



VENTNOR RESOURCES

# AGM

SAND PROJECTS

WESTERN AUSTRALIA 2017

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# Disclaimer

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This summary was prepared with due care and attention and is current at the date of the presentation.

The proposed programs are generic and may differ from project to project.

Actual programs may materially vary from any proposals (where applicable) in this presentation.

Before making any investment in an exploration project, all investors should consider the appropriateness of that investment in light of their individual investment objectives and financial situation.

Exploration is subject to risks associated with location, approvals, commodity markets, geology and geography.

# Silica Sand Use

**Construction Sand**

Concrete

**Glassmaking**

Float, Containers, Architectural, Thin Film

**Metal Casting / Foundry**

Automobile parts

**Oil/Gas Well Stimulation**

Proppant/Frac sand

**Metallurgical**

Ferrous and Non-Ferrous Alloys

**Paints and Coatings**

Brightness and durability

**Chemical Production**

Sodium silicate, Silicon gels

**Ceramics and Refractories**

High-temperature resistance

**Filtration**

Water purification

**Recreational**

Inert growing media, Golf bunkers

# Market Outlook



Estimated demand for silica sand by region:

Region	% of Global demand
Asia Pacific	<b>47%</b>
North America	<b>20%</b>
Western Europe	<b>16%</b>
Eastern Europe	<b>8%</b>
Africa/Middle East	<b>5%</b>
Central and South America	<b>4%</b>

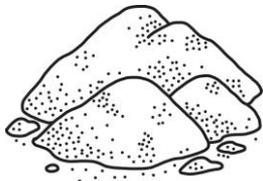
*Source: Freedonia*





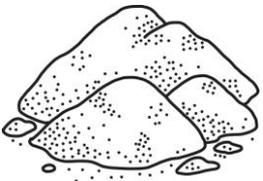
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# Silica Sand Markets

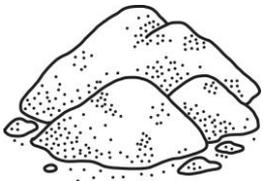


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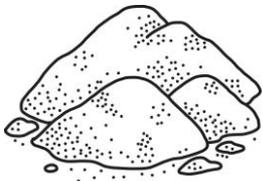
Construction  
sand



Silica sand for  
glassmaking



Foundry sand



Proppant/Frac  
sand



# Construction Sand

- Increasing market demand in Asia; particularly Singapore, Vietnam and India
- Singapore is currently producing 1mt of concrete per month, requires 300Kt of construction sand per month
- Current supplies predominately from Malaysia with concerns about continuing support from the Malaysian Government
- Other exporters in Asia are restricted or banned (Indonesia, Cambodia, Vietnam)
- Singapore Government actively encouraging sources other than “traditional”
- India sand supplies from rivers attracts increasing environmental scrutiny
- Mining approvals due end 2018 timely for the Asian market
- Dubai and Qatar presently imports construction sand from Australia!



# Construction Sand

"Sand, the backbone of the construction industry, has become a problematic resource to procure in Asia. With number of problems associated with sand, namely illegal mining by sand mafia, heavy price volatility, inferior quality and non-grade material, high demand to spur growth, sand is nothing less than a critical mineral of very high value.

Whether a river sand mining ban by a state government regulation to optimally dredge the rivers, the problem with sand supply cannot be resolved by only institutional regulation. The industry needs an answer to the underlying supply side problems and promote alternatives”.

**Manish Bhartia**

Managing Director

CDE Asia Limited.



