

#### Discovering Australia's Next Major Rare Earth Deposit

VHM's Exploration and Growth Story

May 2023



#### **ASX:VHM**

#### Acknowledgement of Country

VHM acknowledges the Australian Aboriginal and Torres Strait Islander peoples as the first inhabitants of the nation and the traditional custodians of the lands where we live, learn and work. We pay our respects to past, present and emerging Elders.

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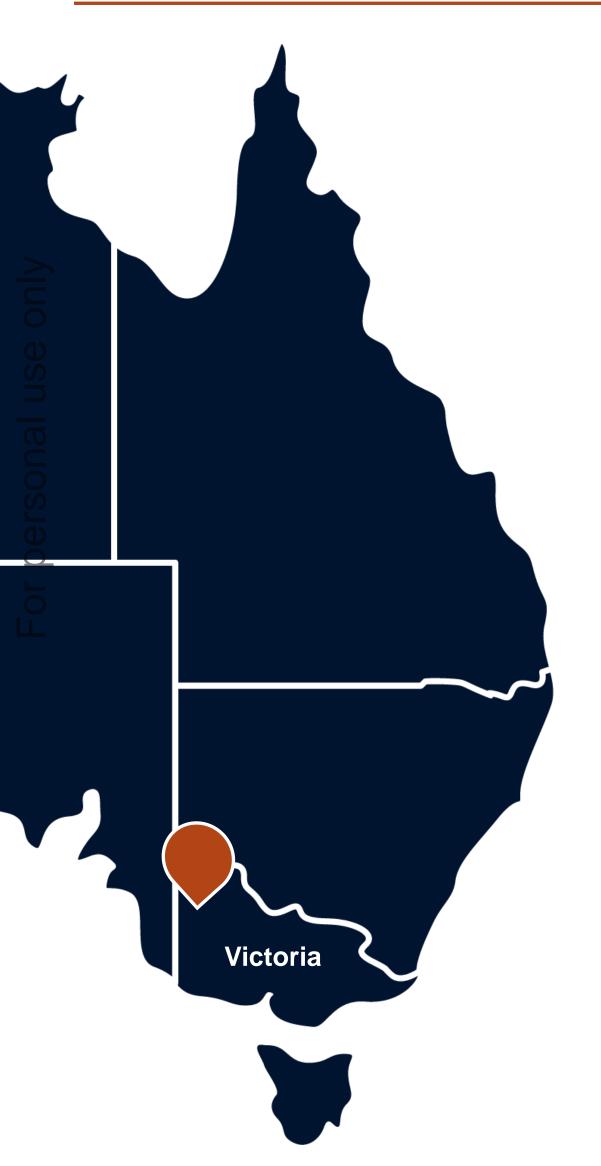
Compliance Statement

The information in this presentation that relates to the DFS & FEED studies, the JORC estimates of Goschen Mineral Resources and Ore Reserves was first reported in the ASX announcement on 28 March 2023 and the Cannie JORC estimates and Mineral Resource were reported in the ASX announcement on 16 May 2023. The information in this presentation that relates to the Exploration Target was first reported in the Prospectus dated 21 November 2022 as supplemented by the supplementary prospectus dated 5 December 2022, lodged with ASX on 5 January 2023. The Company confirms that it is not aware of any new information or data that materially affects the matters previously reported and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified.

#### VHM Limited (ASX:VHM) overview



Corporate snapshot<sup>1</sup>





Owns 100% of the World Class Goschen Rare Earth and Mineral Sands Project and Cannie and Nowie Projects.

Near term producer Phase 1 at detailed engineering design<sup>2</sup> and pilot scale testwork commenced at ANSTO for Phase 1A<sup>3</sup>. The Goschen Project is one of five active projects in Australia at DFS level and one of four to complete a DFS in the past three years<sup>4</sup>.

Compelling economics Goschen DFS Refresh demonstrates NPV of \$1.5 billion, IRR of 44% and rapid payback of 2.8 years coupled with low operating cost and capital intensity<sup>5</sup>.

**Dual commodity** Goschen Project defined as a 5Mtpa conventional process facility that will produce dual commodity streams. Zircon-titania credits will significantly offset rare earth operating costs.

Commissioning the Project will help unlock new growth for minerals processing capabilities in Australia to supply global demand for critical rare earths.



Listed in January 2023 (ASX:VHM)



**Issued shares** 202,801,902



**Market Capitalisation** A\$166.29M



**Top 20 shareholders** ~ 35%



**Share price (15 May 2023)** A\$0.85



**Share options** 11,405,811

#### Note

<sup>(1)</sup> Market data as at 15 May 2023 and sourced from ASX market based data

<sup>(2)</sup> See Company ASX announcement released 18 April 2023

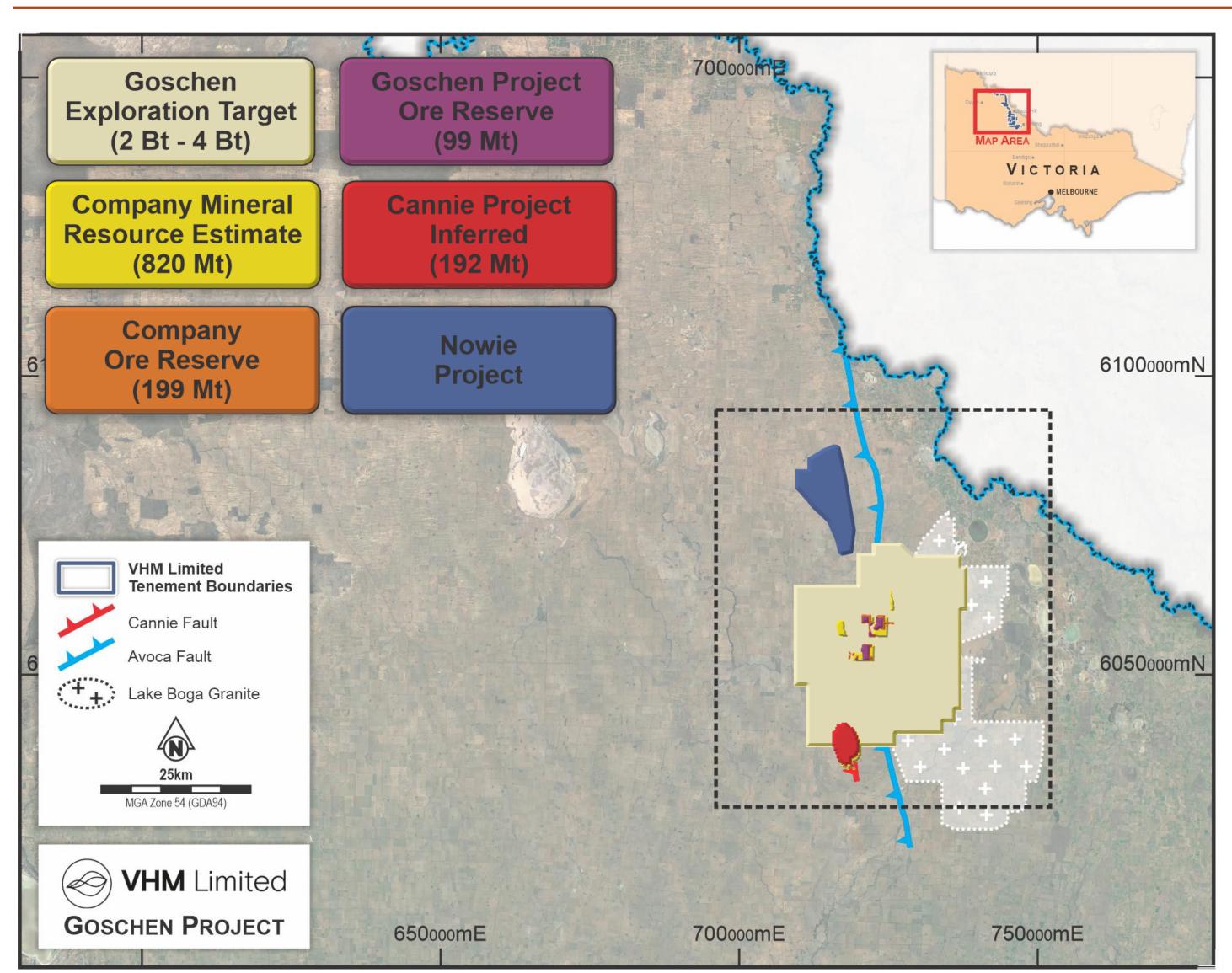
<sup>(3)</sup> See Company ASX announcement released 20 April 2023

