

# **Sand.** **The World's next boom commodity.**



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# Competent Persons Statement

The information in this report that relates to the March 2020 Exploration information for the Beharra Project is based on information compiled and fairly represented by Mr Colin Ross Hastings, who is a Member of the Australasian Institute of Mining and Metallurgy and consultant to Perpetual Resources Limited. Mr Hastings is also a shareholder of Perpetual Resources Limited. Mr Hastings has sufficient experience relevant to the style of mineralisation and type of deposit under consideration, and to the activity which he has 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 Hastings consents to the inclusion in this report of the matters based on this information in the form and context in which it appears.

The information in this report that relates to the Exploration information for the Beharra Project from September 2020 onwards is based on information compiled and fairly represented by Mr John Doepel, who is a Member of the Australasian Institute of Mining and Metallurgy and consultant to Perpetual Resources Limited. Mr Doepel has sufficient experience relevant to the style of mineralisation and type of deposit under consideration, and to the activity which he has 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 Doepel consents to the inclusion in this report of the matters based on this information in the form and context in which it appears.

The information in this report that relates to Mineral Resources is based on information compiled by Elizabeth Haren, a Competent Person who is a Member and Chartered Professional of the Australasian Institute of Mining and Metallurgy and a Member of the Australian Institute of Geoscientists. Elizabeth Haren is employed as an associate Principal Geologist by Snowden Mining Consultants Pty Ltd, who was engaged by Perpetual Resources Limited. Elizabeth Haren 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”. Elizabeth Haren consents to the inclusion in the report of the matters based on her information in the form and context in which it appears.

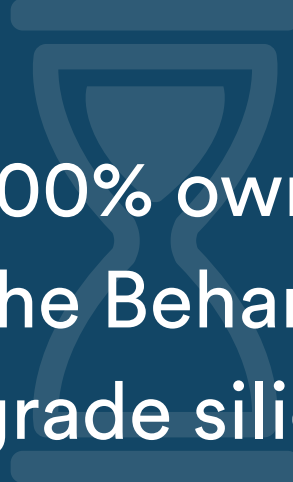




The information in this report that relates to Mineral Resources is based on information compiled by Dr Andrew Scogings, a Competent Person who is a Member of the Australasian Institute of Mining and Metallurgy, a Member of the Australian Institute of Geoscientists and is a Registered Professional Geologist in Industrial Minerals. Andrew Scogings is employed as an associate Executive Consultant Geologist by Snowden Mining Consultants Pty Ltd. Dr Scogings 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”. Dr Scogings consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to the Beharra Ore Reserve is based on information reviewed or work undertaken by Mr Frank Blanchfield (FAusIMM). Mr Blanchfield is an employee of Snowden and has relied on Perpetual for marketing, environmental, permitting, and financial modelling and any costs not relating to mining and metallurgy. The mine design and mining costs and economic viability of the project were assessed and completed by Snowden under his direction. Mr Blanchfield has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the preparation of mining studies to qualify as a Competent Person as defined by the JORC Code 2012. Mr Blanchfield consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The scientific and technical information in this report that relates to process metallurgy is based on information reviewed and work completed by Arno Kruger (MAusIMM), who is a metallurgical consultant and employee of IHC Robbins. The metallurgical factors including process flowsheet design and costs and assumptions for the bulk aircore sample that relate to Mineral Resources have been reviewed and accepted by Mr Kruger. Mr Kruger has sufficient experience that is relevant to the type of processing under consideration and to the activity being undertaken to qualify as a Competent Person as defined by the JORC Code 2012. Mr Kruger consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.



# Perpetual Resources: Investment Highlights

 100% owner of the Beharra high grade silica sand project	 Highly supportive commodity market backdrop provides strong tailwinds	 Led by an experienced team of Board and Executives
 Regulatory and environmental approvals progressing well	 Offtake discussions well advanced	 Pre-feasibility Study demonstrates a long-life project with compelling economics

*Note: For further information and full detail on all assumptions, please refer to ASX announcement titled, "Maiden Ore Reserve and Outstanding Beharra PFS Result Update" dated 17th March 2021.*

Beharra Project	Base case
Post-Tax NPV*	\$236m
Post-Tax IRR*	77%
Production	1.5mt/yr
Initial Capex	\$39m
Revenue (/ton) <sup>#^</sup>	A\$67 FOB
Opex (/ton) <sup>^</sup>	A\$43 FOB
Yr 2 EBITDA <sup>~</sup>	A\$37m

*\*Assumes 40% gearing*

*#Refer to slide 16 for further information*

*^In nominal terms*

*~First year of full production*

# Corporate Snapshot

ASX Code	PEC
Share Price (as at 26 March 2021)	\$0.083
Ordinary Shares	475.5m
Options (5m at 4.5¢, 5m at 13¢)	10m
Market Cap.	\$39m
Cash	\$4m
Debt	Nil
Enterprise Value	\$35m
Performance Shares	130.8m
Shareholders (Top 20 represent 58% of Register)	
Tolga Kumova	6%
Regional Management Pty Ltd	6%
Regal Funds Management	6%
Delphi & Deutsche Balaton	5%
Robert Jewson	5%
Peter Gianni	5%
Julian Babarczy	5%
Robert Benussi	5%



## Julian Babarczy Executive Chairman

Julian Babarczy is a finance industry professional, having worked at Regal Funds Management for the past 14 years, most recently as a Portfolio Manager for the Regal Emerging Companies strategy. Julian has extensive experience investing across financial markets.



## Robert Benussi Managing Director

Robert Benussi has extensive experience in finance, corporate advisory, stockbroking and business development. Previous companies include: Silver Heritage Group Limited, Tawana Resources Limited, Bligh Resources Limited, and Jupiter Mines Limited.



## George Karafotias Non-Executive Director

George Karafotias is an accountant holding a Bachelor of Commerce from the University of Adelaide. He provides corporate advisory services to listed and unlisted companies, focusing on restructuring and refinancing. George is currently the Chief Financial Officer of WHA Ltd.



## Brett Grosvenor Non-Executive Director

Brett is a successful mining industry professional with over 25 years experience. He has previously held senior roles in major companies such as Alinta Energy, Alstom, Sinclair Knight Mertz, and Laing O'Rourke. Brett is currently an Executive Director of Primero Group.



# Project Portfolio

Three discrete Project Hubs prospective for high purity silica and construction sand products – all located proximal to established infrastructure.

## Beharra<sup>1</sup>

- Maiden Mineral Reserve Estimate announced in March 2021 (48mt at 99.6% SiO<sub>2</sub>, 276ppm Fe<sub>2</sub>O<sub>3</sub>)
- Proximal to road infrastructure – <100km via road to Port of Geraldton
- <40% of tenement drilled to date
- >90% high purity white sand sequences encountered
- Pre-feasibility study completed with compelling economics
  - Post tax NPV<sup>2</sup>: \$236m
  - Post tax IRR<sup>2</sup>: 77%
  - Initial Capex: \$39m
- Mining License application soon

## Sargon Hub

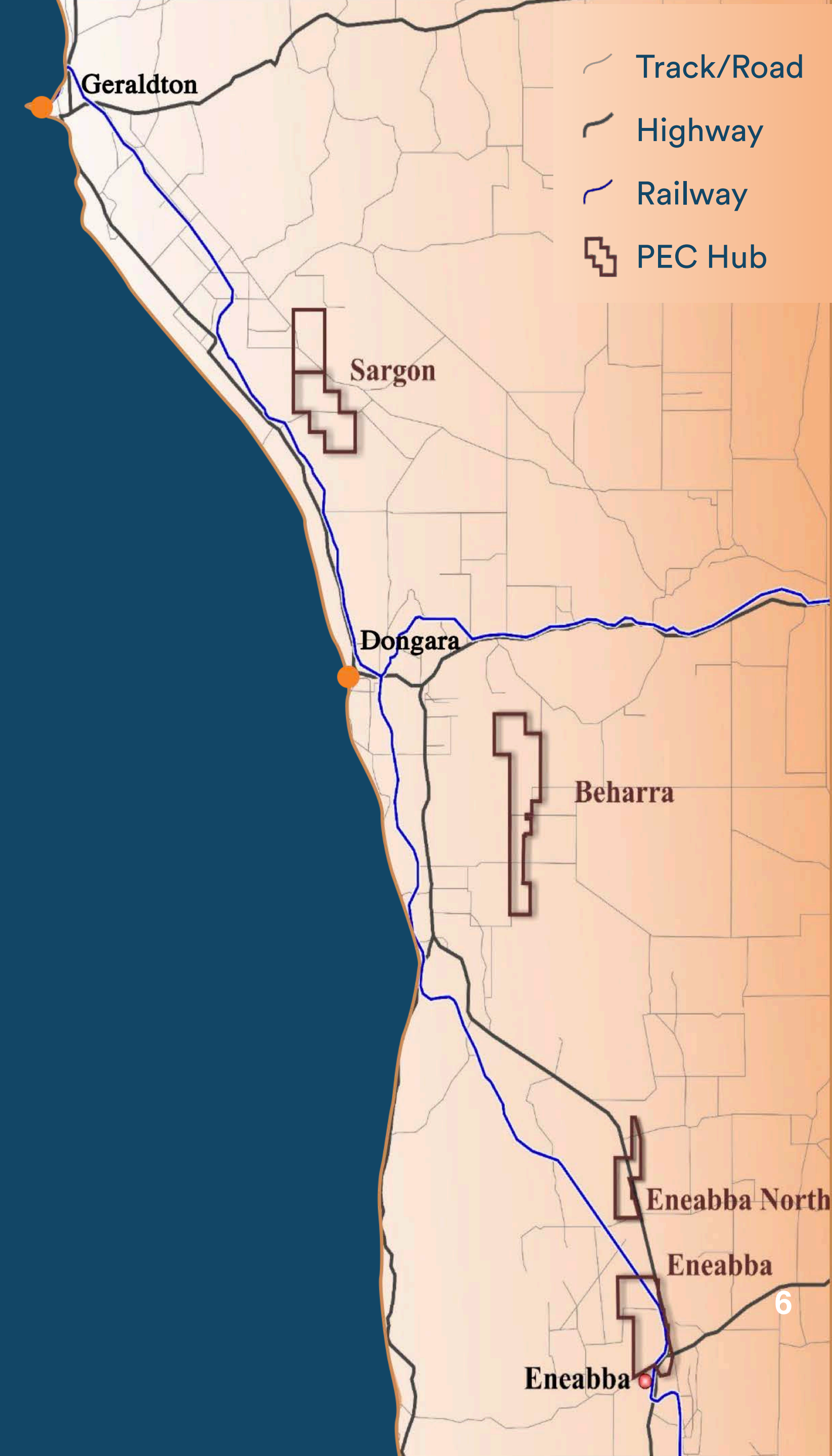
- Strategically located adjacent to Brand Highway & 45km by road to Geraldton
- Priority high purity silica sand target identified
- Prospective for export quality construction sand

## Eneabba Hub

- Prospective for both high purity silica sand and construction sand

<sup>1</sup> Note: For further information and full detail on all assumptions, please refer to ASX announcement titled, "Maiden Ore Reserve and Outstanding Beharra PFS Result Update" dated 17th March 2021.

<sup>2</sup> Assumes 40% gearing







**“We give such little thought to it...  
But sand and gravel build the  
foundations of our economies.”**

United Nations Report on Sand and Sustainability, 2019



# Sand facts

“For construction alone, the world consumes roughly 40 to 50 billion tons of sand on an annual basis. That’s enough to build a wall of 27 meters high by 27 meters wide that wraps around the planet every year”

“The global rate of sand use — which has tripled over the past two decades partially as a result of surging urbanization — far exceeds the natural rate at which sand is being replenished by the weathering of rocks by wind and water”

“We just think that sand is everywhere. We never thought we would run out of sand, but it is starting in some places”

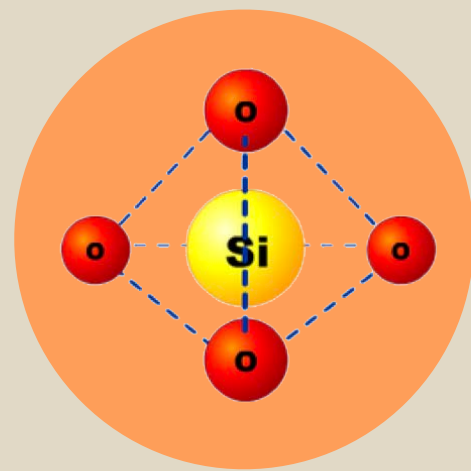
“Sand is the world’s most consumed raw material after water and an essential ingredient to our everyday lives”

“Sand is perceived as cheap, available and infinite and that is partly because the environmental and social costs are pretty much not priced in”



# Silica Sand: An overview

Most sand deposits are unsuitable for industrial applications due to chemical composition, grain size and shape, impurity profile and access to an economic logistics solution.



## What is Silica Sand

Silica sand, also known as quartz sand, white sand or industrial sand, is made up of two main elements; silica and oxygen, which combine to make silicon dioxide ( $\text{SiO}_2$ ). Sand is a commonly found substance, but not all sand is useful for modern day applications.