# Arrowsmith North

- Arrowsmith North Construction Sand Project is located 290 kms north of Perth and 17kms south-east of Dongara, Western Australia
- EL application due to be granted late Dec 2017, 170km<sup>2</sup>
- Location offers strategic advantages for transport, infrastructure, mining approvals, and low-cost operations
- High-quality construction sand: silica (SiO<sub>2</sub>) >98%
- Rail to Geraldton with port facilities available for bulk loading 55,000 tonne vessels
- Initial hand-auger program completed with samples dispatched for client evaluation
- Low-cost JORC Resource drill program planned early 2018





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# Arrowsmith North



# Arrowsmith North Construction Sand

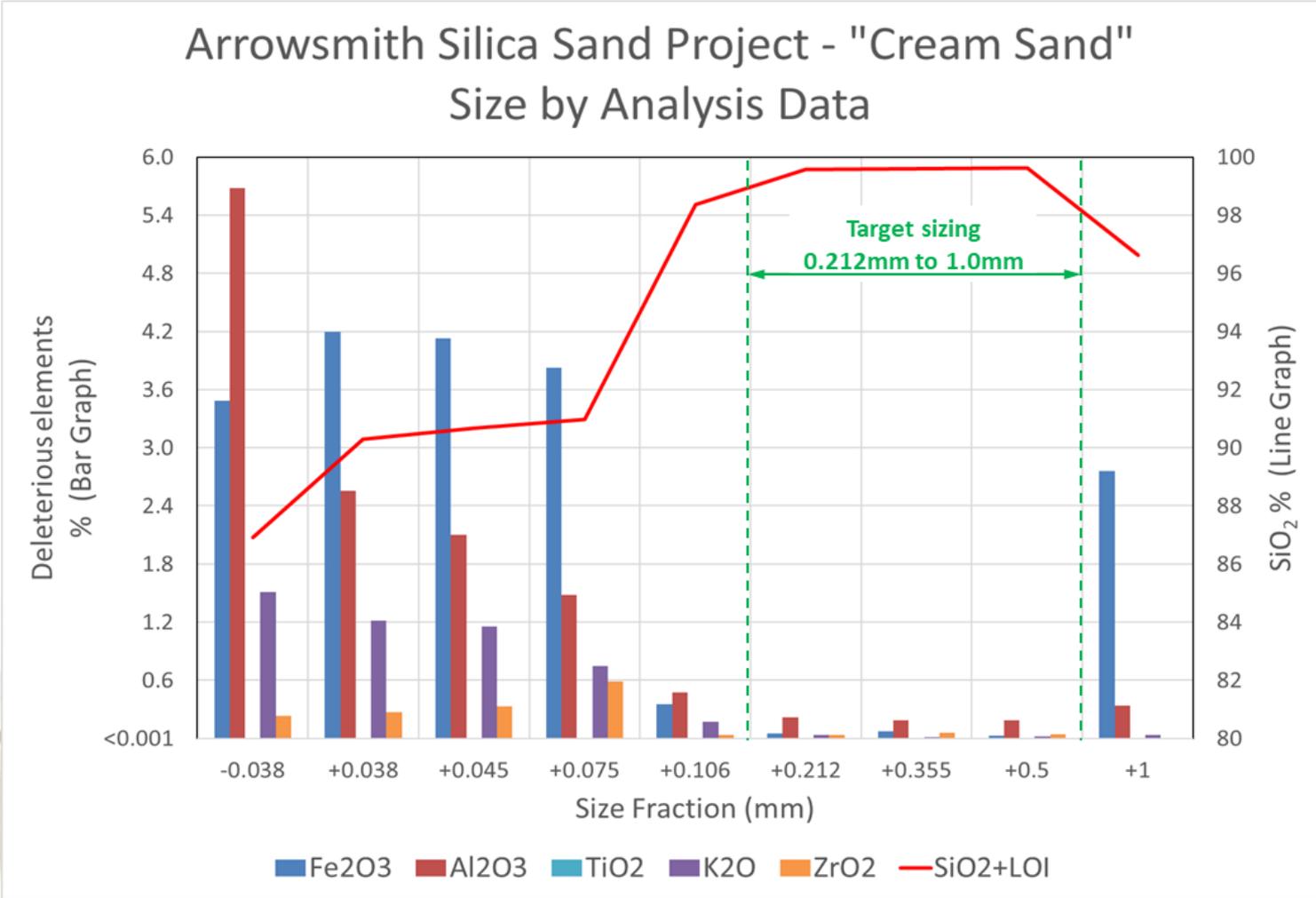
- Auger program completed with average grade 98% SiO<sub>2</sub>
- Potential for +100Mt of sand
- Excellent construction sand properties; sizing and clay content
- Potential for upgrading to glassmaking quality and sizing for Proppant



