



Australian Vanadium Limited

WA Major Projects Conference

March 2020 | ASX: AVL

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Competent Person References

Competent Person Statement – Mineral Resource Estimation The information in this presentation that relates to Mineral Resources is based on and fairly represents information compiled by Mr Lauritz Barnes, (Consultant with Trepanier Pty Ltd) and Mr Brian Davis (Consultant with Geologica Pty Ltd). Mr Davis is a shareholder of Australian Vanadium Limited. Mr Barnes and Mr Davis are members of the Australasian Institute of Mining and Metallurgy and Mr Davis is a member of the Australian Institute of Geoscientists and both have sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities undertaken to qualify as Competent Persons as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Specifically, Mr Barnes is the Competent Person for the estimation and Mr Davis is the Competent Person for the database, geological model and site visits. Mr Barnes and Mr Davis consent to the inclusion in this presentation of the matters based on their information in the form and context in which they appear.

Competent Person Statement – Ore Reserves The scientific and technical information in this presentation that relates to Ore Reserve estimates for the Project is based on information compiled by Mr Roselt Croeser, an independent consultant to AVL. Mr Croeser is a member of the Australasian Institute of Mining and Metallurgy. Mr Croeser has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a competent person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Croeser consents to the inclusion in the presentation of the matters related to the ore reserve estimate in the form and context in which it appears.

Competent Person Statement – Metallurgical Results The information in this presentation that relates to Metallurgical Results is based on information compiled by independent consulting metallurgist, Brian McNab (CP. B.Sc Extractive Metallurgy). Mr McNab is a member of the Australasian Institute of Mining and Metallurgy. Mr McNab is employed by Wood Mining and Metals. Mr McNab has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which is undertaken, to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr McNab consents to the inclusion in the presentation of the matters based on the information made available to him, in the form and context in which it appears.

The information is extracted from the announcement entitled "Gabanintha Pre-Feasibility Study and Maiden Ore Reserve" released to ASX on 19 December 2018 and is available on the Company website at www.australianvanadium.com.au.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the competent person's findings are presented has not been materially modified from the original market announcement.

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This presentation announcement has been approved in accordance with the Company's published continuous disclosure policy and has been approved by the Board.

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Corporate Overview

Australian Vanadium Limited

- Australian Vanadium Limited (ASX: AVL) is an emerging vanadium producer.
- Focused on developing **The Australian Vanadium Project** in Western Australia.
- AVL offers investors exposure to the entire vanadium value chain.
- Leverage offered to rising prices and new applications in energy storage.
- High quality deposit and team - best able to deliver through all price cycles.

VSUN Energy

- AVL's fully-owned subsidiary.
- Focused on growing the emerging market for vanadium in energy storage.
- Promoting **vanadium redox flow batteries** for renewable energy storage.

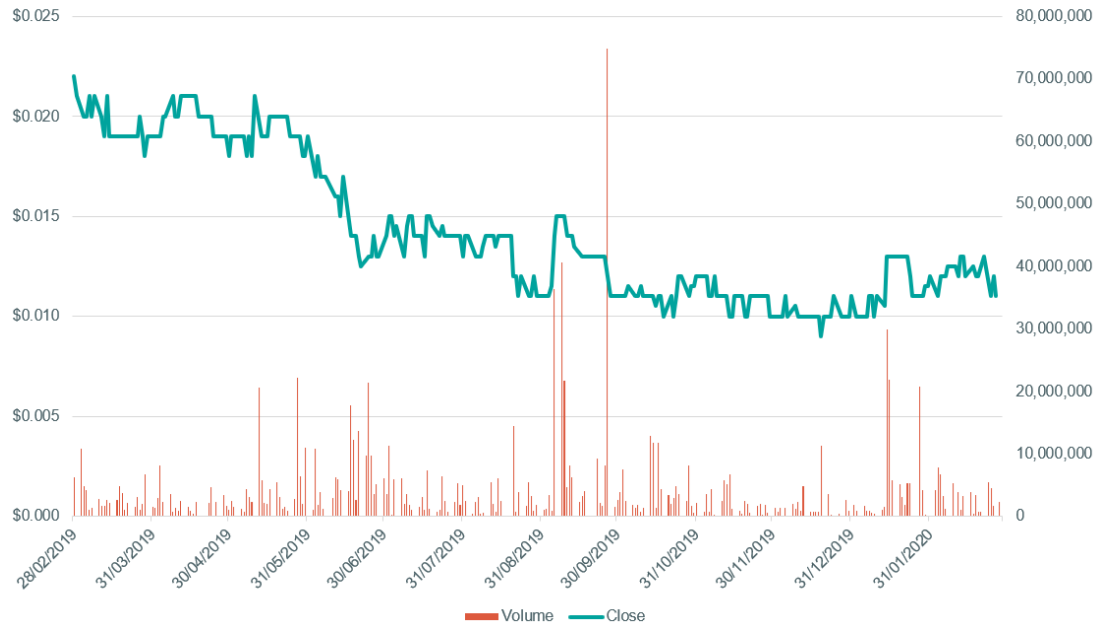
The Australian Vanadium Project

- High-grade V-Ti-Fe deposit.
- Located in the Murchison Province approx. 43kms south of mining town Meekatharra.
- Consists of 11 tenements covering 260km² and is held 100% by AVL.



Corporate Snapshot

AVL Share Price History (28/02/2020)



Key Statistics (28/02/20)

Ordinary Shares on Issue	2.55b
Share Price	A\$0.011
Average Daily Traded Volume	4,265,282
Market Cap (Undiluted)	A\$28m
Cash	~A\$4.7
Shareholders	6,754
Enterprise Value	A\$23.3



AVL's Top Shareholders

JP Morgan Nominees Australia Pty Ltd	3.16%
HSBC Custody Nominees (Australia) Ltd	2.74%
Southland Snipe Superannuation Fund	2.42%

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Vanadium Market Overview

Vanadium Markets

- **Steel:** primary market, accounts for 90% of annual global consumption.
- **Energy storage:** emerging market, accounts for 2% of annual global consumption with significant growth potential.
- **Titanium and chemical:** account for 4% of annual global consumption each.