## Silica Sand Properties

$\text{SiO}_2$  is chemically inert and relatively hard, both of which are highly prized attributes for many industrial applications.  $\text{SiO}_2$  is often white or transparent, but can also come in many other colours, impacted by the geology of the deposit and the depositional and erosional environment.



## Silica Sand Impurities

$\text{SiO}_2$  for most high-quality industrial applications must be  $>99.5\%$   $\text{SiO}_2$  and contain low levels of key impurities such as Iron Oxide ( $\text{Fe}_2\text{O}_3$ ) at  $<400\text{ppm}$ , and Aluminum Oxide ( $\text{Fe}_2\text{O}_3$ ) at  $<1,800\text{ppm}$ .



## Geology Importance

High grade silica sand is different to regular sand which is much higher in impurities which makes regular sand more reactive and darker in colour. Higher grade silica and deposits are therefore relatively difficult to locate and not as prevalent as most believe, and don't generally occur at large scale causing fragmentation of supply for end users.



## Logistics Importance

Locating a suitable silica sand resource is only one piece of the puzzle, as not only must a deposit have acceptable geological attributes, but it must also be within a reasonable distance of suitable logistics infrastructure (i.e. road, rail and port). There are many great sand resources in the world, but most are not economic due to logistics impediments.



# What is Silica Sand Used For?

## Glass

- Architectural
- Smartphones
- Tablets
- Automotive
- Fiberglass
- Container Packaging

## Building products

- Quarts surfaces
- Roofing shingles

## Foundry sands

- Automotive & Manufacturing
- Into Foundry sand markets

## Fillers & Extenders

## Chemicals

## Construction Sands

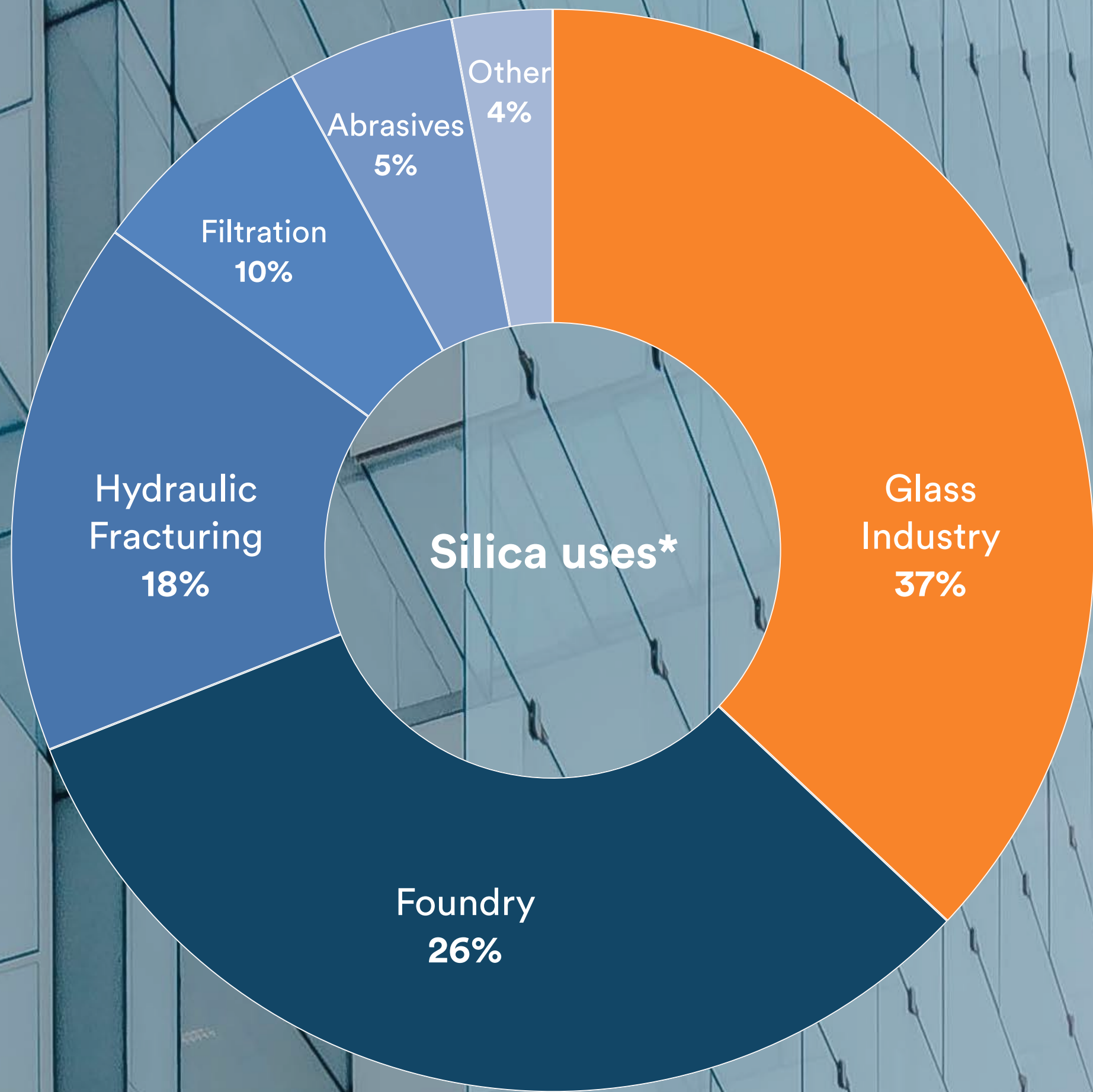




# Relative Size of End Markets

- The global glass and the foundry sand industries are the two largest and also among the highest growth
- These markets are Perpetual’s focus
- Initial beneficiation test work has confirmed Beharra silica sand exceeds the minimum specification for the major float and container glass applications
- Particle size distribution analysis also demonstrates that Beharra sands can service Asia’s foundry sand markets

Glass Application Type	Specification
Float (Plate)	99.5% SiO <sub>2</sub>
Container	99.5% SiO <sub>2</sub>
Cover (Solar Panels)	99.95% SiO <sub>2</sub> & Low Fe
Smart (Ultra Clear)	99.97% SiO <sub>2</sub> & Low Fe
Specialist (Thin Screen)	99.97% SiO <sub>2</sub>



Source: IMARC Group, Report Title: “Asia Pacific Silica Sand Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026”, Report Date: February 2021



# The World Needs More Silica Sand



Global demand for industrial silica sand is growing at 5% per year and is expected to continue to grow at this rate at least, in the foreseeable future.

Chinese domestic demand for silica sand was 68mt in 2015 growing to 85mt in 2020. Chinese imports have grown from 270K tons in 2014 to more than 2mt in 2019.



This demand is driven by industrial uses, urbanisation of the developing world, higher grade requirements from manufacturing and the shift against single use packaging.

The seaborne market was US\$705M per year in 2017 and Australia was the largest exporter of silica and quartz sands with an annual value of US\$105M.



Silica sand is environmentally sustainable, recyclable and has many industrial and consumer applications, including: windows, glass bottles, packaging and LCD screens, etc.

Australia has ideal proximity to key exports market in Asia. Australian share of Chinese silica sand imports has grown from 25% pre-2018 to approximately 50% today.

Source: IMARC Group, Report Title: “Asia Pacific Silica Sand Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026”, Report Date: February 2021, Observatory of Economic Complexity Data, China Customs Data.



Why is sand in short supply?  
The Economist



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# Why there is a shortage of sand

It may be plentiful, but so is the demand for it



We Are Running Out of Sand  
The Good Stuff

BBC Home News Sport Reel More

FUTURE

ENVIRONMENT

Why the world is running out of sand



(Image credit: Getty Images)



Beiser 18th November 2019

than grains of weathered rock, and  
rts and on beaches around the world,  
world's second most consumed

Article continues below

ican entrepreneur shot dead in  
r. Two Indian villagers killed in a gun  
ugust. A Mexican environmental activist  
in June.

Smithsonian MAGAZINE

AGE OF HUMANS FUTURE OF SPACE EXPLORATION HUMAN BEHAVIOR MIND & BODY  
OUR PLANET SPACE WILDLIFE NEWSLETTER EARTH OPTIMISM SUMMIT

## The World is Running Out of Sand

The little-known exploitation of this seemingly infinite resource could wreak political and environmental havoc



We hear a lot about the over  
consequences of the sand t

By Aurora Torres, Jianguo  
Jodi Brandt and Kristen L  
Conversation  
SMITHSONIANMAG.COM  
SEPTEMBER 8, 2017

When people picture sand  
endless deserts, they under

INDEPENDENT

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## Sand mafias and vanishing islands: How the world is dealing with the global sand shortage

The growing scarcity of sand in parts of the world is a serious issue, and one that has been linked with everything from organised crime to natural disasters

Josh Gabbatiss Science Correspondent

@josh\_gabbatiss

Wednesday 06 December 2017 18:40 | 26 comments



A global sand crisis no one is talking about it  
Vince Beiser, TedX

A sand shortage?  
CNBC

CNBC

WORLD POLITICS

## A sand shortage? The world is running out of a crucial — but under-appreciated — commodity

PUBLISHED FRI, MAR 5 2021-1:14 AM EST  
UPDATED FRI, MAR 5 2021-10:20 AM EST

Sam Meredith @SMEREDITH19

SHARE f t in e

KEY POINTS

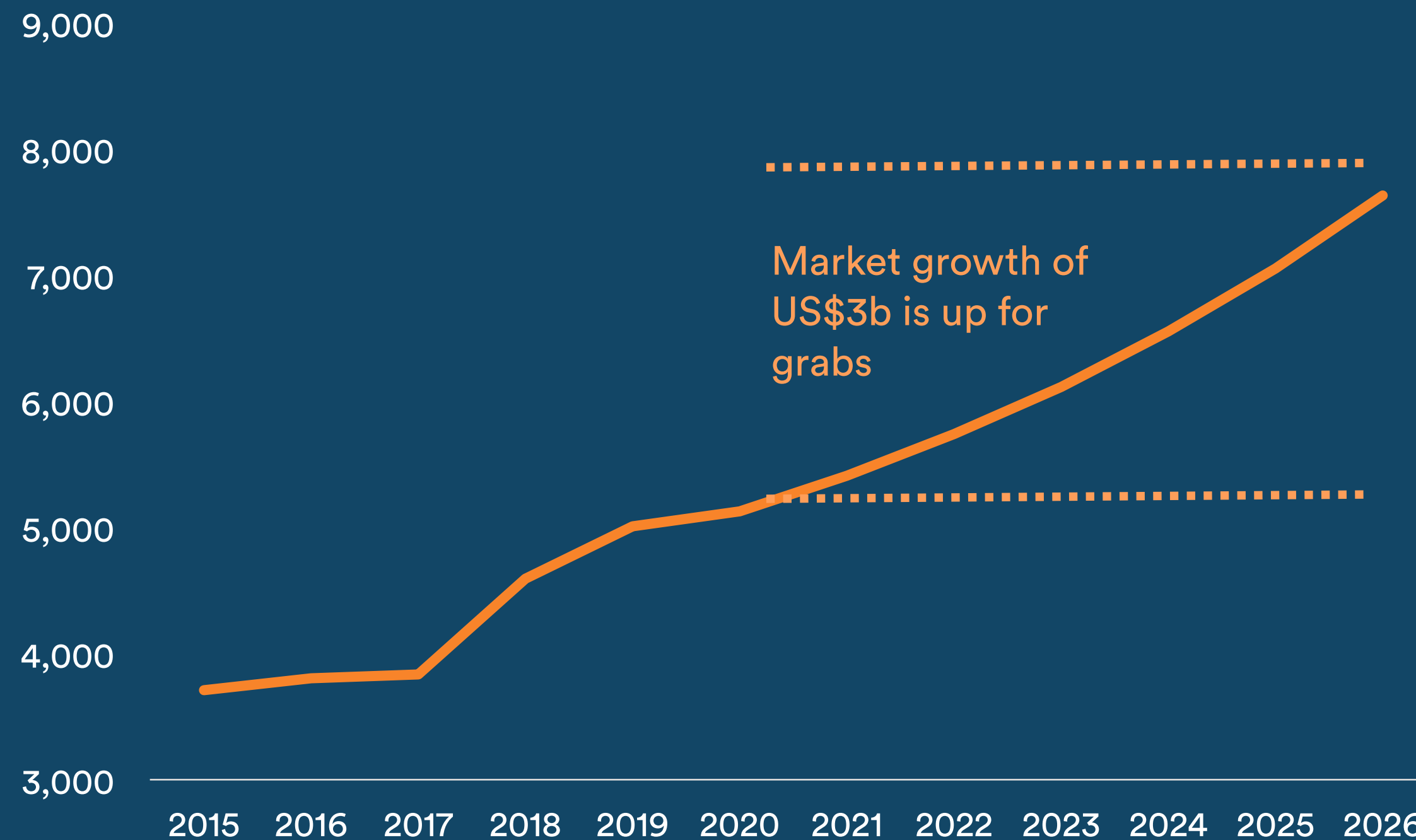
- Sand is the world's most consumed raw material after water and an essential ingredient to our everyday lives.
- Yet, the world is facing a shortage — and climate scientists say it constitutes one of the greatest sustainability challenges of the 21st century.
- "Is it time for panicking? Well, that will certainly not help, but it is time to take a look and change our perception about sand," said Pascal Peduzzi, a climate scientist with the United Nations Environment Programme.