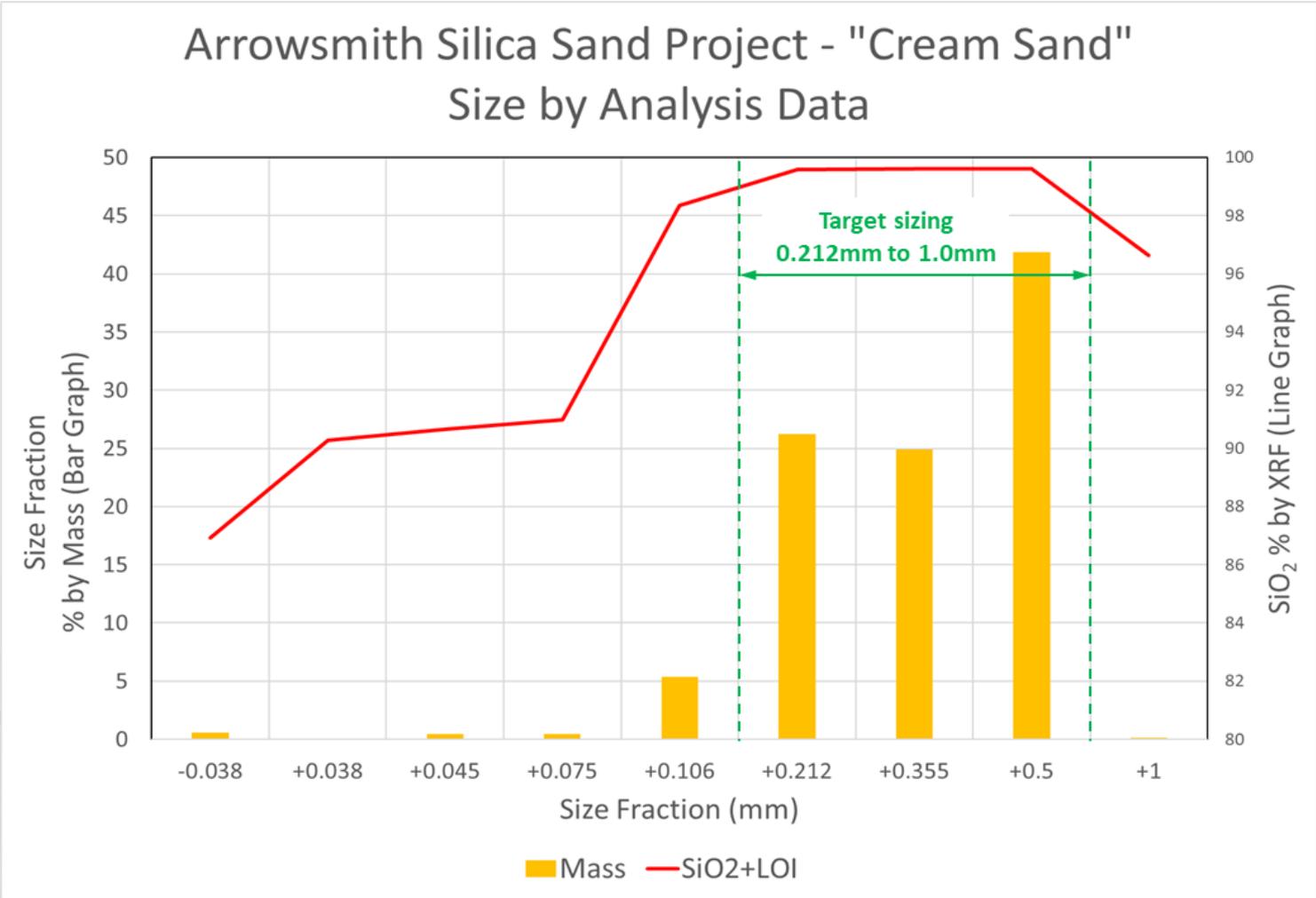
# Arrowsmith North Upgrade



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# Arrowsmith North Upgrade



# Silica Sand for Glassmaking

- Increasing market demand in Asia
- China has declared silica sand a strategic mineral; restricted exports and have become a net importer
- Indonesia has banned exports of silica sand
- Vietnam, Cambodia and Philippines have restricted export and banned dredging
- Asian demand increasing with supply becoming more constrained
- Glass making quality also used in ceramics
- Arrowsmith sand can be upgraded in quality
- Contacts already established in China, Thailand, Vietnam, Indonesia
- Scalable project with unique high-grade products



# Foundry Sand

- American Foundry Society determine specs
- Screen size and sphericity is critical, less so than mineralogy
- AFS 60 is key sizing (testwork to confirm)
- Lower SiO<sub>2</sub> sand, 99%
- Increasing market demand in Asia, particularly India
- Fastest growing market is India: foundry industry dominated by automobile parts
- Biggest buyer in Asia is South Korea (Hyundai, Samsung, Hankook)
- Testwork on Arrowsmith to confirm sand can be screened to meet specs

