



RIU  
**Sydney**  
Resources  
**Round-up**

# Silica Sand An Emerging Mining Sector

Western Australian  
Silica Sand Projects

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May 2023



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# Important information

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## Competent Persons Statement

The information in this document that relates to Arrowsmith North, Arrowsmith Central, Arrowsmith Brand and Muchea Exploration Results, and Arrowsmith Brand and Muchea Aircore Drilling Area Mineral Resources, are based on data collected and compiled under the supervision of Mr David Reid, who is a full-time employee of VRX Silica. Mr Reid, BSc (Geology), is a registered member of the Australian Institute of Geoscientists and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and the activity being undertaken to qualify as a Competent Person under the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code). Mr Reid consents to the inclusion of the data in the form and context in which it appears.

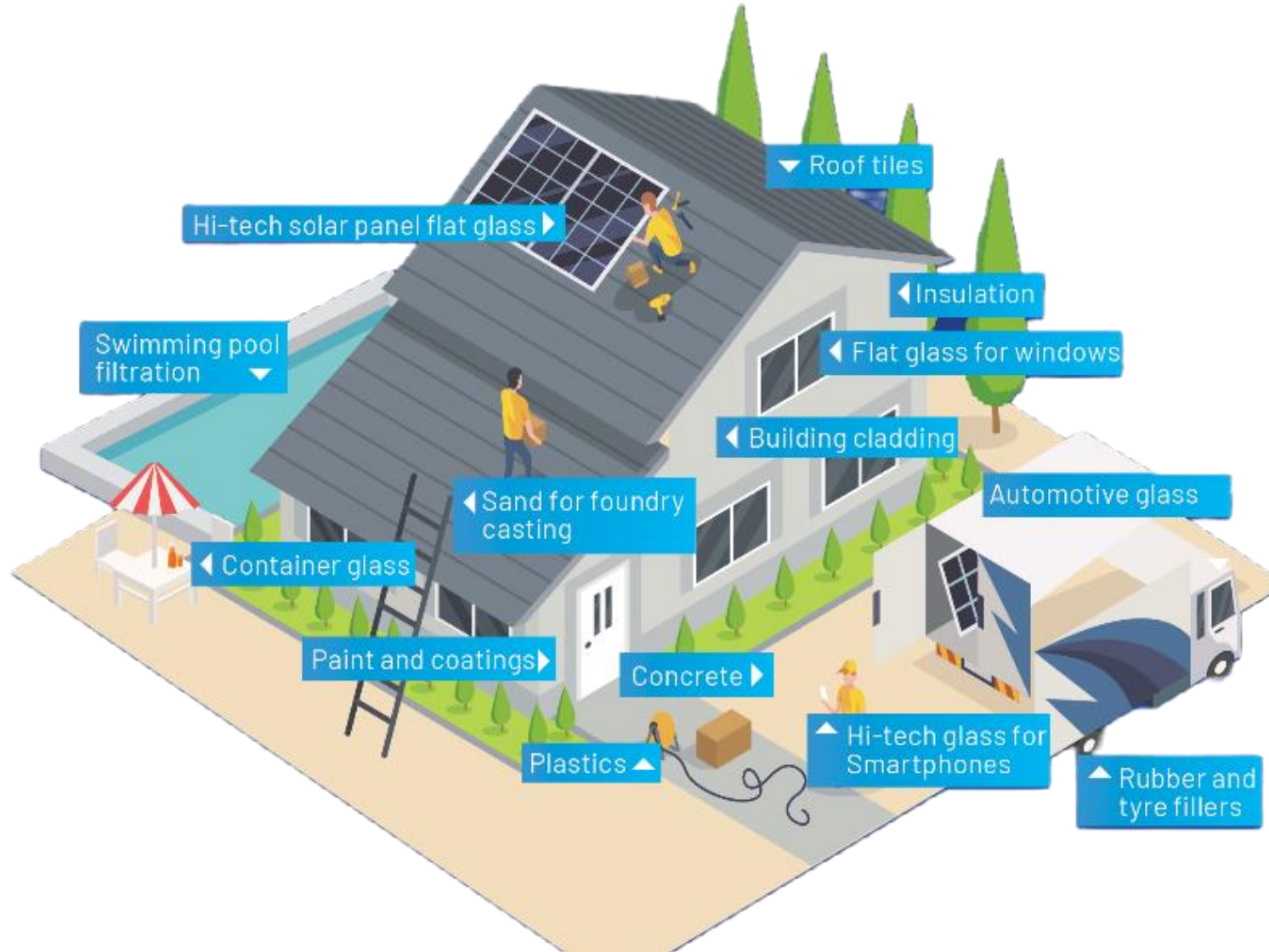
The information in this report that relates to Arrowsmith North, Arrowsmith Central and Muchea Auger area Mineral Resources is based on information compiled by Mr Grant Louw who is a full-time employee of CSA Global, under the direction and supervision of Dr Andrew Scogings, who is an Associate of CSA Global. Dr Scogings is a Member of the Australasian Institute of Mining and Metallurgy and a Member of the Australian Institute of Geoscientists. He is a Registered Professional Geologist in Industrial Minerals. Dr Scogings has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as Competent Person as defined in the 2012 edition of the Australasian Code for the Reporting of Exploration Results, Mineral Resources, and Ore Reserves (JORC Code). Dr Scogings consents to the disclosure of information in this report in the form and context in which it appears.