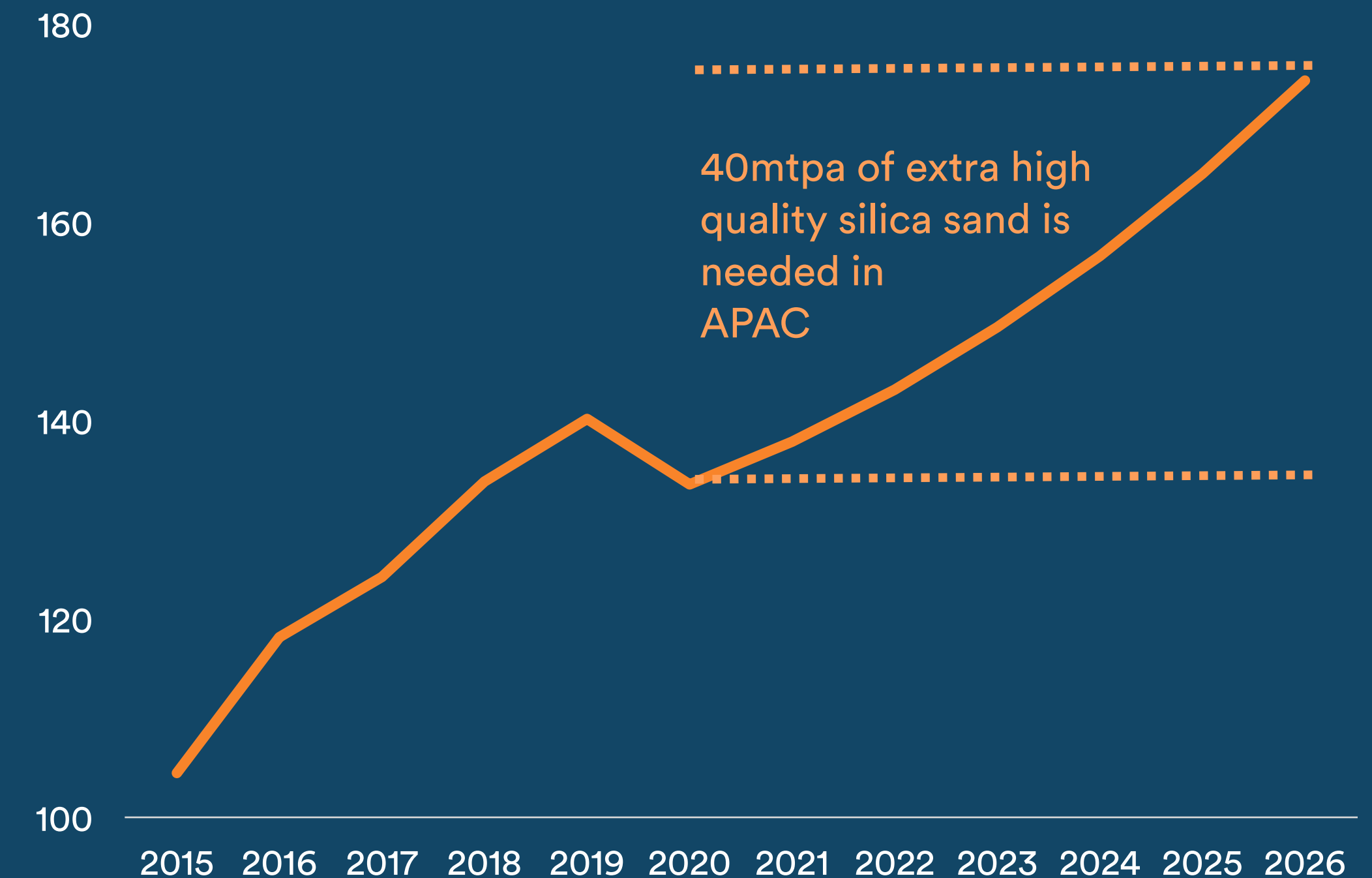


# Asia Pacific: The fastest growing silica sand market in the world

APAC Silica Sand Market Value (US\$m)



APAC Sales Volume (mtpa)

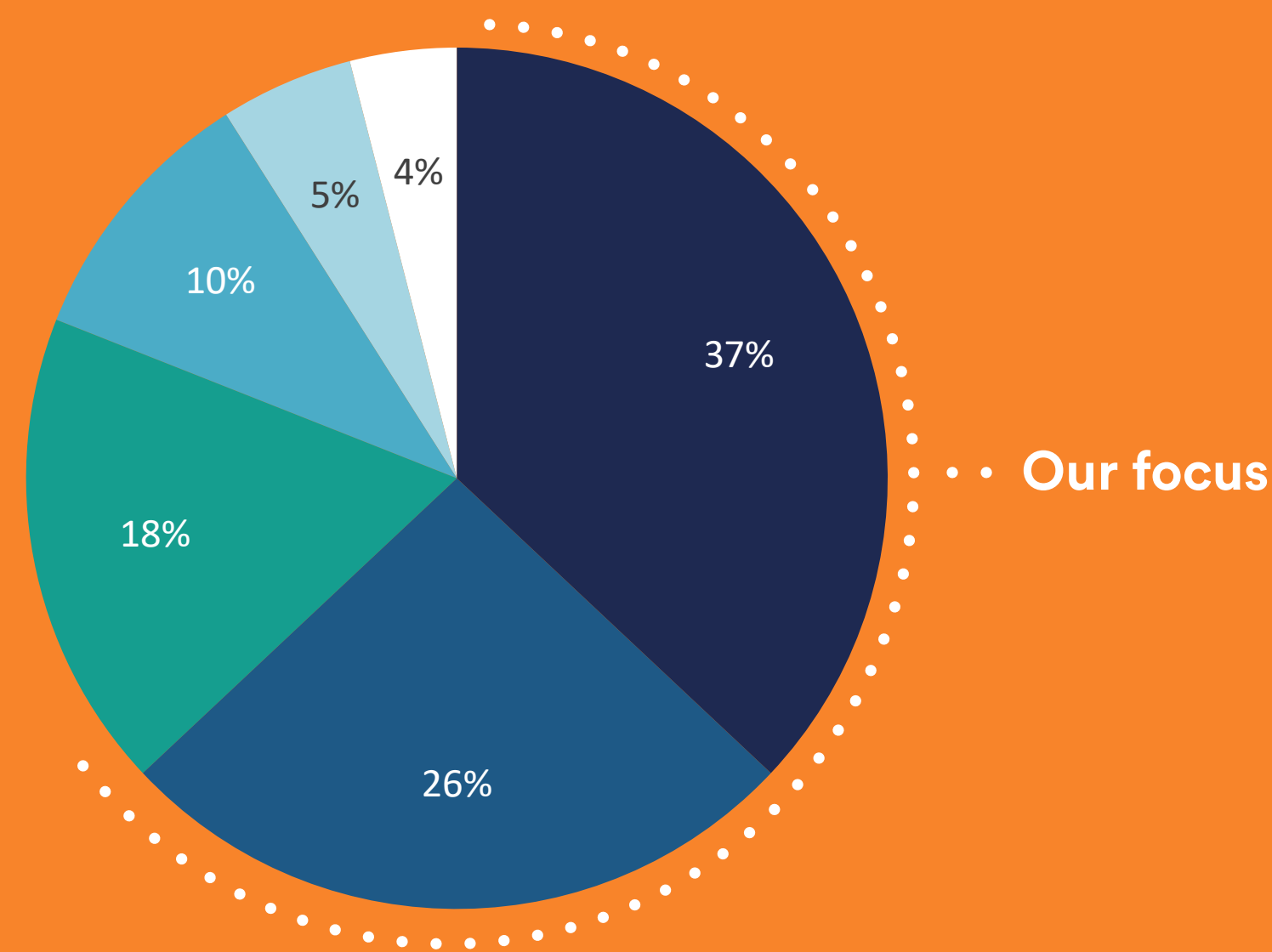


Source: IMARC Group, Report Title: "Asia Pacific Silica Sand Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026", Report Date: February 2021

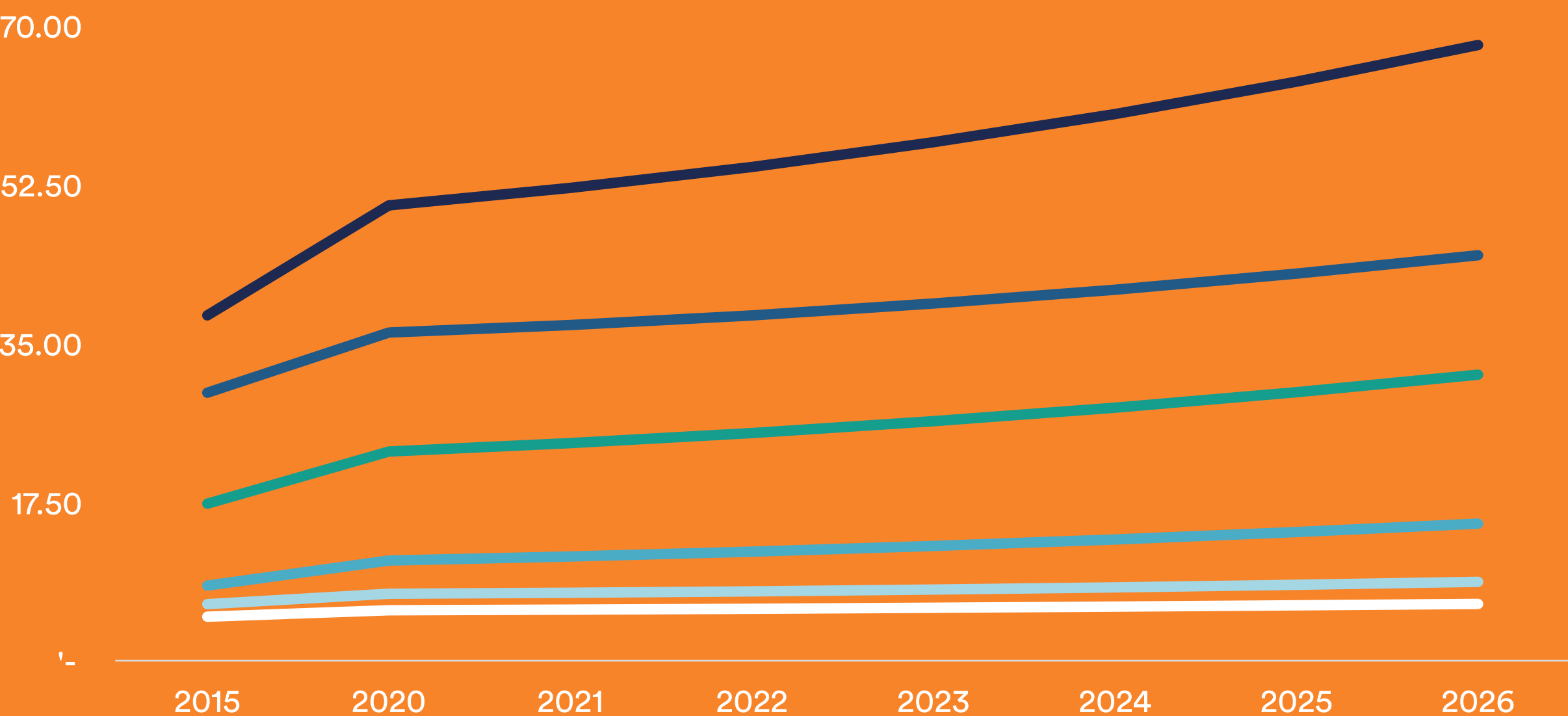


# Beharra is targeting the largest silica sand markets in APAC

APAC Silica Sand Market (by End Use)



APAC Sales Volume (by End Use)

