

## Nechalacho – Staged Development Buyers in Place – Market Demand Strong

Vital Metals (VML) is an emerging rare earths mining company, focused on the development of the Nechalacho project in Canada. Mining of Nechalacho Stage 1 commenced in June 2021, which in combination with a simple ore sorting process is targeting production of a mixed rare earth concentrate. A Stage 2 expansion plan envisages a significantly larger, long-term project utilising Nechalacho's large resource base. We expect the Stage 2 expansion to be fully funded from the A\$43m equity raise in March 2021 and expected cash flows from Stage 1.

### Offtakes in Place with Expansion Options

Stage 1 production will be sold via a 1500 tonnes per annum (tpa) ex-Cerium<sup>1</sup> offtake (with a minimum of 750kg of NdPr)<sup>2</sup> to REEtec Norway. A further offtake MOU is in place with US based Ucore for an additional 500tpa from 2024. Supporting VML's Stage 2 expansion plans are options within REEtec's agreement to expand to ~5,100 tpa ex-Cerium (2,500t NdPr) and Ucore's MOU to supply a minimum of 50% of its proposed 5,000tpa REO separation plant.

### Experience Matters in REO Development

VML's leadership team includes prior experience with leading ASX rare earths company Lynas Corporation (LYC). This experience has helped develop VML's phased development strategy for the Nechalacho and ensures that the company is managing the practical realities of the REO market with commercial returns in mind. VML has brought Nechalacho Stage 1 into production with modest capex, benefiting from significant prior expenditure at the project, full permitting, and existing infrastructure.

### The Market: Electrification and Supply Diversity

Rare-earth oxides / elements / metals (REOs) are found together in deposits as a set of 17 soft heavy metals. REO's highest-growth markets are rechargeable batteries and permanent magnets in electric motors. China is home to most of the world's capacity to process REOs and supplies approximately 80% of the processed rare earths imported by the US. The US is looking to diversify supply and reduce reliance on China. As the US currently has only one major domestic supply of REOs, VML's location and timing plays well into this major market thematic.

### Valuation: Strong Potential Upside – Risked NPV of A\$0.17/Share (Fully Diluted)

The scale of the resource and location in Canada are key advantages which position VML as a frontrunner in building the REO supply chain outside China. We see further upside to our valuation from further Phase 2 expansions. Key risks: uncertainty regarding the outcome of the Stage 2 scoping study, reliance on partners and offtake customers, and changes in costs and commodity prices.

<sup>1</sup> The tonnes per annum are "ex-Cerium". VML's agreement with REEtec is to sell Total Rare Earth Oxides (TREO) of 2000tpa with a maximum of 25% Cerium, equating to 1500tpa on an ex-Cerium basis. VML's process will naturally remove a significant percentage of Cerium with the final product to contain a maximum of 25% Cerium. Tonnages referred to in this report are an ex-Cerium basis.

<sup>2</sup> Neodymium and Praseodymium (NdPr) make up the majority of the value of VML's REO product (see exhibit 24) and agreements have been struck with a minimum requirement of NdPr within the ex-Cerium tonnages.



Vital Metals Limited (ASX: VML) is an emerging Australian mining company with a 100% interest in the operating Nechalacho Project in Canada. VML has also agreed to purchase the Kipawa and Zeus HREO projects in Canada and has a 100% interest in the Wigu Hill rare earth project in Tanzania.

<https://vitalmetals.com.au/>

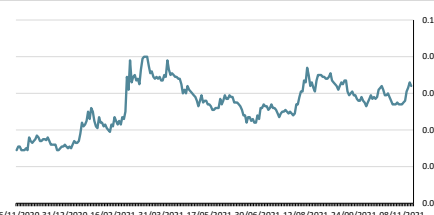
Stock	ASX: VML
Price	A\$0.06
Market cap	A\$256m
Valuation (per share)	A\$0.17

#### Next steps

Stage 2 scoping study

In-fill & exploration drill

#### VML share price (A\$) – 1 Year



Source: FactSet.

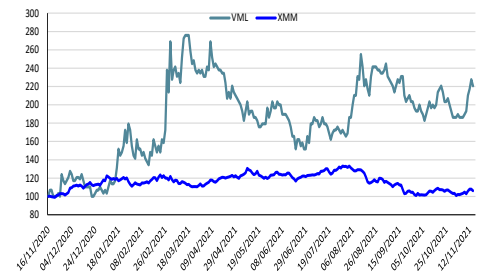
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## Exhibit 1 – Company summary – Year End 30 June

MARKET DATA						
Share Price	A\$/sh	0.06				
52 week high/low	A\$/sh	0.08/0.03				
Valuation	A\$/sh	0.17				
Market Cap (A\$m)	A\$m	253				
Net Debt / (Cash) (A\$m)	A\$m	(29)				
Enterprise Value (A\$m)	A\$m	225				
Shares on Issue	m	4,154				
Options/Performance shares	m	443				
Other Equity	m	0				
Potential Diluted Shares on Issue	m	4,597				
INVESTMENT FUNDAMENTALS						
		Jun-20	Jun-21	Jun-22e	Jun-23e	Jun-24e
Reported NPAT	A\$m	(4.6)	(4.7)	3.1	11.1	17.8
Underlying NPAT	A\$m	(4.6)	(4.7)	3.1	11.1	17.8
EPS Reported (undiluted)	¢ps	(0.2¢)	(0.2¢)	0.1¢	0.3¢	0.4¢
EPS Underlying (undiluted)	¢ps	(0.2¢)	(0.2¢)	0.1¢	0.3¢	0.4¢
Underlying EPS Growth	%	6.4%	-27.6%	-145.9%	253.8%	60.6%
P/E Reported (undiluted)	x	(0.3)	(0.4)	0.8	0.2	0.1
P/E Underlying (undiluted)	x	(0.3)	(0.4)	0.8	0.2	0.1
Operating Cash Flow / Share	A\$	(0.00)	(0.00)	0.00	0.00	0.01
Price / Operating Cash Flow	x	(71.8)	(122.9)	57.5	15.6	9.8
Free Cash Flow / Share	A\$	(0.01)	(0.00)	(0.00)	0.00	0.01
Price / Free Cash Flow	x	(12.0)	(15.6)	(15.4)	16.9	10.6
Free Cash Flow Yield	%	-8.3%	-6.4%	-6.5%	5.9%	9.4%
Book Value / Share	A\$	0.01	0.02	0.02	0.02	0.02
Price / Book	x	8.3	4.0	3.7	3.2	2.5
NTA / Share	A\$	0.01	0.02	0.02	0.02	0.02
Price / NTA	x	8.3	4.0	3.7	3.2	2.5
Year End Shares	m	2,143	4,154	4,154	4,154	4,154
Market Cap (spot)	A\$m	131	253	253	253	253
Net Debt / (Cash)	A\$m	(2)	(35)	(18)	(33)	(57)
Enterprise Value	A\$m	129	219	235	220	196
EV / EBITDA	x	(49.5)x	(49.5)x	54.4x	12.6x	8.0x
Net Debt / Enterprise Value		(0.0)	(0.2)	(0.1)	(0.1)	(0.3)
PRODUCTION AND PRICING						
		Jun-20	Jun-21	Jun-22e	Jun-23e	Jun-24e
REO Production (t)		-	-	250	1,000	1,500
REO Price (US\$/kg)		-	-	50.6	52.1	53.7

### 12-Month Relative Performance vs S&P/ASX Metals & Mining



Profit & Loss (A\$m)	Jun-20	Jun-21	Jun-22e	Jun-23e	Jun-24e
Sales	-	-	6.4	26.0	40.4
Expenses	(4.5)	(4.5)	(2.3)	(8.3)	(12.1)
<b>EBITDA</b>	<b>(4.5)</b>	<b>(4.5)</b>	<b>4.1</b>	<b>17.8</b>	<b>28.3</b>
D&A	(0.1)	(0.2)	(1.0)	(3.9)	(6.1)
<b>EBIT</b>	<b>(4.6)</b>	<b>(4.7)</b>	<b>3.2</b>	<b>13.9</b>	<b>22.2</b>
Net Interest	0.0	0.0	1.0	0.9	1.5
Profit Before Tax	(4.6)	(4.7)	4.2	14.8	23.7
Tax	-	-	(1.0)	(3.7)	(5.9)
<b>Underlying NPAT</b>	<b>(4.6)</b>	<b>(4.7)</b>	<b>3.1</b>	<b>11.1</b>	<b>17.8</b>
Exceptionals	(0.0)	-	-	-	-
<b>Reported Profit</b>	<b>(4.6)</b>	<b>(4.7)</b>	<b>3.1</b>	<b>11.1</b>	<b>17.8</b>

Balance Sheet (A\$m)	Jun-20	Jun-21	Jun-22e	Jun-23e	Jun-24e
Cash	1.8	34.9	18.5	33.4	57.3
Receivables	0.4	1.3	0.5	1.1	2.2
Inventory	-	-	0.3	0.7	1.4
PP&E	1.5	16.1	36.0	33.4	29.3
Other	12.6	13.5	13.5	13.5	13.5
<b>Assets</b>	<b>16.3</b>	<b>65.8</b>	<b>68.8</b>	<b>82.0</b>	<b>103.6</b>
Creditors	0.4	2.3	0.5	1.1	2.2
Debt	-	-	-	-	-
Leases	0.1	0.2	0.2	0.2	0.2
Provisions	0.0	0.3	0.3	0.3	0.3
Other	-	-	-	-	-
<b>Liabilities</b>	<b>0.5</b>	<b>2.8</b>	<b>1.0</b>	<b>1.6</b>	<b>2.7</b>
Minority Interest	-	-	-	-	-
<b>Net Assets</b>	<b>15.7</b>	<b>63.0</b>	<b>67.7</b>	<b>80.4</b>	<b>100.9</b>

Cashflow (A\$m)	Jun-20	Jun-21	Jun-22e	Jun-23e	Jun-24e
Cash From Operations	(1.9)	(2.4)	4.5	19.1	30.3
Interest	0.0	0.0	1.0	0.9	1.5
Tax	0.0	0.3	(1.0)	(3.7)	(5.9)
<b>Net Cash From Operations</b>	<b>(1.8)</b>	<b>(2.1)</b>	<b>4.4</b>	<b>16.3</b>	<b>25.8</b>
Capex	(1.5)	(7.4)	(20.5)	-	-
Exploration	(2.7)	(6.5)	(0.3)	(1.3)	(2.0)
Acquisitions	(4.9)	(0.2)	-	-	-
<b>Free Cash Flow</b>	<b>(10.9)</b>	<b>(16.2)</b>	<b>(16.4)</b>	<b>15.0</b>	<b>23.8</b>
Proceeds from issue of shares / (buy	-	49.6	-	-	-
Proceeds / (Repayment) of Borrowin	(0.1)	(0.1)	-	-	-
Dividend	-	-	-	-	-
<b>Net Increase / (Decrease) in Cash</b>	<b>(10.9)</b>	<b>33.3</b>	<b>(16.4)</b>	<b>15.0</b>	<b>23.8</b>

Source: VML, MST Access.

## Investment Thesis: The Right Place at the Right Time and.... A Simple Low-Cost Plan, Capable Management and a Hungry Market

### Company Profile: Ready to Supply for Increasing Uses with Diverse Portfolio

#### Diverse portfolio of rare earths assets – various stages and locations

VML's portfolio presents an attractive suite of rare earths assets at various stages of development: existing production (Nechalacho – Canada), quality development assets (Kipawa, Zeus – Canada) and higher-risk/reward development options (Wigu Hill – Tanzania) with significant exploration upside and scope for substantial exploration prospectivity. VML is strongly leveraged to an improving rare earths market, backed by a sensible development strategy, as well as a capable and disciplined management team with deep rare earths industry experience.

#### VML's long-term plan: to grow into a significant rare earths company ex-China

VML's stated objective is to become 'the largest, sustainable independent supplier of clean mixed rare earth feedstock to rare earth separation facilities outside of China'. VML aims to become the lowest cost producer of mixed rare earth oxide outside of China by developing one of the highest-grade rare-earth deposits in the world and the only rare earth project capable of beneficiation solely by ore sorting. The company's differentiated corporate strategy is built from significant rare earths industry experience within the company's leadership ranks and a solid suite of quality projects, driven by a clearly articulated three-stage development plan over the next 5 years.

VML has formulated a phased and value-oriented development plan at the world-class Nechalacho rare earth deposit and has potential to build an operationally diversified and globally significant rare earths-focused company.

#### Nechalacho project: flagship project with low-capex 'demonstration phase' mine for ramp-up

The Nechalacho project benefits from a number of advantages including significant prior investment and favourable established infrastructure. The mine site is near Yellowknife, the largest population centre in Canada's Northwest Territories (NWT). This region of Canada has deep economic ties to the mining industry, with significant high-value minerals, having been mined for many decades. The NWT is a stable mining jurisdiction with favourable regulations.

VML's development plan at the Upper Zone of Nechalacho is predicated on a low-capex Stage 1 mine at the North T deposit, which will provide cashflows for the Stage 2 expansion as well as develop operational capability and customer familiarity with/acceptance of the Nechalacho product. We see this approach to asset development as sensible and supportive of strong shareholder value creation over the medium term.

VML's current 94.7mt @ 1.46% Total Rare Earth Oxide (TREO) resource (1.38mt contained REO) at the Upper Zone of Nechalacho supports a long-life operation at the Stage 2 production supported by customer offtake options.

Stage 3 is the Heavy Rare Earths (HREO) Kipawa Project, located in Quebec, Canada. The addition of Kipawa into VML's project portfolio would significantly boost heavy rare earth production and make VML the only producer of the full suite of rare earths outside of China, positioning VML as a key strategic player in the North American rare earth supply chain.

### Customer Offtake – Strong Indication of Support for the Project

VML's target to be a major supplier of Rare Earths outside of China has already attracted 2 offtake customers. An offtake agreement with Norwegian based REEtec and an MOU with US based Ucore. The agreements give a strong indication of support for the project from market participants and play strongly into the theme of the market looking for alternate rare earth supply ex China. Expansion options in the agreements support >5,000t ex-Cerium for REEtec (2,500t NdPr) and supply 50% of Ucore's proposed 5,000t TREO/yr RE separation plant.

### Market: Rare Earths Essential for Modern Applications – USA looking for new Supply

Rare earths are 17 metallic elements with unique properties that are vital for a range of technologies, including batteries, high-powered magnets and electronic equipment. Demand for rare earths has increased with surging demand for electronics and electric vehicles. Rare earth demand grew ~5% YOY in 2013–2018 reaching 170kt in 2020. Industry analyst Roskill estimates FY25 REO demand will be 200kt and 280kt in 2030. A key to the Rare Earths market and specifically VML's location in Canada is that the US, a major user, is looking to diversify supply away from China.

