



Arafura Resources Limited

Nolans Definitive Feasibility Study

February 2019

Corporate Presentation

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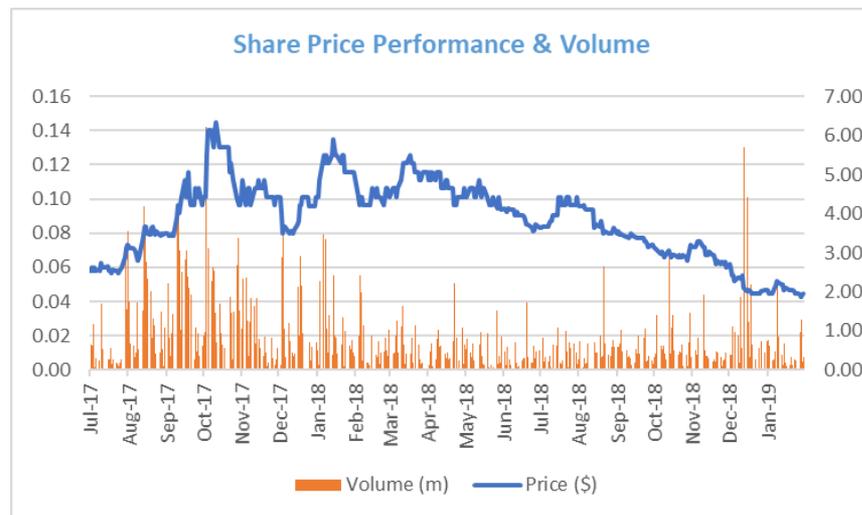
The information in this presentation that relates to Mineral Resources was announced on 7 June 2017. Arafura Resources confirms that it is not aware of any new information or data that materially affects the information included in the announcement of 7 June 2017 and that all material assumptions and technical parameters underpinning the estimates in the announcement of 7 June 2017 continue to apply and have not materially changed.

The information in this presentation that relates to Ore Reserves was announced on 7 February 2019. Arafura Resources confirms that it is not aware of any new information or data that materially affects the information included in the announcement of 7 February 2019 and that all material assumptions, technical parameters and modifying factors underpinning the estimates in the announcement of 7 February 2019 continue to apply and have not materially changed.

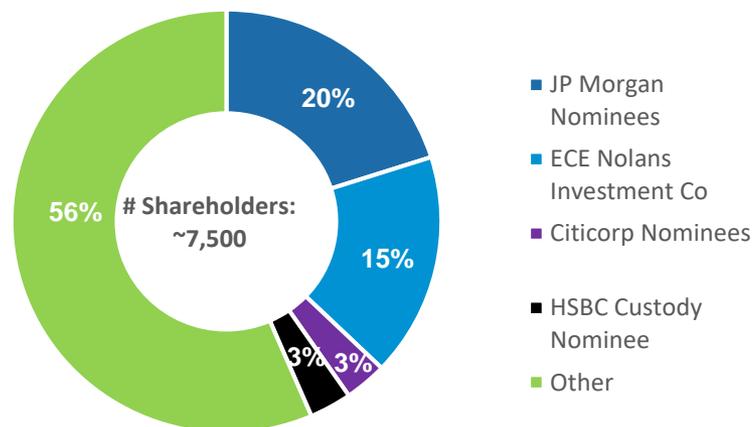
# Introducing Arafura

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Capital Structure	
ASX Code	ARU
ASX Share Price (1 February 2019)	\$0.045
Shares on Issue	721,403,114
Market Capitalisation	\$32.5m
12 Month Liquidity	\$11.7m
Cash (31 December 2018)	\$9.0m
Debt	Nil
Enterprise Value	\$23.5m