<sup>(4)</sup> See Company ASX announcement released 28 March 2023(5) Rare Earth Market Outlook, Independent Analysis for VHM Limited (Q1 2023) Adamas intelligence



### VHM Limited geological overview

A major critical mineral inventory of a global scale is in the making at VHM





With the Goschen, Cannie, and Nowie Projects, VHM has the potential to accumulate one of the world's largest critical mineral inventories<sup>1</sup>.

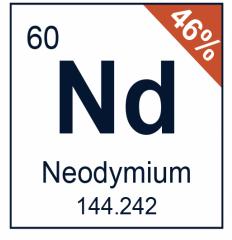


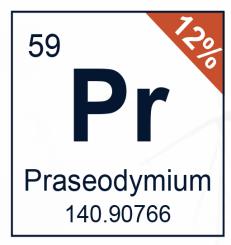
## Global energy transition targets

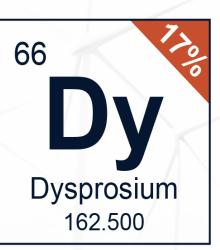
The catalyst driving demand for rare earth elements and commercialisation of Australia's critical minerals

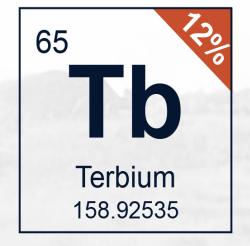
87% of Goschen basket value is derived from the critical rare earths required for electric vehicles<sup>1</sup>.

Nd, Pr, Dy, Tb, Zr and Ti are all identified on the Australian and US critical mineral lists<sup>2</sup>.

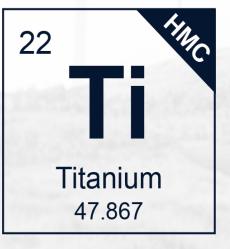










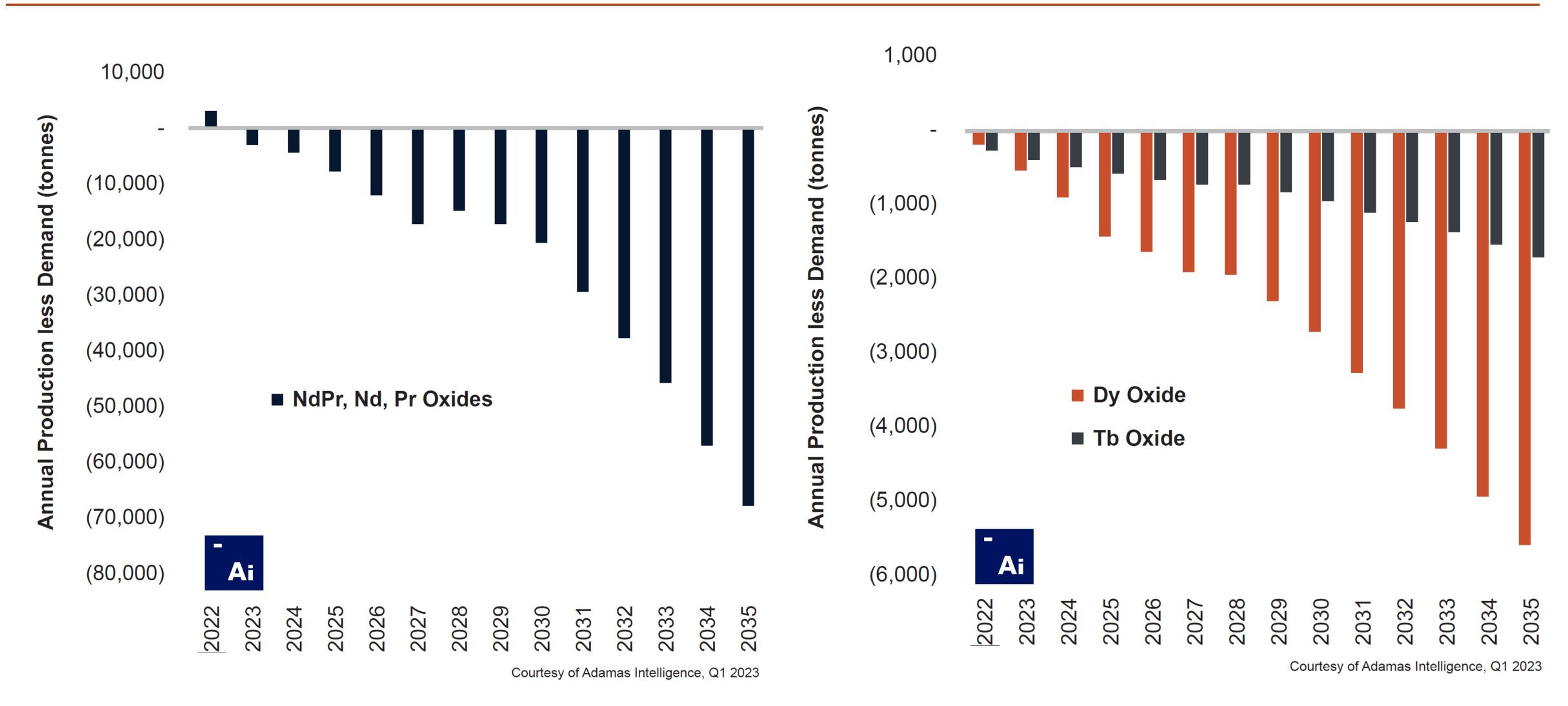






## Supply and demand

Forecasted global production – demand balance for rare earth oxides used in permanent magnets