## Potential Near-term Catalysts and Timing

### CY2021

- 2HCY21, Tardiff – Drilling results further delineate the resource and firm up Stage 2 mine plan;
- 2HCY21, Kipawa/Zeus – Final closure of the acquisition of Kipawa and Zeus projects
- 4QCY21, North T – Delivery of first Nechalacho product to Saskatoon extraction plant

### CY2022

- 1HCY22, North T – Commissioning and first production at Saskatoon extraction plant
- 1HCY22, Tardiff - Resource update incorporating additional drilling results
- 1HCY22, Tardiff – Release of Stage 2 Scoping Study

## Recent Events

- October 2021 – Non-binding MOU signed with Ucore Rare Metals for 500tpa REO (excluding Cerium) from 1H 2024. Agreement also includes a minimum of 50% of feedstock for the expanded plant from 2026
- October 2021 – Expanded offtake agreement with REEtec to 1500tpa ex-Cerium, minimum 750NdPr
- September 2021 – Ore sorter fully commissioned on high-grade stockpiled ore
- August 2021 – Agrees to acquire Canadian HREO projects Kipawa and Zeus
- July 2021 – Ore sorter successfully commissioned on low-grade stockpile ore
- May 2021 – Offtake partner REEtec formally accepts carbonate sample
- May 2021 – Signs lease for Saskatoon extraction plant
- May 2021 – Successfully completes first blast at North T pit
- March 2021 – A\$43m capital raising to commence mining at Nechalacho
- December 2020 – Strikes offtake agreement for 1000tpa REO over 5 years with Norwegian company REEtec
- September 2020 – Signs term sheet with SRC to construct and operate extraction plant in Saskatoon

## Financials – Fully Funded for Nechalacho Stage 2 Operations

Following the successful A\$43m equity raising completed in March 2021, VML has completed funding requirements to undertake the full extent of Stage 1 operations which we expect will provide sufficient cash to fund the Stage 2 expansion plan at Nechalacho. Therefore, the company has secured the funding requirements to support the long-term development potential of Nechalacho at the Upper Zone as it is currently defined.

While feasibility optimisation is to be undertaken on the Kipawa and Zeus projects after the acquisitions are formally completed, it is likely additional funding will be required to take these assets (as well as Wigu Hill) into production, if these are to be sequenced ahead of the achievement of full-scale production at Nechalacho Stage 2. We would expect these funding solutions to consist of some component of debt (supported by Nechalacho cash flows), potential project equity sell-down or further equity funding.

## Valuation: A\$0.17 – Potential Upside and Risks Mitigated

Our risked NPV for VML is A\$0.17 per share, fully diluted. Our valuation does not take into consideration the potential increase in grade and extension to mine life and subsequent uplift in valuation that this would entail. Exploration results to date indicate further potential within the current resource as well as extensions surrounding the mine area.

Key risks include uncertainty regarding the outcome of the Stage 2 scoping study, reliance on the Saskatchewan Research Council to construct and operate the separation plant, the stability and reliability of the offtake partners (REEtec & Ucore) as well as operational risks, cost escalation and commodity price changes. Offsetting these risks is the experienced management team, previous investment in the asset, established infrastructure, and favourable geopolitical location.

## Company Overview: Established Rare Earths Producer with Significant Expansion Upside + Multi-Asset Optionality

VML's portfolio presents an attractive suite of rare earths assets at various stages of development (see Exhibit 2), predominantly situated in Canada – a stable, high-quality mining jurisdiction. The portfolio spans existing production, quality development assets, and higher-risk/reward development options with significant exploration upside. We see scope for substantial exploration prospectivity across the portfolio, particularly as cash flows from existing production can be reinvested in the broader upside potential of the asset base over time. VML is thus strongly leveraged to an improving rare earths market, backed by a sensible development strategy which has been demonstrated to date at Nechalacho, as well as a capable, disciplined management team with deep rare earths industry experience.

Exhibit 2 – Vital Metals project portfolio

Project	Location	Ownership	Resource	Reserve	Current Status
Nechalacho Rare Earths Project	Canada	100%	94.7mt @ 1.46% REO	-	Stage 1: (North T Zone) in production Stage 2: 1800m drill program underway
Kipawa	Canada	68%*	15.5mt @ 0.434% TREO	19.8mt @ 0.411% TREO	Due diligence
Zeus	Canada	100%*	-	-	Due diligence
Wigu Hill Rare Earths Project	Tanzania	100%	3.3mt @ 2.6% LREO5	-	Discussions continue with the Tanzanian Government concerning issuance of a Mining License
Nahouri Gold Project	Burkina Faso	100%	-	-	Further Exploration Drilling
Aue Cobalt Project	Germany	100%	-	-	Further Exploration Drilling

\*Subject to due diligence and completion

Source: VML.

### Existing Production: Nechalacho REO Project

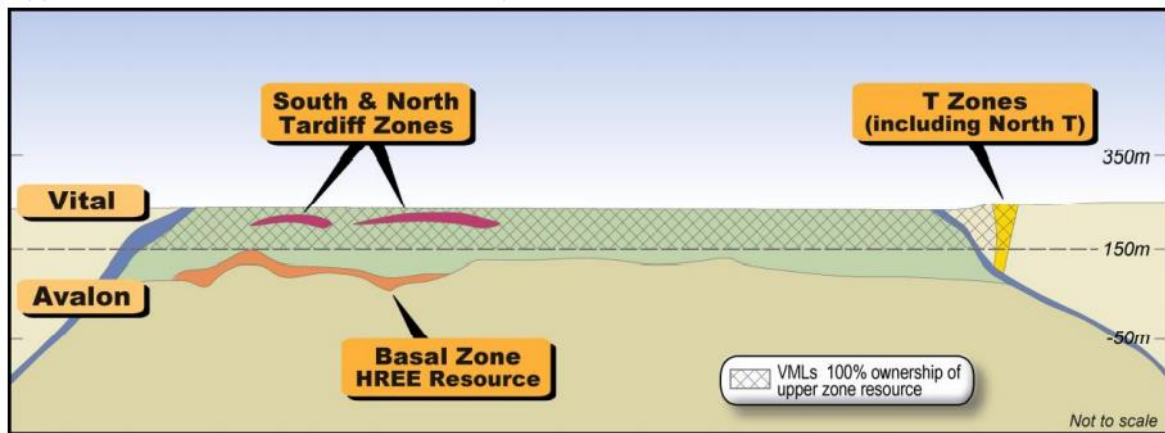
VML's flagship project is the 100%-owned<sup>3</sup> Nechalacho REO Project located in Canada's Northwest Territories (NWT). VML is deploying a staged development strategy at Nechalacho targeting an initial small scale, low-capex operation at North T which will transition to larger scale production at Tardiff in Year 6.

VML has an established offtake agreement with Norwegian company REEtec in relation to the Stage 1 production, which was recently expanded to 2000tpa ex-Cerium over an initial 5-year period (with an option to expand supply). An additional offtake agreement was recently established for 500tpa ex-Cerium from 1H 2024 with Ucore Rare Metals in Alaska (with an option for additional product from 2026). A drilling program is underway which aims to further define the mine plan for Stage 2 focused on the larger Tardiff deposit.

- Stage 1 production recently commenced at the high-grade North T Zone (105 kt @ 8.9% Light Rare Earth Oxide [LREO]), which is targeting production of approximately 2000 tpa ex-Cerium over an initial 5-year period.
- The Stage 2 development plan is focused on proving up a large-scale long-life operation. The larger Upper Zone is situated 2km South of the North T Zone, and contains a resource of 94.7 Mt and 1.46% TREO and the high-grade Tardiff sub-zones. A drilling program is underway at Tardiff (3.2mt @ 2.4% TREO) to advance Stage 2 towards a published scoping / feasibility study outlining an expanded production plan. VML owns the mineral rights from surface to a depth of 150 m above sea level (the 'Upper Zone'). The prior owner, Avalon Rare Metals Inc, retains ownership of the mineral rights below the Upper Zone which contain higher grades of heavy rare-earth ore (HREO).

<sup>3</sup> Under the purchase agreement with Avalon, VML owns 100% of the surface resources with Avalon retaining 100% ownership of the ore at depth (Basal Zone). See Exhibit 3.

Exhibit 3 – Nechalacho Project: illustration of VML's ownership of the Upper Zone



Source: VML.

## Quality Development Assets: Kipawa, Zeus

Following an agreement announced in August 2021, VML will acquire an interest in two heavy rare earth projects (68% interest in Kipawa and a 100% interest in Zeus) in Quebec, Canada for a cost of C\$8m in staged payments over 5 years. Due diligence is currently underway, and the transaction is yet to formally close. Kipawa has a 43-101 (Canadian code for definition of resources and reserves) defined resource & reserve with a mine life defined of 15 years as part of the previously completed DFS (2013). VML will look to optimise the prior DFS on completion and utilise a similar development strategy to that adopted at Nechalacho to get the asset into production.

## Higher Risk-Reward Development Option

VML's Wigu Hill project, situated in Tanzania in Eastern Africa, provides optionality on an additional rare earths project which could provide operational diversification for the company over the medium term.

## Additional Assets with Longer-Term Potential

VML also owns the Nahouri Gold Project in Burkina Faso and the Aue Cobalt Project in Germany. While both assets have longer-term potential, they are not central to VML's current development focus on rare earths and no exploration activity is currently underway at either project.

## Development Plan for Flagship Nechalacho Project: A Staged Approach to Unlock Long Life, Large-Scale Stage 2 Production

VML acquired Nechalacho for A\$14.6m in cash as part of its acquisition of Cheetah Resources in 2019. The project had previously been subject to a 2013 43-101 technical study and Feasibility Study by Avalon Rare Metals Inc, a Canadian listed company, which outlined a project with a post-tax NPV of C\$900m for total capex of C\$1.6bn.

With the experience of VML's key executives including MD Geoff Atkins and COO Tony Hadley (both ex Lynas), the company has an intimate understanding of the critical risks and immense challenges of a traditional development strategy for large-scale REO projects. VML has outlined many of these in recent presentations, including:

- project complexity and extended ramp-up periods to design capacity of 2–3 years
- very high customer specification parameters, and consequent slow customer ramp-up acceptance of 3–4 years
- substantial upfront capex and long-dated shareholder return realisation timelines.

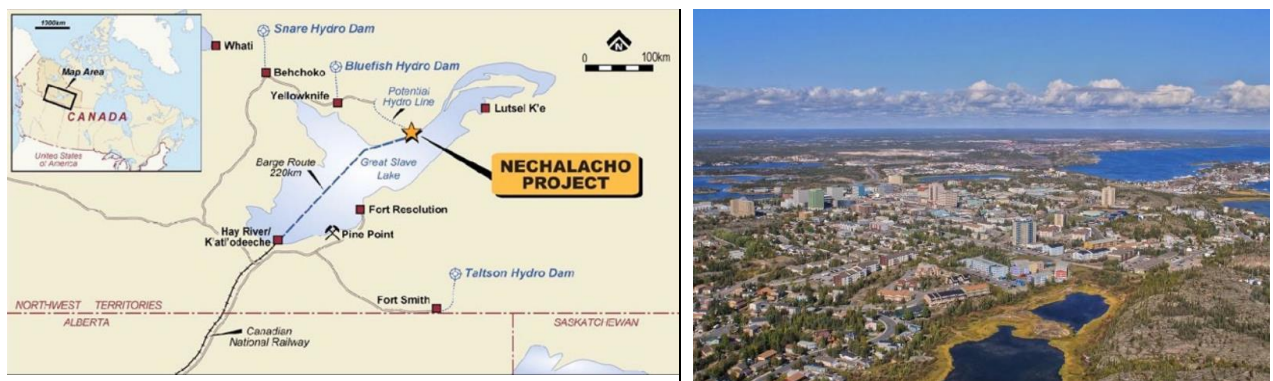
VML's strongly held vision of sensible development strategies to generate significant shareholder returns has led management to define a better framework for a viable pathway to full-scale production.

### Project Location: Favourable Regulations in a Mining-Centred Economy

#### Canadian Northwest Territories – stable mining jurisdiction

The Nechalacho project site is located in Canada, 100km east of Yellowknife – the capital, largest community and only city in the country's Northwest Territories (NWT) (see Exhibit 4, left). The population of NWT is approximately 45,000, around half of which lives in the vast landmass comprising the city of Yellowknife (see Exhibit 4, right).

Exhibit 4 – Project location: Canadian Northwest Territories – an excellent setting for mining development (left); 100km east of city of Yellowknife (right)



Source: VML (left and right).

There is no permanent road to the Nechalacho mine site. The site is directly adjacent to the shore of the Great Slave Lake and straddles other smaller water bodies, including Thor Lake. The Great Slave Lake is free of ice for only ~4 months of the year, and through winter the surface is frozen solid, allowing heavy trucks to use the lake to transport supplies. As such, while many resource developments in the NWT struggle with reliable site access given the remote location as well as the availability of key infrastructure, Nechalacho is fortunately positioned with access directly to the Great Slave Lake 'ice highway' which represents the key access link for mine equipment and supplies. Barges are also used in summer, and a 30m-wide, 305m-long airstrip provides site access throughout the year.

### Exhibit 5 – Transportation on ‘ice road’



Source: VML.

### Local economy reliant on mining, despite efforts to diversify

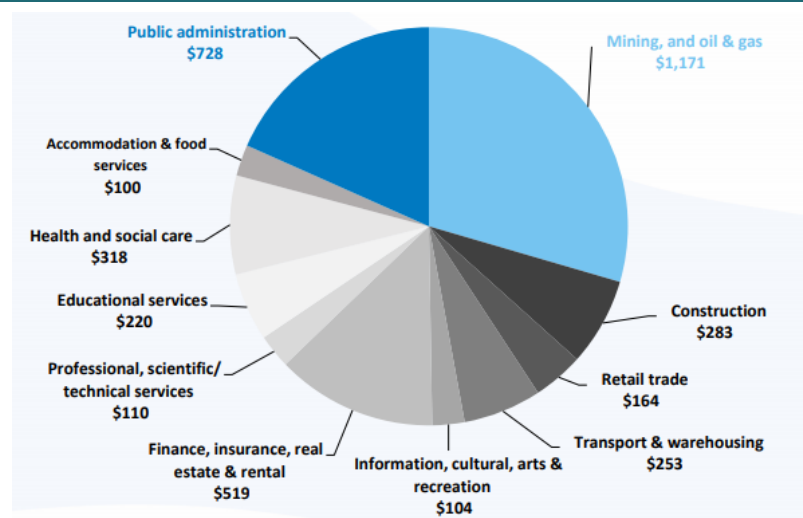
While the Nechalacho mine area is situated towards the NWT’s southern boundary, at the northern end the territory extends well into the Arctic Circle. The landscape is rugged and the climate characterised by extremely prolonged winters and harsh Arctic conditions, with very limited arable land capable of commercial farming. Historically the region’s primary economic driver has been gold mining, as well as diamonds, oil & gas, and to a lesser extent a range of small, scattered mineral projects encompassing uranium, lead, zinc, silver, copper, tungsten and cadmium.