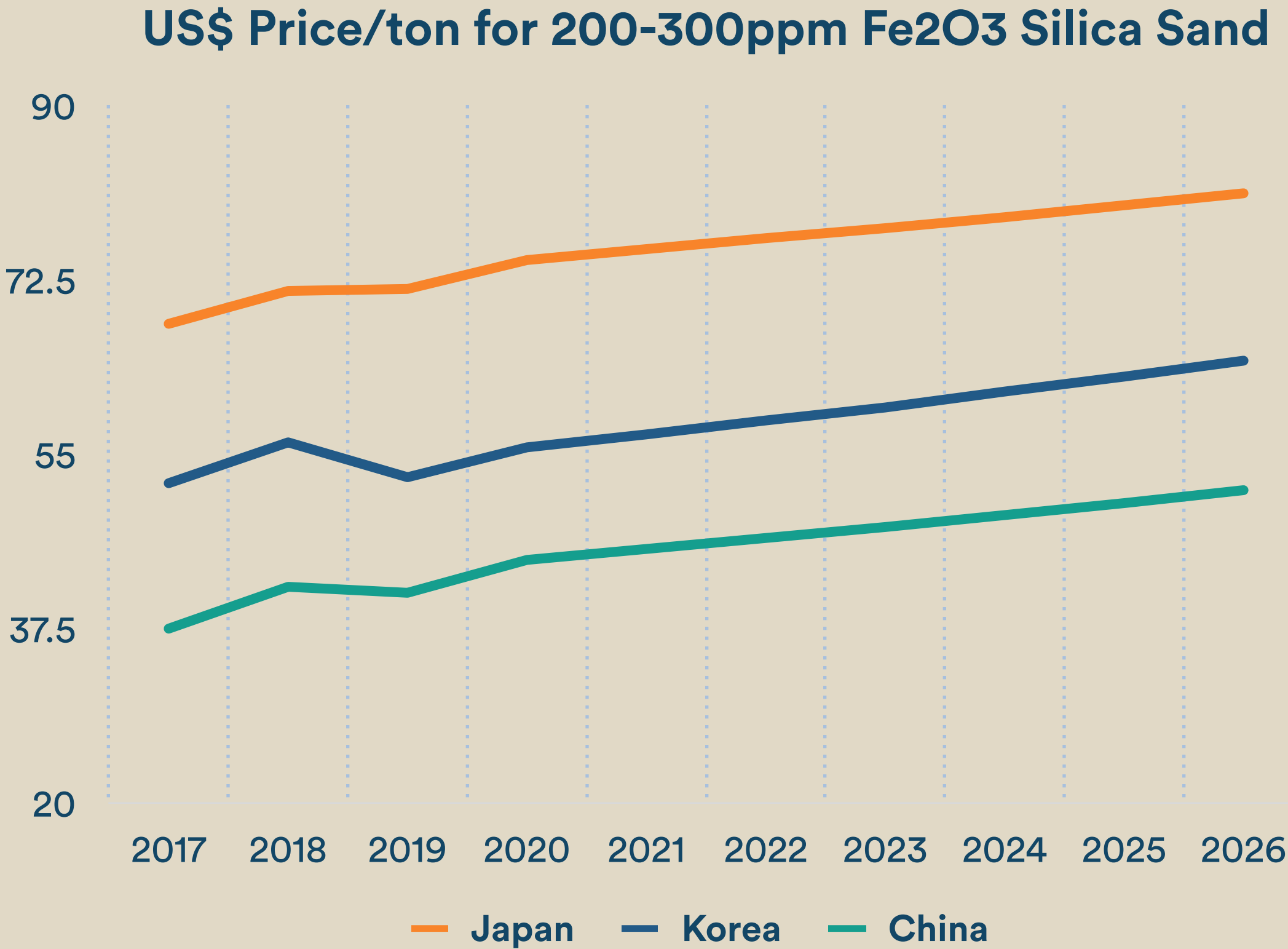
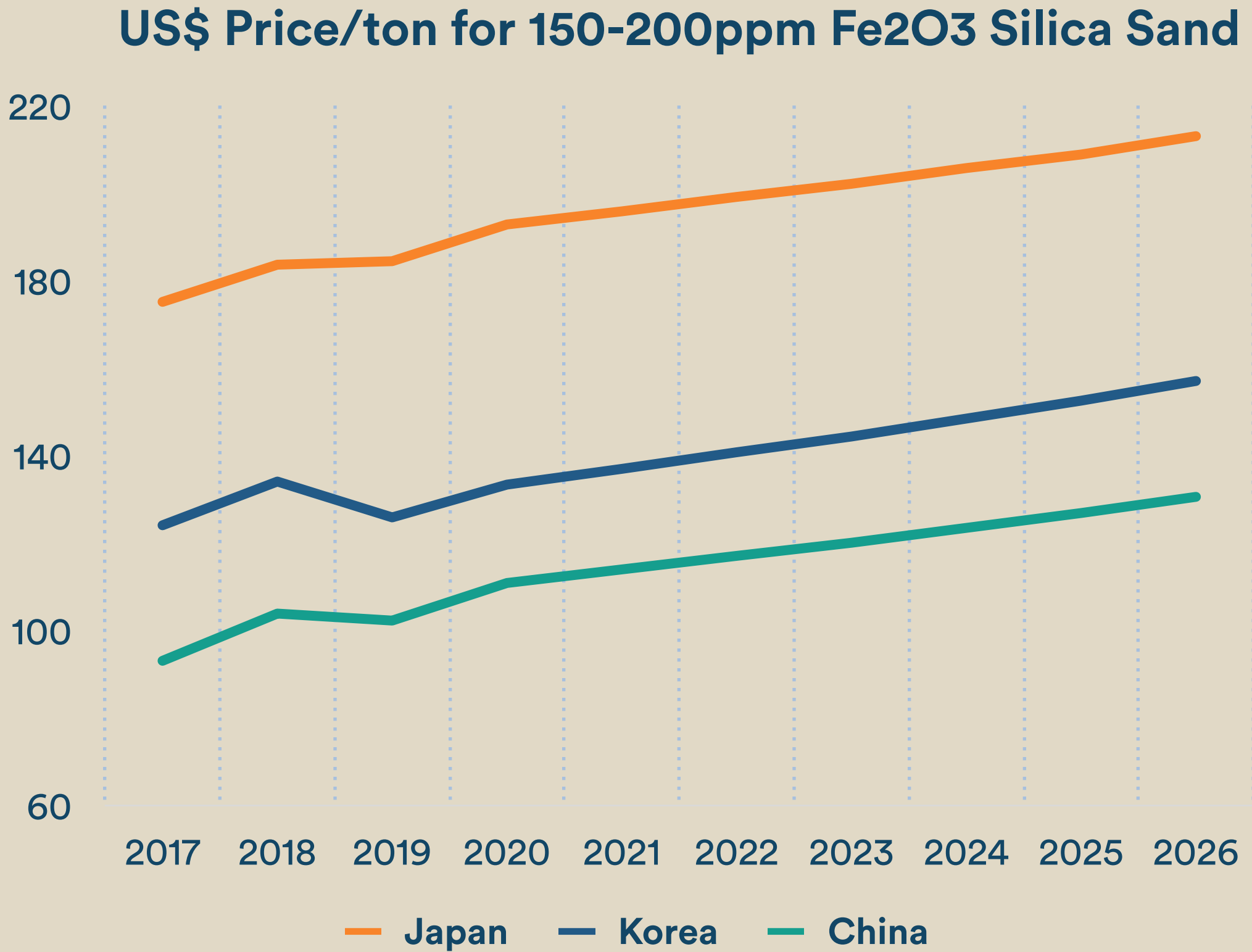


● Glass Industry    ● Foundry    ● Hydraulic Fracturing    ● Filtration    ● Abrasives    ● Others

Source: IMARC Group, Report Title: “Asia Pacific Silica Sand Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026”, Report Date: February 2021



# Structural change in price has been underway for a decade



Source: IMARC Group, Report Title: “Asia Pacific Silica Sand Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026”, Report Date: February 2021



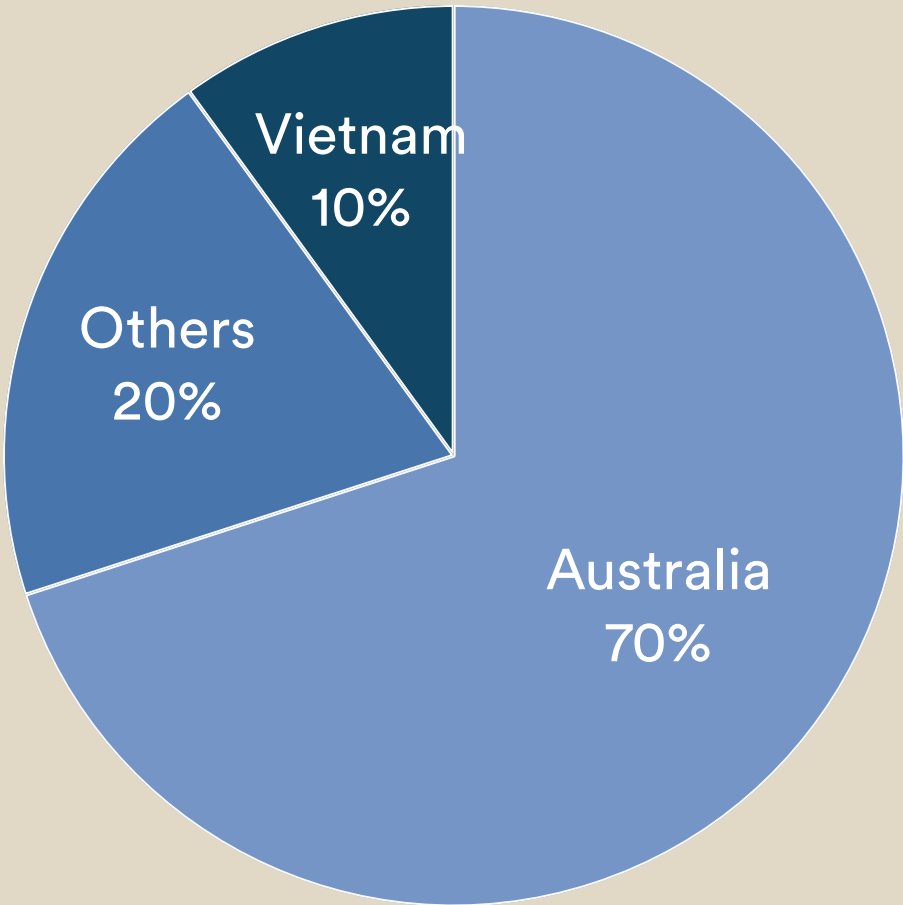
# Silica Sand Seaborne Trade

- Total exports of high quality silica sand from Australia are estimated to be around 5 million tons per annum
- 70% of Japanese & 68% of South Korean silica imports are from Australia – mostly from vertically integrated owners
- Australian share of the Chinese import market has grown from around 25% prior to 2018 to about 50% now
- Chinese domestic production of glass grade silica sand was 35mt in 2018 ( $\text{SiO}_2 \geq 99-99.5\%$   $\text{Fe}_2\text{O}_3 \leq 0.02-0.015\%$ )
- Chinese imports have grown from 270,000 tons in 2014 to more than 2 million tons in 2019
- As China glass production increases, its demand for higher quality silica sand imports will also increase
- China represents a huge potential addressable market for Perpetual, as does the rest of the APAC region