The information in this report that relates to Arrowsmith North, Arrowsmith Central and Muchea Probable Ore Reserves is based on data collected and compiled under the supervision of Mr David Reid, who is a full-time employee of VRX Silica. Mr Reid, BSc (Geology), is a registered member of the Australian Institute of Geoscientists and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and the activity being undertaken to qualify as a Competent Person under the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code). Mr Reid consents to the inclusion of the data in the form and context in which it appears.

## Assumptions Underpinning Mineral Resources and Ore Reserves

The information in this document that relates to the estimation and reporting of the Mineral Resources and Ore Reserves for the Company's silica sand projects is extracted from releases to ASX on 28 August 2019 and 11 November 2022 (Arrowsmith North), 17 September 2019 (Arrowsmith Central), 9 May 2023 (Arrowsmith Brand), 18 October 2019 (Muchea) and 18 August 2022 (Boyatup). The Company confirms that it is not aware of any new information or data that materially affects the information included in this document and all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed.

# Silica Sand - the Second-most Consumed Material on Earth



**WA-based, pure-play silica sand company with advanced silica sand projects**

**100+ year production life**

- ❑ 100% owner of five high value silica sand projects in Western Australia - Tier 1 mining region
- ❑ Multi-decade-scale contiguous sand deposits with significant high-grade Resources
- ❑ Most-advanced non-private silica sand projects in Australia
- ❑ Mining Leases granted over three projects and another pending with permitting and infrastructure preparations well-advanced
- ❑ Arrowsmith North to lead staggered development. First production expected 2023 – followed by Muchea, Arrowsmith Central, Boyatup and Arrowsmith Brand
- ❑ Strong interest from customers in Southeast Asia at a time of diminishing global supply and increasing demand



# Silica Sand – World Class Projects

## Project development pipeline to ensure disciplined, staged development of world-class assets



- ❑ WA-based company and management team
- ❑ Most advanced non-private silica sand projects in Australia
- ❑ Five very large scale, high grade and low impurity silica sand projects each project capable of independent operation to supply processed material to diverse markets
- ❑ Simple, low impact mining and processing
- ❑ Access to established infrastructure (logistics, power, water and gas)
  - rail lines to port run adjacent to all project tenements
  - gas pipelines run adjacent to each of the project areas
- ❑ Scale of projects provides long-term opportunity for silica sand export and potential glass manufacturing and downstream industries in Western Australia

## Near-term development opportunity for a world-class silica sand project

- ❑ Production expected to commence 2023 (subject to final environmental approvals)
- ❑ 221Mt Ore Reserve @99.7% SiO<sub>2</sub> (100-year production) (See Reserve Table)
- ❑ Grade controlled Proved Ore Reserve 9.2Mt for first 6 years of production
- ❑ Tailored 2Mtpa processing plant with patented process circuit, revised capital estimate and DFS underway
- ❑ Access to established infrastructure –
  - ❑ Unused rail line (from Eneabba to Geraldton) runs adjacent to project tenements
  - ❑ Water from Yarragadee North deep aquifer
  - ❑ Access by adjacent Brand Highway
  - ❑ Hybrid gas and solar power supply



# Arrowsmith North Environmental and Mining Approvals

- ❑ Confirmation by Commonwealth Department of Agriculture, Water and the Environment of accredited State approval under the EPBC Act
- ❑ State Department of Water and Environmental Regulation and Environmental Protection Authority (EPA) require PER assessment
- ❑ Environmental Scoping Document (ESD) approved in March 2022
- ❑ Environmental Review Document (ERD) lodged in April 2022 and amended June 2022
- ❑ VRX responded December 2022 to comments from other Govt Agencies and again in May 2023 with confirmation for publication of ERD for public consultation expected on the latest version
- ❑ Mining proposal for DMIRS lodged for assessment in parallel with ERD