Growth in Global Consumption

- Annual global consumption predicted to grow **>135,000 metric tonnes by 2025.**
- Demand for vanadium in batteries could grow to **25,000 metric tonnes by 2030.**
- AVL's current projected production is **5,700 metric tonnes per annum.**

Supplying the High-Purity Market

AVL, through The Australian Vanadium Project, is a **potential supplier of high-purity vanadium.**

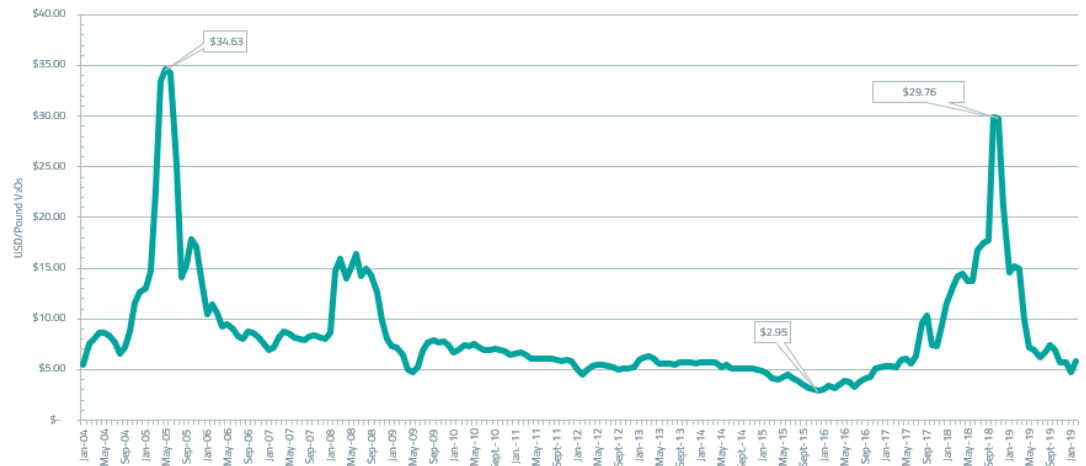
- Only a small number of producers capable of producing vanadium with the high-purity level required for electrolyte (VRFB) use.
- AVL was awarded a CRC-P grant in early 2020 for innovative research to produce ultra-high-purity vanadium.
- Subsidiary VSUN Energy is dedicated to growing the battery market.



Vanadium Market Price

Metal Bulletin V₂O₅ Monthly Midpoint Average Price

Inflated to November 2017 USD

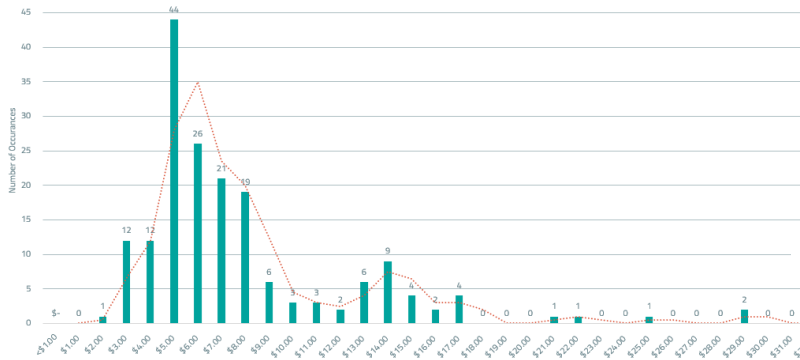


Source: Metals Bulletin Fastmarkets publication

Long-Term Price

Long-term average price for commodity grade V₂O₅ is \$8.86/lb (inflated to 2017 USD)

- High purity V₂O₅ is typically sold at a premium to the commodity price



V₂O₅ Distribution Chart – Jan 2004 to Aug 2019

Inflated to November 2019 USD

Unlike Other Commodities

Vanadium doesn't trade on the open market – sellers and buyers negotiate prices privately for contracts and spot purchases.

- London Metal Bulletin Fastmarkets (Europe)
- Ryan's Notes (US) weekly spot prices

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Social Responsibility

The Meekatharra Community

AVL sponsors the Stephen Michael Foundation.

- Supporting children, young people and the wider community in Meekatharra through funding, sports programmes, mentorship and employee participation.

VSUN Energy sponsors The Meeka Howler.



AMEC Community Award

The Stephen Michael Foundation won the 2019 AMEC Community Contribution Award.

- With the support of AVL, Sandfire Resources and Westgold Resources.

Carbon Footprint

Regulatory Context

Legislation requires monitoring and reporting of greenhouse gas (GHG) emissions.

- WA Government's GHG Emissions Policy for Major Projects aims to ensure new proposals make an appropriate contribution to state goal of net zero emissions by 2050.



Emissions Contributors

Largest emission contributors expected to be:

- Direct fuel use in roasting kiln
- Electrical power for concentrator and processing plant
- Use of dump trucks

Our Approach

GHG management plan in development, with the following opportunities to reduce emissions being investigated:

- Hybrid renewable/vanadium redox flow battery electricity plant
- Innovations to reduce energy requirements through roasting
- Haul route design and equipment selection to minimise truck fuel use
- Electric vehicle and hydrogen fuel advancements

Project Overview

Government Support

- Awarded Major Project Status Sept 2019 in recognition of national strategic significance

Focus on Innovation

- CRC-P Grant for vanadium research
- Innovative solutions to reduce opex and capex (eg. processing plant location)

Well Supported

- Successful \$6.6m capital raising completed

PFS and DFS Status

- PFS completed, with strong fundamentals through all price cycles
- DFS pilot on 30t sample nearing completion

Energy Storage Market

- Ability to produce high-purity V_2O_5 suitable for vanadium redox flow batteries (VRFB)
- Subsidiary focused on growing the market



