



**ASX / KRR**

February 2020

**PREFEASIBILITY STUDY  
UNDERWAY**

Finance News Network Investor Events Presentation  
Sydney 20 February 2020

## Australia's largest deposit of Specialty Metals

King River Resources Speewah Specialty Metals (SSM) project planning is well advanced with a process route incorporating sulphuric acid leaching in heated tanks and refining to initially produce high purity alumina (HPA)

## Overview of HPA ambition

KRR engaged Como Engineers to scope several processing options and is now assisting in preparing a Prefeasibility Study (PFS) for expected release late March 2020. Current focus is to design a modest sized project that minimizes Capex whilst retaining attractive margins.

The mined material will be magnetically separated into 2 products:

- A non-magnetic fraction (~70% of volume) that will contain most of the Alumina (15-16% Al<sub>2</sub>O<sub>3</sub>)
- A magnetic fraction (~30% of volume) that will contain the Iron, Titanium, Vanadium minerals

(refer KRR ASX announcements 21 and 22 March 2019, 27 September 2019, 5 December 2019)

To reduce technical complexity, costs, risk and potential time to construction, the non-magnetic fraction will be leached in sulphuric acid to recover only high purity alumina (HPA) and the magnetic portion stockpiled for future processing optionality.





# Prefeasibility Study for late March 2020

The study will include estimates of Capital Expenditure (CAPEX) and Operating Expenditure (OPEX), including breakdowns of the costs of beneficiation, a leach and metal recovery processing facility and the acid contact and regeneration plant required for sulphuric acid production.

The Sulphuric Acid Plant will be the heart of the initial process plant, producing sulphuric acid, steam, and electricity to drive the entire process.



## Overseas processing potential

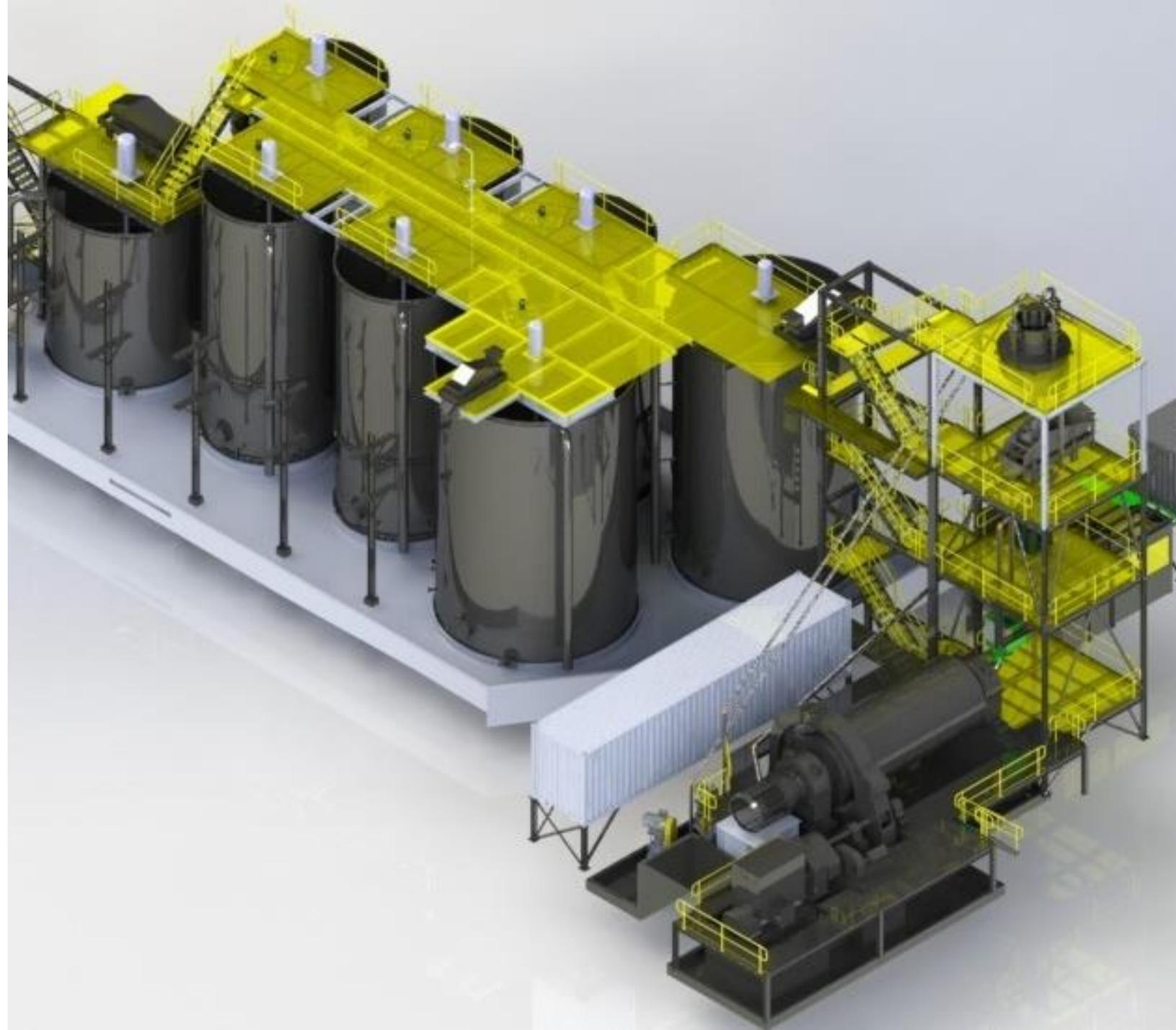
The assumptions surrounding the PFS will be based around a project located in the Eastern Kimberley, of northern Western Australia.