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## Responsible Mining – the VRX Way

### A made-for-purpose mining method designed around continuous rehabilitation

- ❑ VRX has developed a unique and progressive mining method for its silica sand projects
- ❑ The Vegetation Direct Transfer (VDT) method provides a rapid and comprehensive regeneration of mined areas based on continuous rehabilitation as mining progresses
- ❑ The VDT method removes a 400mm-deep sod with topsoil containing the vast majority of native flora and invertebrate fauna remaining intact
- ❑ Root structures in the loose sand are relatively shallow at 200-300mm in depth







# Arrowsmith Central Environmental and Mining Approvals

- Confirmation by Commonwealth Department of Agriculture, Water and the Environment of accredited approval under the EPBC Act
- State Department of Water and Environmental Regulation and Environmental Protection Authority (EPA) require PER assessment
- Environmental Scoping Document (ESD) lodged with EPA in June 2022
- Environmental Review Document (ERD) prepared and will lodge on ESD approval

ersonal use only Arrowsmith North/Central Vegetation Kwongan Heath

Loose sand/shallow root systems suitable for VDT

## Long-term future development opportunity for another world-class silica sand project

- ❑ Production in conjunction with Arrowsmith North by independent processing or an expanded Arrowsmith North processing plant
- ❑ 523Mt Inferred Resource @97.3% SiO<sub>2</sub> (See Resource Table)
- ❑ Access to infrastructure at Arrowsmith North—
  - ❑ Unused rail line (from Eneabba to Geraldton) runs adjacent to project tenements
  - ❑ Water from Yarragadee North deep aquifer bore at Arrowsmith North
  - ❑ Adjacent to Arrowsmith North access road to Brand Highway
  - ❑ Power supply can be extended to either Arrowsmith Brand independent processing or an expanded Arrowsmith North processing plant

## Large scale, world class high-grade and low impurity silica sand project

- ❑ Production to follow Arrowsmith North subject to EPA approval
- ❑ Utilise VDT and duplicate plant
- ❑ Access to established infrastructure
  - ❑ Underutilised railway connects to Kwinana (100km)
  - ❑ Grid power
  - ❑ Water from Yaragadee deep aquifer
  - ❑ Adjacent to Brand Highway
- ❑ Granted Mining Lease and Miscellaneous Licences for access
- ❑ Significant metallurgical testwork **+99.9% SiO<sub>2</sub> - <100ppm Fe<sub>2</sub>O<sub>3</sub>** after processing (high-grade, low impurity)
- ❑ Raw material for premium ultra-clear cover glass production for solar panels
- ❑ Potential for manufacturing cover glass from adjacent gas/hydrogen pipeline