Project Comparison

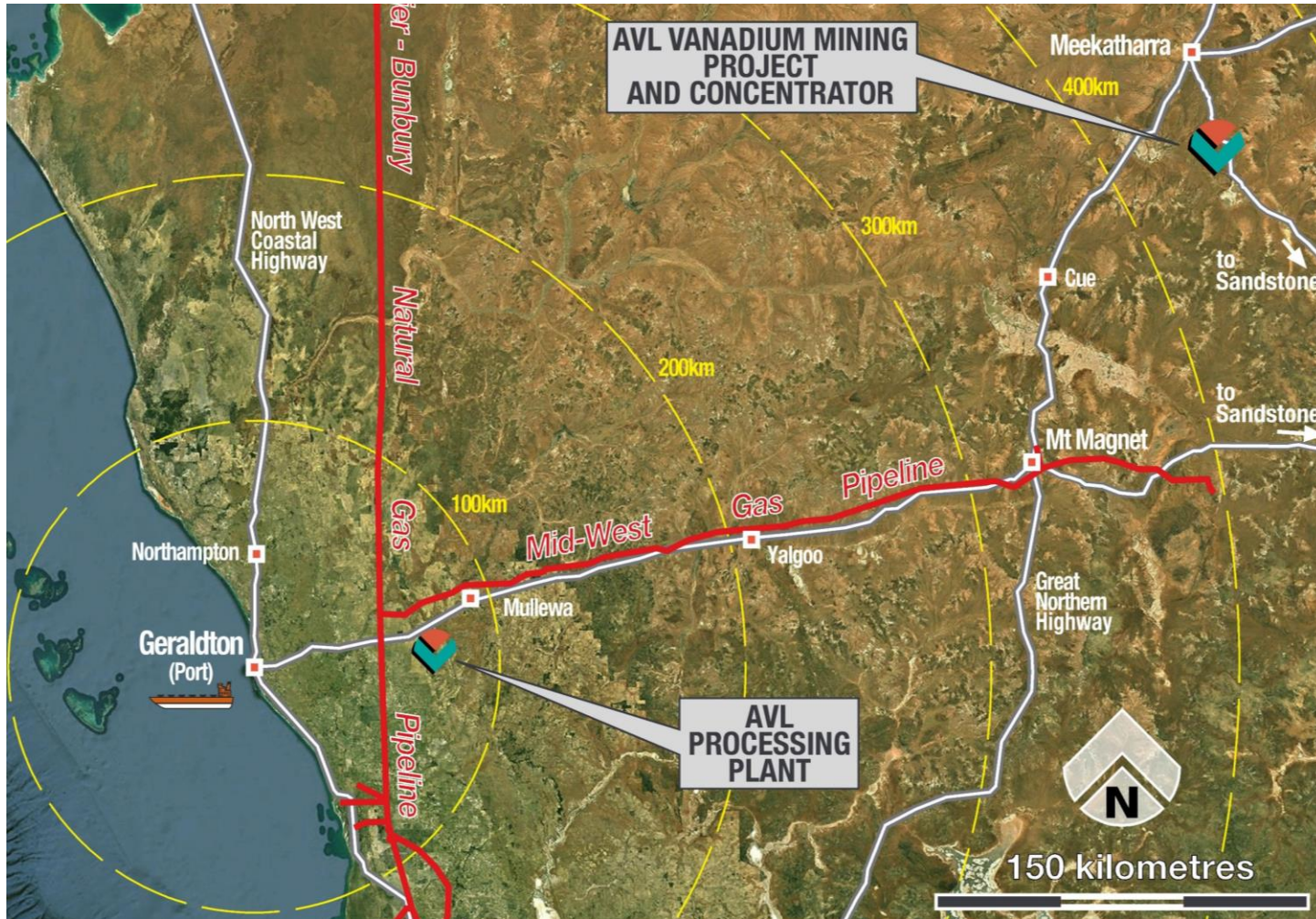
Company and Project	Resource Base	Resource Grade	Annual Production		Operating Cost	
	(Mt)	(% V ₂ O ₅)	MTV	M lbs V ₂ O ₅	(USD/lb V ₂ O ₅)	
Australian Vanadium Limited (AVL) • The Australian Vanadium Project	96.7	1.00	5,700	22.5	4.15	Planned
Largo Resources (LGO) • Maracás Menchen Mine	51	1.00	5,400	21.1	3.3	In Production
Bushveld Minerals (BMN) • Vametco	186.7	0.78	3,400	13.5	5.02	



Information sourced from company websites

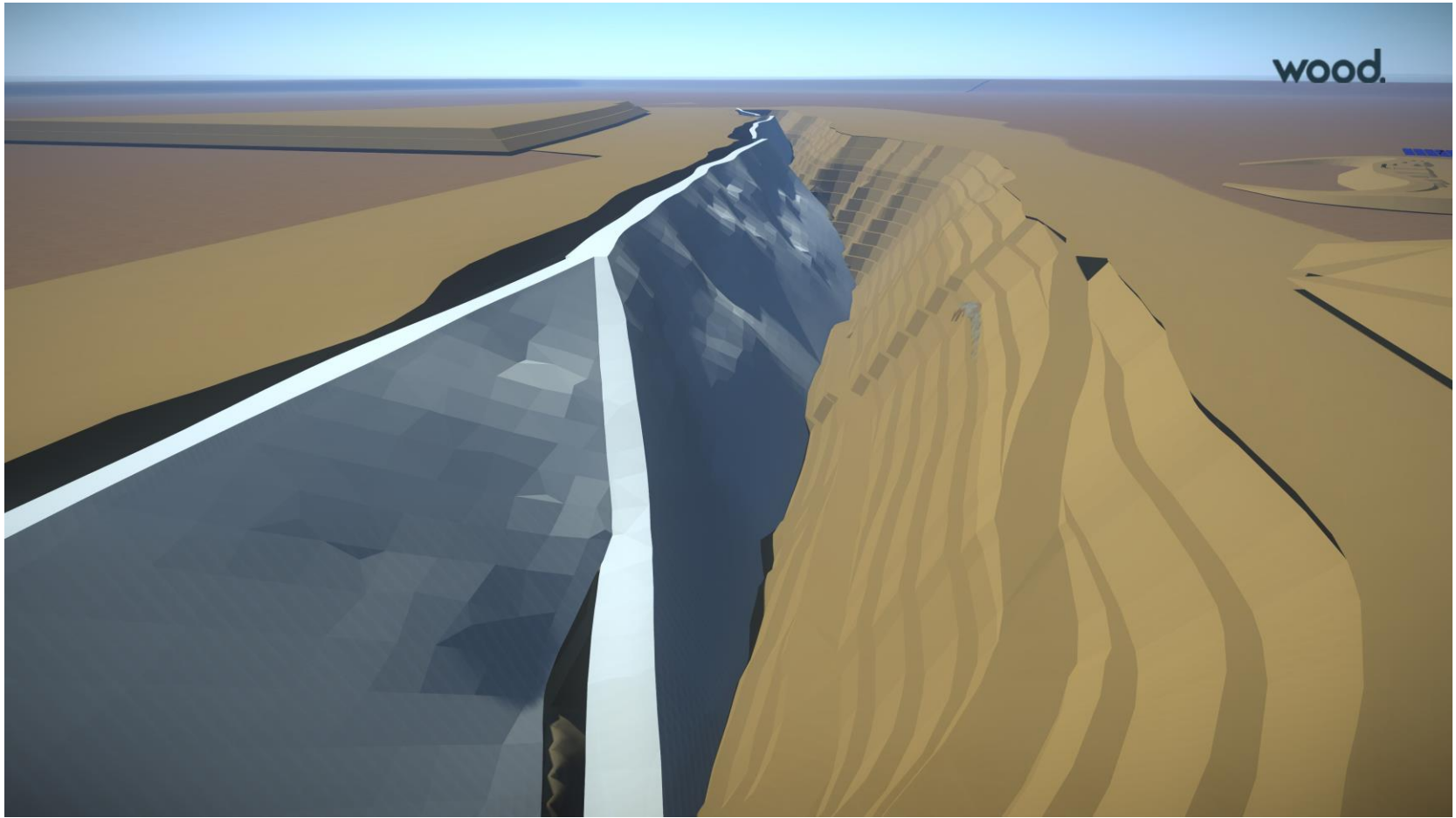
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Project Mechanics