Little gold mining industry remains in NWT. However, several major diamond mines are still operating and sustain a vibrant mining industry, adding to the availability of substantial mining industry services and expertise in Yellowknife:

- Ekati Diamond Mine: commenced production in 1988, situated ~300km northeast of Yellowknife
- Diavik Diamond Mine: commenced production in 2003, situated ~300km northeast of Yellowknife
- Gahcho Kue Diamond Mine: commenced production in 2016; ~280km northeast of Yellowknife.

The NWT economy is relatively small and highly reliant on mining – the largest component of the local economy, responsible for ~20% of GDP (see Exhibit 6). The NWT’s secondary economic engine is the government. Domestic and international tourism was a growth focus, but the local tourism and hospitality sector bore the brunt of job losses from COVID-19, altering the structure of the local economy and reinforcing the core role of mining and government.

### Exhibit 6 – GDP by industry, Northwest Territories, Canada (C\$m)



Source: [https://www.fin.gov.nt.ca/sites/fin/files/resources/budget\\_dialogues\\_2020-economic\\_situation\\_and\\_outlook\\_v2.pdf](https://www.fin.gov.nt.ca/sites/fin/files/resources/budget_dialogues_2020-economic_situation_and_outlook_v2.pdf)

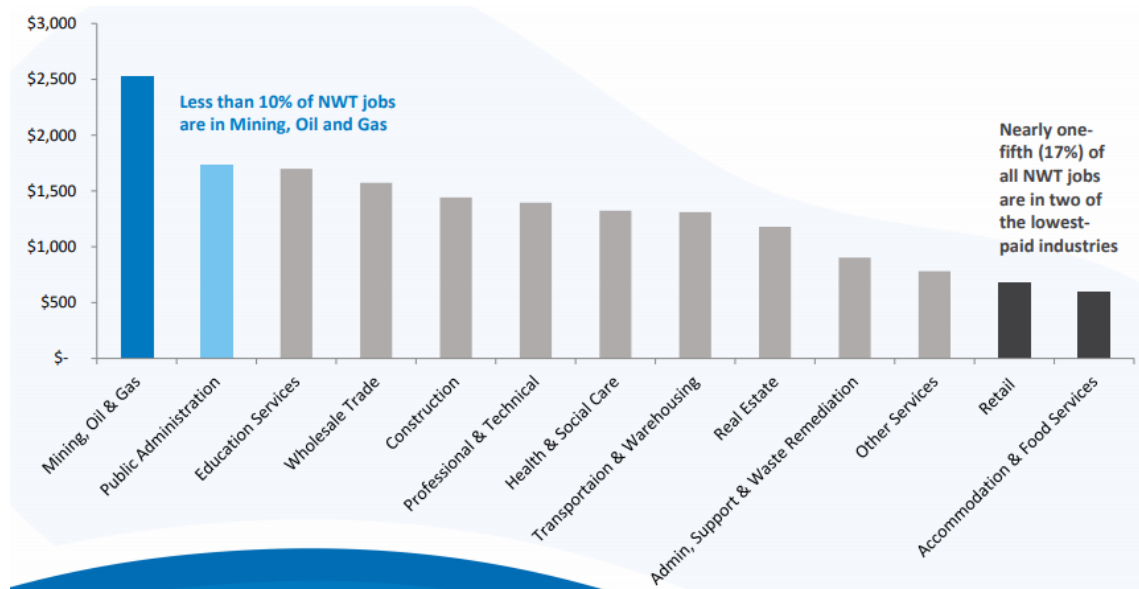
## Regulatory settings likely to remain very favourable for mine development

The political and regulatory backdrop for the Nechalacho mine is highly supportive, and the mine development pathway benefits from local support given the depth of expertise in Yellowknife's established and mining-oriented workforce situated only 100km away.

Canada has a strong mining and energy history, with a regulatory regime and support for the industry somewhat analogous to Australia's. In the NWT, the inherent limitations and historical difficulties of diversifying the economy have been amplified by the fact that, post-COVID, the local economy has become relatively more reliant on the mining sector as the largest private sector generator of economic activity. In a recent post-pandemic presentation entitled 'Budget Dialogues 2020', the NWT Government lamented that 'past efforts to diversify the NWT economy have not worked – heavy reliance on Government and mining has continued'.

The mining sector's share of employment represents <10% of NWT jobs (versus >20% of GDP) and runs third behind retail trade in the NWT, however the sector provides higher-paying jobs than any other sector, including public administration.

Exhibit 7 – Average weekly earnings by industry (C\$), Northwest Territories, Canada



Source: [https://www.fin.gov.nt.ca/sites/fin/files/resources/budget\\_dialogues\\_2020-economic\\_situation\\_and\\_outlook\\_v2.pdf](https://www.fin.gov.nt.ca/sites/fin/files/resources/budget_dialogues_2020-economic_situation_and_outlook_v2.pdf).

It is thus unsurprising that the NWT Government has flagged an increased focus on investing in infrastructure and putting in place an attractive regulatory and taxation framework in order to incentivise business investment in the region.

## Nechalacho Development – The New Plan: Staged Advancement, Value Focused

In contrast to the large-scale Nechalacho development strategy outlined in a 2013 Feasibility Study by the previous owner, Avalon, VML is pursuing a differentiated approach focusing on a staged development of the Upper Zone. This tactic is aimed at de-risking technical aspects of the operation, as well as reshaping funding requirements into manageable components, ensuring that shareholder value creation is the central yardstick by which the project is assessed.

### A quick look back: Original 2013 Development Plan – Too Big, Too Costly

In 2013, Avalon Rare Metals compiled a Technical Report and Feasibility Study for the development of the Nechalacho rare earths project. This study was predicated on a defined Mineral Reserve Estimate (MRE) of **14.6 mt grading 1.7% TREO and 0.45% HREO**, with the mine plan targeting the deposit's Basal Zone given its higher grades of high-value HREO relative to the Upper Zone, supporting a 20-year mine life at the proposed production rate of 730 ktpa, accounting for only 12% of the total Measured & Indicated Resource and less than 5% of the total Resource of over 300mt.

The study envisioned a large-scale 'traditional' development plan that and was comprised of the mine as well as three geographically distinct processing plants, with final processing into a range of finished rare earth products for sale to customers.

The Feasibility Study estimated pre-production capex of C\$1.6bn. The targeted annual was 10ktpa of saleable purified rare earth oxide/carbonate products. The cost of the Feasibility Study itself predicated on this development strategy was ~US\$60m and took two years to complete. The project was unable to move forward predicated on this development strategy, predominantly due to the very large upfront capex commitment not being able to attract the necessary funding.

A more detailed review of the 2013 study is in Appendix 1.

### Background to the New Plan: Distinguishing the Upper and Basal Zones

Prior geological interpretation of the Nechalacho deposit separated the resource into two areas labelled the Upper Zone and the Basal Zone – the key distinction being the concentration of HREO. A key trend identified in the prior technical work was that the proportion of HREO to LREO increases gradually with depth. Disaggregating the Measured and Indicated Resource estimate from the 2013 technical report illustrates this grade differential:

- Upper Zone = 55mt at 1.42% TREO and 0.14% HREO
- Basal Zone = 67mt at 1.57% TREO and 0.34% HREO.

When VML acquired the Nechalacho project in June 2019, the Upper Zone was noted to contain 149mt Mineral Resource (68% Inferred) grading 1.42% REO, representing approximately 50% of the overall Mineral Resource delineated in the 2013 43-101 Technical Report.

In December 2019 VML redefined the JORC Resource inventory within the 100%-owned component of Nechalacho's Upper Zone. The work incorporated a number of revisions to increase confidence levels in the pre-existing data including:

- a broad geological re-interpretation and more constrained geological model
- the creation of new geological wireframes
- a higher cut-off grade (25.2% NdPr).

The work defined an overall resource of 94.7mt at 1.46% TREO (3% Measured, 16% Indicated, 81% Inferred).

Exhibit 8 – Upper Zone Resource (100% VML) at Nechalacho

Confidence Category	ND2O3 cutoff grade	Tonnage	REO	LREO	HREO	ND2O3	PR6O11	NdPr:TREO
	%	Mt	%	%	%	%	%	%
Measured	0.3	1.094	2.004	1.817	0.186	0.394	0.106	25.0%
	0.1	2.914	1.468	1.326	0.142	0.288	0.077	24.9%
Indicated	0.3	6.246	1.928	1.762	0.166	0.380	0.102	25.0%
	0.1	14.662	1.508	1.372	0.137	0.295	0.080	24.9%
Inferred	0.3	30.945	1.797	1.637	0.161	0.360	0.094	25.3%
	0.1	77.159	1.456	1.323	0.133	0.291	0.077	25.3%
Measured, Indicated and Inferred	0.3	38.285	1.825	1.662	0.162	0.364	0.096	25.2%
	0.1	94.735	1.464	1.330	0.134	0.291	0.078	25.2%

Source: VML.

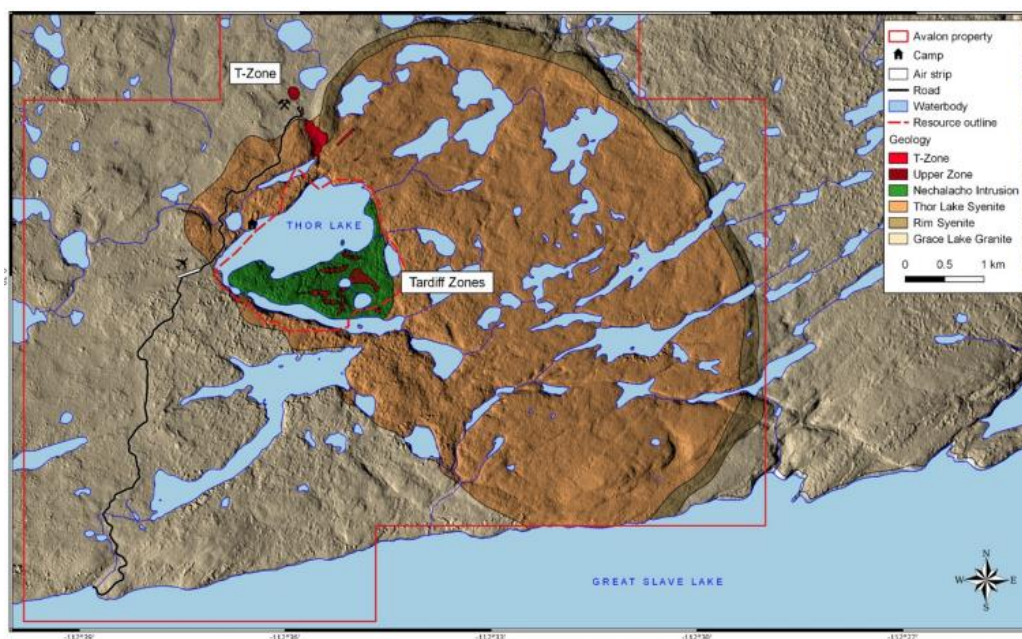
The HREO grade in the Basal Zone is more than twice that of the Upper Zone. The relatively high value of HREO minerals relative to LREO explains the structure of the Nechalacho acquisition agreement with Avalon, whereby Avalon retains ownership of mineral resources below 150m depth which incorporates the Basal Zone situated at an average depth of 200m.

The company has indicated that its development philosophy is ‘to simplify the development process by mining and producing a high purity mixed REO product, thereby avoiding the very high capex requirements associated with rare earth separation facilities, whilst shortening the time to production’.

In executing this plan at Nechalacho, VML has separated the project into two stages:

- **Stage 1 (effectively a ‘demonstration phase’)** – North T Zone: high-grade, near-surface deposit, easily accessible and processed via mechanical sorting to produce a high-grade concentrate. Currently in production.
- **Stage 2** – Tardiff Zone: long-term, large-scale production with current offtake agreements having options of >6500tpa ex-Cerium. We estimate first production for 2025.

Exhibit 9 – Nechalacho project, showing the two distinct zones within the Upper Zone (T and Tardiff Zones)



Source: VML.

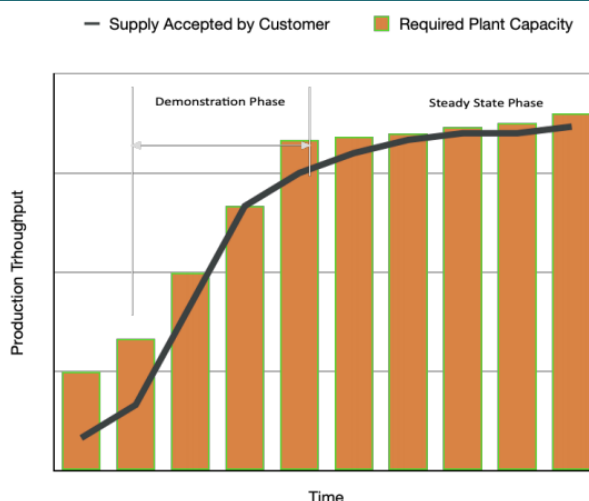
## Overview of Stage 1 ‘demonstration phase’: a disciplined path to market

The Stage 1 mining and processing investment represented by the North T pit, ore sorter and Saskatoon separation plant (detailed below) is structured to represent a ‘demonstration phase’ for the project before proceeding into the broader, long-term, larger-scale Stage 2. A demonstration phase is necessary in REO to gradually onboard new customers and secure firm customer acceptance of the product – a prerequisite to obtaining stable recurring sales contract volumes. VML has graphically illustrated this in its corporate strategy materials (see Exhibit 10).

VML has summarised the objectives of the Stage 1 ‘demonstration phase’ production at Nechalacho as follows:

- to demonstrate to customers the ability to produce product at specification on time
- to demonstrate the ability to ramp up production to meet long-term requirements of off-take partners
- to demonstrate the ability to develop a long-term, sustainable throughput production volume
- to define parameters for the development of the Nechalacho Tardiff project for the second stage of VML’s development strategy.

### Exhibit 10 – REO project development: demonstration phase versus steady state phase



Source: VML.

VML’s carefully sequenced planning of the pathway for Nechalacho to full production showcases the leadership team’s prior rare earths industry experience. We believe the strategy is well defined and provides a solid platform for VML to execute an operational and commercial outcome across its asset base to drive shareholder returns.

## Details of Stage 1 – North T Zone – production has commenced

The North T Zone is a very high-grade deposit of 105kt at 8.9% LREO. The deposit is shallow, and the ore can be easily processed with a low-cost, simple process of ore sorting, gravity separation and leaching. The mine plan anticipates extraction of 74.1kt of ore grading 10.8%, containing 8,028t REO in total.

Mining and crushing at North T commenced in June 2021, conducted by a contract mining partner, and was completed in a single campaign which was finalised in September 2021.

Exhibit 11 – North T pit – mine plan resource inventory

Item	Unit	Resource Inventory
Ore	T	74,124
	REO %	10.8
Waste Overburden	t	84,946
Waste Pegmatite	t	420,300
Waste Total	t	505,245
All Materials	t	579,370
Stripping Ratio	waste/ore	6.8
REO	t	8,028

Source: VML Annual Report FY20.