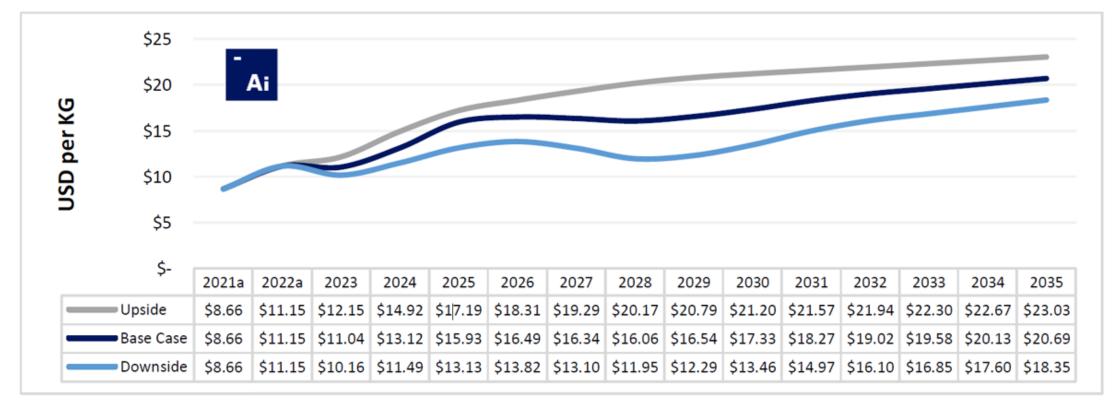


#### Price forecast for rare earths

Strong pricing anticipated for Goschen's rare earth products<sup>1</sup>

#### **Rare Earth Mineral Concentrate Price Outlook**

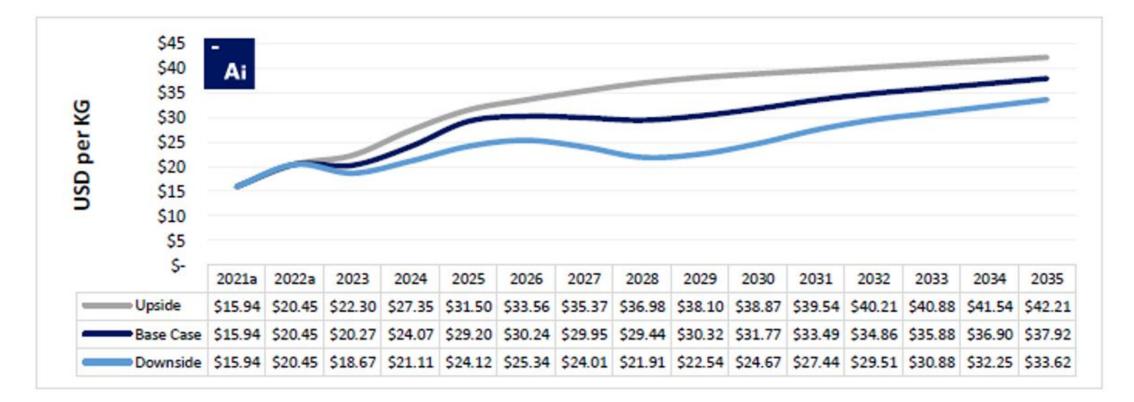
The REMC from Goschen (61.4 wt. % TREO) will have a value of \$10.16 to \$12.15 per kilogram of concentrate in 2023 and will increase overall to \$18.35 to \$23.03 per kilogram in 2035.



<sup>\*</sup> Prices in USD per kilogram of concentrate; concentrate contains 61.4 weight % TREO.

#### **Mixed Rare Earth Carbonate Price Outlook**

MREC from Goschen (59.7 wt. % TREO) will have an average value of \$18.67 to \$22.30 per kilogram of carbonate in 2023 and will increase overall to \$33.62 to \$42.21 per kilogram in 2035.



<sup>\*</sup> Prices in USD per kilogram of concentrate; concentrate contains 59.7 weight % TREO.





## Goschen Project highlights

The DFS Refresh<sup>1</sup> demonstrates the Goschen Project economics to be compelling



#### 5Mtpa

>20 years

Conventional open cut mining methods excavation, load and haul



#### 8.5ktpa MREC

Target annual production rates for mixed rare earth carbonate (MREC)



## 9.4ktpa

REMC

Target annual production rates for rare earth mineral concentrate (REMC)



# 134.5ktpa

**HMC** 

Target annual production rates for zircon/titania heavy mineral concentrate (HMC)