The next progressive step of this project will be a Definitive Feasibility Study (DFS) that will involve larger scale pilot studies, flow sheet and technical optimization and the investigation of many other commercial variables.

An important part of this next study will be to review closely the potential of processing the beneficiated products offshore where the acid costs, electricity pricing, labor costs, and government incentives and taxation can be materially attractive to such ventures.



**Example of  
heated  
agitated tank  
leaching plant**



## High Purity Alumina process breakthrough

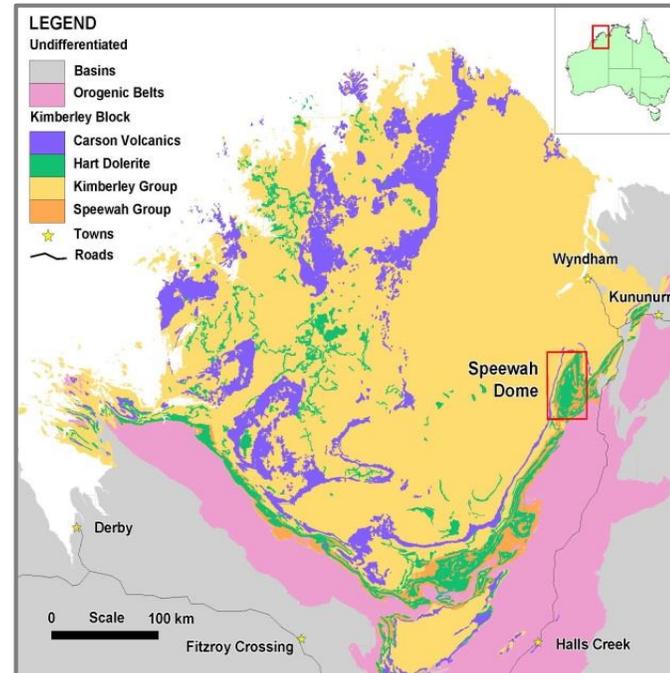
In November 2019, KRR made a breakthrough extracting aluminium (Al) directly from the V, Ti, Fe, Al and Mg rich sulphuric acid leach solution as the first precipitation product (KRR ASX release 26 November 2019).

This process development resulted from investigations into removing iron from the leach solution to facilitate the solvent extraction of vanadium (V) and titanium (Ti).

Purification of the intermediate Al rich product followed by calcination and washing has already produced 99.98% Al<sub>2</sub>O<sub>3</sub> (3N8) HPA (KRR ASX release 5 December 2019).

Optimisation test work to improve HPA purity to 4N (99.99% Al<sub>2</sub>O<sub>3</sub>) and increase the overall recovery is ongoing.