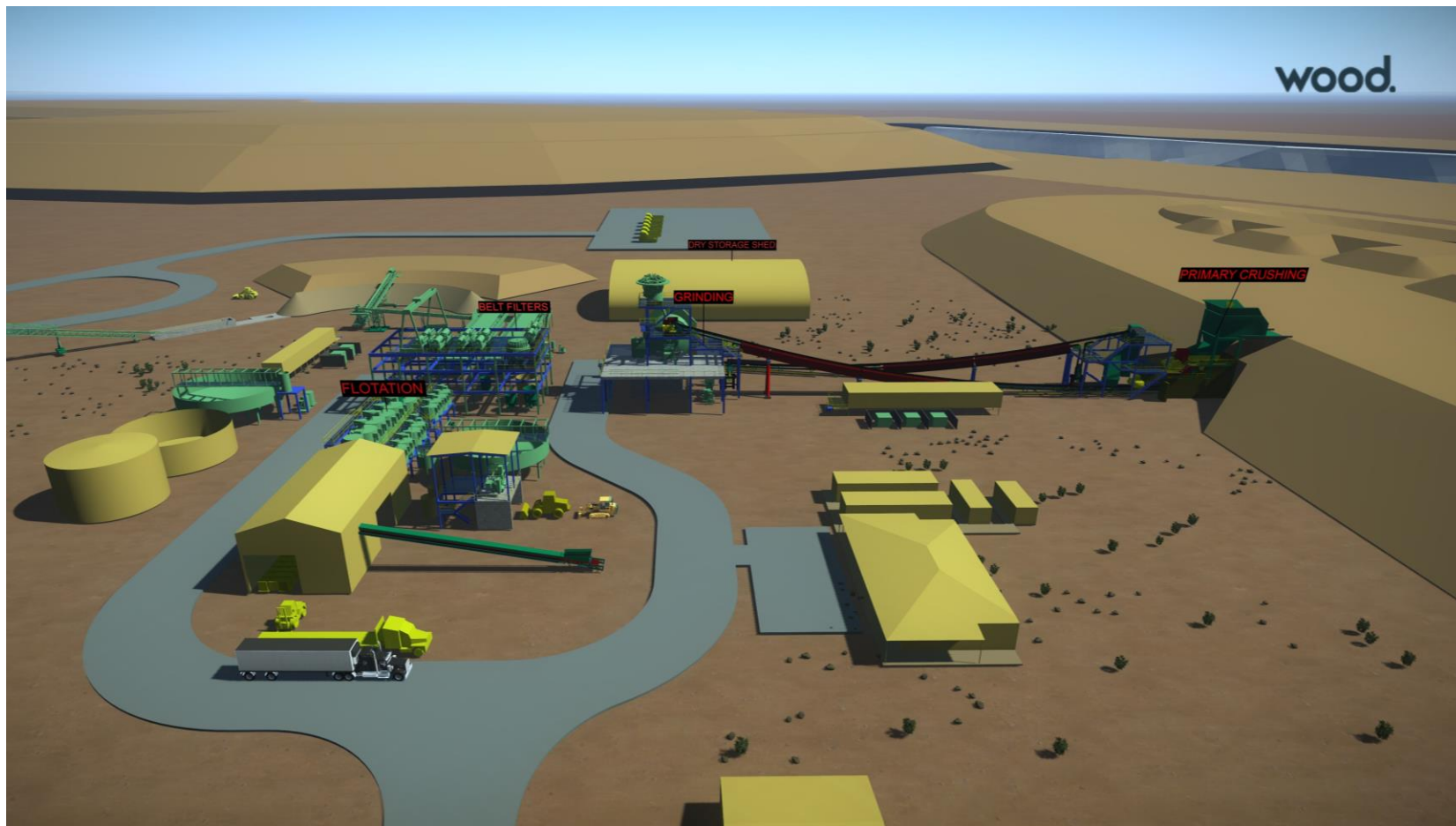
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Model of Proposed Pit



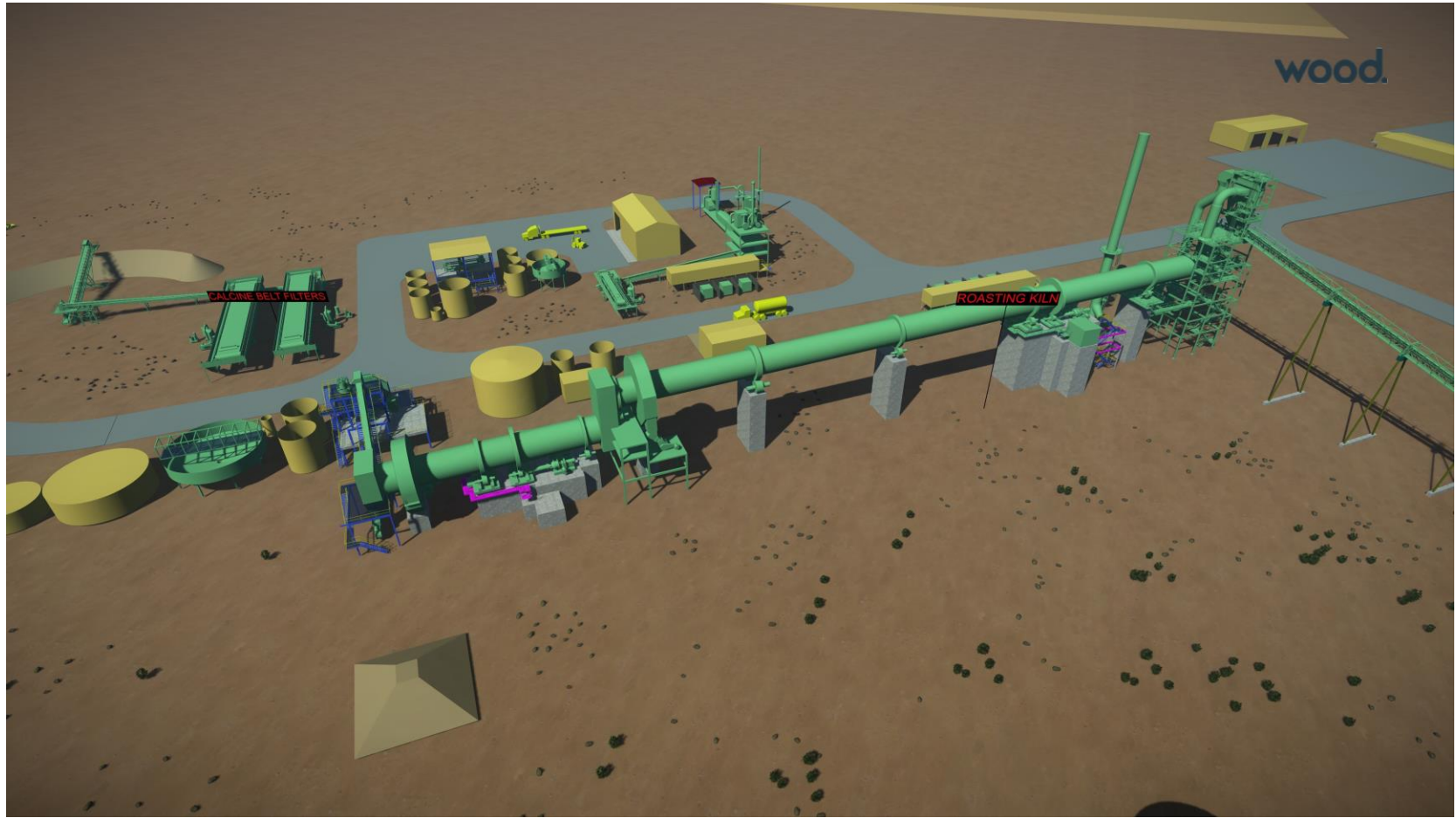
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Model of Proposed Beneficiation Plant



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Model of Vanadium Processing Plant



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Broader State Economic Impact Analysis

Employment Opportunities

- During construction each of the two sites will use approx. 250 employees (500 total).
- Once construction is complete, there will be approximately 120 employees at each site (240 total), with a further headcount in the corporate office based in Perth.
- Using a job multiplier of 4 (mining industry standard), the estimated jobs for the entire project is about 3,000.