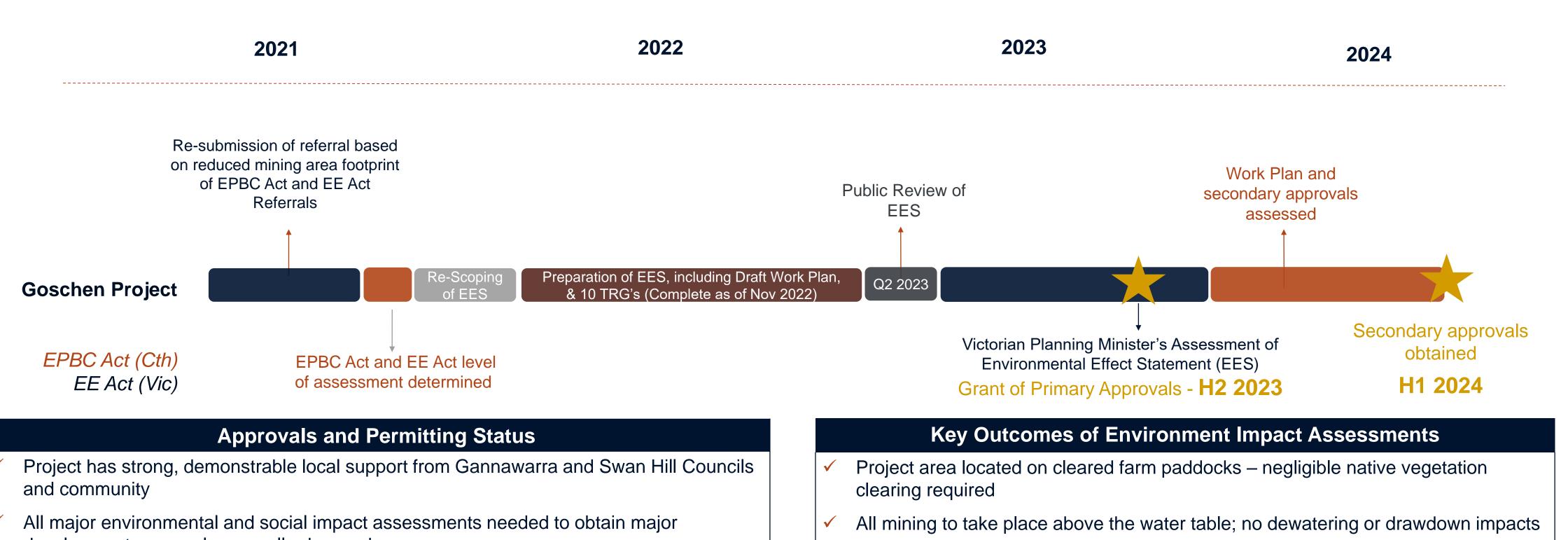
5Mtpa Goschen Project DFS Financial Metrics (Phase 1 and 1A)									
Pre-tax	1,525								
Pre-tax	44%								
Payback	s)	2.8							
Ore Res	20.5								
Average	4.0%								
Average	Average strip ration (waste : ore)								
		REMC	9,428						
	Average Production (tpa)	MREC	8,568						
Mine		Zircon-titania HMC	134,500						
of M	Average revenue per annum (A\$ m)	564							
	Average opex per annum (A\$ m)	273							
First 10 Years	Average EBITDA per annum (A\$ m)	291							
st 10	Average unlevered, pre-tax FCF per ann	270							
Ä	Average revenue A\$/t ore	118							
	Average operating costs A\$/t ore	57							
	Payback period (years)	2.8							

Note: (1) See Company ASX announcement on 28 March 2023



## Approvals and permitting

#### AECOM appointed for their permitting expertise and credentials



- development approvals are well advanced
- Operational impacts are well understood, with all material risks either eliminated or minimised to the extent practicable
- Public review of the Environmental Effects Statement to occur in Q2 2023, with VHM expecting a decision to be received from the Minister by H2 2023

- Low rainfall, dry land cropping area no highly sensitive agricultural receptors
- Radiation Measurement of background gamma radiation across the project area shows rates which are within the normal background range seen across Australia
- Studies indicate that the Goschen Project is low impact compared to similar projects



#### **Project benefits**

The Goschen Project will make a significant contribution to the local and state economy

Project construction and ongoing operations expected to **add** 

\$2.0 billion

to the Loddon-Mallee economy

The Project will **increase mining output** in the Loddon-Mallee region by

20%

Goschen Project is estimated to add an additional

\$1.3 billion

to the Victorian economy

1+2

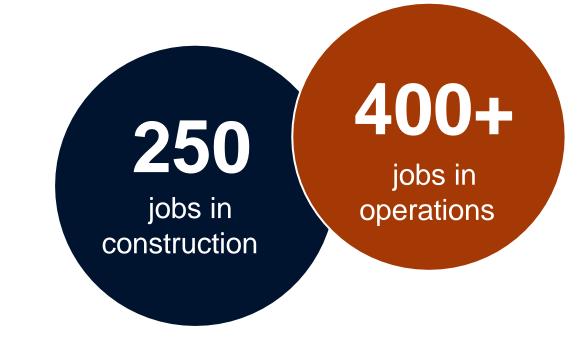
Every direct mining job creates two additional jobs in supply chains



Pictured: Gannawarra Shire Council CEO Geoff Rollinson and VHM Limited Managing Director Graham Howard signing the Memorandum of Understanding.

More jobs for the Loddon-Mallee Region







Pictured: Swan Hill Regional City Council Mayor Cr Les McPhee (left) and CEO Scott Barber (right) with VHM Community Engagement General Manager Debbie Rice.



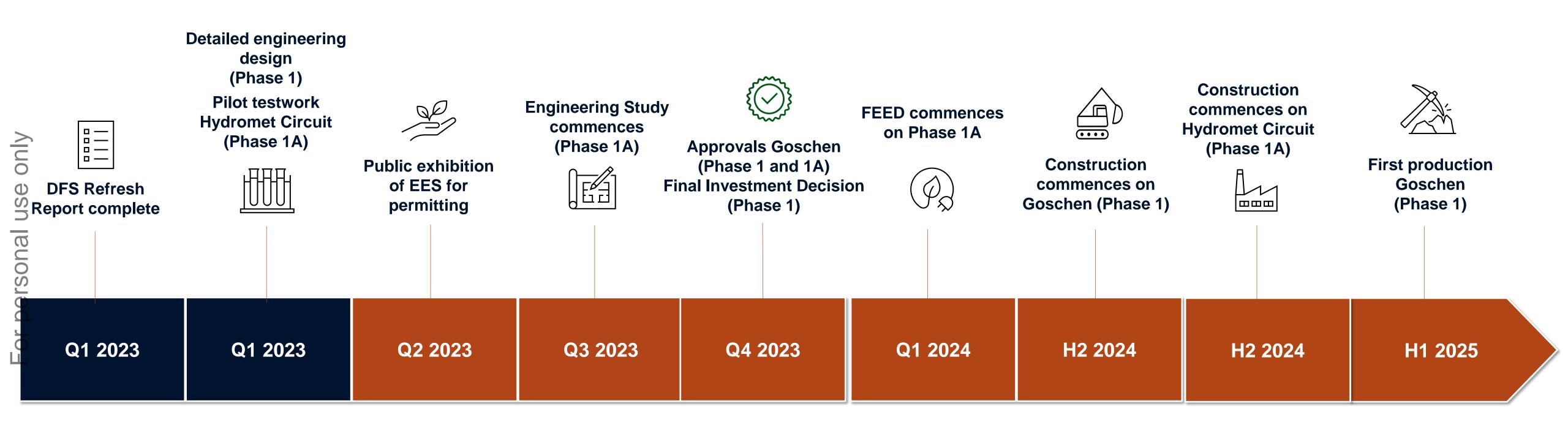
# Project benefits

VHM is focused on making a positive impact on the local communities in the region