Exhibit 12 – North T pit progress

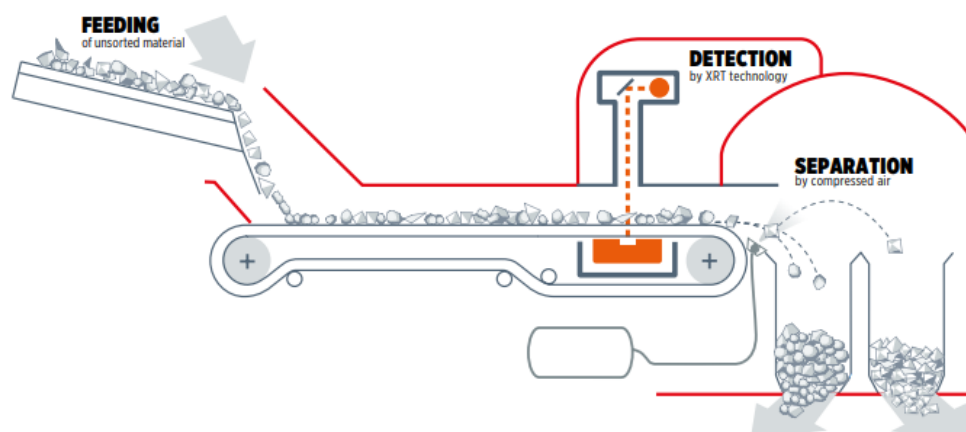


Source: VML.

**The process:** Ore will be crushed and processed with an ore sorter which has been installed and which commenced commissioning and calibration at site in July 2021 using only material from low-grade stockpiles (2–5% TREO). With the initial results from ore sorting producing concentrate to the target specification of 35% TREO, the processing continued onto medium- and high-grade materials from August 2021

Ore sorters use sensors to mechanically separate crushed ore into higher-grade material. A number of sensor technologies can be deployed including colour, density, near-infrared (NIR), laser, x-ray transmission, and electromagnetic technologies. VML has purchased a Tomra COM Series (i.e., belt based versus chute based) Tertiary XRT 1220/B, which uses x-ray transmission as its primary sensor technology. Tomra specification documents state that XRT sensor technology ‘makes it possible to obtain a high separation performance in sorting materials irrespective of size, moisture, dust or dirt on a surface.’

Exhibit 13 – Tomra COM Tertiary XRT ore sorting schematic



Source: Tomra.

XRT sensors detect and separate materials based on specific atomic density. VML acquired the machine (the same machine used in test work) for C\$1.4m, including installation, commissioning and spare parts. The ore sorting plant is comprised of the sorter itself, as well as a feed system comprised of a hopper, feeder and conveyor; two sets of discharge stacker conveyors – one set for ore sorter eject and one set for ore sorter non-eject; and an air compressor and diesel power generator.

The machine will operate within a 40ft shipping container, mounted on framework at the mine site. The total capital cost budget for the ore sorting plant was a modest \$3.7m, which VML funded from cash reserves.

**Capacity:** Based on the COM Tertiary XRT 1220/B product specifications of a feed rate of up to 150t/h, and the budgeted operating hours of the plant of 1530 hours/year, the ore sorting plant could conceivably process up to 230ktpa. As this represents more than double the North T total resource, VML retains some potential upside to the initial Stage 1 production target, should additional resources be discovered.

Predicated on the testwork and commissioning results so far, we believe the ore sorting process will produce a consistent product to target specification at the North T Zone.

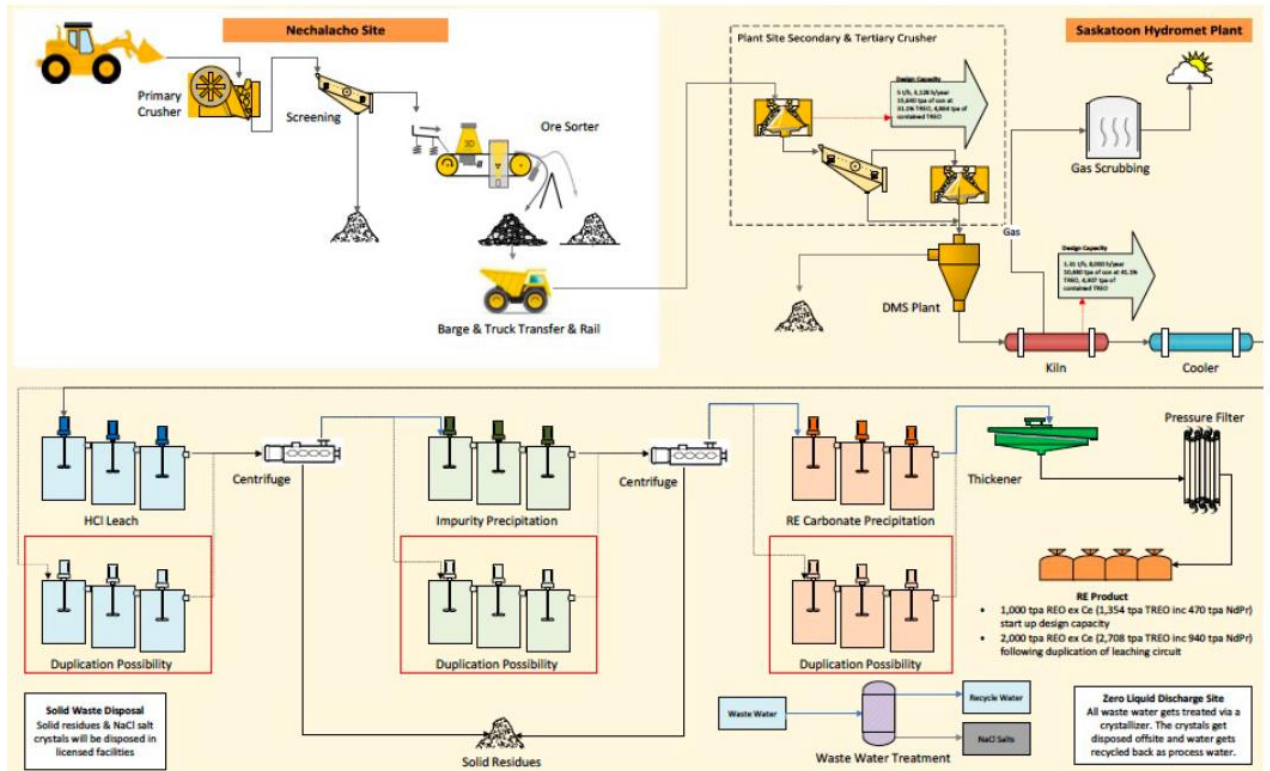
**Saskatoon extraction plant under construction:** The mixed rare earth concentrate produced via Nechalacho's single-step ore-sorting process will be shipped to Saskatoon for more processing into a mixed rare earth precipitate. VML has leased a site in Saskatoon adjacent to the Saskatchewan Research Council's (SRC) planned C\$31m rare earth separation plant (announced in August 2020) which has been designed to convert mixed rare earth carbonates, such as those targeted for production by VML, into commercial-grade separated REOs. SRC expects its facility to achieve first production in 1H CY22. Construction is underway.

VML selected a site for the separation plant close to the SRC plant with a view to potentially targeting SRC as a customer for the rare earth carbonate finished product. VML expects SRC's investment will underpin the development of a rare earths 'technology hub' in Saskatoon which could provide a range of optionality and opportunity for rare earths innovation and product development in the region.

In September 2020 VML agreed with SRC to construct and operate VML's extraction plant to produce a mixed rare earth carbonate. The total target capex for Saskatoon extraction plant and the ore sorting is ~\$20m. SRC is responsible for securing all the required permits and approvals including waste disposal.

First deliveries of Nechalacho product to Saskatoon are scheduled for November 2021, with a start up capacity of 1000tpa (ex-Cerium) ramping up to plant capacity of 2000tpa (ex-Cerium) to be increased to its expanded size with 2 years of commencement of operations, in line with the expanded offtake agreement with REEtec.

Exhibit 14 – VML’s Full Process – Nechalacho and Saskatoon



Source: VML.

Exhibit 15 – SRC’s rare earth ‘precinct’



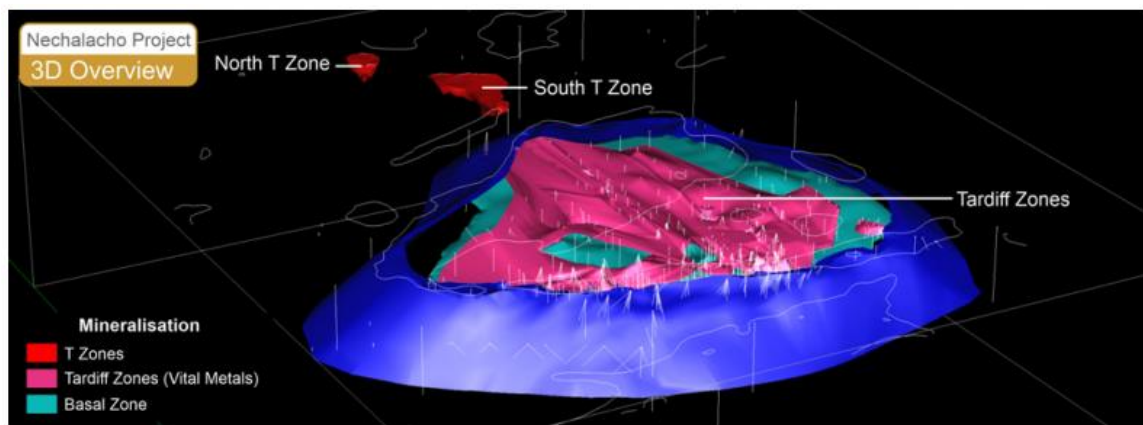
Source: VML.

## Stage 2 – expansion at Tardiff – Option of Wigu Hill

The REEtec agreement envisages an option to increase offtake to >5,000tpa (ex-Cerium) for a period of 10 years. Ucore's MOU also provides an option to supply half of its 5,000tpa separation plant (see Exhibit 23). The expanded plant would source the ore from the Tardiff zone which contains of 3.2mt at 2.4% TREO (76.8kt of contained REO). Tardiff is sizable compared to North T, it remains a small component of the broader Upper Zone resource at 95mt grading 1.46% TREO, or over 1mt of contained REO.

We see the expansion of the Phase 2 project not being limited to the current offtake options as VML looks to utilise the large, long life resource at the Nechalacho project.

### Exhibit 16 – Nechalacho: North T and Tardiff Zones

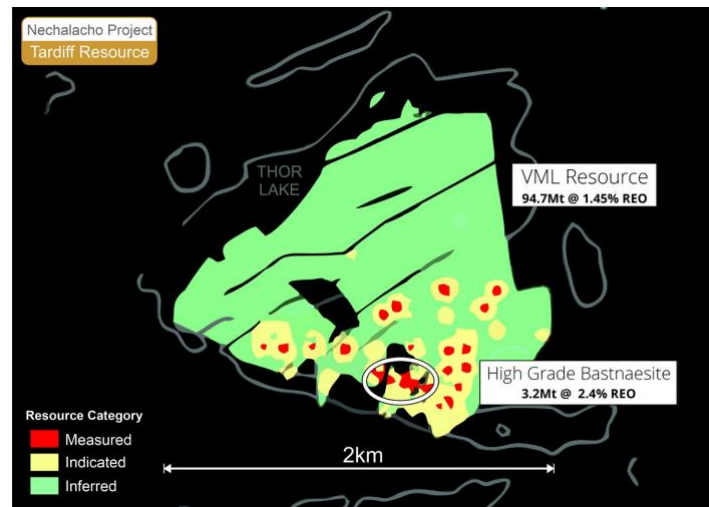


Source: VML.

The mineralisation at Tardiff is similar to North T (red bastnaesite crystals); as such, VML believes ore sorting will be similarly used to upgrade the ore in a 'scaled-up' version of the process for the North T deposit. Processing at Tardiff will likely require the inclusion of a flotation circuit to account for the finer-grained material compared to North T.

**Test drilling underway:** A drilling program currently underway is primarily focused on testing high-grade targets within the Tardiff Zone and developing a mine plan to support Stage 2 development. While the 2013 Feasibility Study compiled by Avalon had a substantial amount of data, drilling had primarily targeted the HREO-rich Basal Zone and drilling information relating to the LREO zones near surface such as Tardiff was wide spaced and highly clustered. This is reflected in the large Inferred component of the broad Upper Zone deposit, shown in Exhibit 17 along with the location of the high-grade Tardiff Zone (3.2mt @ 2.4% REO) which underpins the Stage 2 expansion plans.

## Exhibit 17 – Nechalacho: North T and Tardiff Zones



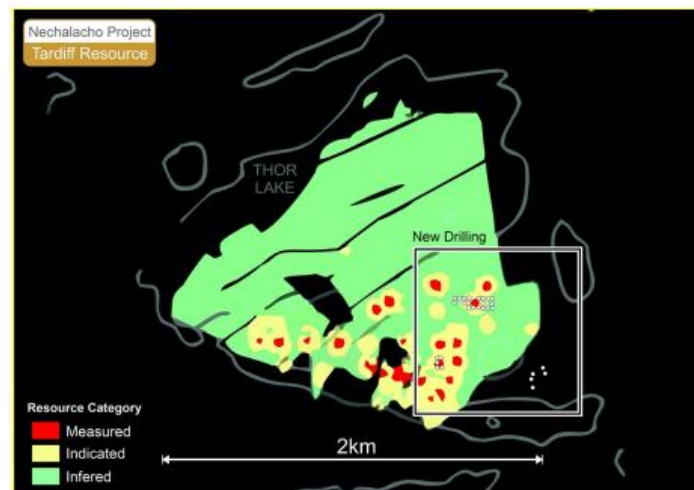
Source: VML.

**Drilling results** reported to date have shown good intercepts including thick zones of oxides grading ~2-3% and within 75m of surface, including:

- Zone 2: 25.1m at 3.03% TREO
- Zone 2: 19.0m at 2.05% TREO
- Zone 3: 51.0m at 2.13% TREO
- Zone 3: 36.7m at 1.96% TREO.

While these results are promising signs of potential continuity and expansion of the resource inventory as it stands, further work is required to better define zone boundaries and relationships between the zones. Furthermore, while prior metallurgical results have shown that Tardiff ores are conducive to successful ore sorting adopting a flowsheet similar to North T, further test work will be required to provide the required clarity.