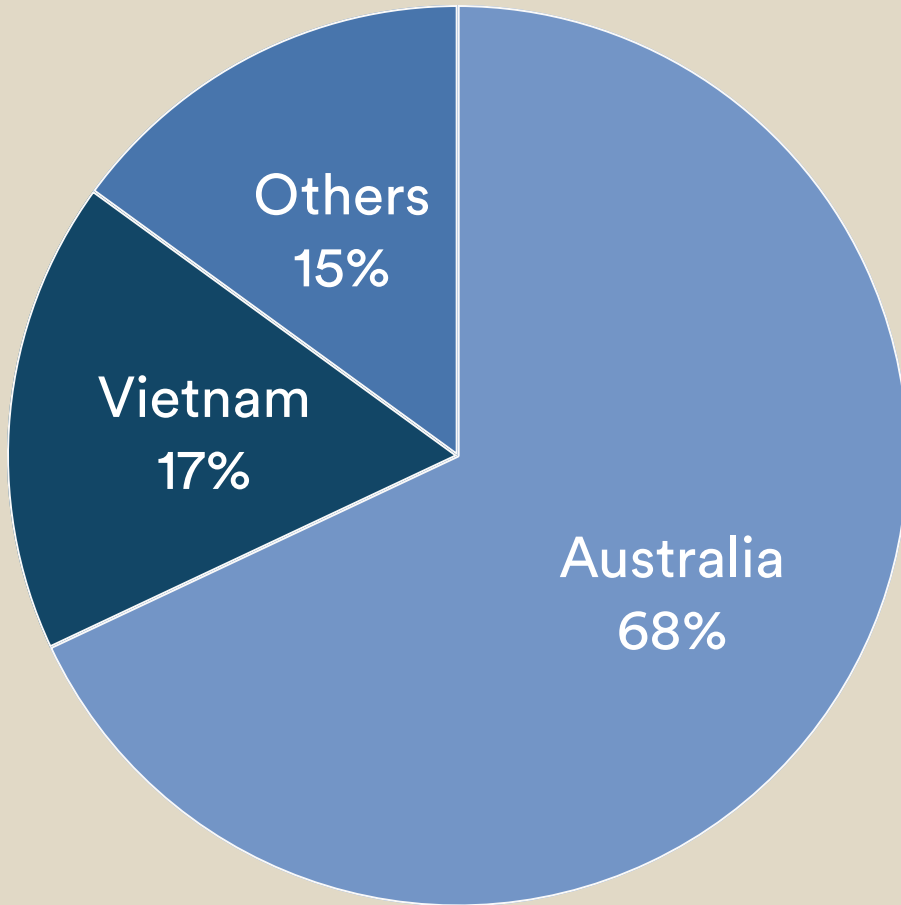
## Chinese Imports of Silica Sands



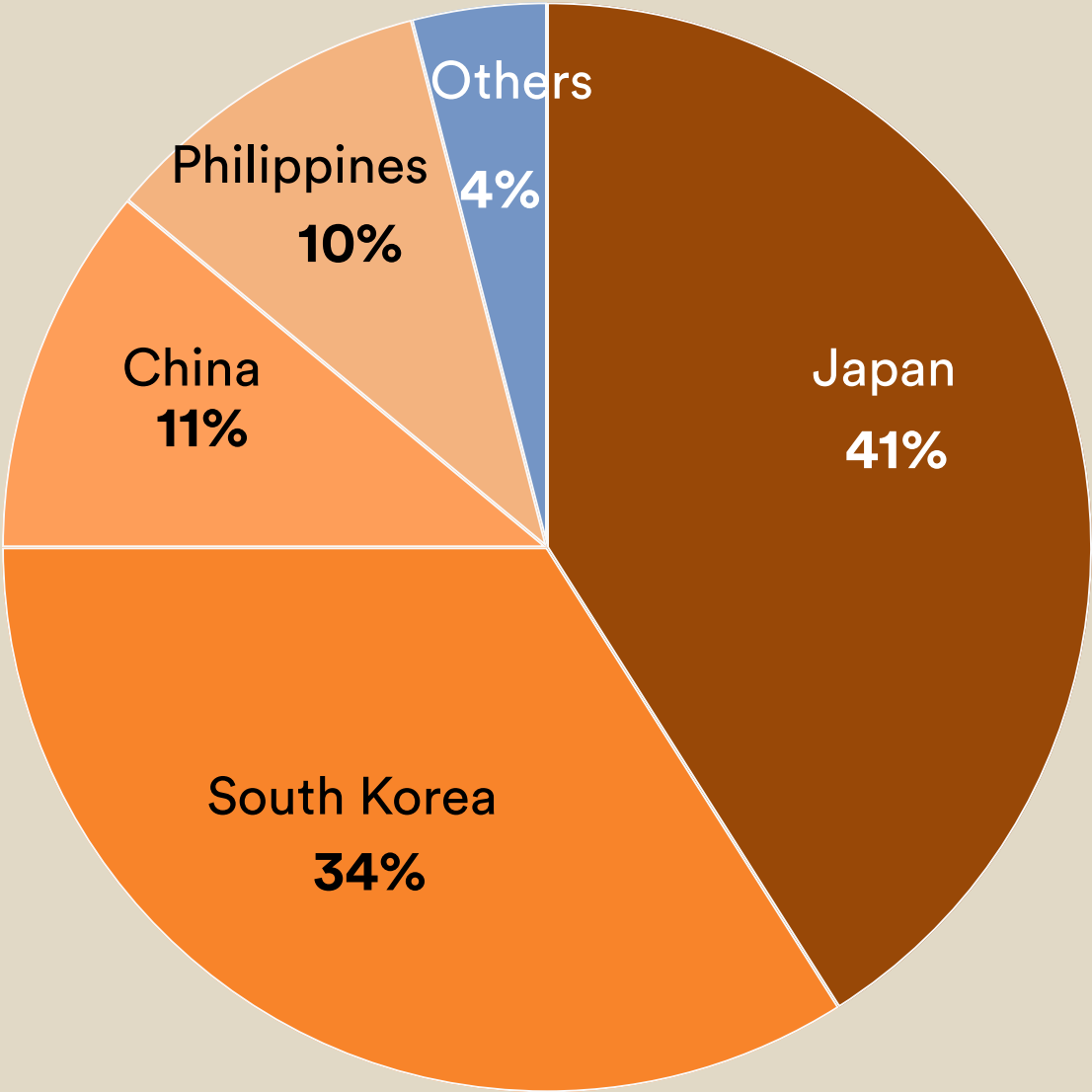
Japanese Silica Imports



Korean Silica Imports



Australian Silica Export destination



Source: IMARC Group, Report Title: “Asia Pacific Silica Sand Market: Industry Trends, Share, Size, Growth, Opportunity and Forecast 2021-2026”, Report Date: February 2021, Observatory of Economic Complexity Data, China Customs Data.



# Beharra: High Grade Silica Sands

## LOCATION

Approximately 100km south of Geraldton, comprising a north-south striking exploration licence covering an area of about 49 km<sup>2</sup>

## SCALE

The project lies within the northern part of the Perth Basin and contains a 13km strike length of potentially high grade silica sand

## RESERVE/RESOURCE

- Maiden Mineral Reserve Estimate of 48mt of 99.6% SiO<sub>2</sub>, 276ppm Fe<sub>2</sub>O<sub>3</sub><sup>1</sup>
- Mineral Resource Estimate of 139mt at 98.6% SiO<sub>2</sub><sup>2</sup>
- Beharra tenement only <40% explored – significant upside remains
- >90% of resource identified as higher purity white sands

## PROCESSING

Detailed metallurgical test work conducted by Perpetual confirmed a simple gravity and magnetic separation flow sheet to produce a concentrate that resulted in upgrading the SiO<sub>2</sub> to 99.6% and reduced Fe<sub>2</sub>O<sub>3</sub> content to 276ppm (1,950ppm in situ)<sup>3</sup>

## PRODUCT

Extensive metallurgical testing has confirmed suitability for the major glass and foundry sand markets in Asia

<sup>1</sup> Please refer to ASX announcement titled, “Maiden Ore Reserve and Outstanding Beharra PFS Result Update” dated 17th March 2021.

<sup>2</sup> Please refer to ASX announcement titled, “Upgraded Mineral Resource Estimate - Beharra”, dated 9th March 2021.

<sup>3</sup> Please refer to ASX announcement titled, “Exceptional Metallurgical Test Results - Beharra”, dated 29th January 2021.





# Beharra: Compelling Project Economics



Mid West region's lowest impurity and **highest quality product**



Located in WA, Australia's best and **most friendly** mining jurisdiction



Optionality around end product specifications allows significant **revenue optimization**



On the doorstep of the **fastest growing** silica sand markets in the world



Potential for very **high margins** and scope for project optimization and expansion


**Strong relationships** with local stakeholders, team of leading silica sand experts and experienced Board

Beharra Project	Base case
Post-Tax NPV*	\$236m
Post-Tax IRR*	77%
Production	1.5mt/yr
Initial Capex	\$39m
Revenue (/ton) <sup>#^</sup>	A\$67 FOB
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Note: For further information and full detail on all assumptions, please refer to ASX announcement titled, "Maiden Ore Reserve and Outstanding Beharra PFS Result Update" dated 17th March 2021.

\*Assumes 40% gearing

<sup>#</sup>Refer to slide 16 for further information

<sup>^</sup>In nominal terms

<sup>~</sup>First year of full production



# Beharra: A leading Regional Silica Sand Project

- Lowest known impurity project in Mid West Region
- Simple and sustainable mining
- Simple metallurgy
- Standard flow sheet & processing
- Existing road network
- Sealed national highway proximal
- High quality partners secured
- Bulk port accessible
- Open access arrangements
- Negotiations underway
- Compelling distance to high growth markets
- Multiple buyers in multiple end markets



Regional regulations restrict traditional supply and support demand and higher pricing

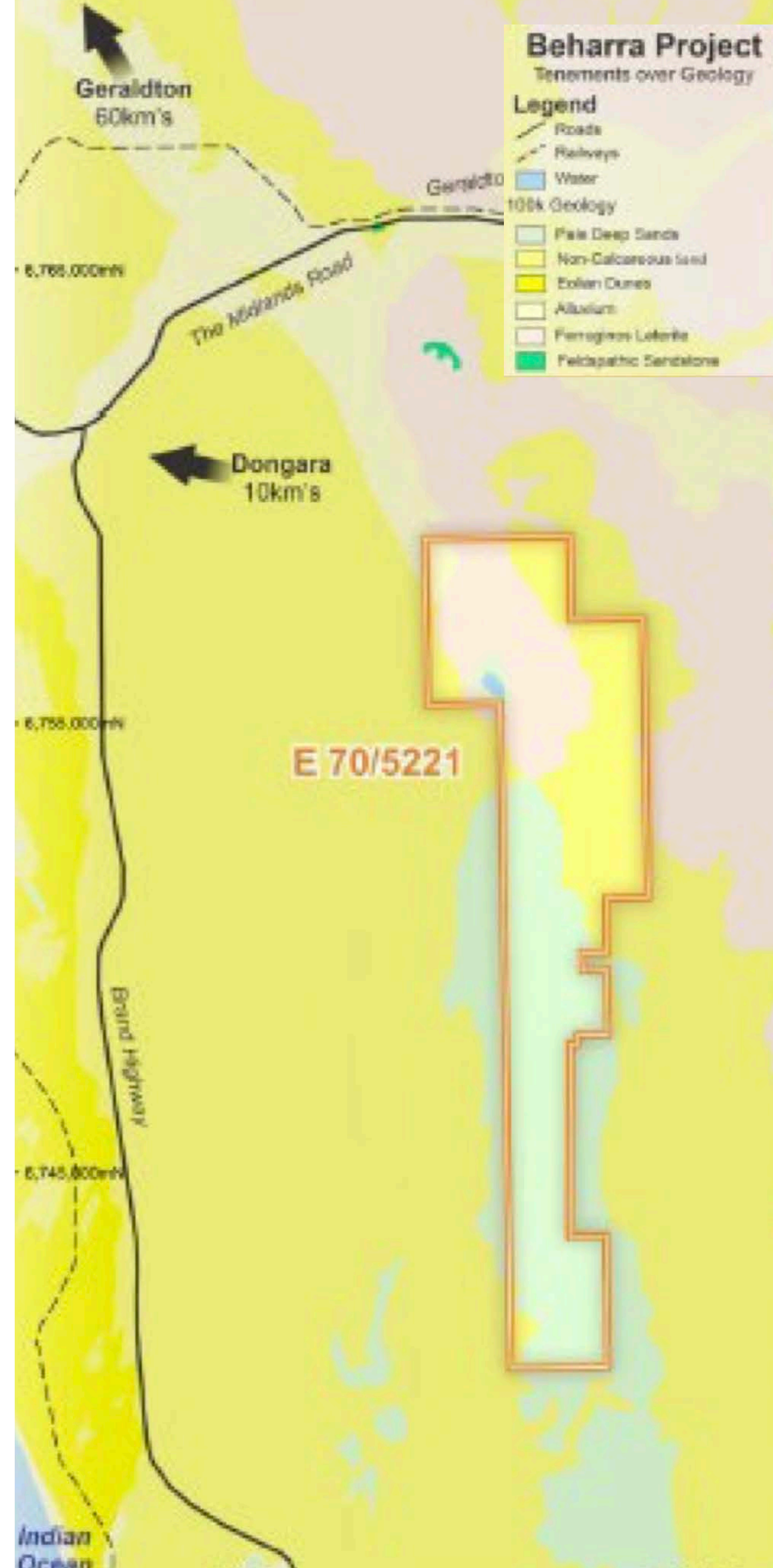


# White Sand: Mother Nature's Gift

- Beharra hosts predominantly high purity white (pale) sands, which suggests a higher revenue per ton is potentially achievable for Beharra silica sand
- Geological model predicted PEC would encounter a high percentage of white sands
- >90% of defined Mineral Resource Estimate is now confirmed as white sand

## Why is white sand superior?

- White sand has less impurities, the key to achieving a saleable product
- Higher impurities requires more processing, which adds to capital and operating costs
- In most cases, it is not economic to utilise yellow sand for anything other than construction sand applications, which are lower in value



**Beharra White Sand**  
*compared to*  
**Beharra Yellow Sand**



# Project Reserves/Resources

## Beharra Indicated Mineral Resource February 2021<sup>1</sup>

Sand	Volume (Mm <sup>3</sup> )	Density	Tonnes (Mt)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	LOI%
Yellow	8.1	1.64	13.2	98.2	0.50	0.23	0.23	0.51
White	76.7	1.64	125.8	98.6	0.41	0.36	0.23	0.21
Total	84.8	1.64	139.0	98.6	0.42	0.35	0.23	0.24

Note: (Mt) = Million tons

## Beharra Probable Ore Reserve February 2021<sup>2</sup>

Sand	Tonnes (Mt)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> ppm	TiO <sub>2</sub> ppm	Fe <sub>2</sub> O <sub>3</sub> ppm	LOI%
Insitu	64.1	98.6	4,240	3,460	1,950	0.235
Saleable Product	47.6	99.6	1,789	369	276	0.100

Note 1: Million tons are rounded to one decimal place. Grades are rounded to 3 significant figures.

Note 2: No cut off is applied to the silica sand product.

Note 3: The Insitu and Saleable Product are not additive, and the Saleable Product is a portion of the Insitu sand tonnage.