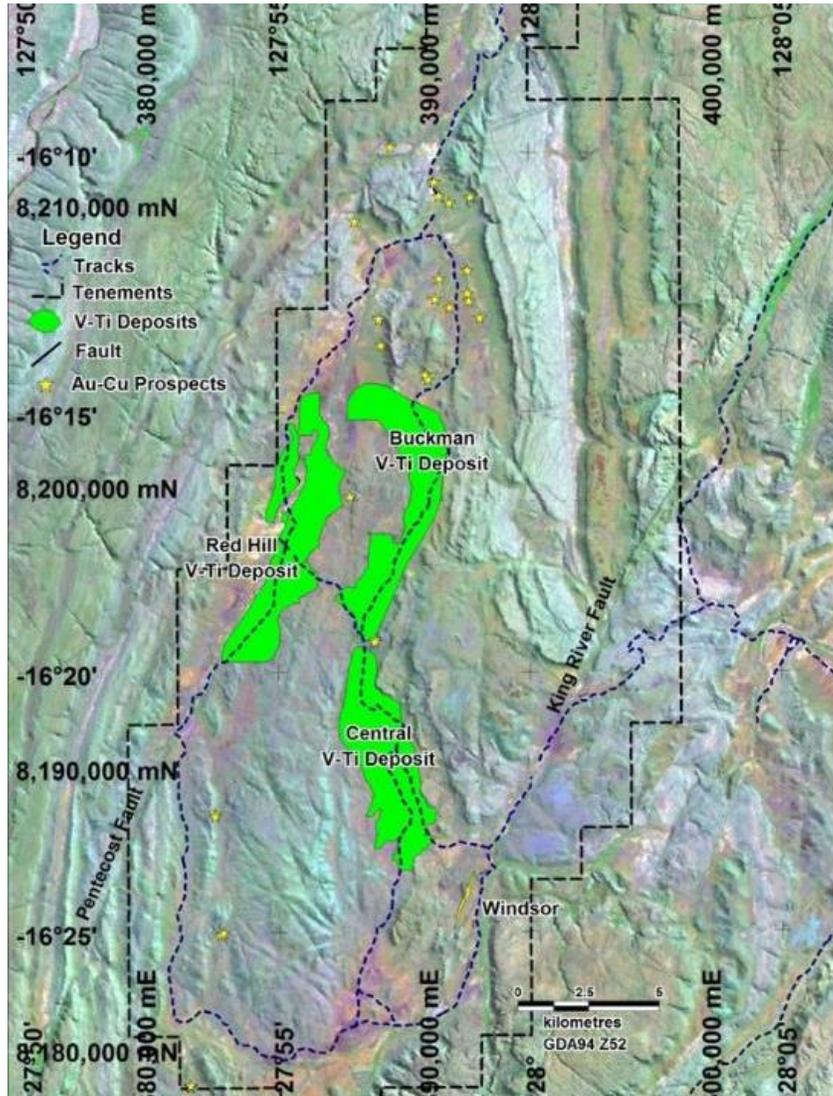
## Project Location

Nearby infrastructure includes sealed major highway, Wyndham Port, Ord River Dam and hydro electric project, Kununurra skilled workforce and industry involved with servicing the Argyle Diamond Mine.

*This project is ~110 kilometres southwest of Kununurra*

## 4.7 billion tonne JORC resource

Vanadium resource estimates by CSA Global Pty Ltd, an ERM Group Company (refer ASX announcements 2 April 2019 and 6 November 2019, and Resource Statements in Tables 1 and 2 on Slide 14).



Measured, Indicated and Inferred Mineral Resource, reported at a 0.23% V<sub>2</sub>O<sub>5</sub> cut-off grade from the Central, Buckman and Red Hill deposits, totals:

**4,712 million tonnes at 0.3% V<sub>2</sub>O<sub>5</sub>, 3.3% TiO<sub>2</sub> and 14.7% Fe**

(comprising Measured Resources of 322 million tonnes at 0.32% V<sub>2</sub>O<sub>5</sub>, 3.4% TiO<sub>2</sub> and 14.9% Fe, Indicated Resources of 1,054 million tonnes at 0.33% V<sub>2</sub>O<sub>5</sub>, 3.3% TiO<sub>2</sub> and 14.9% Fe, and Inferred Resources of 3,335 million tonnes at 0.29% V<sub>2</sub>O<sub>5</sub>, 3.3% TiO<sub>2</sub> and 14.6% Fe)



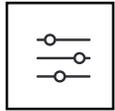
The Central deposit, reported at a 0.23% V<sub>2</sub>O<sub>5</sub> cut-off grade, comprises a Measured, Indicated and Inferred Mineral Resource of:

**1,240 million tonnes at 0.31% V<sub>2</sub>O<sub>5</sub>, 3.3% TiO<sub>2</sub>, 14.6% Fe, 12.5% Al<sub>2</sub>O<sub>3</sub> and 4.7% MgO**