## Exhibit 18 – Nechalacho Upper Zone showing location of new drilling

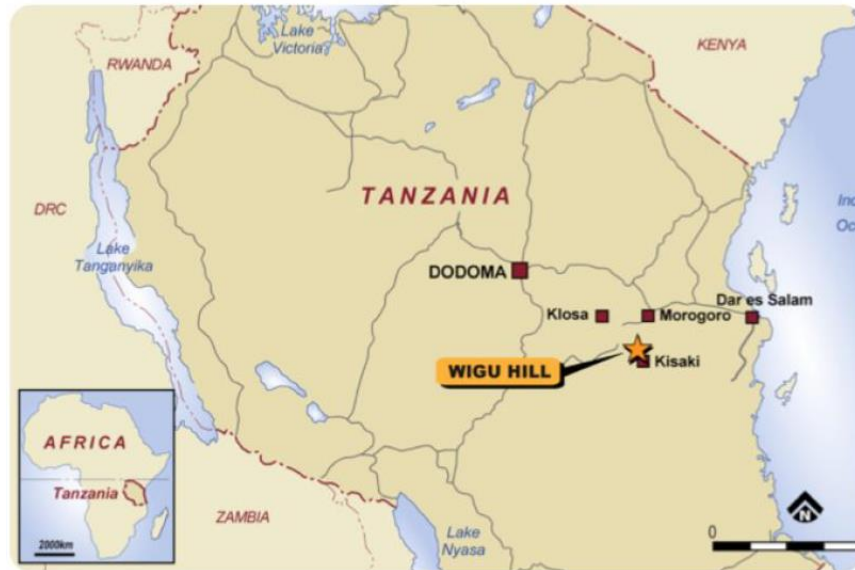


Source: VML

**Resource supports long-life Stage 2 plans:** The scale of the resource contained within the Upper Zone, including the high-grade component at Tardiff, clearly supports a potential long-life operation. We expect that with further drilling (scheduled to commence in the northern winter), the resource can be sufficiently delineated and potentially expanded to support the definition of the mine plan for Stage 2.

## Stage 2 Option – Wigu Hill – Tanzania – Production Flexibility

### Exhibit 19 – Wigu Hill Location



Source: VML

The Wigu Hill project located in Tanzania is targeted to be the 2nd Rare Earth project for VML. The project has strong potential to be a world class asset with the previous owner spending over \$10m.

Similar to Nechalacho's T Zone the Twiga deposit contains large, discrete bastnaesite crystals. Mineralisation widespread over entire hill with only 2 out of 10 known targets drilled, with the project hosting a high grade resource of 3.3mt @2.6% TREO.

There is excellent infrastructure with rail and power within 10km. VML acquired the rights in 2018 for \$US1m.

Multiple projects enable flexibility to react quickly to changes in market and customer requirements.

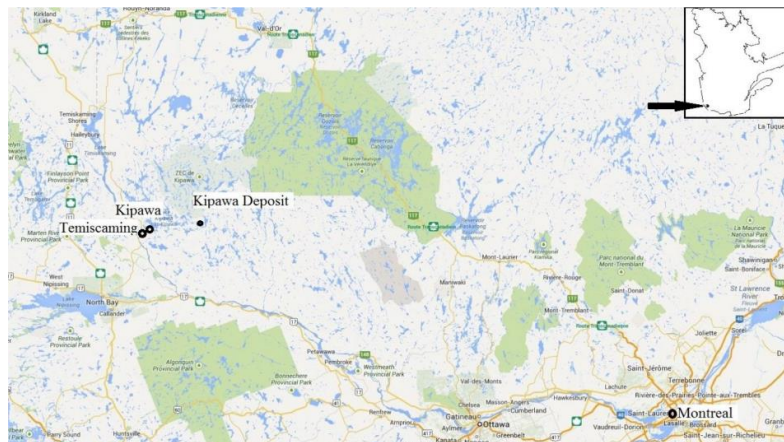
### Exhibit 20 – Wigu Hill Mineralisation



Source: VML

### Stage 3 – Looking to High Value Heavy Rare Earths – Kiwapa Project Quebec

Exhibit 21 – Kiwapa Project Location in Quebec, Canada.



Source: VML

VML entered an agreement in August 2021 to acquire 68% of the Kipawa and 100% of Zeus Heavy Rare Earths (HRE) projects in Quebec Canada for C\$8m. The acquisition represents an opportunity for VML to be the only producer of both light and heavy rare earths in North America and will position VML as a key strategic player in the North American rare earth supply chain

Kipawa potentially will provide a significant increase in heavy rare earth production. From 1,000t TREO/yr production, Kipawa will produce more terbium and dysprosium than a 5,000t TREO/yr operation at Tardiff will achieve.

Exhibit 22 – Kiwapa Project – Heavy Earth Value v Tardiff

Rare Earth Metal	Symbol	Distribution North T (%)	Market Price (as at 18 Nov, 2021) US\$/kg	US\$ / kg North T	Distribution Kipawa (%)	US\$ / kg Kipawa
Praseodymium	Pr <sub>6</sub> O <sub>11</sub>	5.10%	\$129.04	\$6.58	3.56%	\$4.59
Neodymium	Nd <sub>2</sub> O <sub>3</sub>	18.70%	\$126.69	\$23.69	13.40%	\$16.98
Terbium	Tb <sub>4</sub> O <sub>7</sub>	0.20%	\$1,587.00	\$3.17	0.54%	\$8.57
Dysprosium	Dy <sub>2</sub> O <sub>3</sub>	0.64%	\$459.00	\$2.94	3.58%	\$16.43
<b>Total</b>				<b>\$36.38</b>		<b>\$46.57</b>

Source: VML, Metal.com

Kipawa is a heavy rare earths project, located 50km from Temiscaming in Quebec, with a Mineral Resource Estimate of 15.5Mt of eudialyte at 0.434% TREO and 0.873 ZrO<sub>2</sub>, 6.3Mt of mosandrite at 0.391% TREO, 1.018% ZrO<sub>2</sub>, 5.1Mt of britholite at 0.286% TREO, 0.944% ZrO<sub>2</sub>, and with a Proven and Probable Reserve Estimate of 19.8Mt at 0.411% TREO.

A Definitive Feasibility Study (DFS) was performed on the project in 2013. Utilising similar alternate development and processing methodologies as implemented at its Nechalacho REO mine in NWT, VML will optimise the DFS to minimise capital and operating expenditure and reduce development timelines

The Projects total 73 claims over 43km<sup>2</sup>. The Kipawa deposit is defined by three enriched horizons within the “Syenite Complex”, which contains some light rare earth oxides but primarily heavy rare earth oxides. Drilling since 2011 totals 293 drill holes (24,571m)

Twelve heavy rare earth showings have been identified on the Zeus project, some of which contain niobium and tantalum.

## Customer Offtake – Strong Indication of Support for the Project

VML's target to be a major supplier of Rare Earths outside of China has already attracted 2 offtake customers. An offtake agreement with Norwegian based REEtec and an MOU with US based Ucore. The agreements give a strong indication of support for the project from market participants and play strongly into the theme of the market looking for alternate rare earth supply ex China.

### Offtake Agreement with REEtec Norway – Recently Increased by 50% - Options to Expand Further

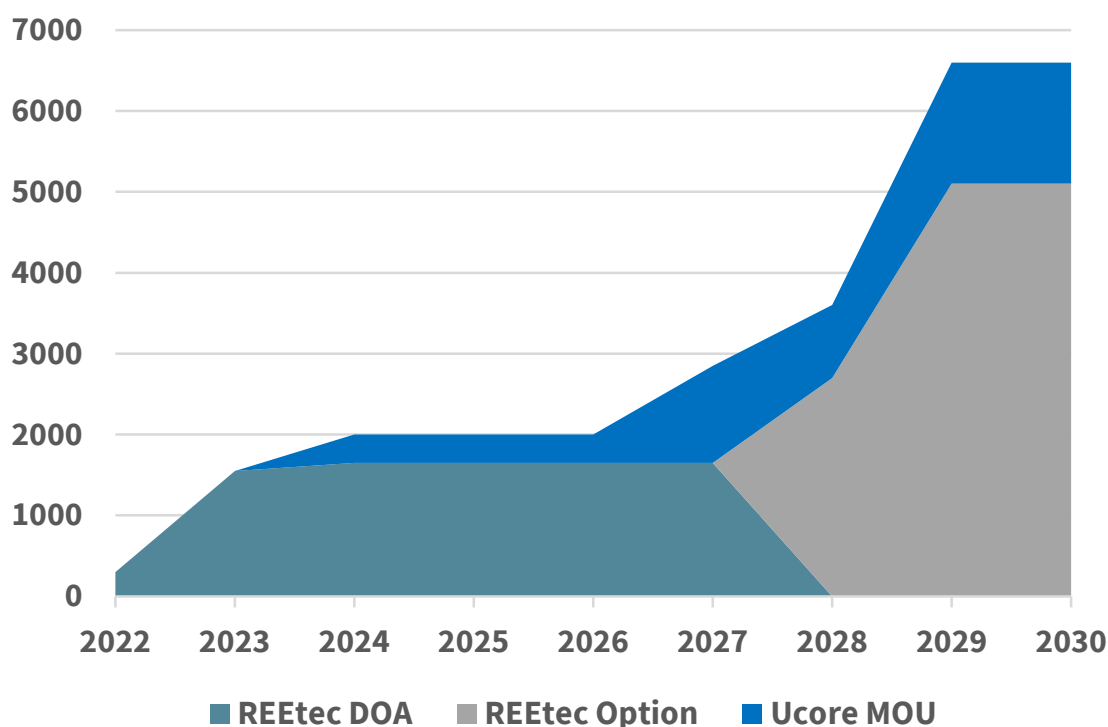
Product from the Stage 1 operation will be sold to Norway-based REEtec, which has agreed an expanded offtake agreement over 5 years for rare earth carbonate from Nechalacho equating to 1500tpa ex-Cerium, with a minimum of 750t Neodymium/Praseodymium (NdPr). The mixed rare earth concentrate produced via the single step ore-sorting process at Nechalacho will be shipped to the Saskatoon extraction facility and then onwards to REEtec. REEtec has developed new technology to manufacture high-purity rare earth elements which has been proven through the successful operation of an industrial scale demonstration plant. The agreement also provides the option to further expand operations during an additional 10-year long-term supply agreement to provide up to 2,500t NdPr per annum contained within ~5,100 tonnes ex-Cerium (6,800 tonnes TREO (containing a maximum 25% Cerium)).

### Additional MOU Signed with Ucore USA from 2024 with expansion from 2026

A non-binding MOU was recently signed for the supply of 500tpa (ex-Cerium) commencing in 1H 2024 to Ucore Rare Metals, who are developing a 2000tpa separation plant in Southeast Alaska (with expansion plans in place for >5000tpa by 2026) with the goal of fostering an independent American REE supply chain. Ucore's facility is expected to come online in 1H 2024, in line with the commencement date of the MOU signed with VML. VML will expand its operations to supply to Ucore a minimum of 50% of Ucore's proposed 5,000t TREO/yr RE separation plant by 2026.

The distribution of rare earth volume at the North T deposit is ~45% neodymium/praseodymium which make up ~90% of the price of the product and are key components used in the manufacturing of magnets.

Exhibit 23 – VML Offtake agreement profile (tonnes per annum)



Source: VML

## An Estimate of the Current Market Value of VML product and REEtec Offtake

We have taken current market prices for Rare Earths and estimated the value of the VML product per kilogram (payability is 50% of this).

Exhibit 24 – North T: separated rare earth oxides and prices as at 22 October 2021

Rare Earth Metal	Symbol	Distribution (%)	Market Price (as at 18 Nov, 2021) US\$/kg	US\$ / kg VML (as at 18 Nov, 2021)	US\$ / kg REEtec (as at 18 Nov, 2021)
Lanthanum	La <sub>2</sub> O <sub>3</sub>	47.4%	\$1.37	\$0.65	\$0.59
Praseodymium	Pr <sub>6</sub> O <sub>11</sub>	10.4%	\$129.04	\$13.42	\$15.01
Neodymium	Nd <sub>2</sub> O <sub>3</sub>	34.3%	\$126.69	\$43.46	\$48.61
Samarium	Sm <sub>2</sub> O <sub>3</sub>	3.5%	\$4.14	\$0.15	\$0.13
Europium	Eu <sub>2</sub> O <sub>3</sub>	0.4%	\$30.50	\$0.12	\$0.11
Gadolinium	Gd <sub>2</sub> O <sub>3</sub>	1.5%	\$61.00	\$0.91	\$0.83
Terbium	Tb <sub>4</sub> O <sub>7</sub>	0.2%	\$1,587.00	\$3.17	\$2.89
Dysprosium	Dy <sub>2</sub> O <sub>3</sub>	0.5%	\$459.00	\$2.30	\$2.09
Ytterbium	Y <sub>2</sub> O <sub>3</sub>	1.4%	\$8.99	\$0.13	\$0.11
<b>Total</b>		<b>100%</b>		<b>\$64.30</b>	<b>\$70.38</b>

Source: VML, Metal.com, MST Est

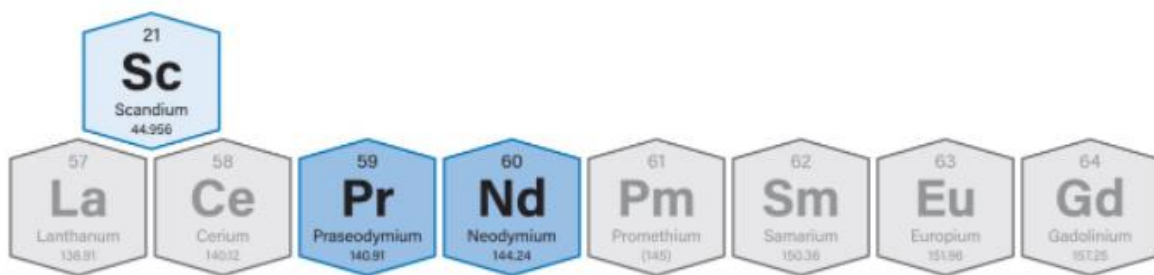
## Market Overview – Strong Demand and a Desire to Diversify Supply

### Rare Earths – What Are They?

The ‘lanthanides’ (elements with atomic numbers 57–71), as well as scandium and yttrium, are 17 metallic elements that are known collectively as ‘rare earth oxides’ (REOs). Scandium and yttrium are considered rare-earth elements (REEs) because they tend to occur in the same ore deposits as the lanthanides and exhibit similar chemical properties but have different electronic and magnetic properties.

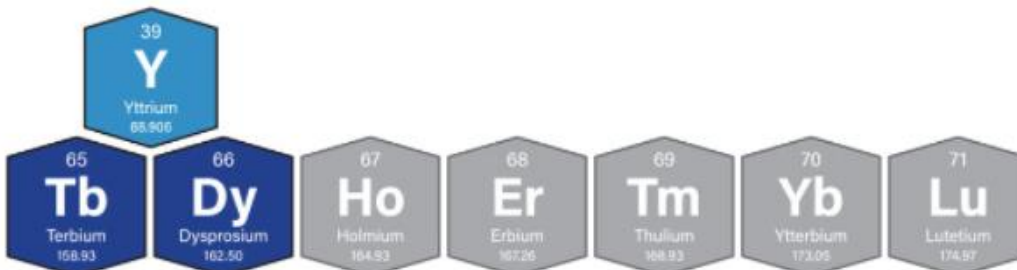
Heavy rare earth metals (HREs) are defined by their higher atomic weights relative to light rare earths (LREs). HREs are less common, and some elements within the group are facing shortages as demand outpaces supply. HREs are generally more valuable than LREs.

