>
<p>✓ <b>Large scale resources</b> with further potential to acquire acreage worldwide</p>	<p>✓ <b>Low capital intensity infrastructure</b> advantage over land based deposits</p>	<p>✓ <b>Low site operating costs</b> no drill and blast, trucking, rail or port costs, rehabilitation, no waste dumps, or legacy issues</p>	<p>✓ <b>STB has low capex and opex advantages</b> of being entirely marine-based operation</p>

# Appendix 4 The Vanadium Fact Sheet



A Critical Mineral	Global Prod. (V <sub>2</sub> O <sub>5</sub> )	Why Vanadium for utility/grid storage*?	
		Vanadium	Lithium
<p><b>Vanadium is deemed a critical mineral in: USA, EU &amp; Australia</b></p>	<p>Annual production~115,000t/yr Historical growth 3%p.a. <b>Demand prediction – double 5yrs</b></p>	<p><b>Safety:</b> Non-flammable, not susceptible to thermic reactions, no health risk from chemistry involved</p>	<p>40 known fires** at large scale li-ion battery storage systems. Complex release of gases complicates extinguishing</p>
<p>Historically used to strengthen steel (1kg vanadium doubles tensile strength of steel) - military &amp; aeronautical applications</p>	<p>Vanadium producer regions</p> <ol style="list-style-type: none"> <li>1. China ~55%</li> <li>2. Russia ~20%</li> <li>3. Brazil ~15%</li> <li>4. South Africa ~10%</li> </ol>	<p><b>Environment:</b> VRFB release 78% less emissions than li-ion in manufacturing process. Vanadium fully recyclable</p>	<p>Larger carbon footprint than vanadium battery in manufacturing. Lithium battery waste growing at 20%p.a. - CSIRO</p>
<p><b>Vanadium flow batteries now utility/grid storage medium of choice (gaining similar status in grid storage to that what lithium holds in mobility storage)</b></p>	<p>New Zealand has potential to become 3<sup>rd</sup> largest producer through Manuka’s VTM project (&gt;20,000t / 55 million lbs vanadium p.a. in concentrate = ~15% of global production)</p>	<p><b>Lifespan:</b> 100% of vanadium electrolyte reusable at end of life. <b>20 year long-life battery.</b> Can be scaled - modular</p>	<p><b>Expectations are 8–10 year lifespan.</b> Recycling more complicated (currently only 10% of li-ion batteries recycled in Aust. – CSIRO)</p>

\*Siecap – Why vanadium redox flow batteries will be the future of grid-scale energy storage 24-8-2022

\*\* Paul Christensen – Professor of electrochemistry at Newcastle University

## Appendix 5 South Taranaki Bight - already an Active Petroleum Region with 4 current petroleum permits, and gas well and pipeline to mainland