Geraldton

- With the processing plant's location near to Geraldton, there will be significant economic impact on this area and the ability for the workforce to be located in a growing and vibrant town.

Meekatharra

- AVL aims to ensure that the community of Meekatharra is offered job opportunities on site where appropriate.
- The company provides support for the town through volunteer work and expenditure into the businesses in town.
- During the exploration stage, AVL has been providing economic benefit to Meekatharra, with the company spending over \$350,000 on services from local businesses in the 2018/19 financial year.



Personnel Requirements

Operational Workforce

Operational workforce comprises a combination of professional technical, trade, industry experienced operators (fixed and mobile plant) and entry level roles.

- Total number of employees may vary based on adopted roster cycle.
- Breakdown of personnel requirements is provided in the table to the right.

Workforce Prerequisites

Prerequisites for all roles will include:

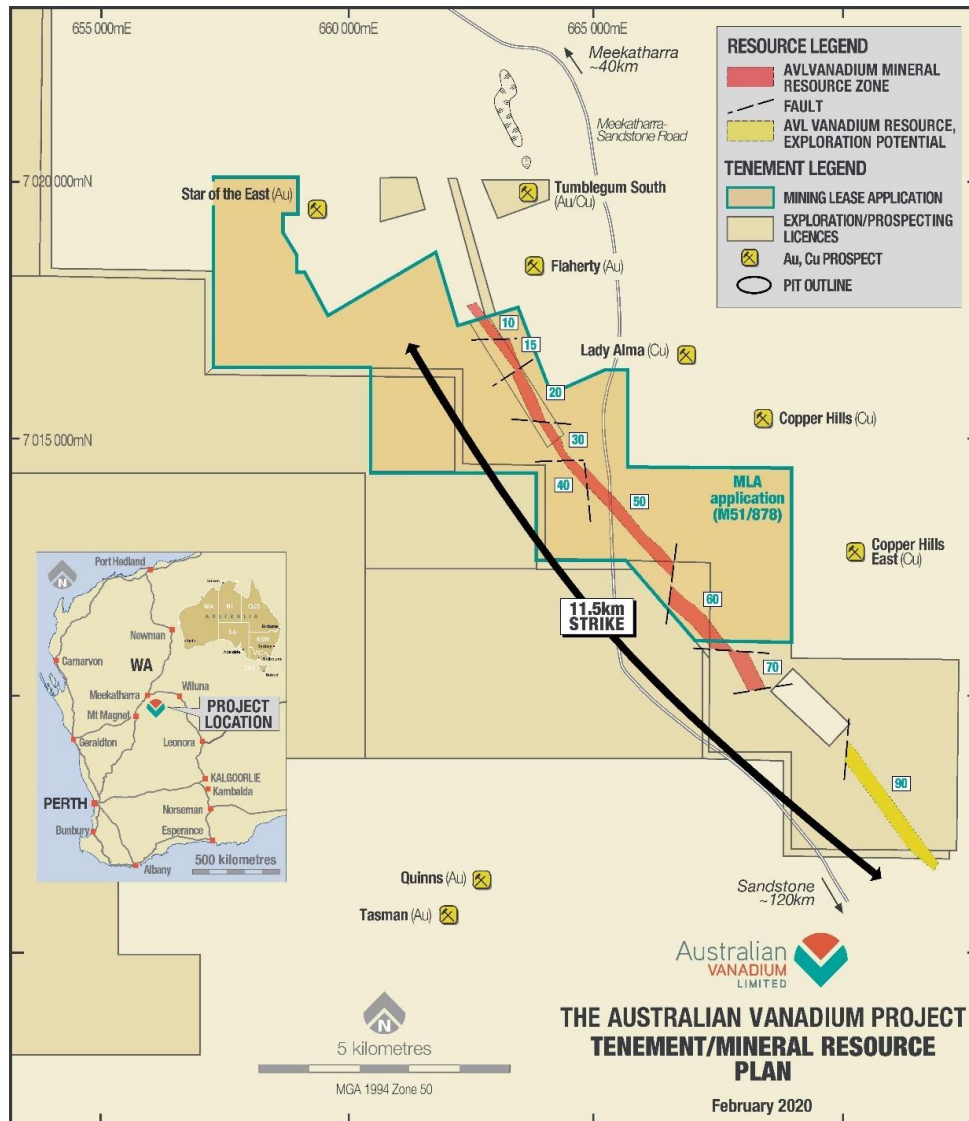
- Manual driver's licence, National Police Clearance, pre-employment medical.

Role specific qualifications will include:

- Working at heights, tertiary qualifications, trade certificate, industry certificates.

Function	Employees
Site management, commercial and site services	30
Mineral processing: process engineering, process plan operations, laboratory and warehouse	50
Maintenance – trades	40
Technical services: mining engineering, geology and surveying	10
Mining operation encompassing: project management, technical services, mobile plant operations, trades, stores, support services.	110
Total workforce	240