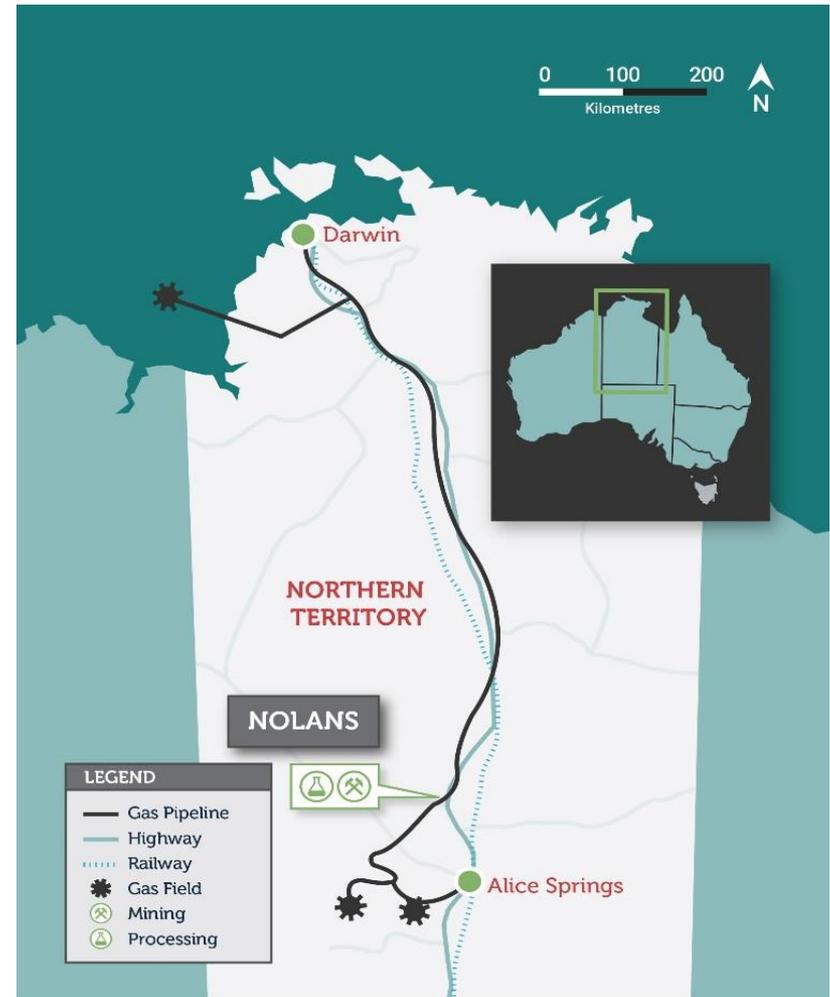
- Arafura Resources Limited (**Arafura**) is an ASX-listed company focused on developing its 100%-owned Nolans Rare Earths Project located in the Northern Territory of Australia
- Neodymium-Praseodymium (**NdPr**) are two rare earths which are essential ingredients in rare earth permanent (**NdFeB**) magnets
- NdFeB magnets are used in electric vehicles (**EVs**), clean energy applications and robotics
- Nolans Definitive Feasibility Study (**DFS**) completed February 2019



# Nolans DFS Highlights

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- Confirms Nolans as a world class NdPr project
- Annual NdPr production 21% higher than previously estimated at 4,357 tonnes p.a.
- Ultra-low cost producer at US\$25.94/kg NdPr
- Robust economics – average EBITDA A\$377m p.a., NPV<sub>10</sub> A\$729m, IRR 17.43%
- Highly leveraged to NdPr (80% of revenue) – US\$5/kg increases NPV by A\$130m
- Long-life asset – 23-year mine life based on Ore Reserves only with potential to extend production
- Globally strategic asset – 100% Australian-domiciled mine and processing operation with environmental approval
- Well positioned to feed into forecast NdPr supply shortfall – targeting project commissioning in 2022