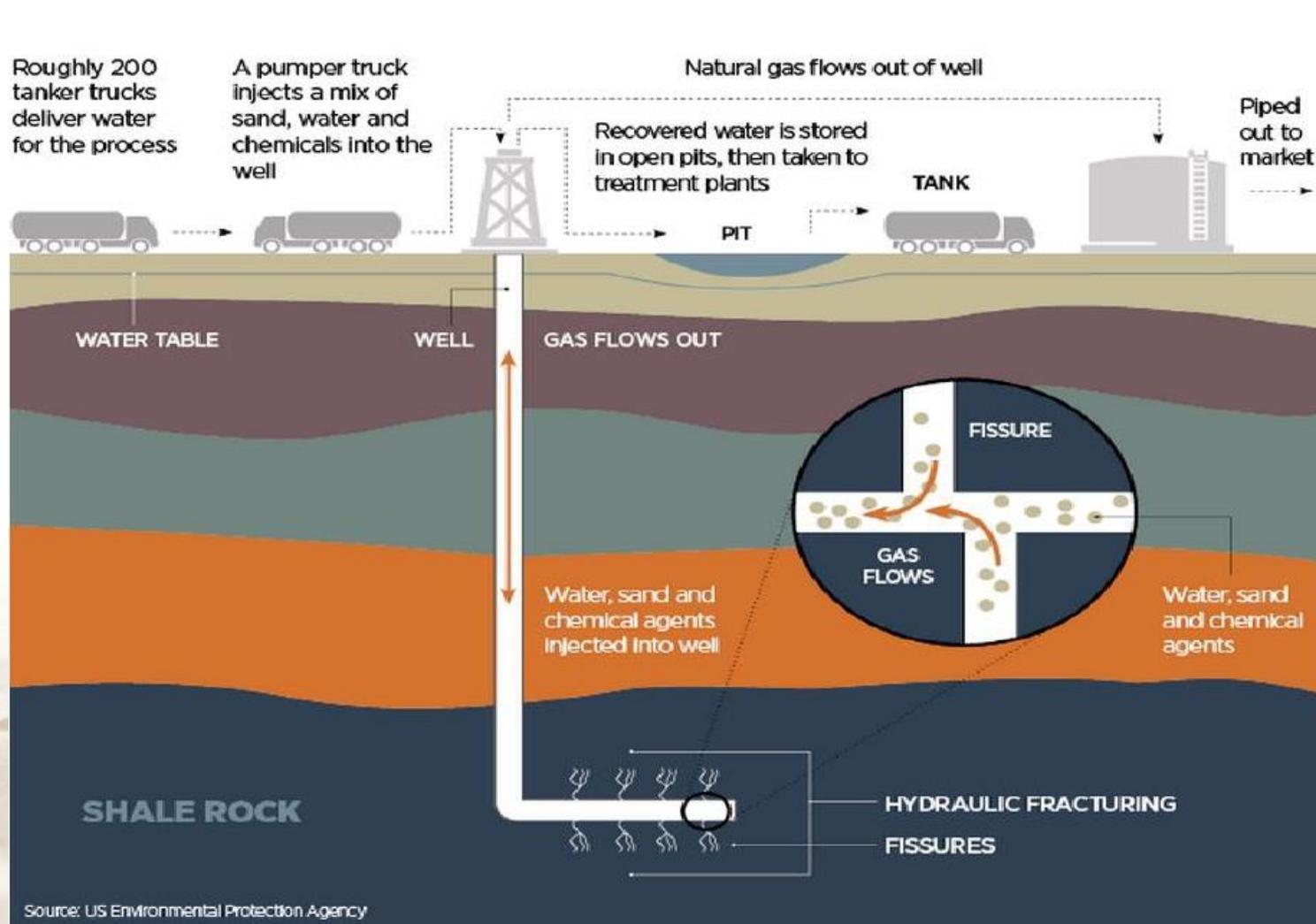


# Silica Sand for Proppant

- US gas production expansion due to directional drilling and well stimulation
- US market 75-80Mt but a significant increase forecast in 2018 to 85-95Mt
- Supply predominantly from Wisconsin with increasing State restrictions
- Use per production hole increasing to up to 10,000 tonnes of sand per hole
- Very specific sand qualities required, particularly sphericity and crush strength
- Preliminary investigation of Arrowsmith North sand indicates potential high recoveries of suitable sand
- Contacts established in US
- Bulk samples to be collected this year and sent for met testwork to acquire International Certification to meet US specs



# Proppant Use



# Proppant Specs

## API RP 19C ; ISO 13503-2

Particle size	90% within specified size ranges, frequently: 12/20# (1700-850 microns)    20/40# (850-425 microns) 40/70# (425-212 microns)    70/140# (212-106 microns)
Particle shape	Well-rounded, spherical grains (>0.6 for frac sand, >0.7 for resin coated sand and ceramic proppants)
Crush resistance	Withstand compressive stress 4000-6000 psi (28-42 MPa), determined at 10% crush material
Acid solubility	Limits on acid soluble material (<2% $\geq$ 30/50, <3% <30/50, <7% for resin coated sand or ceramic proppants)
Turbidity	Limits on clay (<2 microns) and silt (2 - 63 microns) content, maximum turbidity 250 FTU (Formazin Turbidity Unit)