(comprising a Measured Mineral Resources of 230 million tonnes at 0.33% V<sub>2</sub>O<sub>5</sub>, 3.4% TiO<sub>2</sub>, 14.9% Fe, 12.7% Al<sub>2</sub>O<sub>3</sub> and 4.5% MgO, Indicated Resources of 301 million tonnes at 0.31% V<sub>2</sub>O<sub>5</sub>, 3.4% TiO<sub>2</sub>, 14.8% Fe, 12.5% Al<sub>2</sub>O<sub>3</sub> and 4.6% MgO, and Inferred Resources of 709 million tonnes at 0.30% V<sub>2</sub>O<sub>5</sub>, 3.3% TiO<sub>2</sub>, 14.5% Fe, 12.5% Al<sub>2</sub>O<sub>3</sub> and 4.8% MgO).

*The largest titanomagnetite hosted vanadium resource in Australia.*

# Flat lying geometry: Conceptual pit shell



Flat lying geometry of magnetite gabbro outcropping in the West in the Central deposit.



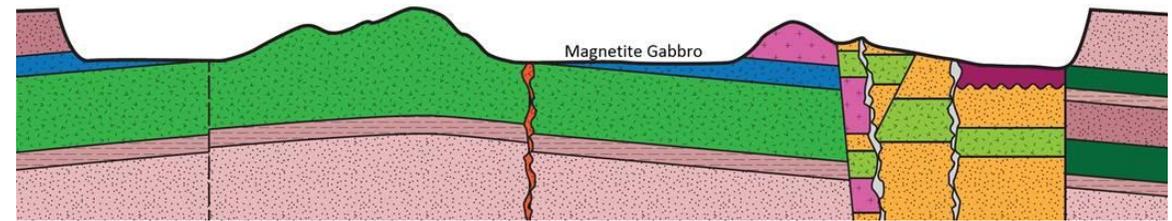
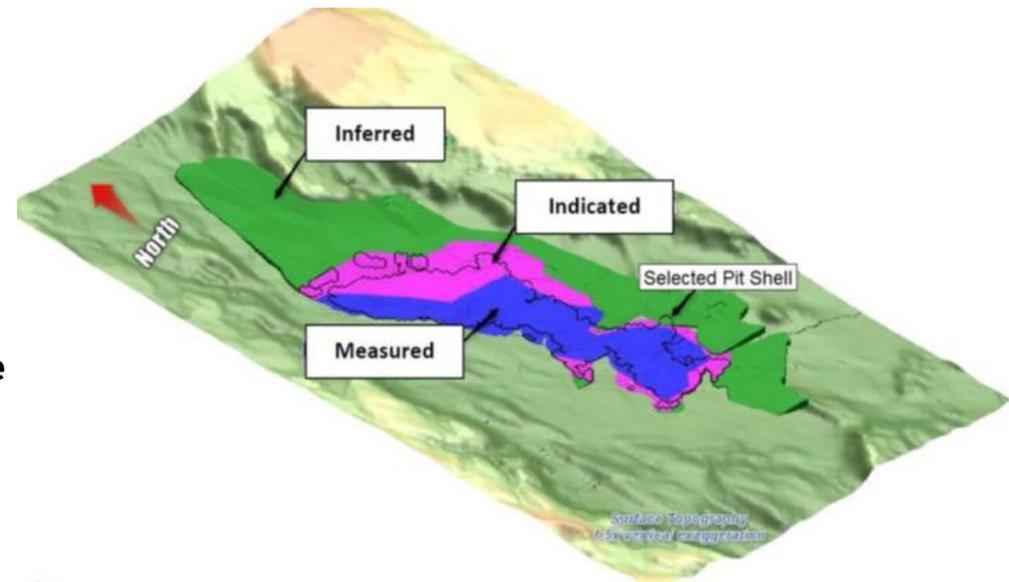
**The flat lying nature of the Speewah mineralisation presents the opportunity to mine with minimum waste.**



An earlier study by CSA Global modelled a preliminary pit shell 4.2km x 1.2 km with a very low strip ratio of only 0.4 (KRR ASX release 20 June 2018).



The PFS plan, based on a smaller scale HPA operation, should be significantly smaller.



# Specialty metals project summary

The conceptual PFS project plan can be summarised as follows:

## 1. Open pit mining

The current plan is to mine the flat lying mineralisation of the Central deposit.