## Accelerating towards production in 2025



# 2 years

target to production

#### **Opportunities to accelerate entry to market**

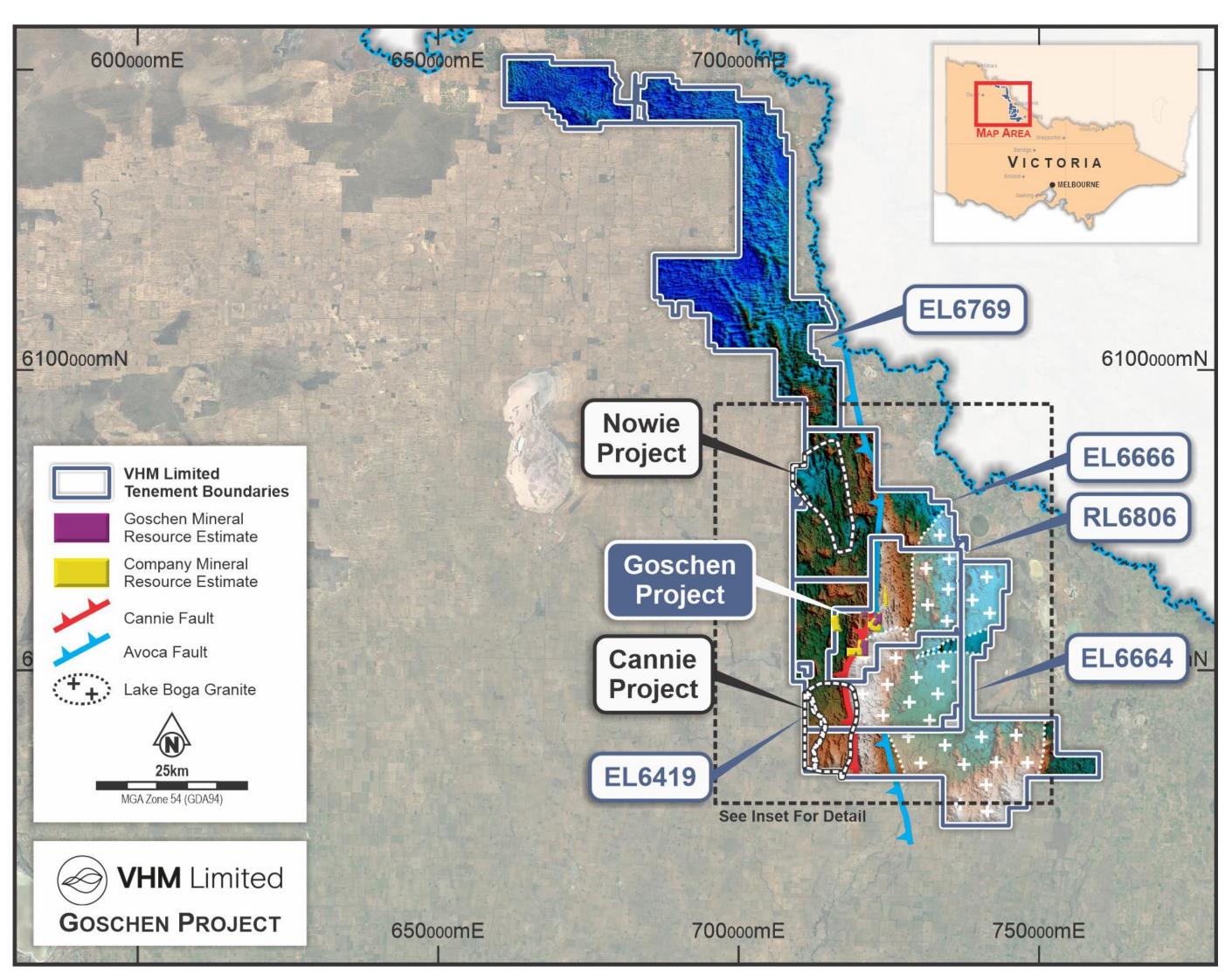
- Finalise financing arrangements; obtain financial commitments for development expenditure
- Completion of offtake agreements to facilitate project funding



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#### VHM Limited geological overview

A major critical mineral inventory of a global scale is in the making at VHM





With the discovery of the Cannie and Nowie Prospects<sup>1</sup> the Company confirms a major new critical minerals province centred on top and west of the Lake Boga granite.

A significant Critical Minerals inventory that has the potential to unlock new growth in Victoria's mineral processing industry.

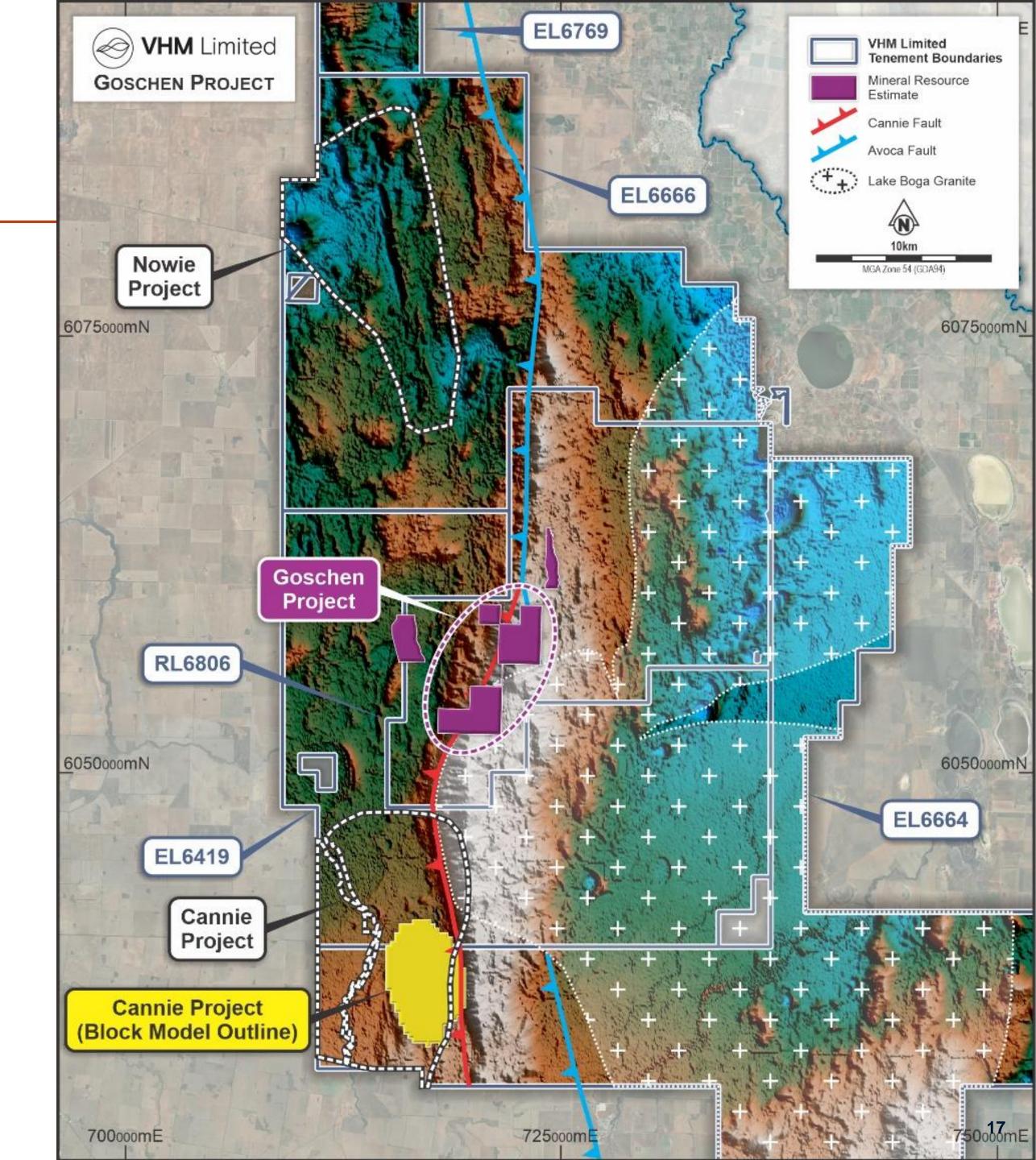
Note: (1) See Company ASX announcement 4 April 2023