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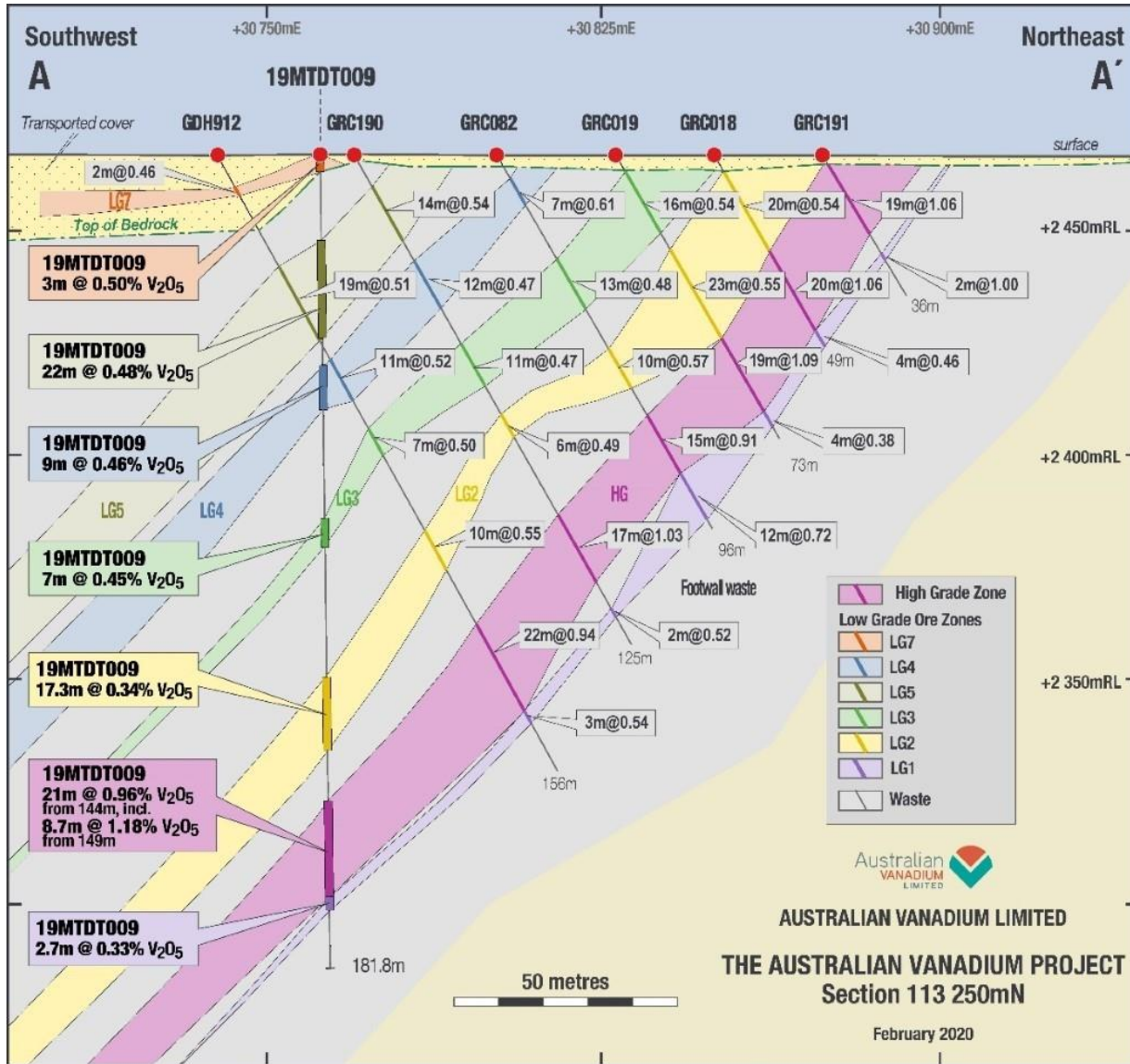


Bushveld-type vanadiferous titanomagnetite (VTM) deposit, drilled over 11km of AVL controlled strike.

AVL holds significant ground position for project development.

Consistent geology over 11km of AVL controlled strike.

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Massive magnetite averaging 15-20m in true thickness.

Announcement Highlights

2020 Announcement Highlights

- 4 Mar** Total Resource Updated to 208 Million Tonnes
- 10 Feb** AVL Awarded \$1.25m CRC-P Grant for Vanadium R&D
- 4 Feb** Shallow High-Grade Intersections from Southern Infill Drilling
- 15 Jan** LOI with Hebei Yanshan Vanadium (HBIS Group Subsidiary)

2019 Announcement Highlights

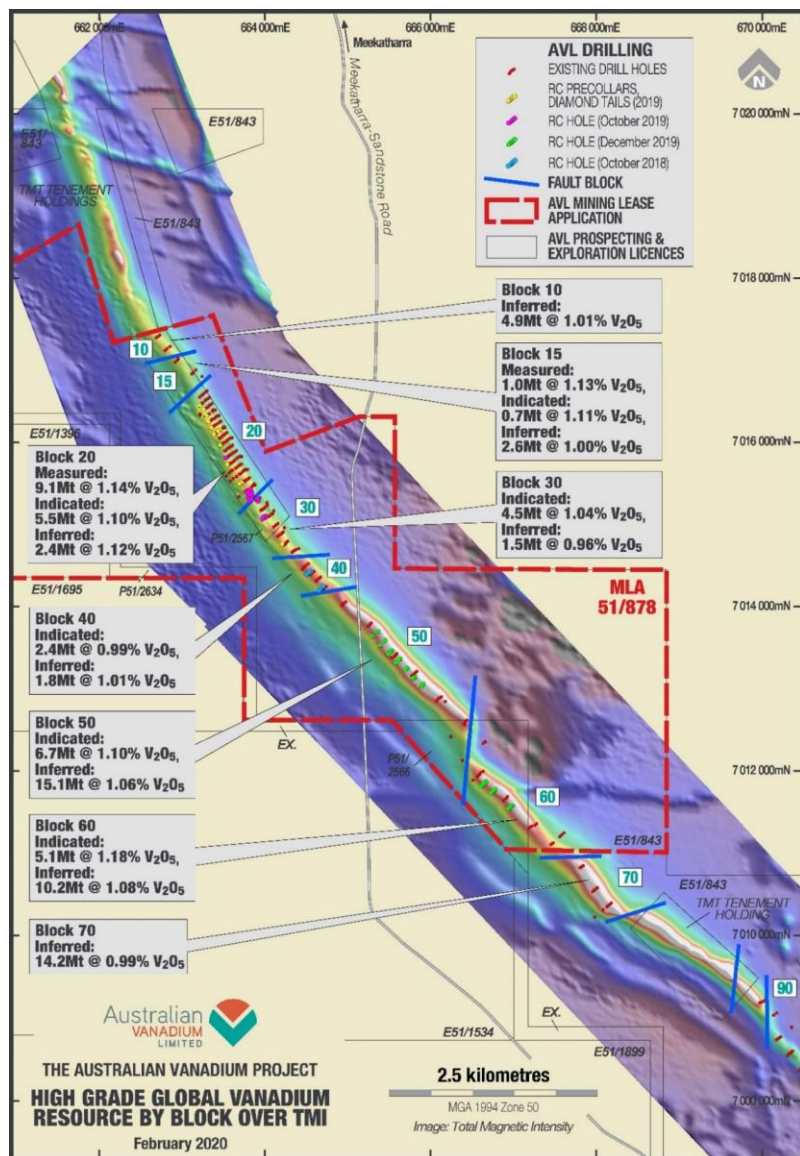
- 28 Nov** High-Grade Results from Resource Definition Drilling
- 29 Oct** Geraldton Processing Plant Option Agreement
- 23 Sept** \$6.6m Raised from Successful SPP and Placement
- 9 Sept** Tests Confirm Potential for Significant Iron By-Product
- 6 Sept** The Australian Vanadium Project Awarded Major Project Status
- 30 Aug** Metso to Conduct Vanadium Pilot Roast Work
- 25 June** Key Project Water Supply Opportunity Secured
- 28 May** High Purity Vanadium Pentoxide Produced

Significant Resource Extension

Mineral Resource Update

AVL announced an updated Mineral Resource following a series of drill programmes.