Exhibit 25 – Light rare earth (LRE) elements



Source: VML

Exhibit 26 – Heavy rare earth (HRE) elements



Source: VML

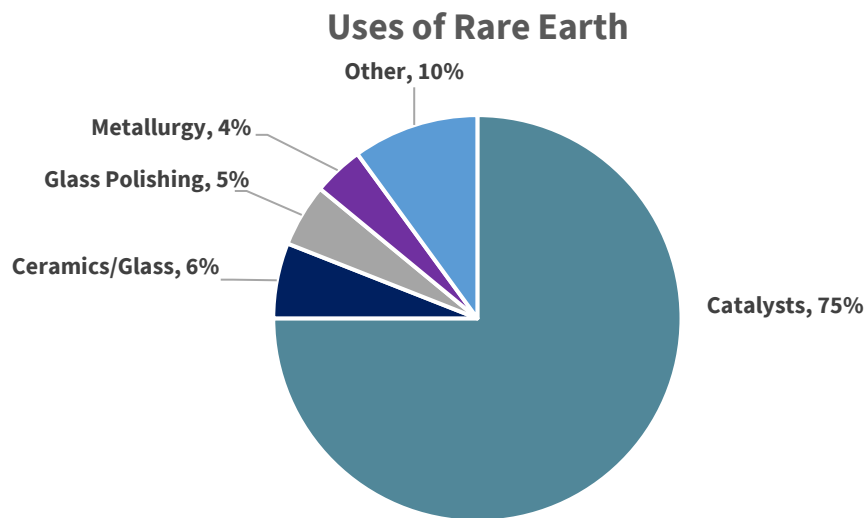
### What Are Rare Earths Used For?

Each of the rare earths has unique properties that are vital for a range of commercial and defence technologies, including batteries, high-powered magnets and electronic equipment. An iPhone, for example, contains eight different rare-earth minerals, and there are several in a refrigerator and washing machine. They also make up about 420 kg of an F-35 fighter jet and are essential for guided cruise missiles. Amongst the properties rare earths bring to applications including strong magnetic properties, luminescence, refraction and oxidation. Key products produced using rare earths are:

- **permanent magnets (PMs)** (Nd, Pr, Dy, Tb, Sm) – REEs produce strong magnetic fields for high-strength PMs which have enabled the production of ubiquitous devices (mobile phones, laptops), as well as power-dense energy-efficient electric motors and generators used in EVs, wind turbines, energy efficient appliances and hundreds of other applications.
- **battery alloys** (La, Ce, Pr, Nd) – used in hybrid electric vehicles (EVs), consumer electronics and other applications of rechargeable batteries.
- **catalysts** (La, Ce) – catalytic converters of gasoline- and diesel-powered vehicles, as well as fuel-cracking catalysts and additives used by oil refiners to break down crude oil into lighter distillates, such as gasoline, diesel, and kerosene.

- **ceramics, pigments and glazes** (La, Ce, Pr, Nd, Y).
- **glass polishing powders and additives** (Ce, La, Er, Gd, Y) – hardening LCD display screens, improve UV-filtering in glass and as an additive to increase the quality of optical glass used in camera lenses, microscopes and telescopes.
- **metallurgy and alloys** (La, Ce, Ho, Gd, Y) –add strength to certain steels, as well as ductile iron making.
- **phosphors** (Ce, La, Y, Tb, Eu) – for energy-efficient lamps, display screens and avionics; added to fiat currency in some nations as an anti-counterfeit measure.
- **other** (La, Ce, Nd, Dy, Tb, Gd, Lu, Tm) – defence, medicine, aerospace, agriculture, high-tech, chemical industries.

Exhibit 27–Uses of rare earth minerals



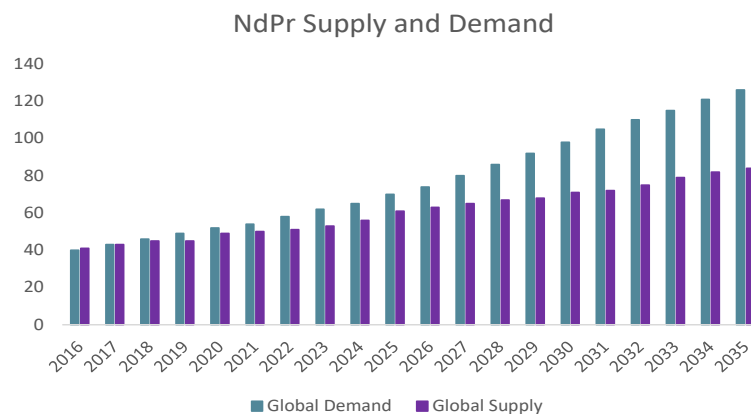
Source: Reported by the United States Geological Survey Mineral Commodity Summary 2020.

## Global Demand for Rare Earths Growing, Dominated by China

### Global demand surging with increased commercial and government applications

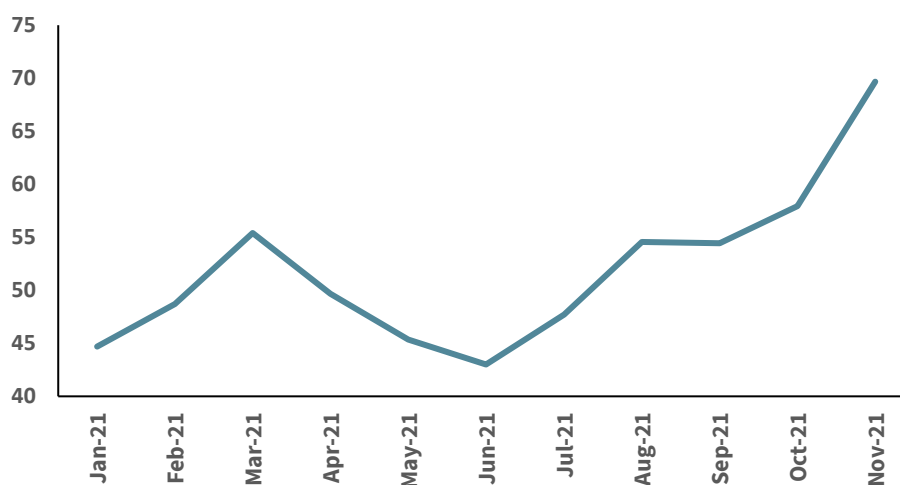
Demand for REOs has increased as demand for electronics and EVs continue to surge. Rare earths also play an essential role in national security and commercial applications. For cell phones to vibrate or EV motors to provide power, they need powerful PMs, which require REOs in their manufacture. REO demand grew by around 5% YOY in 2013–2018, reaching 170,000t in 2020 with a value of approximately US\$4.5bn. Industry analyst Roskill estimates that FY25 REO demand will be 200,000t, increasing by 2030 to 280,000t.

Exhibit 28 –Global supply and demand for rare earths, 2016–2035E (kt)



Source: Roskill (2018), Department of Industry, Innovation and Science (2019).

Exhibit 29 –Rare Earth Pricing – 1 year - VML basket \$US/kg



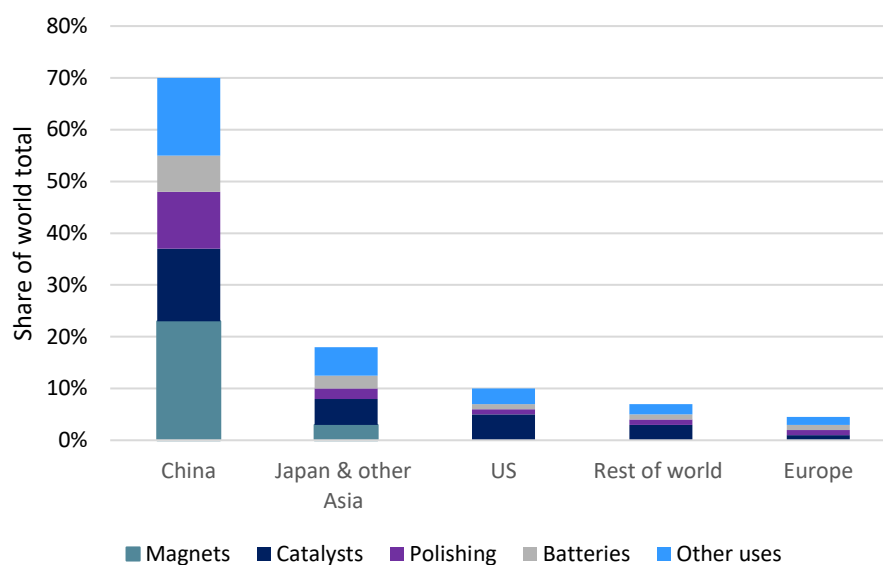
Source: metal.com

### China dominates demand for both mined supply (mined REOs) and end-use (processed REOs)

China, which also dominates rare earths supply globally, leads the world in mine REOs demand for feedstock for their REOs processing industry. Major importers of mined REOs are China (56%), Japan (22%), and US (17%).

China also leads demand for processed REOs, accounting for 69% of world end-use consumption. Exhibit 26 shows the split of demand by end-use.

Exhibit 30 –Rare earths end-use: consumption by type and region



Source: Roskill, Department of Industry, Innovation and Science .

## Global Supply –China Dominates Both Mined Supply and Processing

China dominates world supply in terms of both mined REOs and processing capacity.

### Mined supply – China dominates resources and mined production

#### Global REO resources

China is home to 38% of the world's resources of REOs, with Australia having the sixth-largest resource (see Exhibit 27, left). Additionally, China dominates global mined supply (Exhibit 32, right). Its supply dominance, built off a large resource, is around 70% of mined supply of REOs. This places China in a strong position to influence the market.

Exhibit 31–Rare earths global mine resources (left); Rare earths global mine production (right)

Rank	Country	Economic Resources (kt REO)	Percentage of world total	Rank	Country	Production (kt REO)	Percentage of world total
1	China	44 000	38%	1	China	120	72%
2	Brazil	22 000	19%	2	<b>Australia</b>	<b>19</b>	<b>11%</b>
3	Vietnam	22 000	19%	3	USA	15	9%
4	Russia	12 000	10%	4	Myanmar	5	3%
5	India	6 900	6%	5	Russia	2.6	2%
6	<b>Australia</b>	<b>3 660</b>	<b>3%</b>	6	India	1.8	1%
7	USA	1 400	1%	7	Brazil	1	<1%
8	Malaysia	30	<1%	8	Burundi	1	<1%
	Others	4 400	4%	9	Thailand	1	<1%
	<b>Total</b>	<b>120 000</b>		10	Vietnam	0.4	<1%
				11	Malaysia	0.2	<1%
					<b>Total</b>	<b>170</b>	

Source: CSIRO (left and right).

#### REO processing – China once again dominates

China is home to at least 85% of the world's capacity to process REOs into material manufacturers can use. China's processing capacity of 220,000 tonnes is five times the combined capacity of the rest of the world.

China routinely adjusts its domestic production quotas and subsidises rare-earth prices to strategically flood the market when it wants to drive out competitors and deter new market entrants.

A challenge to China's rare-earth monopoly has been the coup in Myanmar. China is dependent on rare-earth imports from Myanmar, particularly HREs. Imports of heavy minerals from Myanmar account for 60% of domestic Chinese consumption—and there have been restrictions imposed by the Myanmar government.

## Challenging China's Dominance – Looking for Alternative Supply

### US concerns are an opportunity for alternative suppliers

The US Government has seen the need to develop a secure supply of rare earths due to concerns around security and diversity of supply. According to the US Government, China's dominance 'may pose risks to the continued availability' of rare earth materials for defence applications in the future.

In the past three years, the US government has been stockpiling rare earth materials. Rare Earths are classified as one of 35 minerals (ie REOs plus 34 other mineral types) deemed critical to the US.

The only domestic US supplier is MP Materials, which still sends minerals to China for processing. Activity is underway to establish refineries in North America. For example, Defence Metals Corp. (British Columbia) is aiming to bring a deposit of rare earths into production. A pilot refining plant is planned, but only the initial testing stages are funded.

## Structural change in the REO market – could VML play a role?

The REO market is undergoing structural change. Chinese dominance of mined supply, and REO processing has major market participants, particularly the US, seeking supply alternatives from other regions.

VML's location in Canada sets it up as a major participant in this structural change which had been clearly demonstrated by having initial offtake arrangements with European and US based customers.

The ASX has a number of listed aspirants in the REO space. The dominant and most advanced of these is Lynas Minerals. Lynas has had a number of years in the REO market and has changed strategy a number of times, but it is now well established with one of the largest mines outside of China and a number of processing options.

Exhibit 32 –ASX-listed REO producers, developers and explorers

ASX Listed Rare Earth Companies	Market Cap (US\$ Billion)
<b>Miners and Developers</b>	
LYNAS RARE EARTHS (LYC)	5.1
VITAL METALS (VML)	0.2
NORTHERN MINERALS (NTU)	0.2
ARAFURA RESOURCES (ARU)	0.2
HASTINGS TECHNOLOGY METALS (HAS)	0.3
GREENLAND MINERALS (GGG)	0.1
AUSTRALIAN STRATEGIC MATERIALS (ASM)	1.1
ILUKA RESOURCES (ILU)	3.4
PEAK RESOURCES (PEK)	0.2
<b>Explorers</b>	
IONIC RARE EARTHS (IXR)	0.1
AMERICAN RARE EARTHS (ARR)	0.1
RAREX (REE)	0.5
RED MOUNTAIN MINING (RMX)	0.1
LOTUS RESOURCES (LOT)	0.3
AUSTRALIAN RARE EARTHS (AR3)	0.0

Source: ASX, MST.

## Valuation: Framing Up the Stage 2 Potential – NPV Implies Good Upside

### Base-Case Valuation – Risked NPV of A\$0.17, Fully Diluted

We use a risk-weighted NPV methodology to arrive at our base-case valuation of A\$0.17 per share, fully diluted. We have applied a 100% probability/risk weighting for Stage 1. For Stage 2, we have assigned a probability/risk weighting of 85% ahead of the publication of scoping study information.

We believe our methodology and assumptions appropriately balance the risks to the valuation against the prior investment and existing infrastructure at the Nechalacho site as well as the deliverable project development plan. VML's current share price does not reflect the underlying value of the project based on our forecast project parameters, after weighting the valuation for risks typically associated with the remaining uncertainty for projects at this stage of advancement (scoping study stage).

Exhibit 33 – Base-case valuation using risked NPV

NPV OF PROJECTS	US\$M	Ownership	Risk Weight	A\$M	A\$/share	Valuation Methodology
Nechalacho - Stage 1	70	100%	100%	99	<b>0.03</b>	Riskied Project NPV (100%)
Nechalacho - Stage 2	447	100%	85%	543	<b>0.12</b>	Riskied Project NPV (85%)
Kipawa /Zeus	6	68%	100%	6	<b>0.01</b>	EV/Resource
Wigu Hill	9	100%	100%	13	<b>0.01</b>	EV/Resource
<b>Enterprise NPV</b>	<b>532</b>			<b>661</b>	<b>0.17</b>	
Corporate Costs	(25)	100%	100%	(36)	<b>(0.01)</b>	
Net Cash (Debt)	20	100%	100%	29	<b>0.01</b>	As at 30/09/2021
<b>Total</b>	<b>1058</b>			<b>1315</b>	<b>0.17</b>	
<b>WACC</b>					<b>10%</b>	
AUDUSD					0.70	
Shares on issue (Undiluted)					4,154	
Options on Issue					443	
Shares on issue (Fully Diluted)					<b>4,597</b>	

Source: MST estimates.