## VHM Limited geological overview

Cannie drilling defines a new 192Mt Mineral Resource



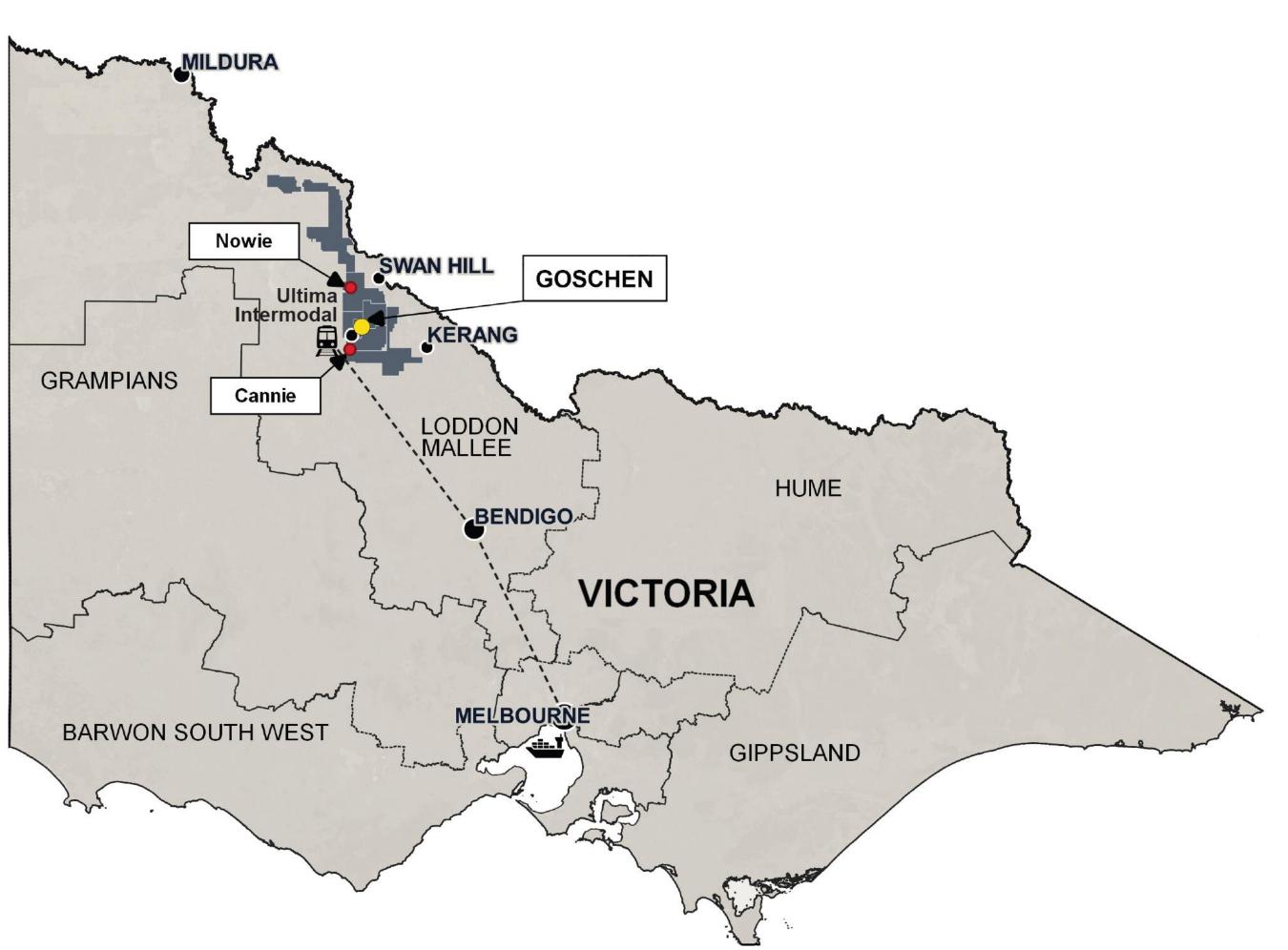
- Company completed 142 drill holes totaling 5,482m.
- A total of 38 drill holes were used for the Cannie Inferred Mineral Resource estimate.
- Down hole geophysics and assays confirm spatial continuity across strike and extends 7.2km north-south and 4.4km east-west and remains open in all directions.
- A major new Critical Minerals Province for Victoria stretching over 55km along the western flank of the Lake Boga granite.
- Next steps: H2 2023 Cannie Mineral Resource update.





# VHM's world class Critical Minerals Projects

Located in Victoria's premier minerals province



May 2023 Goschen Cannie Project underpins significant uplift in rare earth mineral inventory<sup>1</sup>.

590 Kt

**TREO +Y2O3** 

**43%** 

Total Rare Earth Oxides

Measured, Indicated and Inferred



Further Resource programs in 2023 will deliver further upgrades to the mineral inventory.