- **Total Resource now 208 million tonnes.**
- Measured and Indicated Resource of high-grade massive magnetite zones **increased by 115%** to 25.1Mt at 1.10% V₂O₅ comprising:
- Measured Resource: 10.1Mt at 1.14% V₂O₅.
 - Indicated Resource: 25.1Mt at 1.10% V₂O₅.
 - Inferred Resource: 52.7Mt at 1.04% V₂O₅.
- Total Mineral Resource **increase by 9.5%** to **208.2Mt** at 0.77% V₂O₅ from massive and disseminated zones consisting of:
- Measured Resource: 10.1Mt at 1.14% V₂O₅.
 - Indicated Resource: 69.6Mt at 0.72% V₂O₅.
 - Inferred Resource: 128.5Mt at 0.73% V₂O₅.



Federal Government Support

Project Awarded Major Project Status

September 6, 2019

The Australian Vanadium Project was awarded Major Project Status by the Federal Government in recognition of the Project's national significance due to:

- Economic growth of the Australian vanadium market (steel, energy storage).
- Economic growth for the mid-west region (direct and indirect jobs).
- Vanadium being on the critical minerals list for Australia and the US.

The award enables AVL to access stream-lined assistance with Government approvals.

CRC-P Grant for Vanadium Research

February 10, 2020

AVL was awarded a highly competitive grant to partly fund industry-leading research aimed at improving vanadium processing efficiency.

- Development of an ultra-high-purity production path.
- Extraction of valuable by-products including critical minerals (eg. titanium).
- Increasing recoveries from mine to mill.
- Reduction of mining and processing waste products.

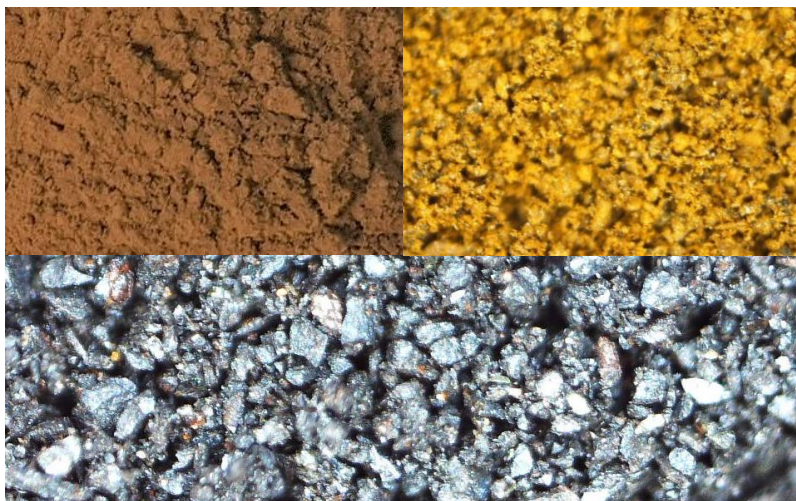
Improvements are expected to have a positive impact on operating costs for The Australian Vanadium Project.

Innovative Approach

High-Purity Product

High-purity (99.4%) vanadium pentoxide (V_2O_5) produced from pre-pilot testwork.

- Provides greater value per unit of ore processed than anticipated in PFS.
- For steel, chemical and battery markets.
- Expected to be standard mine product.



Roast-Leach Process Innovation

Extraction rate significantly improved through roast-leach process innovation.

- Yield in refining increased by 6% to 94%.
- Provides greater value per unit of ore processed than anticipated in PFS.

Calcine By-Product Opportunity

Calcine by-product testwork being undertaken.

- Establish whether calcine can be upgraded from lower-grade concentrate (<55% Fe) to higher-grade product (>62% Fe).
- Could generate significant additional revenue over Project life.

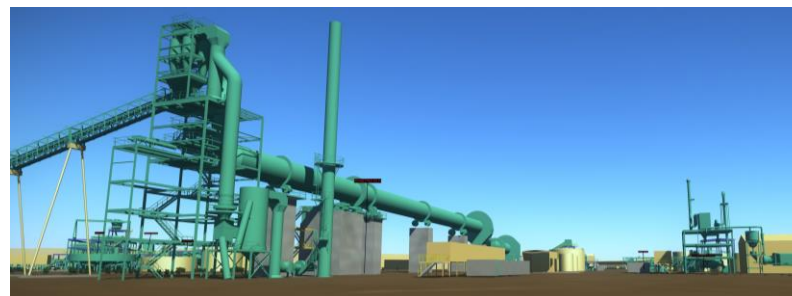
Innovative Approach

Metso Pilot Roast Work

Metso was chosen to conduct pilot roast work due to its world-renowned expertise in Grate Kiln (GK) processing solutions.

- Tests show substantial extraction increase (95.4% vs standard rotary kiln 85-88%).

Objective of Metso pilot testwork is to optimise process economics, confirm design parameters for Project's kiln flowsheet.



Processing Plant Location

Geraldton identified as the location for AVL's processing plant, offering the following benefits:

- Proximity to gas pipeline infrastructure and associated low domestic gas prices.
- Existing road, rail, water and gas infrastructure.
- Available local workforce.
- Reduced capex at Project minesite.
- Increased potential to sell valuable iron ore by-product via Port of Geraldton.
- Strong government support.