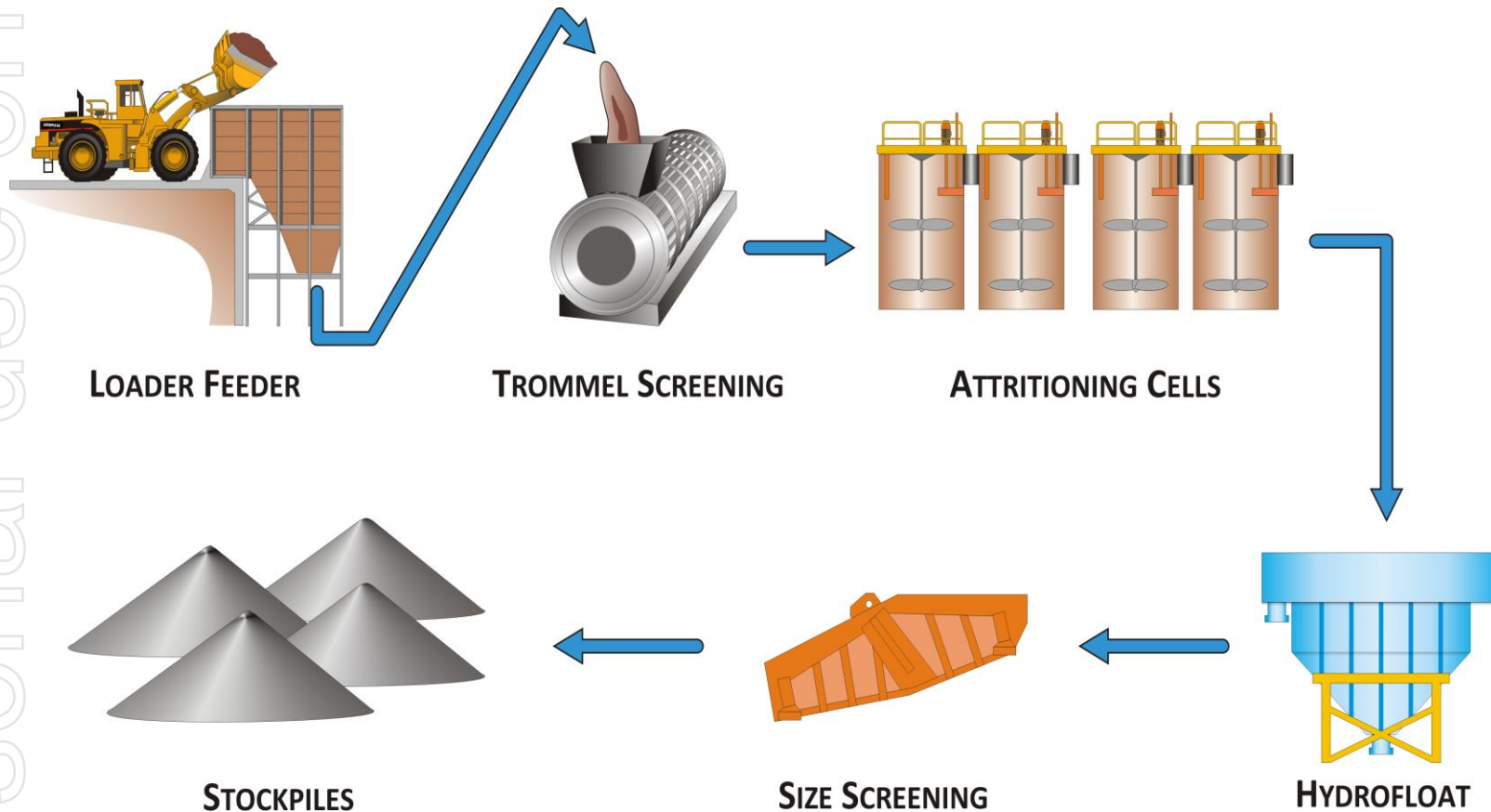


Muchea Vegetation Banksia Woodland


Low grasses and sedges suitable for VDT

# Processing Flowsheet

Simplified wet processing, multiple products, no dust, 2mtpa processing plant at each site



### Processing Plant Design



- Arrowsmith North, Arrowsmith Central and Muchea to each have 2 Mtpa processing capacity
- No toxic reagents required

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# Sustainability, Environment, Social and Governance (ESG)

VRX is delivering on its ESG responsibilities aligned to the UN's Sustainable Development Goals

## SUSTAINABLE DEVELOPMENT GOALS



### CLEAN ENERGY

Utilising reliable, renewable modern energy

### ECONOMIC GROWTH

Enhancing economic and productive employment

### INDUSTRY INNOVATION

Building resilient infrastructure and fostering innovation

### SUSTAINABLE COMMUNITIES

Respecting heritage values

### RESPONSIBLE PRODUCTION

Employing sustainable mining methods

### CLIMATE ACTION

Reducing emissions from production

### REHABILITATION PLAN

Employing direct vegetation transfer as a unique rehabilitation method

# Other Initiatives

## **VRX is investigating other potential downstream products and cost saving alternatives**

- ❑ IAF Grant - VRX is shortlisted for a grant from the State Innovation Attraction Fund to investigate the production of silica flour
- ❑ Critical Minerals Prospectus – VRX projects at Arrowsmith North and Muchea were included in the Critical Minerals Prospectus published by Austrade
- ❑ Trials of VDT - VRX has applied for a NVCP at Muchea to trial the practicalities of VDT in various vegetation types at Muchea
- ❑ Geothermal power - VRX has made application for three geothermal permits near Arrowsmith



# Our Team

## Board

Person	Role	Experience
<b>Paul Boyatzis</b>	Chairman	Governance: over 30 years' experience in investment, equity markets and managing public companies
<b>Bruce Maluish</b>	Managing Director	Technical and finance: over 40 years' experience in mining industry including previous roles as ASX MD and General Manager
<b>Peter Pawlowitsch</b>	Non-Executive Director	Senior executive: finance and corporate roles
<b>David Welch</b>	Non-Executive Director	Senior executive: responsible for strategy, business transformation and performance, commercial negotiations

## Executive

Person	Role	Experience
<b>Ryan Baxter</b>	General Manager	Production: 15 years' experience in mining and construction with last 9 years exporting silica sand
<b>David Reid</b>	Exploration Manager	Technical: responsible for exploration and mineral processing
<b>Steven Papadopoulos</b>	Commercial Manager	Legal and commercial: over 25 years' experience as corporate lawyer and commercial advisor in resources and other industries
<b>Yoonil Kim</b>	Marketing Manager	Marketing: 19 years' experience selling silica sand in the Asian market