Note: (1) See Company ASX announcement on 16 May 2023



## VHM's world class Critical Minerals Projects

Cannie Project provides a significant uplift in the Company's mineral inventory<sup>1</sup>

5.1 Mt

Zircon

**A** 39%

Total Company Zircon Inventory in Mt

2.9 Mt

Leucoxene

**A** 95%

Total Company Leucoxene Inventory in Mt

2.7 Mt

Rutile

**451%** 

Total Company Rutile Inventory in Mt



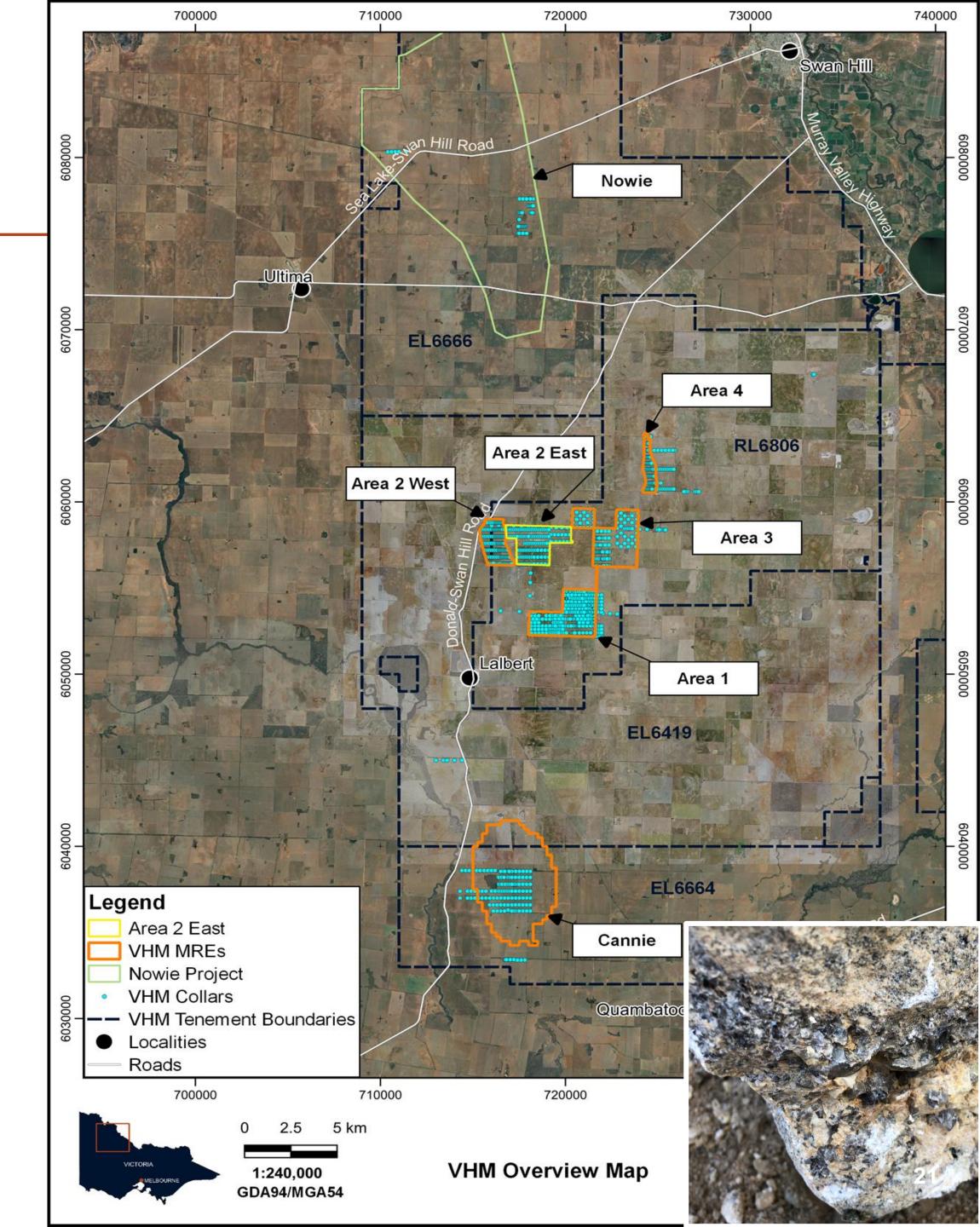
Current annual global demand for zircon is 1.2Mtpa<sup>2</sup> Global supply constrained for high value rutile

#### **Future Mineral Resource definition**

Focus on expansion of North-West Victoria Critical Mineral Province



- Q2 2023 Area 2 East Mineral Resource update
- Q2 2023 Maiden Nowie Mineral Resource
- H2 2023 Cannie Mineral Resource update
- H2 2023 Ore Reserve update
- H2 2023 Nowie Mineral Resource update
- Lake Boga granite exploration review
- Focus on expansion of Company Resource inventory north-west of the Goschen Project area



# Upcoming milestones

- Detailed engineering for development and implementation planning and execution (Phase 1).
- Pilot scale testwork at ANSTO for Phase 1A and advancement of engineering study and FEED.
- **EES decision** on primary approvals and enabling grant of Mining Licence in H2 2023.
- Offtake VHM are continuing conversations with strategic western supply chain participants (Japan, USA and Europe) to complement the Shenghe Resources offtake.
- Continue to seek government funding and grants through EFA and Critical Minerals Development Program.
- Final Investment Decision upon receipt of all necessary approvals and permits, VHM is seeking to make FID for Phase 1 and 1A in H2 2023.