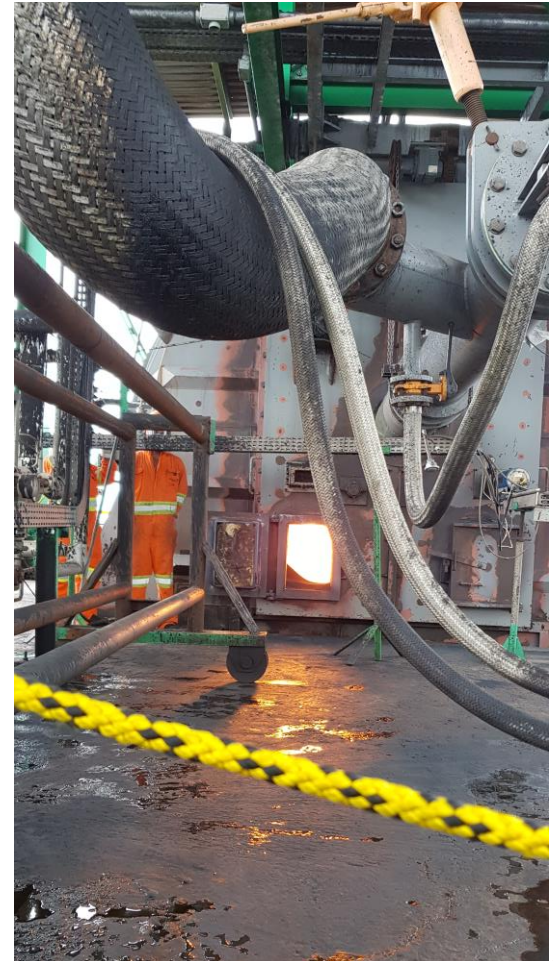
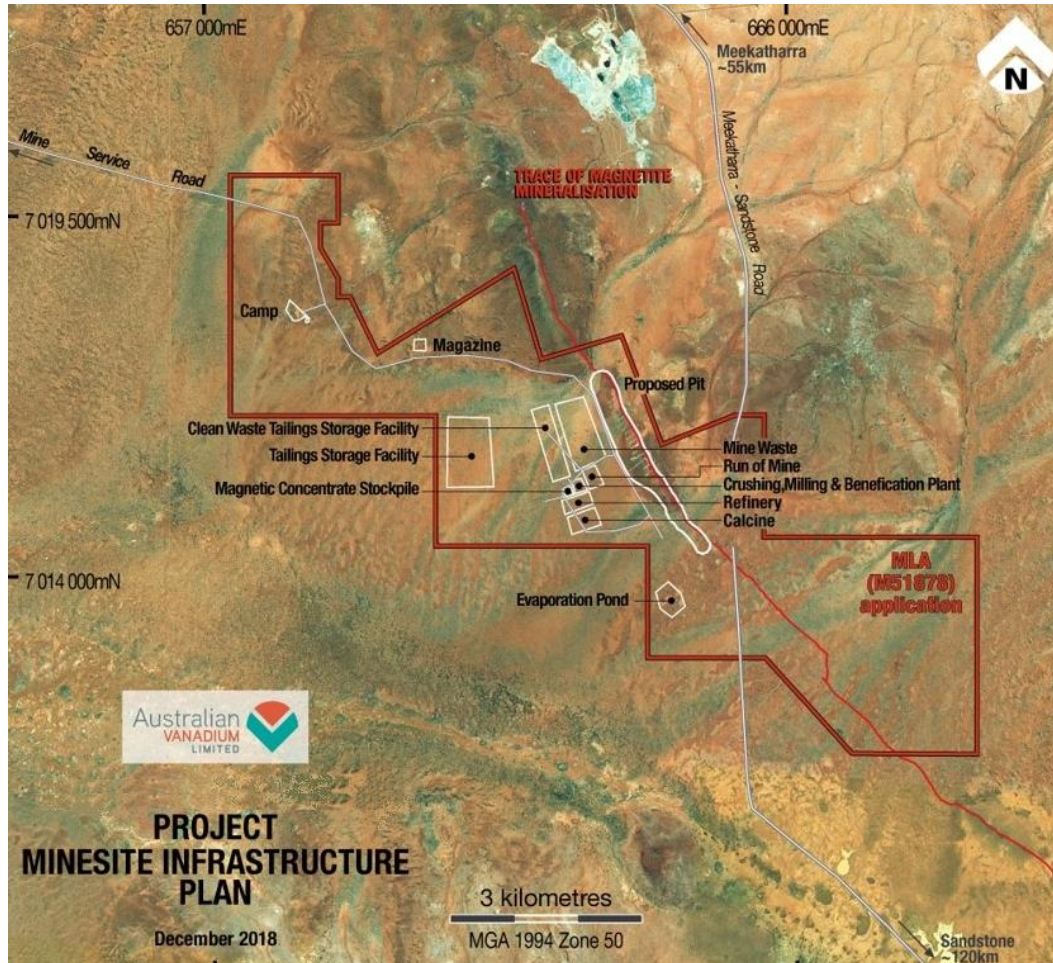
Infrastructure Requirements

Infrastructure Requirements

- Gas pipeline infrastructure
- Updated water infrastructure for processing plant section
- Innovative water solutions onsite (pumping water out of mine pits)
- Roads and water pipelines
- Camp
- Mining
- Site power (large renewable component)
- Port access (processing plant)



Planned Infrastructure



Challenges and Permitting

Opportunities and Challenges

- Environmental approval (working within EPA guidelines) – water is a specific challenge; priority species.
- Natural gas infrastructure.
- Road transport and port access.
- Heritage – achieving a satisfactory outcome for both parties and the wider community.



Permitting: Finalised

- ✓ Water impact assessment
- ✓ Flora and fauna field assessments
- ✓ Heritage access agreements
- ✓ Stygofauna and troglofaunal sampling
- ✓ Mining licence application
- ✓ Federal Major Project Status

Permitting: Progressing

- Mining agreement and licence grant
- Environmental approval application
- State Major Project Status

Project Summary

Completed

- ✓ Exploration success (large high quality VTM resource)
- ✓ Resource and Reserves for initial 17 year mine, significant potential for extension
- ✓ Completed PFS, DFS well underway
- ✓ Heritage agreements
- ✓ First Chinese party MOU (finance, offtake of vanadium oxides)
- ✓ MOU with Westgold for life-of-mine water requirements



Key Objectives for 2020

Offtake Agreements

Offtake agreements for final vanadium and iron ore products

DFS Engineering

Completion of DFS-level engineering and costing

Critical Path: Environmental Approval

Submission of final environmental approvals in 2020

Financiers

Qualification with project financiers

Federal and State Recognition

Achieve Federal and State recognition and support

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Contact Us

P +61 (08) 9321 5594

E info@australianvanadium.com.au

www.australianvanadium.com.au

Level 1, 85 Havelock Street West Perth,
Western Australia 6005

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Updated Resource Table

Material	JORC Resource Class	Million Tonnes	V ₂ O ₅ %	Fe %	TiO ₂ %	SiO ₂ %	Al ₂ O ₃ %	LOI %
High Grade	Measured	10.1	1.14	43.9	13.0	9.2	7.5	3.7
	Indicated	25.1	1.10	45.4	12.5	8.5	6.5	2.9
	Inferred	52.7	1.04	44.6	11.9	9.4	6.9	3.3
	Subtotal – High Grade	87.9	1.06	44.7	12.2	9.2	6.8	3.2
Low Grade	Indicated	44.5	0.51	25.0	6.8	27.4	17.0	7.9
	Inferred	60.3	0.48	25.2	6.5	28.5	15.3	6.7
	Subtotal – Low Grade	104.8	0.49	25.1	6.6	28.0	16.1	7.2
Transported	Inferred	15.6	0.65	28.4	7.7	24.9	15.4	7.9
	Subtotal – Transported	15.6	0.65	28.4	7.7	24.9	15.4	7.9
Total	Measured	10.1	1.14	43.9	13.0	9.2	7.5	3.7
	Indicated	69.6	0.72	32.4	8.9	20.6	13.2	6.1
	Inferred	128.5	0.73	33.5	8.8	20.2	11.9	5.4
	Total	208.2	0.74	33.6	9.0	19.8	12.1	5.6

Note: Mineral Resource estimate by domain and resource classification using a nominal 0.4% V₂O₅ wireframed cut-off for low grade and nominal 0.7% V₂O₅ wireframed cut-off for high grade (total numbers may not add due to rounding).