### Strong potential valuation upside

Our valuation does not take into consideration the potential increase in grade and extension to mine life and subsequent uplift in valuation that this would entail. Exploration results to date indicate further potential within the current resource as well as extensions surrounding the mine area.

We also conservatively assume that Stage 2 produces 5,000tpa ex-Cerium. With the large resource at Nechalacho and options in the current offtake agreements, we see potential for production to go beyond this level and increase our valuation substantially.

Nechalacho has a significant resource base, with substantial possible upside via exploration success. The potential to grow the resource base and/or increase the average grade of the project could add significant further value beyond our base-case valuation.

An exploration program continues at Nechalacho to support the formulation of the mine plan for Stage 2 as well as feed into the scoping study information. This exploration program is targeting both infill resource boundary definition as well as resource extensions. The results so far have been promising and are targeting the LREO component of the Upper Zone which was historically not targeted by Avalon, and therefore we see significant potential for an upscaled resource and potential higher grade zones which may increase the overall life of mine average grade and lower costs.

We also see potential upside in the valuation from the Kipawa and Wigu Hill projects. VML have included these projects as part of their long-term strategy and they represent both an extension of mine life and in the case of Kipawa an increase in the highly valuable Heavy Rare Earths. We currently value those projects on an EV/Resource basis based on the market multiple applied to VML's current resource base.

## Key assumptions in our NPV valuation

At this stage, until more information is available, we have utilised the following parameters to establish a base-case expectation for Stage 2 (the basis for our valuation, given that Stage 1 is a small-scale project aimed at providing funding for the capital costs associated with Stage 2). We have adopted the following rough high-level assumptions, which are subject to significant uncertainty:

**Infrastructure and production:** We assume processing infrastructure is established at the Nachalacho mine site consisting of ore sorting infrastructure and a flotation circuit, with overall capex of US\$50m. Our base-case NPV valuation for Nechalacho Stage 2 is based on an initial 10-year mine life at average production and mine production rate of 350,000tpa and 5,000tpa REO ex-Cerium, assuming a life-of-mine mined grade of 2.4% REO and 60% conversion of in-situ metal to payable metal.

**Prices:** We assume a flat US\$50/kg REO price for mixed rare earth carbonate and a 50% payability.

**Timelines:** Our calculations assume the project will commence development of the Tardiff Zone in CY2025 with first ore production in 1HFY26. We assume the completion of a scoping study, followed by a full feasibility study over the next 18–24 months, and a construction period of approximately 18 months.

**Funding and ownership:** We assume that the project will be owned 100% by VML, although a possible funding option is to sell down equity in the project. We have assumed the final project will be funded from current cash reserves in conjunction with cash generated from the Stage 1 operation, with no further equity funding required to bring Nechalacho through construction and into full production of 5000tpa ex -Cerium.

**Discount rate:** We use a 10% discount rate.

Exhibit 34 – Material Stage 2 assumptions behind our base-case valuation

Assumptions	
<b>PROJECT ASSUMPTIONS</b>	
Project Ownership (%)	100%
Average Annual Production (tonnes) ex-Cerium Stage 2	5,000
Average Mined Ore Grade (% REO)	2.4%
<b>COST &amp; FINANCING ASSUMPTIONS</b>	
Discount Rate (%)	10.0%
AISC Cost Life of Mine (US\$/kg) Stage 2	4.50
Capital Cost (US\$m) Stage 2	50
Annual Cost Inflation (%)	3.0%
<b>PRICING AND EXCHANGE RATE ASSUMPTIONS</b>	
AUDUSD	0.70
CADUSD	0.75
Mixed Rare Earth Carbonate (US\$/kg)	50
Payability	50%
Effective NWT Royalty (% EBITDA)	1.5%
Effective Tax Rate (% EBITDA)	26.5%

Source: MST estimates, VML.

## More detail on capital cost assumptions

Capital cost is clearly a crucial assumption, but with the Stage 2 scoping study work yet to be released there is little information to rely upon.

**Context: The 2013 Feasibility Study.** While the 2013 Feasibility Study is an entirely different project targeting a different component of the resource (HREO), the Nechalacho site capital cost defined as part of this work was C\$548m (see Exhibit 31).

This incorporated the following key elements:

- 730 ktpa underground mine and paste backfill plant
- 730 ktpa concentrator and tailings management facility
- site utilities/infrastructure including power plant, accommodation, airstrip and dock.

The average TREO production targeted with this infrastructure footprint was ~7,200 tpa which is ~45% higher than that targeted by the Stage 2 VML production case. In addition, the mining rates we have assumed of ~350 ktpa to support the Stage 2 production target rates of 5,000 tpa are less than half those considered in the 2013 Feasibility Study completed by Avalon Rare Metals Inc.

We also believe that the VML processing is likely to be vastly simplified compared to the Avalon scenario, given the incorporation of ore sorting (and a likely flotation circuit) to produce a concentrate product for shipping to Saskatoon for further processing.

We have also reviewed other potential projects (such as Peak Minerals) to compare with VML's project.

Therefore, we believe that a reasonable capex estimate for the VML Stage 2 project is likely to be substantially lower by a large magnitude than the 2013 Feasibility Study

**Our capex assumption:** We adopt an estimated capex for Stage 2 of US\$50m as our base-case assumption for financial modelling and discounted cash flow valuation.

## Key sensitivities

The key assumptions that are subject to the most significant uncertainty in our valuation are the REO price and USD. Analyses of key sensitivities are in Exhibits 32–33.

Exhibit 35 – VML NPV sensitivity (AUD cents per share): REO price

REO US\$/kg Pricing				
30.00	40.00	50.00	60.00	70.00
0.10	0.13	0.17	0.21	0.25

Source: MST estimates.

Exhibit 36– Sensitivity: USD

USD				
0.60	0.65	0.70	0.75	0.80
0.19	0.18	0.17	0.16	0.16

Source: MST estimates.

## An alternative look at valuation: EV/resources – comparing Australian listed peers

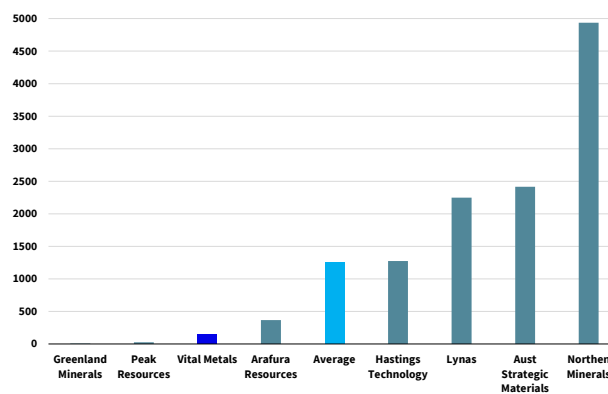
A common way to assess the value of mineral based companies is to compare the enterprise valuation (EV) to the resource base in order to see what value the market places on the company's resource and its potential.

With REO companies it is an inexact comparison due to different stages of development and variation in resource grade and size, however it is a handy comparison to demonstrate the upside potential of VML and to compare and contrast the EV/Resource Valuation with our NPV based valuation.

We compared VML with a selection of Australian-listed REO peers, who are in pre development /development / production stage in order to compare its relative EV/resources multiple. VML records one of the lowest EV/resources multiple of the peer group, despite its strong resource base at a relatively high grade as well as it being close to production and sales and being strongly funded. It is clear that Lynas trades on multiple times EV/Resource of VML due to its size, high grade and being in production. This indicates to upside potential for VML, and indicates the market is applying a significant discount for the construction, delivery, expansion and operating risk of VML.

**VML's current EV is A\$238m.** If a **peer average EV/resource multiple of 1246** is applied to VML, the **EV for VML** would be some **A\$1935m or a fully diluted share price of A\$0.42, 7x the current share price and 2.4x our NPV based valuation of \$0.17.**

Exhibit 37 – EV/resources for Australian-listed Rare Earth Developers VML amongst the cheapest

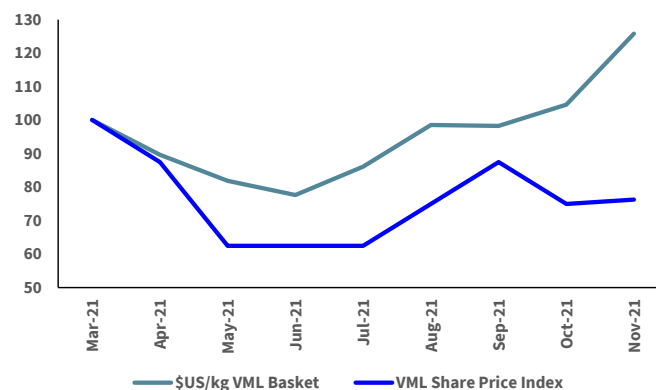


Source: Company releases, MST estimates.

## VML Performance Relative to Underlying Commodity Price

REO pricing has been strong in recent months. Exhibit 38 shows VML's recent share price performance relative to the move in REO pricing, showing an outperformance of the underlying prices compared to VML's price.

Exhibit 38 – VML Recent Share Price Movement relative to underlying REO pricing



Source: Factset, Metal.com

## Positive Catalysts for the Share Price and Valuation

### Key drivers of share price upside

#### Further exploration results from Nechalacho

Exploration continues as part of the scoping study definition. Further strong results would support the stock.

#### Increase in resources and reserves

Reserves and resources are key to mine life and annual production; increases would be positive for the share price.

#### Completion of the Scoping Study on Stage 2 at Nechalacho

The scoping study represents a significant step forward for the project and a basis for understanding the key parameters, key process confirmation and timing.

#### Completion of the acquisition of Kipawa and Zeus HREO projects

The acquisitions have been announced but not yet closed. The addition of HREO exposure to VML's project portfolio, as well as the potential operational diversity that these projects would bring, would benefit the overall business.

### Other potential share price catalysts

- REO price increases: the valuation and share price are very sensitive to the REO basket price.
- USD depreciation: the valuation is highly sensitive to the USD/AUD. USD depreciation would be positive.
- Capital cost and/or operational cost savings: these would benefit the valuation and reflect well on management.
- Early project delivery: this would bring forward cash flows, boosting the valuation and reflecting well on management.

## Risks to the Share Price and Valuation

### Key risks to share price

#### Disappointing exploration results

As a key valuation driver, any disappointment in exploration results would be a negative for the stock.

#### Delays to the scoping study completion

The scoping study is a significant step for the project, as it sheds light on key parameters including key process confirmation and timing. Delays to the study would be detrimental to the project start date and the valuation.

#### Delays to approvals

Delays to approvals would be detrimental to the commencement of the project and the valuation.

### Other potential risks to share price and valuation

- COVID-19: The pandemic continues to create issues globally. COVID remains prevalent despite vaccination rates, creating more uncertainty around obtaining site access as well as the stability of site operations.
- REO price decreases: As a key driver, REO price decreases would have a negative effect on the valuation.
- USD appreciation: The valuation is highly sensitive to the USD/AUD and would be hurt by USD appreciation.
- Delays to project delivery: Any delays to the project delivery would have a negative effect on valuation and may reflect negatively on management.
- Changes in regulatory framework: Regulatory change would alter the risk profile of the company and be detrimental to the stock price.
- Increase in project capital cost and/or operational costs: Any increase in capital costs or operational costs would detract from the valuation and reflect negatively on management.
- Delays in mining and processing ramp-up: Such delays would mean later generation of cash flows and a decrease in valuation.

## Financials

### Funding

Management believes the Nechalacho project is fully funded through to full production at Stage 2 based on the A\$43m equity raising in March 2021 in combination with expected cash flows from the 5-year 2000tpa Stage 1 operation.

We estimate capex for the Stage 2 project development of US\$50m. This assumption remains subject to uncertainty given the scoping study work continues and, as such, our understanding of the required infrastructure and likely costs is based on very high-level estimates.

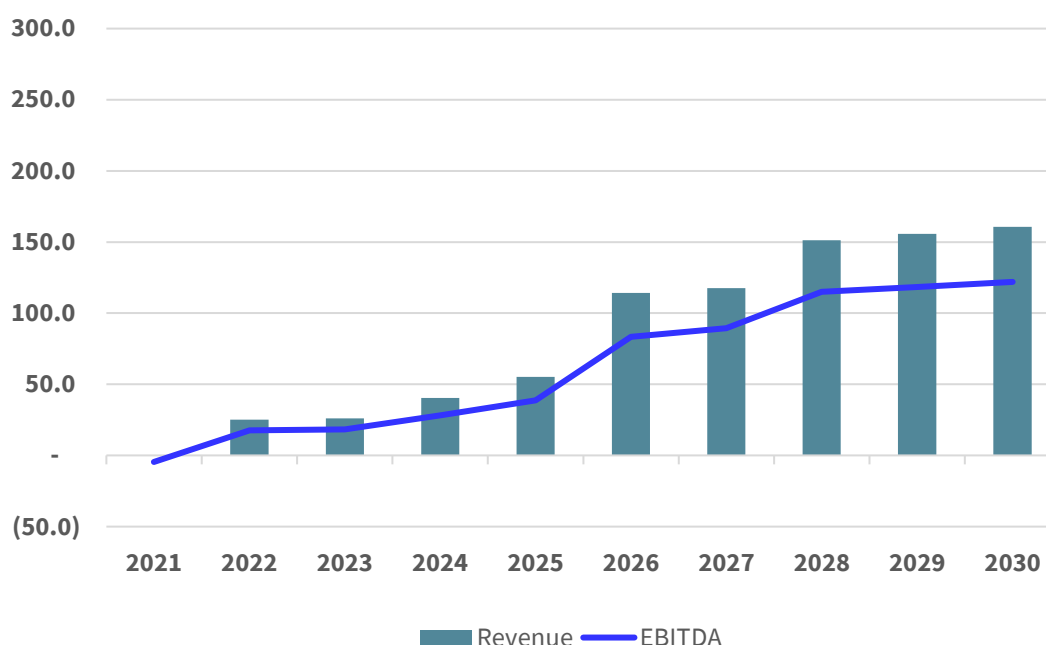
We expect VML would likely be able to obtain additional finance (corporate bonds, bank debt, or financing from potential offtake customers) on attractive terms, because the project is located in Canada and fulfills a critical objective in battery metal supply chains globally of sourcing reliable supplies of raw materials ex China. Similarly exposed mining operations in the same region have recently obtained attractive debt funding.

VML's leadership team has extensive knowledge and history with rare earths project financing. As such, we are confident that no further equity financing will be required to fund Stage 2 at Nechalacho. However, the timing and sequence of potential construction of VML's other projects remains unclear and, depending on the development strategy and scale of these operations, further equity funding may be required.