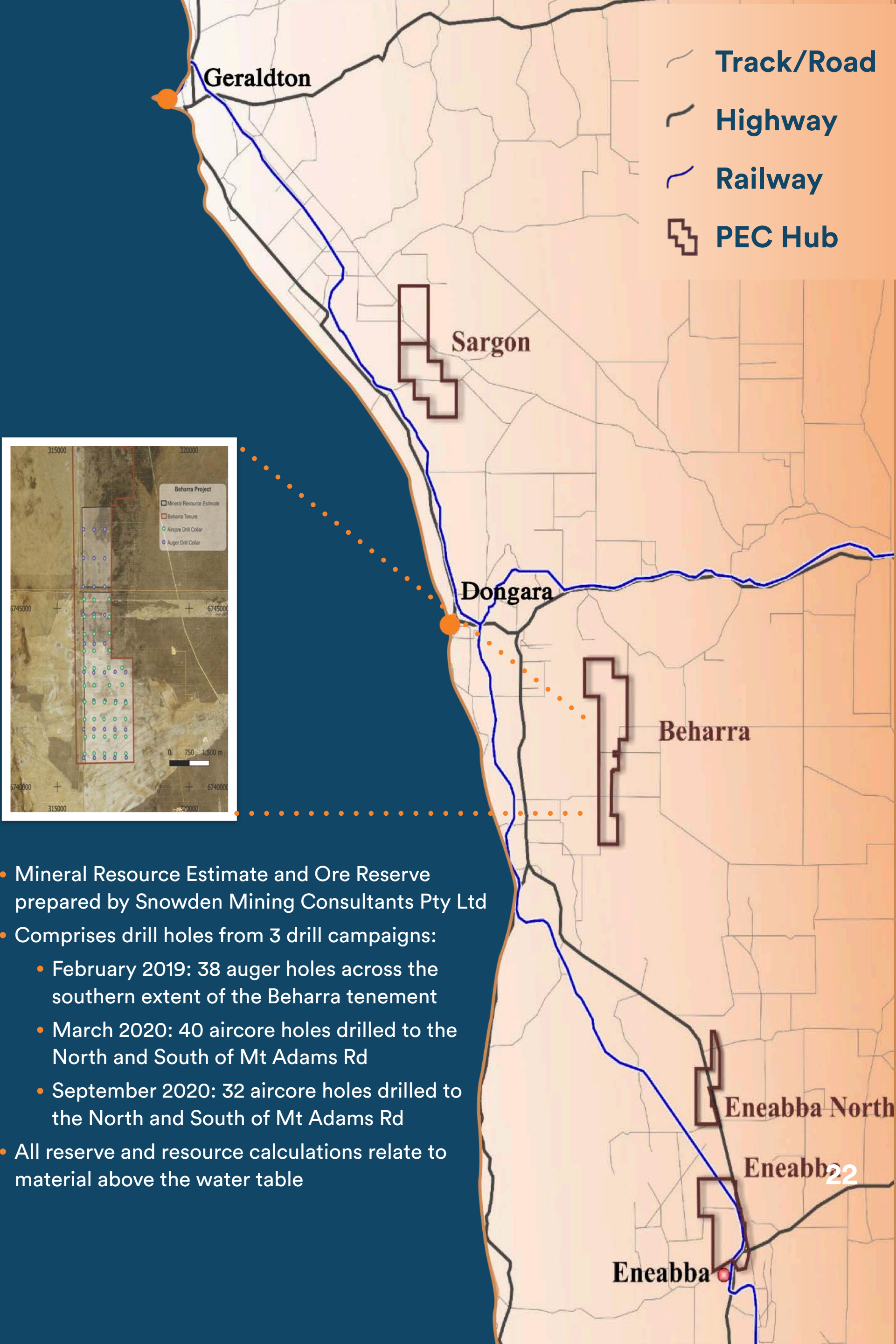
## Potential Products - ICP Analysis<sup>3</sup>

Sample ID	Tonnes (Mt)	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> ppm	TiO <sub>2</sub> ppm	Fe <sub>2</sub> O <sub>3</sub> ppm	LOI%
Beharra Premium	74.4	99.6	1,789	369	276	0.14
Beharra Special #27	6.3	99.7	1,405	300	235	0.13
Beharra Special #46	68.0	99.5	1,825	375	280	0.14

<sup>1</sup> Please refer to ASX announcement titled, “Upgraded Mineral Reserve Estimate - Beharra”, dated 9th March 2021.

<sup>2</sup> Please refer to ASX announcement titled, “Maiden Ore Reserve and Outstanding Beharra PFS Result Update”, dated 17th March 2021.

<sup>3</sup> Please refer to ASX announcement titled, “Exceptional Metallurgical Test Results - Beharra”, dated 29th January 2021.

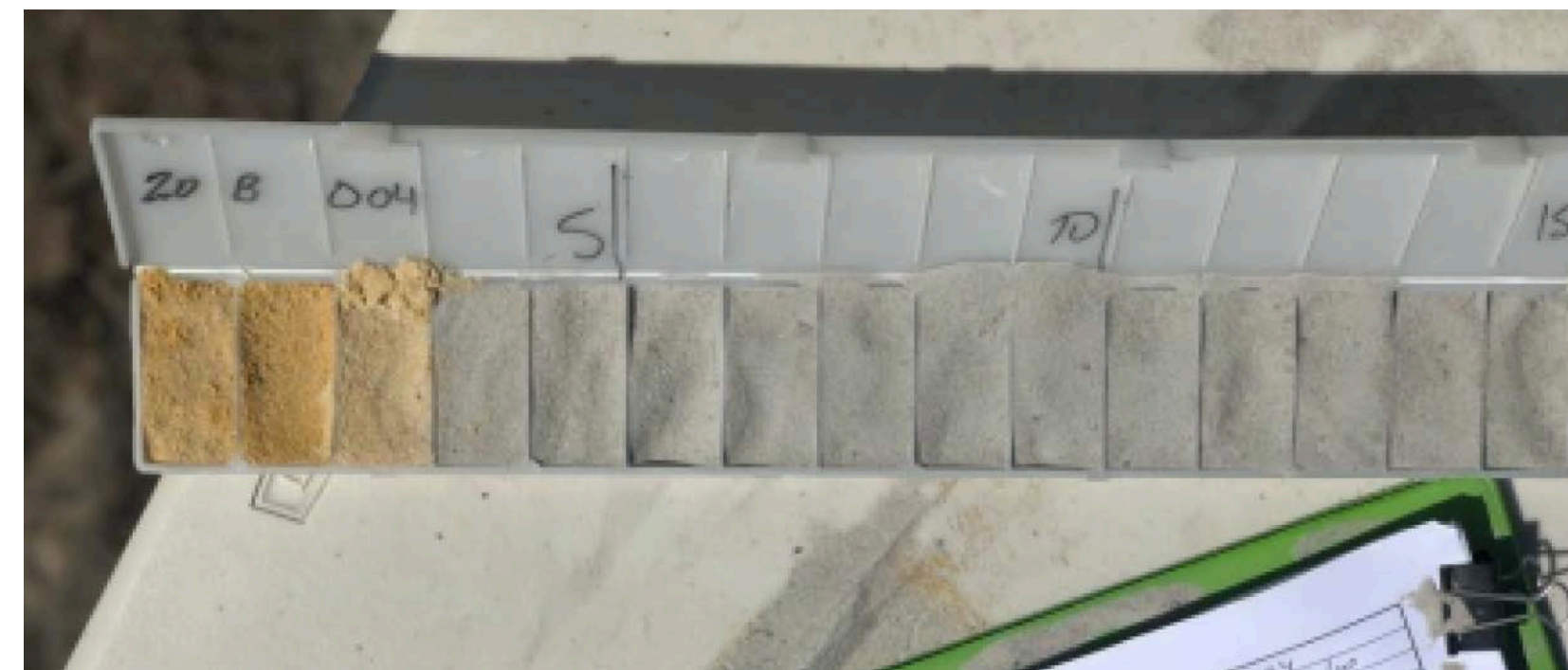
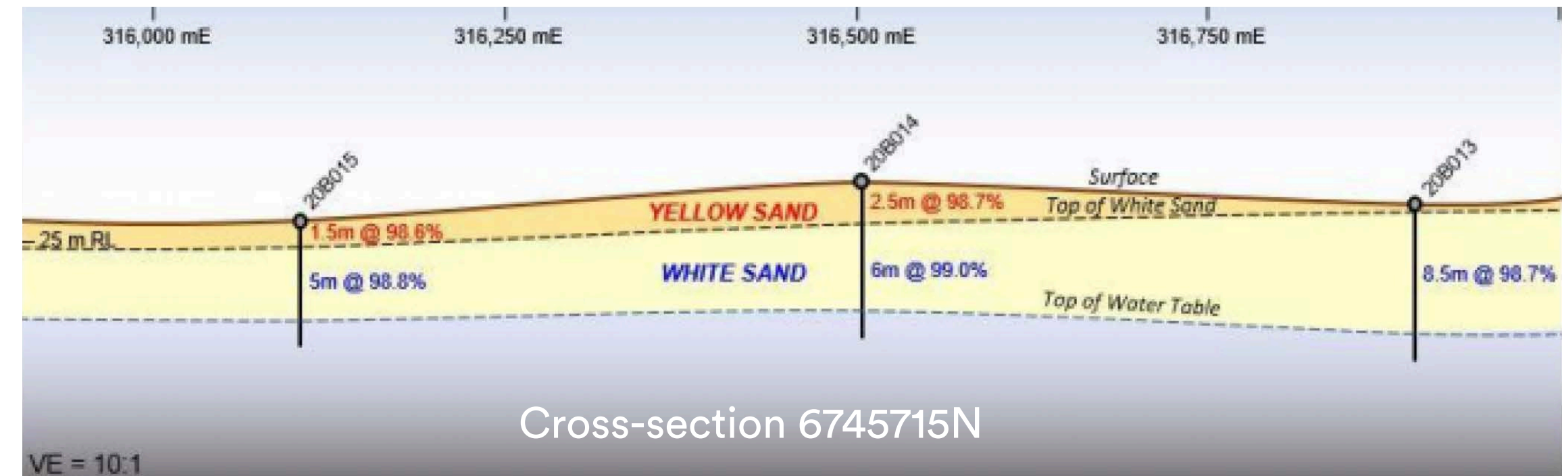
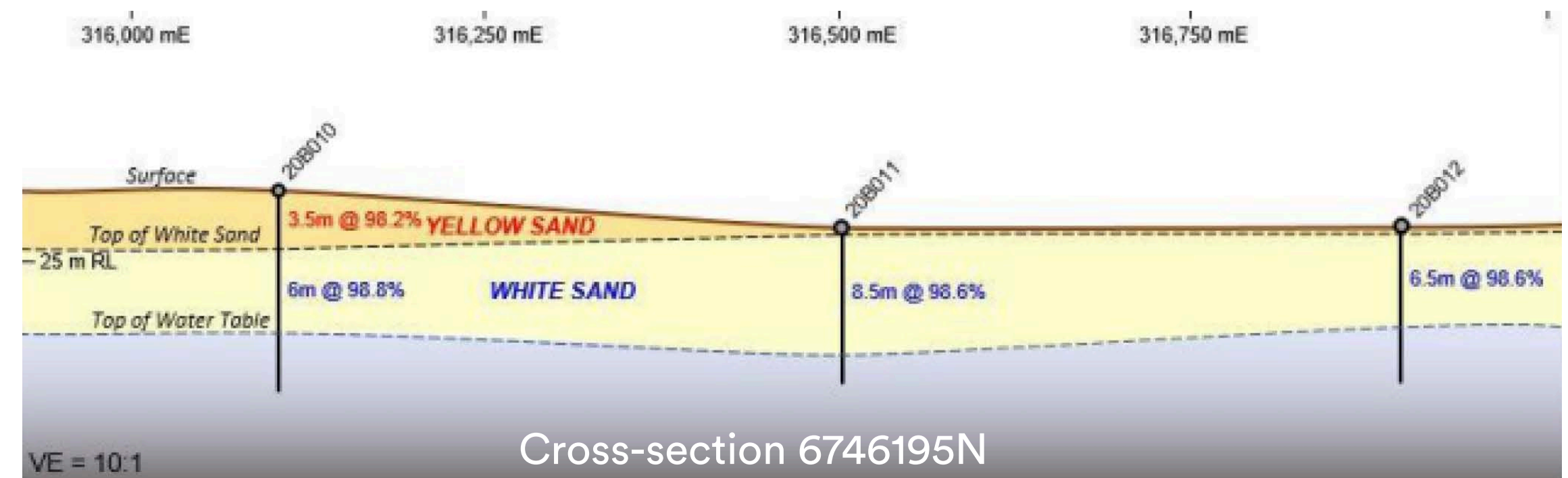


- Mineral Resource Estimate and Ore Reserve prepared by Snowden Mining Consultants Pty Ltd
- Comprises drill holes from 3 drill campaigns:
  - February 2019: 38 auger holes across the southern extent of the Beharra tenement
  - March 2020: 40 aircore holes drilled to the North and South of Mt Adams Rd
  - September 2020: 32 aircore holes drilled to the North and South of Mt Adams Rd
- All reserve and resource calculations relate to material above the water table