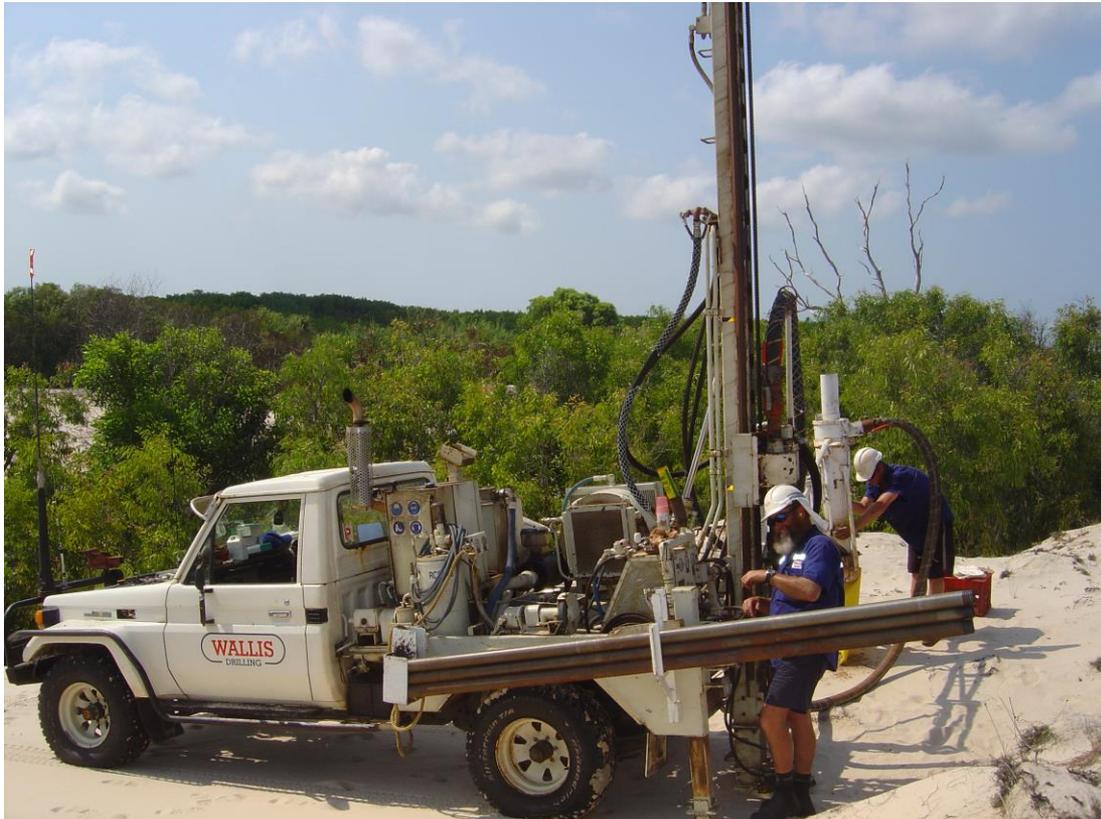
# Proppant Sphericity



Scale in mm

# Proposed Exploration Program

**Drill sampling using typical 4WD-mounted AC rig**



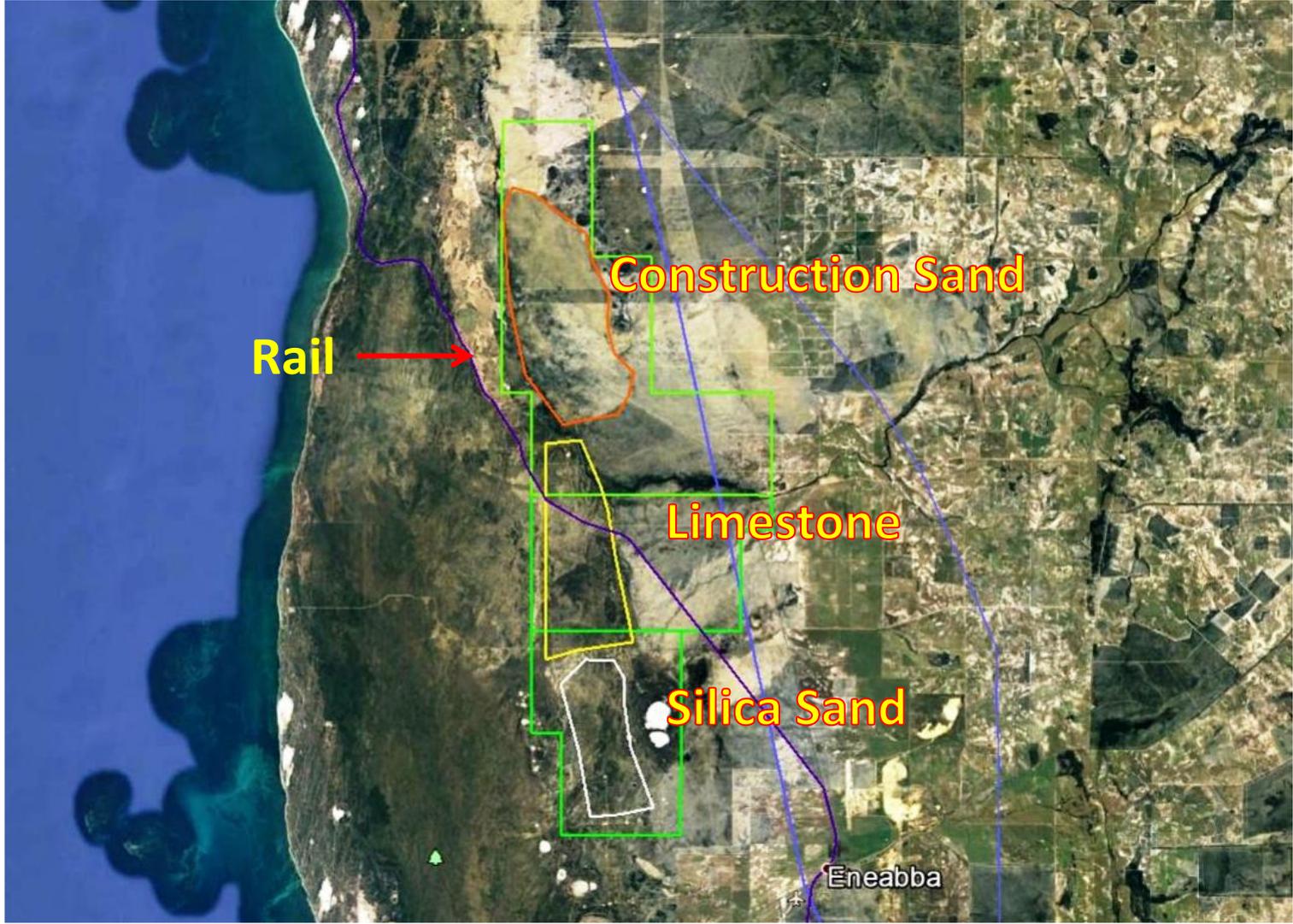
# Construction Sand Development Program

- First Pass drilling, assaying and Resource estimation, exploration target +100Mt
- Adequate sampling and testwork to forward final quality samples to prospective importers in India, Vietnam, Thailand, Taiwan and China
- Finalise logistics chain for access to rail and port facilities to export through Geraldton
- Current logistics under-utilised with significant interest from operators
- Very low-cost DSO capital requirements; processing by off-the-shelf plant
- Testwork to consider upgrading to glass-quality silica sand, foundry sand and proppant
- Other resources of Silica Sand and Limestone products yet to be investigated on VRX landholding at Arrowsmith



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# Arrowsmith Potential Projects



# Arrowsmith Limestone



**YET TO BE  
EVALUATED**

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Potential significant  
source of:

Limestone armour

Crushed limestone

Dimension stone

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Immediately adjacent  
to rail line to  
Geraldton

# Geraldton Port





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# Investment Considerations

**EMERGING  
AUSTRALIAN  
STRATEGIC  
SILICA SAND  
PRODUCER**

**OUTSTANDING  
PROJECT  
ECONOMICS  
AND LOGISTICS**

**IDEALLY PLACED  
TO CAPITALISE  
ON ROBUST  
MARKET  
OUTLOOK AND  
DEMAND**

**POTENTIAL  
SIGNIFICANT  
SAND  
RESOURCES AND  
PRODUCTION**

**RAPID PATHWAY  
TO FINANCING  
AND  
PRODUCTION**

**OTHER  
PROSPECTS  
UNDER  
INVESTIGATION**



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**Thank you**