## Capital Structure

Share Price	9.8cps *
Ordinary Shares on Issue	560.4 million
Options on Issue	41.3 million
Market Capitalisation	\$55 million*
Cash	\$3 million
Debt	Nil
Enterprise Value	\$52 million

## Shareholders

Board and Management	12%
Top 20 Total	33%

## Broker Coverage

Euroz Hartleys

EUROZ HARTLEYS

\* Closing share price on ASX on 5 May 2023

# Right Time, Right Place

**Opportunity for WA to capture its economic advantages of silica sand and gas reserves to build world-class glass manufacturing and downstream processing industries**

- Very long life, high-grade silica sand supply with combined 1.1 billion tonne Resource, 99.6% to 99.9% SiO<sub>2</sub> grade**
- WA domestic gas reserves and burgeoning hydrogen projects in mid-west**
- Long term supply of essential raw materials and green energy for glass manufacturing (gas/solar/hydrogen)**
- High-tech ultra-clear glass production capability from Muchea**
- Manufacturing of solar panels in WA for a huge and growing market in Australia**



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# Thank you

## Bruce Maluish

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# Silica Sand Resources and Reserves

## Mineral Resources

Project	Classification	Mt	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	LOI %
Muchea	Indicated	29	99.6	0.1	0.0	0.1	0.2
	Inferred	179	99.6	0.1	0.0	0.1	0.2
	<b>Total</b>	<b>208</b>	<b>99.6</b>	<b>0.1</b>	<b>0.0</b>	<b>0.1</b>	<b>0.2</b>
Arrowsmith North	Measured	10	95.9	1.9	0.7	0.3	0.7
	Indicated	237	97.7	1.0	0.4	0.2	0.5
	Inferred	266	98.4	0.7	0.3	0.2	0.4
	<b>Total</b>	<b>513</b>	<b>98.0</b>	<b>0.9</b>	<b>0.3</b>	<b>0.2</b>	<b>0.4</b>
Arrowsmith Brand	Inferred	523	97.3	1.4	0.4	0.2	0.6
	<b>Total</b>	<b>523</b>	<b>97.3</b>	<b>1.4</b>	<b>0.4</b>	<b>0.2</b>	<b>0.6</b>
Arrowsmith Central	Indicated	28.2	96.6	1.7	0.4	0.2	0.7
	Inferred	48.3	96.9	1.5	0.4	0.2	0.7
	<b>Total</b>	<b>76.5</b>	<b>96.8</b>	<b>1.5</b>	<b>0.4</b>	<b>0.2</b>	<b>0.7</b>
Boyatup	Inferred	60	67.8	0.8	0.2	0.1	0.9
	<b>Total</b>	<b>60</b>	<b>67.8</b>	<b>0.8</b>	<b>0.2</b>	<b>0.1</b>	<b>0.9</b>

**Total Mineral Resources**

**1,381 Million Tonnes**

## Ore Reserves

Project	Classification	Product	Mt	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	LOI %	
Muchea	Probable	F80	10.2	99.9	0.02	0.008	0.03	0.1	
		F80C	4.25						
		F150	4.25	99.8	0.07	0.015	0.035	0.1	
<b>Muchea Ore Reserve</b>			<b>18.7</b>	<b>Million Tonnes</b>					
Arrowsmith North	Proved	AFS20	0.8	99.5	0.25	0.07	0.05	0.1	
		AFS35	3.9	99.5	0.5	0.06	0.05	0.1	
		AFS55	2.7	99.2	0.5	0.1	0.05	0.1	
		Local	1.8						
	<b>Proved Ore Reserve</b>			<b>9.2</b>	<b>Million Tonnes</b>				
	Probable	AFS20	24.2	99.5	0.25	0.07	0.05	0.1	
		AFS35	102.5	99.5	0.5	0.06	0.05	0.1	
		AFS55	51.1	99.2	0.5	0.1	0.05	0.1	
		Local	34.1						
	<b>Probable Ore Reserve</b>			<b>212</b>	<b>Million Tonnes</b>				
<b>Arrowsmith North Ore Reserve</b>			<b>221</b>	<b>Million Tonnes</b>					
Arrowsmith Central	Probable	CF400	4.2	99.6	0.25	0.04	0.03	0.1	
		C20	8.4						
		C40	4.2						
		High TiO <sub>2</sub>	2.2			<1%	2%		
<b>Arrowsmith Central Ore Reserve</b>			<b>18.9</b>	<b>Million Tonnes</b>					

**Total Ore Reserves 259 Million Tonnes**