# Project Geology

- Simple geology with clearly defined horizons of white and yellow sand
- White sand is pervasive and represents >90% of the Beharra Resource
- Results in straight forward mining operations with minimal operational complexity



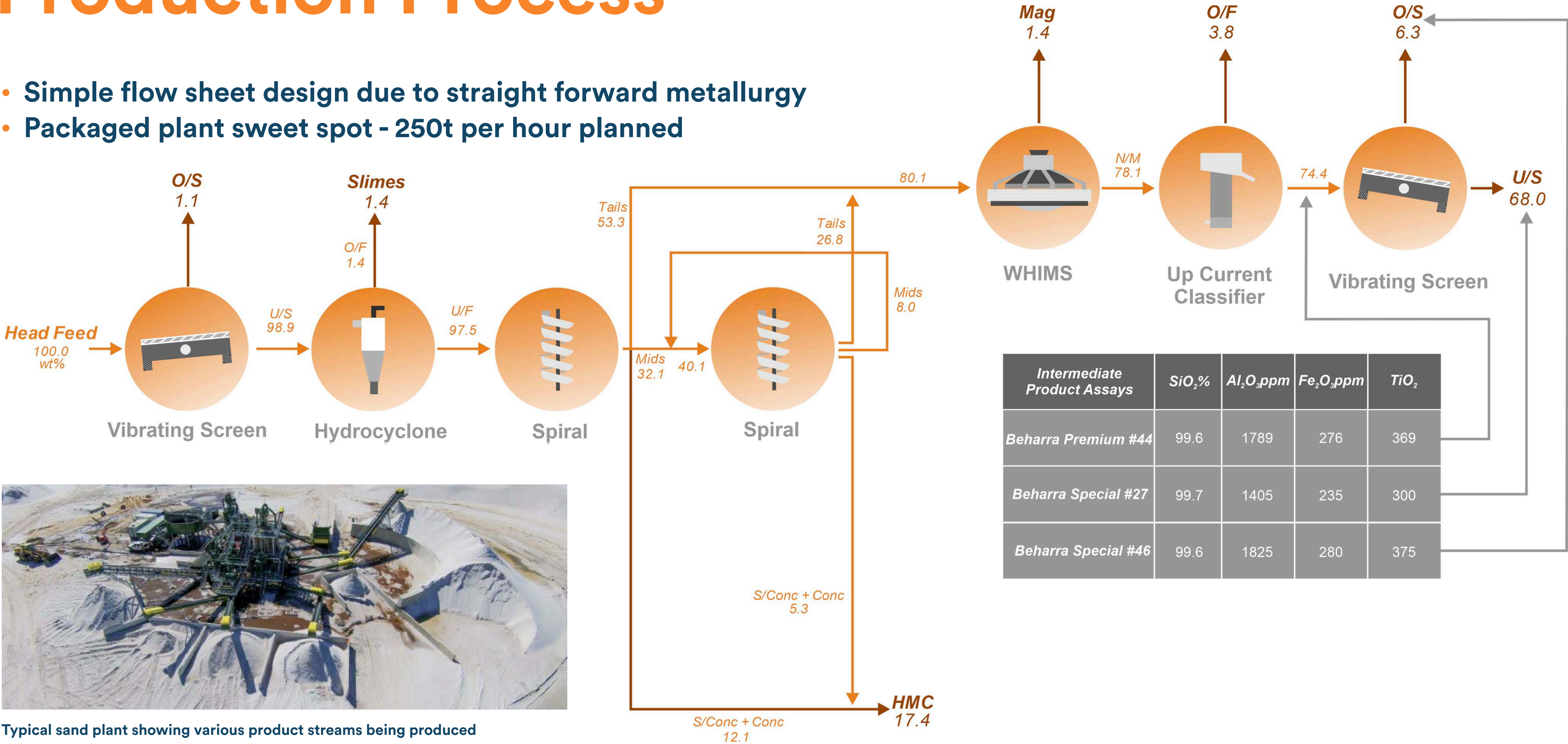
>12m Intersection of White Sand separated into 1m intervals from September 2020, Beharra Drill Program\*

\*For further information, please refer to ASX announcement titled, "Conclusion of Air-Core Drilling Program at Beharra", dated 1st October 2020, and ASX announcement titled, "Air-Core Drilling Results - Beharra", dated 7th December 2020.



# Production Process

- Simple flow sheet design due to straight forward metallurgy
- Packaged plant sweet spot - 250t per hour planned



Typical sand plant showing various product streams being produced

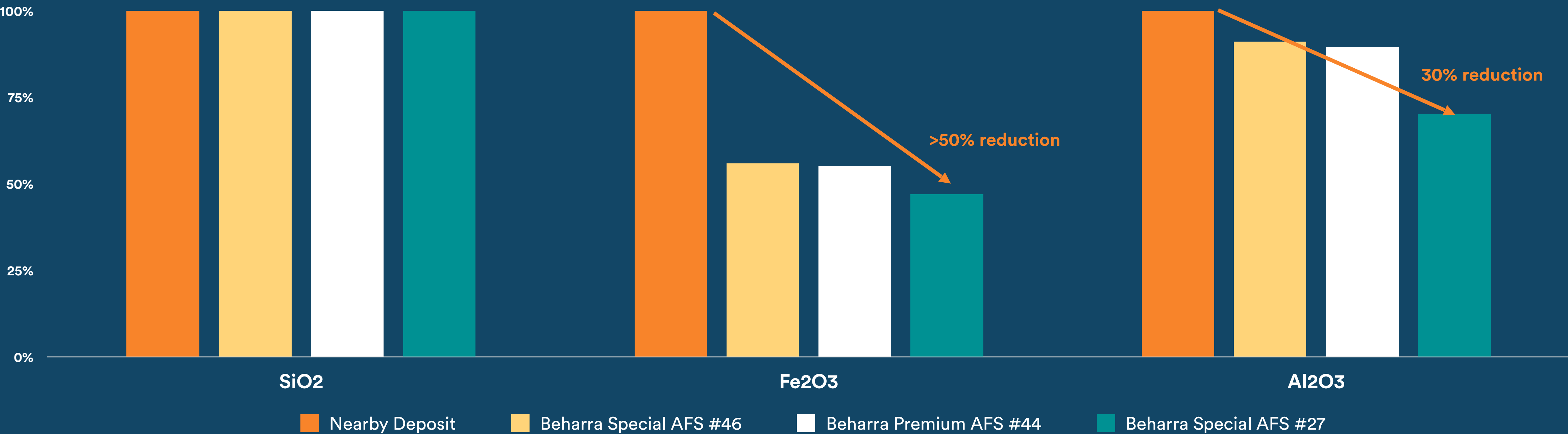
Note: For further information please refer to ASX announcement titled, “Exceptional Metallurgical Test Results - Beharra”, dated 29th January 2021.



# Standout Metallurgy

Beharra has demonstrated, through a rigorous bulk sample metallurgical program, that it can beneficiate to the lowest known impurity profile in the Mid West region of WA, suggesting potential for premium pricing and greater market acceptance.

Comparison of Key Attributes of Beharra Product Suite to Nearby Deposit<sup>1</sup>



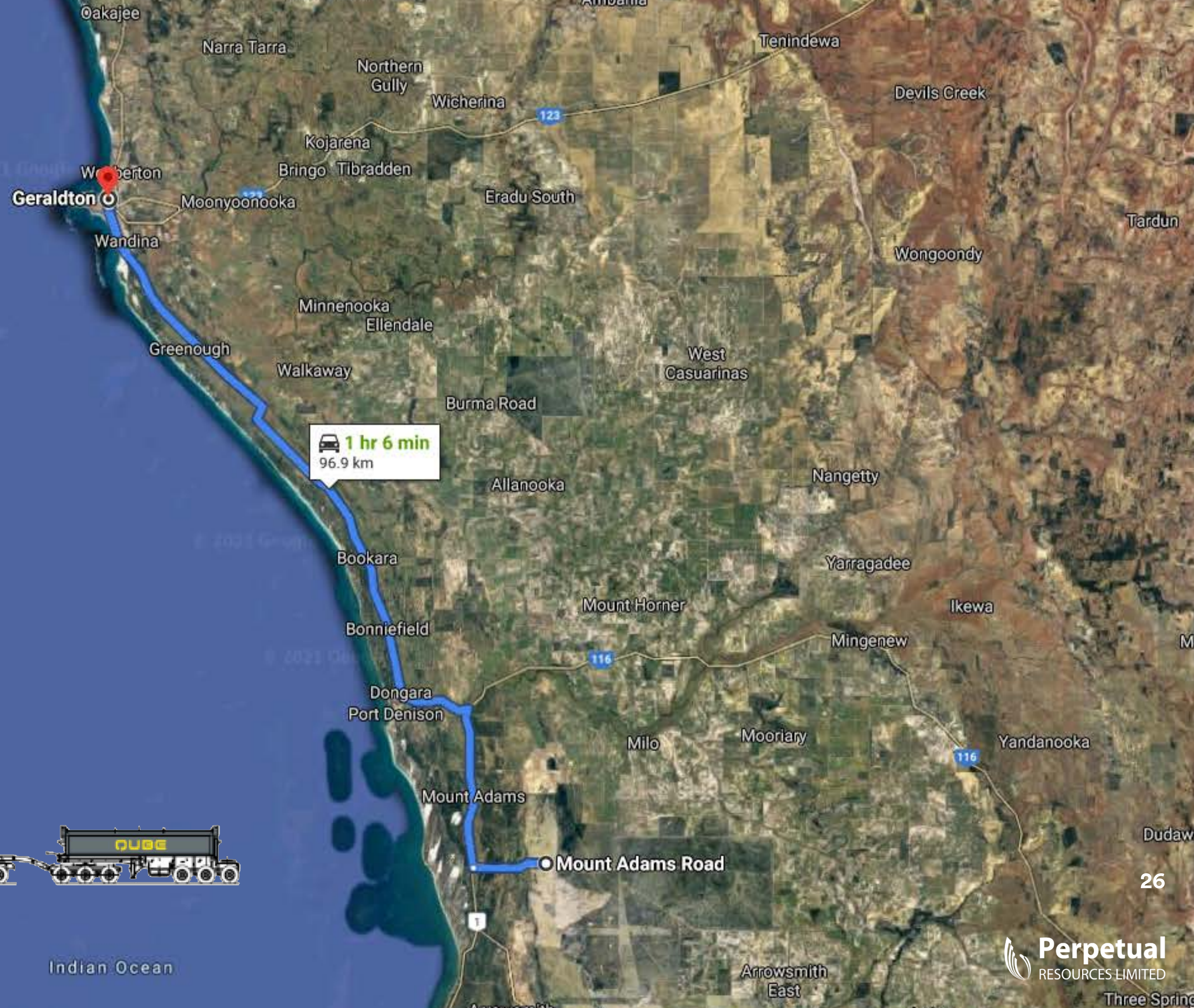
<sup>1</sup>Source: PEC test results (see ASX Announcement dated 29th January 2021) and VRX Silica's Arrowsmith North technical Sheet (see <https://vrxsilica.com.au/assets/Arrowsmith-NF500.pdf>)



# Tier 1 Infrastructure Regional

Beharra is one hour by high quality road to Geraldton Port, underpinning the economic viability of Beharra.

RAV7.3 – PBS Super Triple





# Tier 1 Infrastructure In Practise





# Project Economics

Perpetual's strategy is to operate with maximum flexibility, aiming to be able to respond to the expected positive changes in market demand. As a result, a flexible cost base is assumed, with potential to reduce opex over time through strategic reinvestment of cashflows into core plant and equipment and/or additional logistics infrastructure.

Opex item	A\$/ton	% of total
Product Haulage & Port Charges	\$26.09	61%
Mining & Rejects	\$7.33	17%
Processing	\$3.31	8%
Royalty	\$2.30	5%
Contingency	\$1.88	4%
General & Admin	\$1.58	4%
Rehabilitation	\$0.58	1%
<b>Total Operating Cost</b>	<b>\$43.07</b>	

Item (Base Case)	Cost (A\$)
Wet Processing Plant	\$19.1m
On Site Infrastructure	
- Buildings & Amenities	
- Power Station	
- Roads & Hardstand	
- General Site Civils & Earthworks	\$3.5M
- Fuel Storage & Distribution	
- Mobile Equipment	
- Weigh Bridge	
Off-Site Infrastructure (Bore field, site access roads)	\$9.3m
Indirect Costs (PCM Fees)	\$2.3m
Other	
- Insurances	
- Commissioning spares	
- Operational spares	\$1.3m
- Owners costs	
Contingency	\$3.5m
<b>TOTAL</b>	<b>A\$39m</b>

Note: For further information please refer to ASX announcement titled, "Maiden Ore Reserve and Outstanding Beharra PFS Result Update", dated 17th March 2021.