### Project Revenue and EBITDA

We assume Nechalacho Stage 2 will commence production in FY26 and reach full production rates of 5000 tpa within 12–18 months with the benefit of the prior Stage 1 'demonstration phase'. We assume capital expenditure for the project will be spent predominantly in FY24/25, and that the first full year of production is FY27.

Exhibit 39– Revenue and EBITDA (A\$m)



Source: MST estimates.

## Environmental, Social and Governance (ESG): A Highlight for VML – Minimal-Waste Process and Products Helping the Environment

ESG factors play an integral role in many investors' decision-making. We assess VML positively from an ESG perspective. The environmental angle is strong given VML's process produces minimal waste and minimal carbon emissions, while its key products have substantially positive contributions to the environment by enhancing the production of clean energy and electric vehicles (EVs).

### Environmental: A Strong 'E' in ESG with Minimal On-site Environmental Effect and Environment-Enhancing Products

An assessment of VML's environmental credentials must consider both the project and the company's key products.

#### The project: environmental assessment of Nechalacho project's processes

Various environmental studies have been conducted and submitted at the Nechalacho project, including baseline studies and significant fieldwork which fed into the permitting process and 2013 project Feasibility Study.

#### Overall environmental impact requirements

As the project is located in an environmentally sensitive region, and is in Canada and on a relatively small footprint, the project development will be subject to very high standards of engineering and environmental management. The project is expected to leave an insignificant environmental impact after the project area is rehabilitated once production ceases at the end of the mine life. Significant mining activity has been conducted in this region, so environmental regulations are clear and well understood. VML will be required to comply with best management practices and regulations, including monitoring and re-vegetation investments after closure.

#### Water management

Water management practices will ensure that any water discharged to the environment is of an acceptable quality, as well as keeping as much water as possible within the 'semi-closed loop' of the operation site and maintaining tailings storage levels to manage the risk of storm events. Fresh water for the site will be sourced from Thor Lake.

#### Tailings management

As the exact process design is yet to be fully unveiled in the scoping study which is underway, it is unclear what extent of tailings management will be required. However, as part of the 2013 Feasibility Study which incorporated a concentrator at site, several sites were considered for tailings management and a preferred option was selected approximately 3km northeast of the concentrator with storage capacity of 4.38mt (life of mine). Much of the tailings (~65%) production over the life of mine was to be utilised to generate paste backfill for the underground mine workings.

### The products: rare earths are crucial in emissions reductions

#### Rare earths needed for renewables and sustainable energy applications ...

The European Commission has recently highlighted the substantial amounts of neodymium and dysprosium, alongside metals such as graphite and nickel, needed for renewables and EVs by 2050, its target date for net zero emissions.

The transition to low-carbon technologies means rare earth metals are being used in sustainable energy applications such as wind power generation and EVs, via permanent magnets (PMs) containing the metals. Wind turbines with a direct drive PM generator are efficient at low wind-speed sites and are lighter and cheaper to maintain. In EV powertrains, the PM technology leads to compact sizes and greater efficiency. In 2019, 82% of all EV powertrains used PM technology compared to 79% in 2015.

### ... but room to improve on downstream RE processing

RE companies have a somewhat chequered history when it comes to downstream processing.

The radioactive elements thorium and uranium associated with rare earths processing are one of the key issues with processing and disposing of waste. In sufficient quantities, uranium can be recovered and used as a nuclear fuel, but thorium cannot be used in this way at present—although it has long been thought to be useful as a nuclear fuel and as a way to get rid of such waste.

Site contamination by rare earths processing has also been a major concern. The ability to adequately rehabilitate and allow for other uses is key to mitigating actual and perceived links to health risks, and the sustainability of processes has become even more important as the global demand for REs increases.

The emergence of new RE producers globally and the focus on environmental improvement in China will help in reducing waste and contamination issues from RE processing.

Recycling and service sector opportunities for this sector have much potential for development as technologies improve for retrieval of the metals and unconventional resources such as coal, coal ash and deep sea deposits can help reduce environmental risk.

## Social

The social aspects of VML's business are key to operating successfully in the community.

The Nechalacho site is within the traditional territory of local Aboriginal groups, and traditional harvesting of natural resources continues to be important to the native cultures of the NWT. Previous studies include socio-economic factors as well as negotiated land use agreements, traditional knowledge and archaeological studies. These studies did not identify any culturally significant sites within the Nechalacho site.

VML has constructive and active relationships with the local community. The NWT economy is relatively small and therefore highly reliant on the substantial mining sector which is the largest component of the local economy and responsible for ~20% of GDP. The company has indicated that it is committed to local training and employment and a high utilisation of the local workforce. VML is heavily committed to developing local business and working with communities to ensure that the project provides benefits beyond direct employment.

## Governance

### ASX Corporate Governance Council Principles and Recommendations

VML has adopted a comprehensive governance framework in the form of a formal corporate governance charter together with associated policies, protocols and related instruments.

- The company has adopted the ASX Corporate Governance Council Principles and Recommendations, as published by the ASX Corporate Governance Council.
- The board's qualifications are appropriate for the business.
- The board has three members.
- The board has adopted a remuneration structure, risk assessment and policies that are predominantly in line with market practices.
- Due to the current small size of the company, separate risk, nominations, remuneration and audit committees have not been created on the board.

### Board of Directors

The Board is responsible for the corporate governance of the company, developing strategies for VML, reviewing strategic objectives and monitors performance against those activities. The specific goals and responsibilities of the Board are outlined in VML's prospectus.

The Board consists of three directors (two non-executive and one executive). The Board has a majority of independent directors as is the preference for strong governance (Evan Cranston and Jamie Henderson are considered independent). We see the small Board as appropriate given VML's small size and the skills of the Board. However, as the company grows, more independent directors with appropriate skills will need to be appointed.

Exhibit 40 – Board composition and skill matrix

Board Skill	Non-Exec Chairman	Managing Director and CEO	Non- Executive Director
	Evan Cranston	Geoff Atkins	James Henderson
Leadership	√	√	√
Strategy	√	√	√
Financial & Legal	√	√	√
Geology	-	√	√
Project Development	√	√	√
Mining	√	√	√
International Experience	√	√	√
Health, Safety and Environment	-	√	√
Stake Holder Management	√	√	√
Corporate Governance	√	√	√

Source: VML, MST.

**Evan Cranston – Non-Executive Chairman:** Mr Cranston is an experienced mining executive with a background in corporate and mining law. He is the principal of corporate advisory and administration firm Konkera Corporate and has extensive experience in the areas of equity capital markets, corporate finance, structuring, asset acquisition, corporate governance and external stakeholder relations. He holds a Bachelor of Commerce and Bachelor of Laws from the University of Western Australia.

**Geoff Atkins – Managing Director:** Mr Atkins is a civil engineer with over 20 years of project and corporate development experience across commercial, industrial, mining and infrastructure sectors with responsibility for driving projects from concept, through feasibility and development to operational assets. He is the current Managing Director of Cheetah. Other recent roles include Corporate Planning Manager at Lynas Corporation where he oversaw development and implementation of the corporate strategic planning process. This included the management and governance of the following capital works and business development programs: Mt Weld Rare Earth Mine and Concentration Plant; Lynas Advanced Materials Plant (LAMP): Kuantan, Malaysia; Kangankunde Rare Earth Project: Malawi; and Crown Polymetallic Deposit.

He has also held the position of Group Executive – Operations at Rutila Resources. In this role, he managed corporate and project development activities including strategic and execution plans, business cases, feasibility assessments, project management and governance activities for the following projects:

- \$4bn Balla Balla Infrastructure Project: 100Mtpa open access, greenfield port and rail development
- \$1bn Balla Balla Titano-Magnetite Project.

**James Henderson – Non-Executive Director:** Mr Henderson is the founder of Transocean Group and its Chairman since 1987. He has over 35 years' experience in providing financial advisory services in Australia and overseas across a wide range of industries including medical devices, aged care, clean energy and natural resources. Mr Henderson specialises in providing advice to emerging companies relating to corporate transactions and strategies, including corporate advice, financial and corporate structuring, capital raisings and commercial negotiations. He has a proven ability to assist companies to execute their business plan and advise on all aspects of development of emerging companies. Mr Henderson was previously National Chairman at Sothertons Chartered Accountants in Western Australia specialising in taxation, accountancy and corporate structures and is a qualified Chartered Accountant.

## Key management

**Tony Hadley – Chief Operating Officer:** Mr Hadley is regarded as one of the world's leading experts in rare earth processing outside of China. He has extensive experience in operations, technical development, project design and management, engineering and commissioning. His project experience has encompassed feasibility studies in three different countries, piloting, construction and commissioning of process plants. Mr Hadley has a broad technical knowledge in mineral processing covering comminution, flotation, cracking, leaching and neutralisation of rare earth concentrates, waste water and waste gas treatment, solvent extraction, pressure oxidation, albiol oxidation, roasting, cyanide destruction, filtration, drying, gravity and magnetic separation.

## Appendix 1 – Nechalacho 2013 Large Scale Development Plan – The Details

### Nechalacho: Original 2013 Development Plan – Too Big, Too Costly

In 2013, Avalon Rare Metals compiled the 43-101 Technical Report and Feasibility Study for the development of the Nechalacho rare earths project. This study was predicated on a defined Mineral Reserve Estimate (MRE) (adopting a cut-off value >US\$320/t NMR) of **14.6 mt grading 1.7% TREO and 0.45% HREO**, with the mine plan targeting the deposit's Basal Zone given its higher grades of high-value HREO relative to the Upper Zone.

This MRE incorporated high-grade components of the much larger Mineral Resource which stood at 121mt (Measured & Indicated) grading 1.5% TREO and 0.25% HREO, with an additional 183mt in the Inferred category at lower grades of 1.27% TREO and 0.17% HREO. As such the 14.6 mt Reserve supporting a 20-year mine life at the proposed production rate of 730 ktpa accounted for only 12% of the total Measured & Indicated Resource and less than 5% of the total Resource of over 300mt, including the Inferred category.

Exhibit 41 – Nechalacho 2013 Feasibility Study – Mineral Resource Estimate

Category	Zone	Tonnes (million)	TREO (%)	HREO (%)	ZrO <sub>2</sub> (%)	Nb <sub>2</sub> O <sub>5</sub> (%)	Ta <sub>2</sub> O <sub>5</sub> (%)
Measured	Basal	10.86	1.67	0.38	3.23	0.40	0.04
	Upper	-	-	-	-	-	-
<b>Total Measured</b>		<b>10.86</b>	<b>1.67</b>	<b>0.38</b>	<b>3.23</b>	<b>0.40</b>	<b>0.04</b>
Indicated	Basal	55.81	1.55	0.33	3.01	0.40	0.04
	Upper	54.59	1.42	0.14	1.96	0.28	0.02
<b>Total Indicated</b>		<b>110.40</b>	<b>1.49</b>	<b>0.24</b>	<b>2.49</b>	<b>0.34</b>	<b>0.03</b>
Measured and Indicated	Basal	66.67	1.57	0.34	3.05	0.40	0.04
	Upper	54.59	1.42	0.14	1.96	0.28	0.02
<b>Total Measured and Indicated</b>		<b>121.26</b>	<b>1.50</b>	<b>0.25</b>	<b>2.56</b>	<b>0.34</b>	<b>0.03</b>
Inferred	Basal	61.09	1.29	0.25	2.69	0.36	0.03
	Upper	122.28	1.26	0.12	2.21	0.32	0.02
<b>Total Inferred</b>		<b>183.37</b>	<b>1.27</b>	<b>0.17</b>	<b>2.37</b>	<b>0.33</b>	<b>0.02</b>

Source: VML.

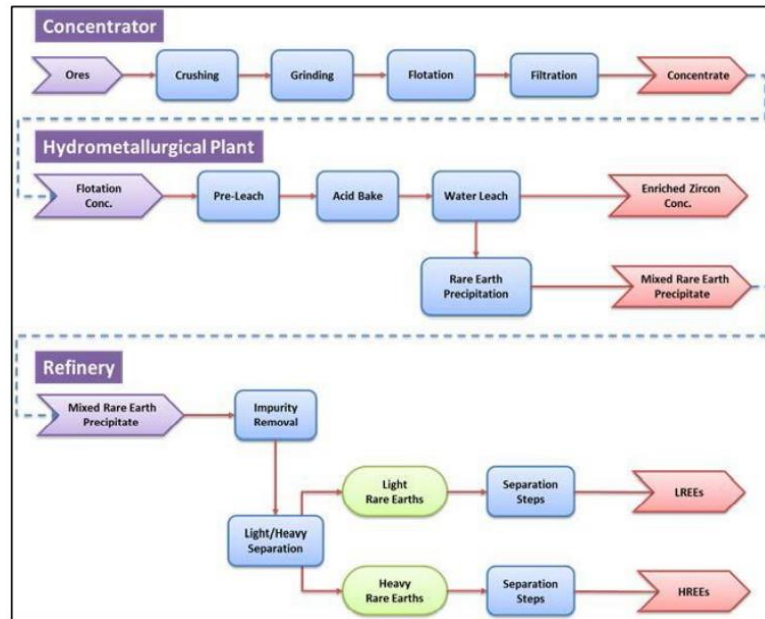
### Infrastructure envisioned by the 2013 study

The study envisioned just the type of large-scale 'traditional' development plan that is now eschewed by VML's corporate philosophy, and was comprised of the mine as well as three geographically distinct processing plants:

- **Nechalacho underground mine** (730 ktpa production rate over a 20-year mine life), paste backfill plant, concentrator, tailings management facility, site infrastructure (diesel generation power plant, 120-person accommodation camp, airstrip extension to 1000m and dock facility for barge loading/unloading)
- **Pine Point hydrometallurgical plant**, including sulphuric acid plant, hydrometallurgical tailings facility and dock (on the southern side of Great Slave Lake)
- **Geismar rare earth refinery** (located at Baton Rouge, Louisiana, USA).

The plan was for concentrate produced at the mine site to be taken by barge to the Pine Point hydrometallurgical plant and upgraded to a mixed rare earth precipitate, which would then be transported via rail to the Geismar refinery for final processing into a range of finished rare earth products for sale to customers. At Pine Point a secondary enriched zirconium concentrate (EZC) product was to be sold directly to external third parties.

Exhibit 42 – 2013 Feasibility Study: Nechalacho process flowsheet



Source: VML.

### Capex and production envisioned by 2013 study

The Feasibility Study estimated pre-production capex of C\$1.6bn. The targeted annual production under this integrated development strategy comprised of the mine, concentrator, hydrometallurgical plant and refinery was 10ktpa of saleable purified rare earth oxide/carbonate products. The cost of the Feasibility Study itself predicated on this development strategy was ~US\$60m and took two years to complete.

Despite the study concluding the project had 'robust economics', an NPV of C\$900m (at a 10% discount rate) and a 6.3-year payback period, the project was unable to move forward predicated on this development strategy, predominantly due to the very large upfront capex commitment not being able to attract the necessary funding.

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