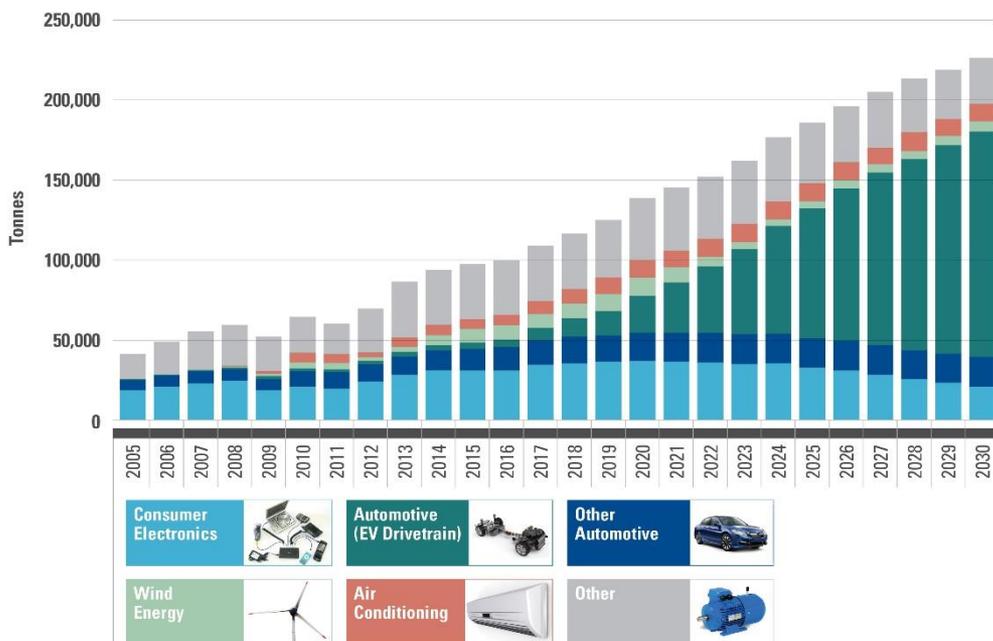


# NdPr Market Opportunity

# NdPr Market Opportunity

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**NdFeB Magnet Demand by Application**



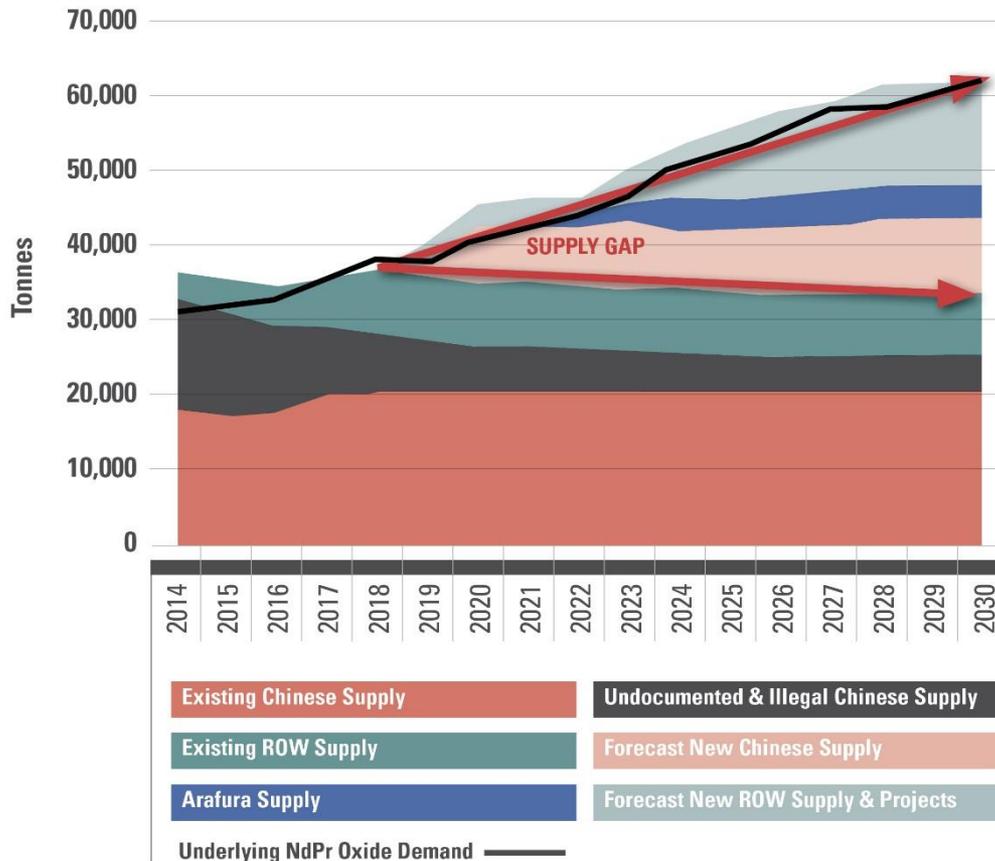
\*Other includes MRI, elevator motor, magnetic separator, robotics and industrial applications.