The head grade feed, based on an earlier unrestricted mine study, should assay: 0.31%  $V_2O_5$ , 3.37%  $TiO_2$  and 14.7% Fe (KRR ASX releases 20 June 2018, 21 and 22 March 2019). Based on the resource estimates, this material should assay ~12.5%  $Al_2O_3$  and ~4.7% MgO (see Slides 8 and 14).

## 2. Beneficiation and waste

Run-of-mine material would be crushed and ground to 0.5mm, with the magnetite and ilmenite magnetically separated into a magnetic concentrate with a mass yield of ~30%. The non-magnetic material waste (~70%) is then ground down further to 0.15mm to facilitate more efficient acid leaching.

The alumina grade of the non-magnetic fraction is ~15-16%  $Al_2O_3$ .

(refer KRR ASX releases 21 and 22 March 2019, 27 September 2019 and 5 December 2019).

## 3. Heated sulphuric acid leaching in agitated tanks

Leaching test work on the non-magnetic material is underway using 20% sulphuric acid at 20% pulp density, heated to 70°C and agitated over 3 days. Previous vat leach test results on lump whole rock material reported Al extractions of 43% (KRR ASX release 1 March 2019).

## 4. Refining of products

KRR's breakthrough in extracting aluminium (Al) from the leach solutions as an intermediate compound (KRR ASX 26 November 2019) has directed the current PFS focus on producing HPA as the first stage in the SSM project development plan, with the recovery of vanadium pentoxide ( $V_2O_5$ ), titanium dioxide ( $TiO_2$ ) and iron oxide ( $Fe_2O_3$ ) products by solvent extraction at a later stage.



# Corporate Overview



**ASX CODE**  
KRR



**ASX OPTIONS**  
(exc. 12 cents 30/7/20)  
~413 million



**SHARE PRICE**  
(17/2/2020)  
2.3 cents



**UNLISTED OPTIONS**  
~11.5 million



**ISSUES SHARED**  
~1.25 billion



**MARKET CAPITALISATION**  
~ \$28.8 million

# Board of Directors

## AND TOP SHAREHOLDERS



**MR ANTHONY BARTON**  
Non Executive Chairman

Mr Barton has been involved in founding and growing a number of successful listed public companies. He has extensive experience in capital markets, corporate finance, funds management and venture capital and has had advisory roles in the incorporation and listing of many Australian based resource companies.



**MR GREG MACMILLAN**  
Non Executive Director

Mr MacMillan has wide ranging corporate, financial, capital markets and commercial experience over the last 30 years. He has held the positions of director, company secretary, chief financial officer, and corporate finance executive in numerous companies across the finance, mining and commercial sectors.



**MR LEONID CHARUCKYJ**  
Non Executive Director

Mr Charuckyj has had extensive experience over a broad range of technical, engineering, management and corporate roles including senior positions in government, public and private industry both in Australia and overseas.

## TOP SHAREHOLDERS

**ANTHONY BARTON & ASSOCIATES: ~8.%**

## World class mineral projects typically need?



A unique orebody with a very long mine life, consistent grades amenable to the most modern day large scale mining methods



Commodity/revenue diversification



Economically viable process routes to produce high demand and high quality/purity products



Leading international engineering partners and consultants



Adequate sources of capital



A modest to low risk domicile

*KRR is starting to tick the boxes*



Zone	JORC Classification	Tonnage (Mt)	V (%)	V <sub>2</sub> O <sub>5</sub> (%)	Fe (%)	Ti (%)	TiO <sub>2</sub> (%)
High Grade	Measured	181	0.21	0.37	15.1	2.1	3.5
	Indicated	404	0.20	0.35	15.0	2.0	3.4
	Inferred	1,139	0.19	0.34	14.9	2.0	3.4
Total High Grade		1,725	0.20	0.35	15.0	2.0	3.4
Low Grade	Measured	141	0.15	0.27	14.6	2.0	3.3
	Indicated	650	0.15	0.27	14.5	1.9	3.2
	Inferred	2,196	0.15	0.27	14.4	1.9	3.2
Total Low Grade		2,987	0.15	0.27	14.5	1.9	3.2
Combined Zones	Measured	322	0.18	0.32	14.9	2.0	3.4
	Indicated	1,054	0.18	0.33	14.9	2.0	3.3
	Inferred	3,335	0.16	0.29	14.6	2.0	3.3
Grand Total		4,712	0.17	0.30	14.7	2.0	3.3