# Beharra: Offtake Discussions

## Yaoguo Solar Science & Technology Co.

- MOU for offtake signed in October 2020 covering indicative interest to purchase 250,000 tons per annum of Beharra silica sand
- Yaoguo a significant purchaser of high-grade silica sand and potential distributor of additional tons to regional Chinese markets
- Testing and discussions ongoing with potential for expanded and innovative commercial arrangement between Perpetual and Yaoguo

## Other offtake interest

- Significant inbound enquiries received from a range of APAC end users and traders
- Samples and specifications sent to customers
- Discussions ongoing

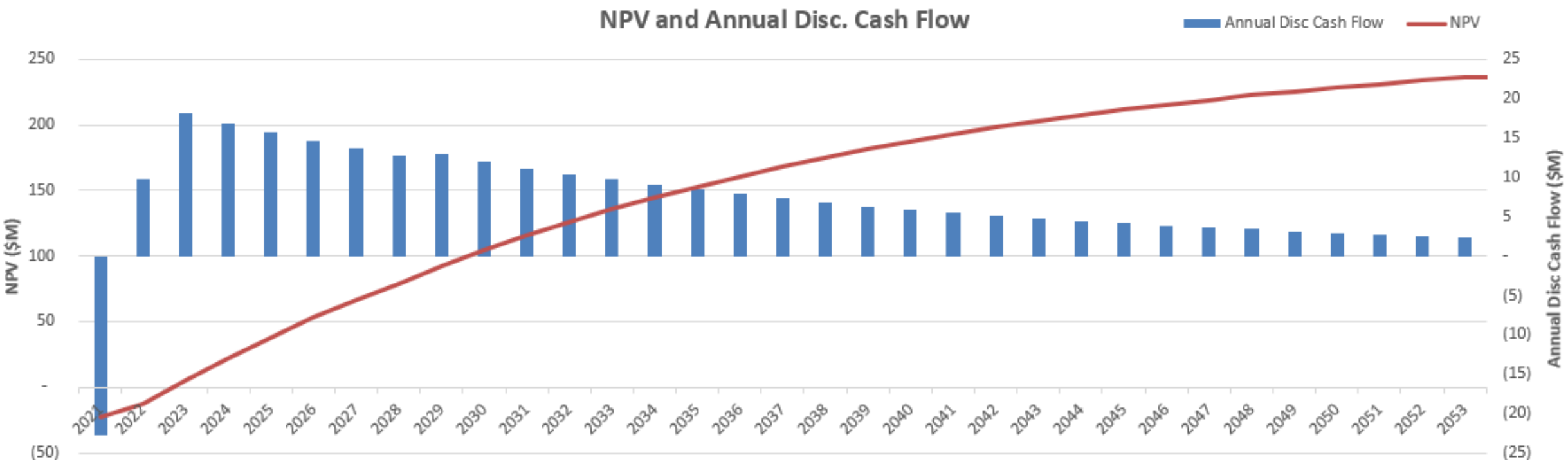
*Note: Please refer ASX announcement titled, “MOU for Silica Sands Offtake Signed” dated 26th October 2020*





# Project Economics: Detailed Overview

Beharra commands a compelling mining project investment case.



NPV Geared*	NPV Ungeared	IRR Geared*	IRR Ungeared
\$236m	\$231m	77%	55%

*\*Assumes 40% gearing*  
*Note: For further information and full detail on all assumptions, please refer to ASX announcement titled, "Maiden Ore Reserve and Outstanding Beharra PFS Result Update" dated 17th March 2021.*



# Future Opportunities for Enhancement

Campaign mining and processing

Freight alternatives such as Road + Rail or Rail only

Conversion of capex to opex or shared costs with other operators

Investigations of expansion cases in terms of increased plant throughput

Direct port access as part of Mid West Ports expansion project

Selective processing of the white sand horizons

Potential simplifying of the metallurgical flowsheet to lower capital and operating costs

Dry mining and slurrification option (hydro-transport of ROM)



# Project Study Team and Stakeholders



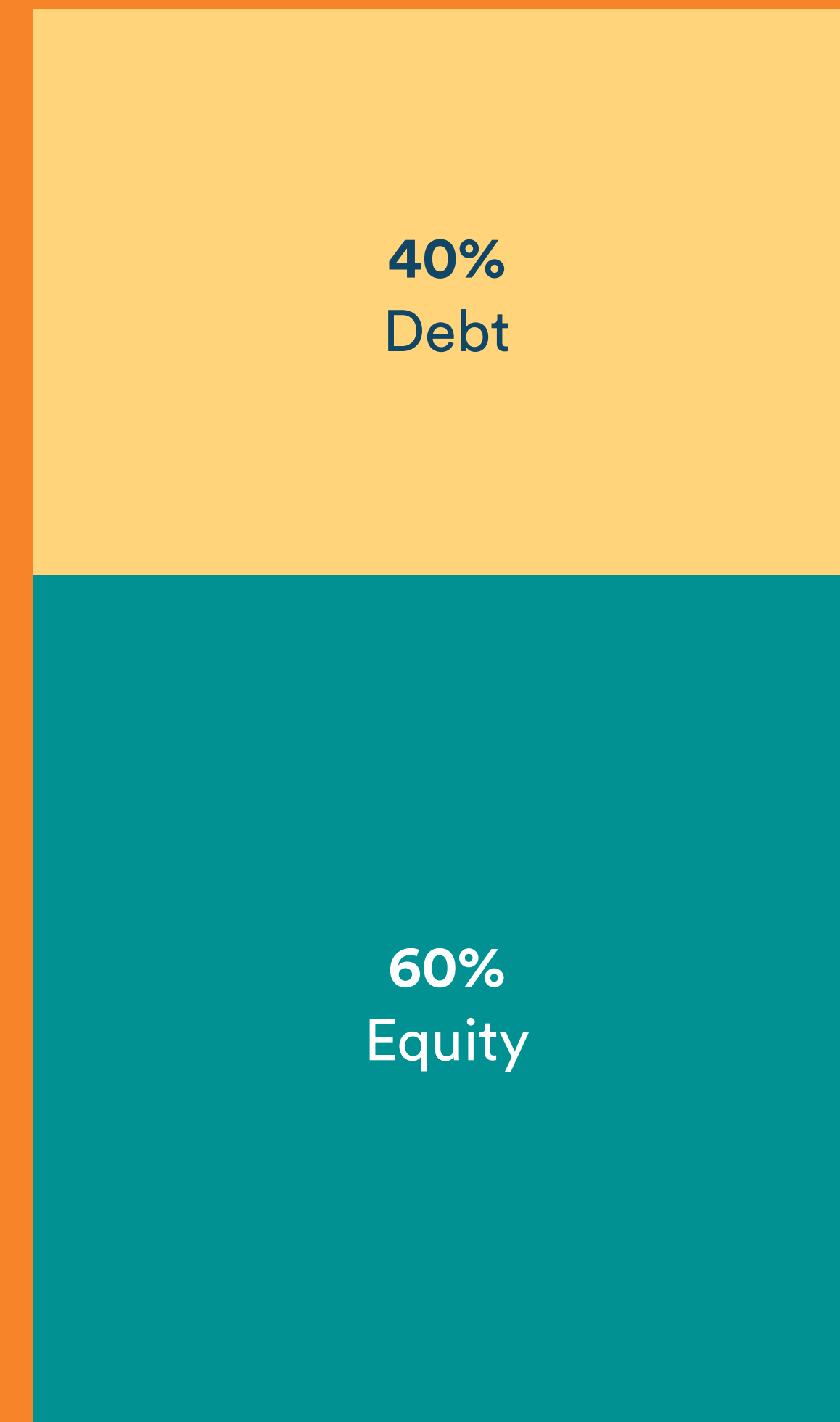


# Project Funding

Perpetual anticipates strong interest in debt financing for up to 40% of the total Beharra Project capital costs, with the remainder anticipated to be funded by equity and/or strategic investor interest.

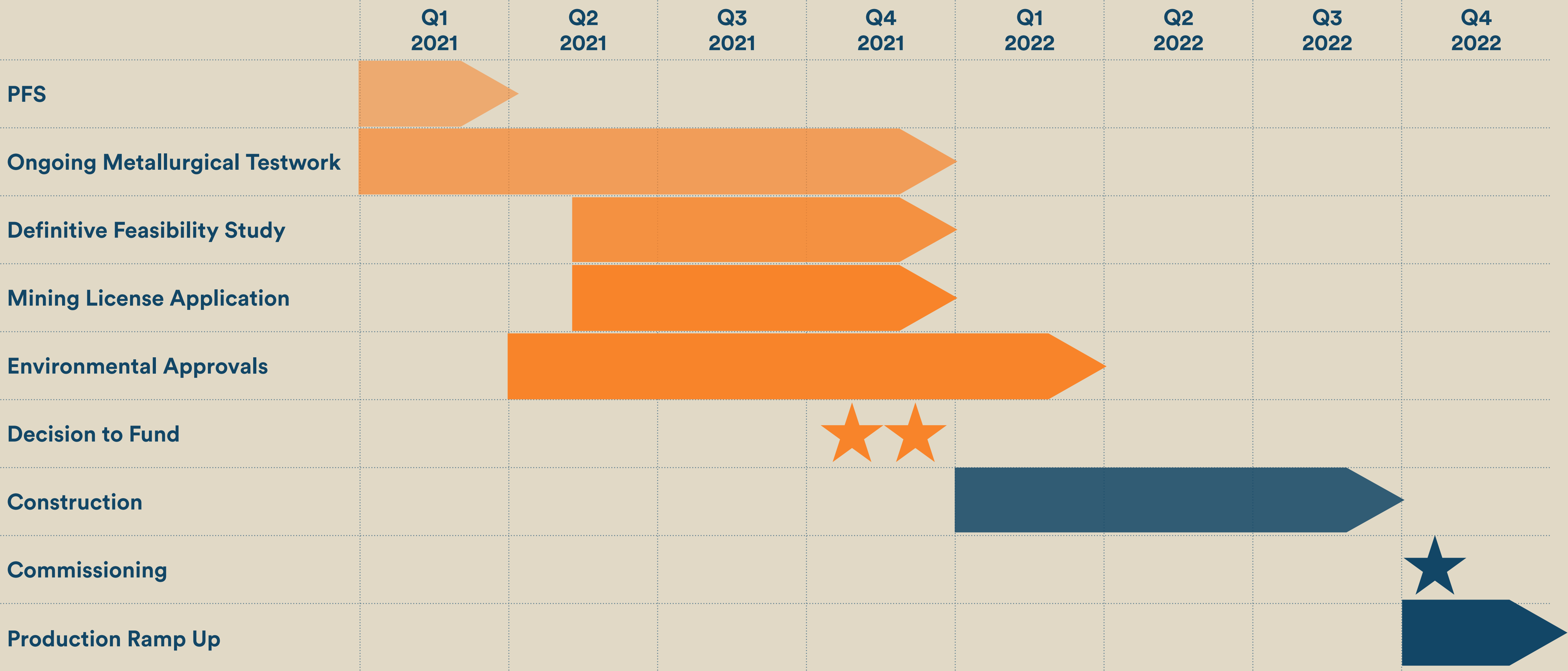
Key to securing the debt will be further engagement with end users and potential for binding offtake agreements to underpin debt payback period.

## Indicative Funding Split





# Beharra Development Timeline





# Conclusion

## The Mid West Region's lowest impurity silica sand project

- The Mid-West Region's pre-eminent silica sand resource and project
- Ideally located proximal to tier 1 infrastructure
- Compelling project economics confirming a long life, low capital and high margin operation
- Significant scope for project expansion

## Strong project economics

- 1.5mtpa silica sand sales generates an NPV of \$236m and a compelling IRR of 77%\*
- Project economics are resilient to key sensitivities
- Project upside exists though optimization of revenue per ton
- Annual EBITDA of A\$37m in first year of full operation (Year 2)

## Located on doorstep to APAC, the world's fastest growing market

- Minimal road upgrades to ensure sealed road transport from site to port
- Deep water port with direct access to major high value APAC markets

## Strong study team and consultants

- Expert multi-disciplinary team providing experienced advice on project development and study options
- Decades of experience in developing sand-related projects throughout Australia
- Deep sand processing knowledge and expertise

## Experienced Board and Leadership Team


- Highly credentialled Board of Directors with significant project execution and operations experience, as well as deep project and company funding experience
- Management team with significant project execution expertise
- Growing owners' team with select additions expected to further strengthen capabilities

## Rapidly advancing project

- Maiden Mineral Resource Estimate delivered mid 2020
- PFS delivered in 1Q 2021
- Maiden Mineral Reserve Estimate delivered 1Q 2021
- DFS planning to be commenced immediately, with permitting and planning underway in parallel
- Targeting rapid production start in line with strong market demand

\*Assumes 40% gearing



An aerial photograph of the Dubai skyline at sunset. The Burj Khalifa is the central focus, towering above other skyscrapers. The sky is a mix of orange, yellow, and blue. In the foreground, there are complex highway interchanges and several modern buildings, including one with a distinctive stepped, crystalline design on the left.

**Julian Babarczy**  
Executive Chairman

**Robert Benussi**  
Managing Director

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