- Underlying demand for NdFeB magnets across all applications is forecast to grow by 6% p.a. over the period to 2030
- NdFeB demand growth for EV applications is more dramatic and forecast to grow by 24% p.a.
- Supply-demand balance achieved through demand destruction in lower quality applications and technology innovations that achieve better use of NdPr in magnet manufacturing
- Demand in applications for consumer electronics and wind turbines will reduce during the forecast period. For some applications substitution will be traded off against reduced performance and cost.
- EV applications require high quality and efficient motors using NdFeB magnets
- New supply will not come on stream fast enough to meet demand from all applications – NdFeB magnets and NdPr oxide will move to the best value in use

Source: Roskill

# Supply & Demand Balance

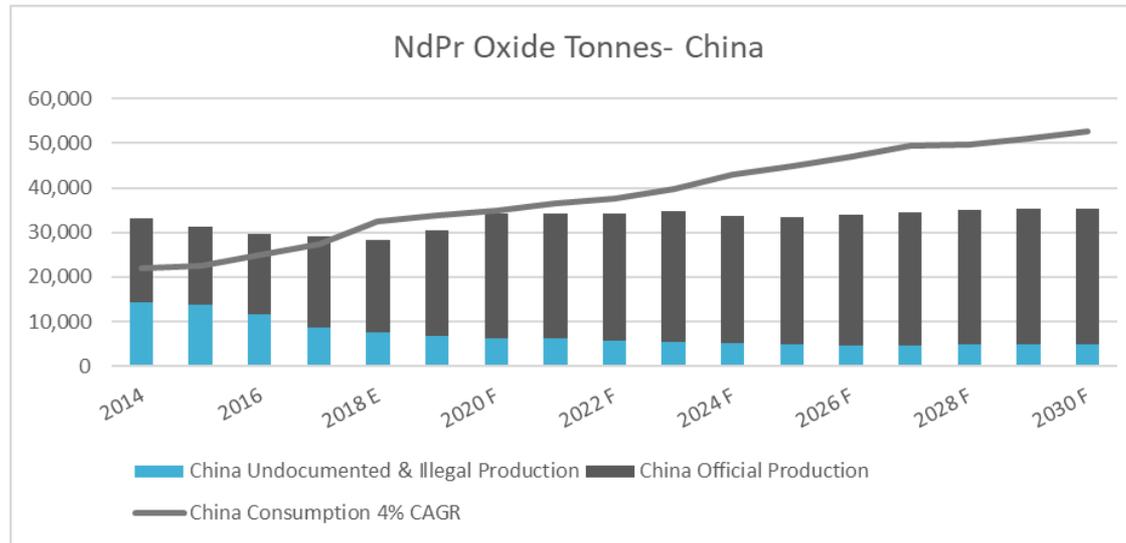
## NdPr Oxide Supply & Demand



- China continues to dominate the global supply chain being the world's largest producer accounting for about 80% of NdPr for global NdFeB magnet production
- Supply reforms, industry consolidation and higher environmental standards will constrain China's ability to rapidly increase NdPr production
- Supply growth of 20,000 tonnes of NdPr oxide required in the next decade
- Lynas Corporation (ASX:LYC) is the only significant miner and processor of rare earth materials outside China enjoying a market capitalisation in excess of \$1bn
- China remains the dominant supplier, however analysts forecast China to become a net importer by the early 2020s