## ALUMINA - VANADIUM - TITANIUM

**Table 1 (left):** Speewah Project Global Mineral Resource estimate (at 0.23% V<sub>2</sub>O<sub>5</sub> cut-off grade)

**Note:** Vanadium Resources estimated under JORC 2012 KRR ASX announcement 1 April 2019

# Mineral Resource Estimates

**Table 2 (right):** Central Mineral Resource estimate (at 0.23% V<sub>2</sub>O<sub>5</sub> cut-off grade)

**Note:** Central Resource update estimated under JORC 2012 KRR ASX announcement 6 November 2019

Central Mineral Resource estimate, 0.23% V<sub>2</sub>O<sub>5</sub> cut-off grade

Zone	JORC classification	Tonnage (Mt)	V (%)	V <sub>2</sub> O <sub>5</sub> (%)	Fe (%)	Ti (%)	TiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	MgO
High Grade	Measured	139	0.21	0.37	15.1	2.1	3.5	12.7	4.5
	Indicated	135	0.21	0.37	14.8	2.0	3.4	12.7	4.6
	Inferred	247	0.20	0.36	14.7	2.0	3.4	12.7	4.7
Total High Grade		520	0.20	0.36	14.8	2.0	3.4	12.7	4.6
Low Grade	Measured	91	0.15	0.26	14.6	2.0	3.3	12.6	4.5
	Indicated	167	0.15	0.27	14.8	2.1	3.4	12.4	4.6
	Inferred	462	0.15	0.27	14.3	1.9	3.2	12.4	4.8
Total Low Grade		720	0.15	0.27	14.5	2.0	3.3	12.4	4.7
Combined Zones	Measured	230	0.18	0.33	14.9	2.1	3.4	12.7	4.5
	Indicated	301	0.17	0.31	14.8	2.0	3.4	12.5	4.6
	Inferred	709	0.17	0.30	14.5	2.0	3.3	12.5	4.8
GRAND TOTAL		1,240	0.17	0.31	14.6	2.0	3.3	12.5	4.7

Notes:

- Due to the effects of rounding, the total may not represent the sum of all components.
- V<sub>2</sub>O<sub>5</sub> calculated as V x 1.785.
- TiO<sub>2</sub> calculated at Ti x 1.67.

# Important Notices



## **Note 1: Competent Persons Statement**

The information in this Presentation that relates to Exploration Results, Mineral Resources, Metallurgical Results and Studies is based on information compiled by Ken Rogers and fairly represents this information. Mr. Rogers is the Chief Geologist and an employee of the Company, and a member of both the Australian Institute of Geoscientists (AIG) and The Institute of Materials Minerals and Mining (IMMM), and a Chartered Engineer of the IMMM. Mr. Rogers has sufficient experience of relevance to the styles of mineralisation and the types of deposits under consideration, and to the activities undertaken, to qualify as a Competent Person 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. Mr. Rogers consents to the inclusion in this report of the matters based on information in the form and context in which it appears.

## **Note 2: Resource Statements**

The information in this Presentation that relates to Mineral Resources is based on previous KRR ASX announcements:

The Vanadium Resources reported in Tables 1 and 2 in the previous slide has been sourced from Resource Estimate Report Updates which were reported in KRR ASX announcements dated 1 April 2019 and 6 November 2019. These Vanadium Resources were estimated in terms of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (JORC Code 2012 Edition).

KRR confirms it is not aware of any new information or data that materially affects the information included in these resource announcements and confirms that all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed.

## **Note 3: Disclaimer**

This Presentation contains forward looking statements concerning the projects owned by KRR. Statements concerning mineral resources may also be deemed to be forward looking statements in that they involve elements based on specific assumptions. Forward looking statements are not statements of historical fact, and actual events or results may differ materially from those described in the forward looking statements as a result of a variety of risks, uncertainties and other factors. Forward looking statements are based on KRR's beliefs, opinions and estimates as of the date they are made and no obligation is assumed to update forward looking statements if these beliefs, opinions and estimates should change or reflect other future developments. The interpretations and conclusions reached in this presentation are based on current geological theory and the best evidence available to the authors at the time of writing. It is the nature of all scientific conclusions that they are founded on an assessment of probabilities and, however high these probabilities might be, they make no claim for complete certainty. Any economic decisions that might be taken on the basis of interpretations or conclusions contained in this presentation will therefore carry an element of risk.

This announcement was authorised by the Chairman of the Company, Anthony Barton Email: [info@kingriverresources.com.au](mailto:info@kingriverresources.com.au)  
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**THANK YOU**