# Company Mineral Resources

#### 820Mt Mineral Resource estimate

Mineral				Oversize	THM Assemblage <sup>(3)</sup>						Rare Earth Oxides																		
Area	Resource Category	Material	In Situ THM	Bulk Density	Mineral (THM)	Slimes	material >2mm	Zircon	Rutile	Leucoxene	Ilmenite	Monazite	Xenotime	La <sub>2</sub> O <sub>3</sub>	CeO <sub>2</sub>	Pr <sub>6</sub> O <sub>11</sub>	Nd <sub>2</sub> O <sub>3</sub>	Sm <sub>2</sub> O <sub>3</sub>	Eu <sub>2</sub> O <sub>3</sub>	Gd <sub>2</sub> O <sub>3</sub>	Tb <sub>4</sub> O <sub>7</sub>	Dy <sub>2</sub> O <sub>3</sub>	Ho <sub>2</sub> O <sub>3</sub>	Er <sub>2</sub> O <sub>3</sub>	Tm <sub>2</sub> O <sub>3</sub>	Yb <sub>2</sub> O <sub>3</sub>	Lu <sub>2</sub> O <sub>3</sub>	Y <sub>2</sub> O <sub>3</sub>	TREO + Y <sub>2</sub> O <sub>3</sub>
	0 ,	(Mt)	(Mt)	(gcm3)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
	Measured	30.7	1.8	1.76	5.72	15	5	29.9	10.8	9.0	24.7	4.3	0.8	0.48	0.96	0.11	0.38	0.07	0.004	0.06	0.01	0.07		0.05	0.01	0.05		0.47	2.72
Area 1	Indicated	62.2	1.4	1.72	2.31	18	2	26.6	11.5	9.2	25.0	4.6	0.9	0.53	1.11	0.12	0.46	0.08	0.004	0.07	0.02	0.07		0.05	0.01	0.05		0.48	3.04
	Total <sup>(1)</sup>	92.9	3.2	1.73	3.44	17	3	27.7	11.2	9.1	24.9	4.5	0.8	0.51	1.06	0.12	0.43	0.08	0.004	0.07	0.02	0.07		0.05	0.01	0.05		0.48	2.94
	Indicated	26.0	0.7	1.72	2.80	20	8	22.0	16.0	12.0	25.0	3.0	1.0	0.31	0.66	0.07	0.28	0.05	0.003	0.05	0.01	0.06		0.04	0.01	0.04		0.39	1.97
Area 2 Wes	Total <sup>(1)</sup>	26.0	0.7	1.72	2.80	20	8	22.0	16.0	12.0	25.0	3.0	1.0	0.31	0.66	0.07	0.28	0.05	0.003	0.05	0.01	0.06		0.04	0.01	0.04		0.39	1.97
	Indicated	204.1	6.9	1.73	3.38	19	3	19.2	9.0	8.0	25.0	3.2	0.6	0.36	0.78	0.09	0.33	0.06	0.003	0.05	0.01	0.05		0.04	0.01	0.04		0.37	2.19
Area 3	Inferred	287.7	6.7	1.72	2.32	18	3	17.2	8.7	7.5	22.7	2.9	0.5	0.35	0.76	0.08	0.31	0.06	0.003	0.05	0.01	0.05		0.03	0.01	0.03		0.36	2.10
	Total <sup>(1)</sup>	491.8	13.6	1.73	2.76	18	3	18.2	8.9	7.7	23.9	3.0	0.6	0.36	0.77	0.09	0.32	0.06	0.003	0.05	0.01	0.05		0.03	0.01	0.04		0.36	2.14
A 4	Indicated	18.0	0.8	1.74	4.60	20	5	19.0	11.0	10.0	24.0	3.0	1.0	0.32	0.67	0.07	0.28	0.05	0.002	0.05	0.01	0.05		0.03	0.01	0.04		0.33	1.90
Area 4	Total <sup>(1)</sup>	18.0	0.8	1.74	4.60	20	5	19.0	11.0	10.0	24.0	3.0	1.0	0.32	0.67	0.07	0.28	0.05	0.002	0.05	0.01	0.05		0.03	0.01	0.04		0.33	1.90
	Inferred	191.7	5.9	1.70	3.1	19	6	24.5	15.5	24.3	2.1	4.1	0.8	0.49	1.06	0.12	0.45	0.08	0.004	0.07	0.01	0.07	0.02	0.05	0.01	0.05	0.01	0.49	3.00
Cannie	Total <sup>(2)</sup>	191.7	5.9	1.70	3.1	19	6	24.5	15.5	24.3	2.1	4.1	0.8	0.49	1.06	0.12	0.45	0.08	0.004	0.07	0.01	0.07	0.02	0.05	0.01	0.05	0.01	0.49	3.00
	Measured	30.7	1.8	1.76	5.72	15	5	29.9	10.8	9.0	24.7	4.3	0.8	0.48	0.96	0.11	0.38	0.07	0.004	0.06	0.01	0.07		0.05	0.01	0.05		0.47	2.72
Grand	Indicated	310.3	9.8	1.73	3.19	19	3	20.5	10.1	8.6	24.9	3.4	0.7	0.38	0.81	0.09	0.34	0.06	0.003	0.05	0.01	0.05		0.04	0.01	0.04		0.38	2.27
Total	Inferred	479.4	12.5	1.71	2.61	18	4	20.6	11.8	15.4	13.1	3.4	0.7	0.42	0.90	0.10	0.37	0.07	0.003	0.06	0.01	0.06	0.008	0.04	0.01	0.04	0.004	0.42	2.52
	TOTAL	820.4	24.1	1.72	2.95	18	4	21.2	11.0	12.1	18.8	3.5	0.7	0.41	0.87	0.10	0.36	0.07	0.003	0.06	0.01	0.06	0.004	0.04	0.01	0.04	0.002	0.41	2.43

	Material	In-Situ TREO + Y <sub>2</sub> O <sub>3</sub> Grade <sup>(4)</sup>	In-Situ TREO + Y <sub>2</sub> O <sub>3</sub>			
	(t)	(%)	(t)			
Area 1, Area 2 West, Area 3, Area 4, Cannie	820,364,884	0.07	588,355			

#### Notes

- 1. Any discrepancies in totals are a function of rounding
- 2. Mineral resources reported at a cut-off grade of 1.0% THM
- 3. Mineral resources reported at a cut-off grade of 1.75% THM
- 4. Mineral assemblage, via QEMScan Particle Analysis, is reported as a percentage of in situ THM content
- 5. In-Situ TREO Grade is calculated by THM Grade (2.95%) multiplied by TREO Grade (2.43%)



# **Exploration Target**

#### 2-4Bt Exploration Target<sup>1</sup>

Toni	nage	THM	grade	In situ THM					
Low Case	Upper Case	Low Case	Upper Case	Low Case	Upper Case				
2,622 Mt	4,071 Mt	2.05%	2.16%	54 Mt	88 Mt				
In situ	ı THM	Zircon	grade	In situ zircon					
Low Case	Upper Case	Low Case	Upper Case	Low Case	Upper Case				
54 Mt	88 Mt	5.31%	6.03%	3 Mt	5 Mt				
In situ	u THM	Rutile	grade	In situ rutile					
Low Case	Upper Case	Low Case	Upper Case	Low Case	Upper Case				
54 Mt	88 Mt	2.03%	2.34%	1 Mt	2 Mt				
In situ	ı THM	Leucoxe	ne grade	In situ leucoxene					
Low Case	Upper Case	Low Case	Upper Case	Low Case	Upper Case				
54 Mt 88 Mt		3.08%	3.46%	2 Mt	3 Mt				
In situ	u <b>THM</b>	Ilmenit	e grade	In situ ilmenite					
Low Case	Upper Case	Low Case	Upper Case	Low Case	Upper Case				
54 Mt	88 Mt	7.13%	8.2%	4 Mt 7 Mt					
In situ	ı THM	Monazit	te grade	In situ monazite					
Low Case	Upper Case	Low Case	Upper Case	Low Case	Upper Case				
54 Mt	88 Mt	0.68%	0.76%	0.4 Mt	0.7 Mt				
In situ	ı THM	Xenotin	ne grade	In situ xenotime					
Low Case	Upper Case	Low Case	Upper Case	Low Case	Upper Case				
54 Mt	88 Mt	0.07%	0.07%	0.04 Mt	0.06 Mt				

Note (1): The Exploration Target was first reported in the Prospectus dated 21 November 2022 as supplemented by the supplementary prospectus dated 5 December 2022, lodged with ASX on 5 January 2023.

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