Source: Roskill

# China – From Exporter to Net Importer



- China’s domestic NdPr consumption will increase by over 20% in the next 5 years as it pursues clean energy objectives and global leadership in EV manufacturing
- Even on modest growth assumptions an additional 10,000 tonnes p.a. of NdPr will be required over next decade for China alone
- China will ensure it procures the NdPr necessary to achieve its EV manufacturing objectives for value adding and the *Made in China 2025* strategy
- Demand-supply imbalance will be more pronounced for stakeholders that are not aligned with the China value-add strategy

Source: Roskill, ACREI and Shanghai Metals Market

# Nolans Project

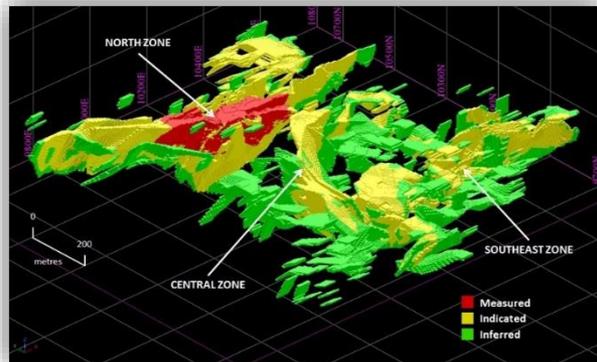
# Long Life Asset

RESOURCES	TONNES (m)	RARE EARTHS TREO %	PHOSPHATE P <sub>2</sub> O <sub>5</sub> %	NdPr Enrichment %
Measured	4.9	3.2	13	26.1
Indicated	30	2.7	12	26.4
Inferred	21	2.3	10	26.5
<b>TOTAL</b>	<b>56</b>	<b>2.6</b>	<b>11</b>	<b>26.4</b>

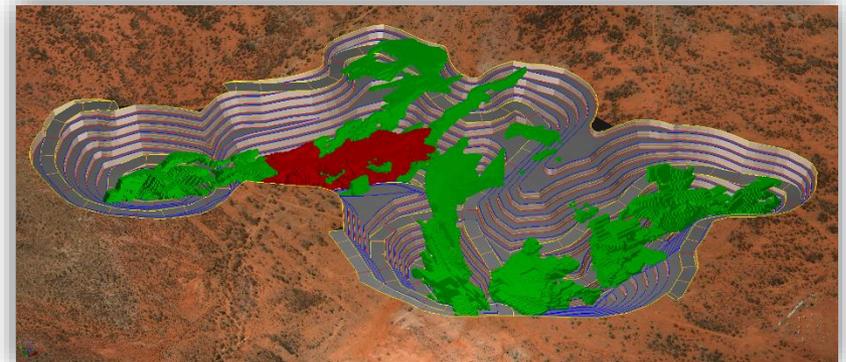
As announced on 7 June 2017. 1.0% TREO cut-off grade. Numbers may not compute exactly due to rounding. "NdPr enrichment" is the proportion of TREO comprising Nd<sub>2</sub>O<sub>3</sub> and Pr<sub>6</sub>O<sub>11</sub>.

RESERVES	TONNES (m)	RARE EARTHS TREO %	PHOSPHATE P <sub>2</sub> O <sub>5</sub> %	NdPr Enrichment %
Proved	4.3	3.1	13	26.1
Probable	14.9	2.9	13	26.5
<b>TOTAL</b>	<b>19.2</b>	<b>3.0</b>	<b>13</b>	<b>26.4</b>

As announced on 7 February 2019. Numbers may not compute exactly due to rounding. "NdPr enrichment" is the proportion of TREO comprising Nd<sub>2</sub>O<sub>3</sub> and Pr<sub>6</sub>O<sub>11</sub>.

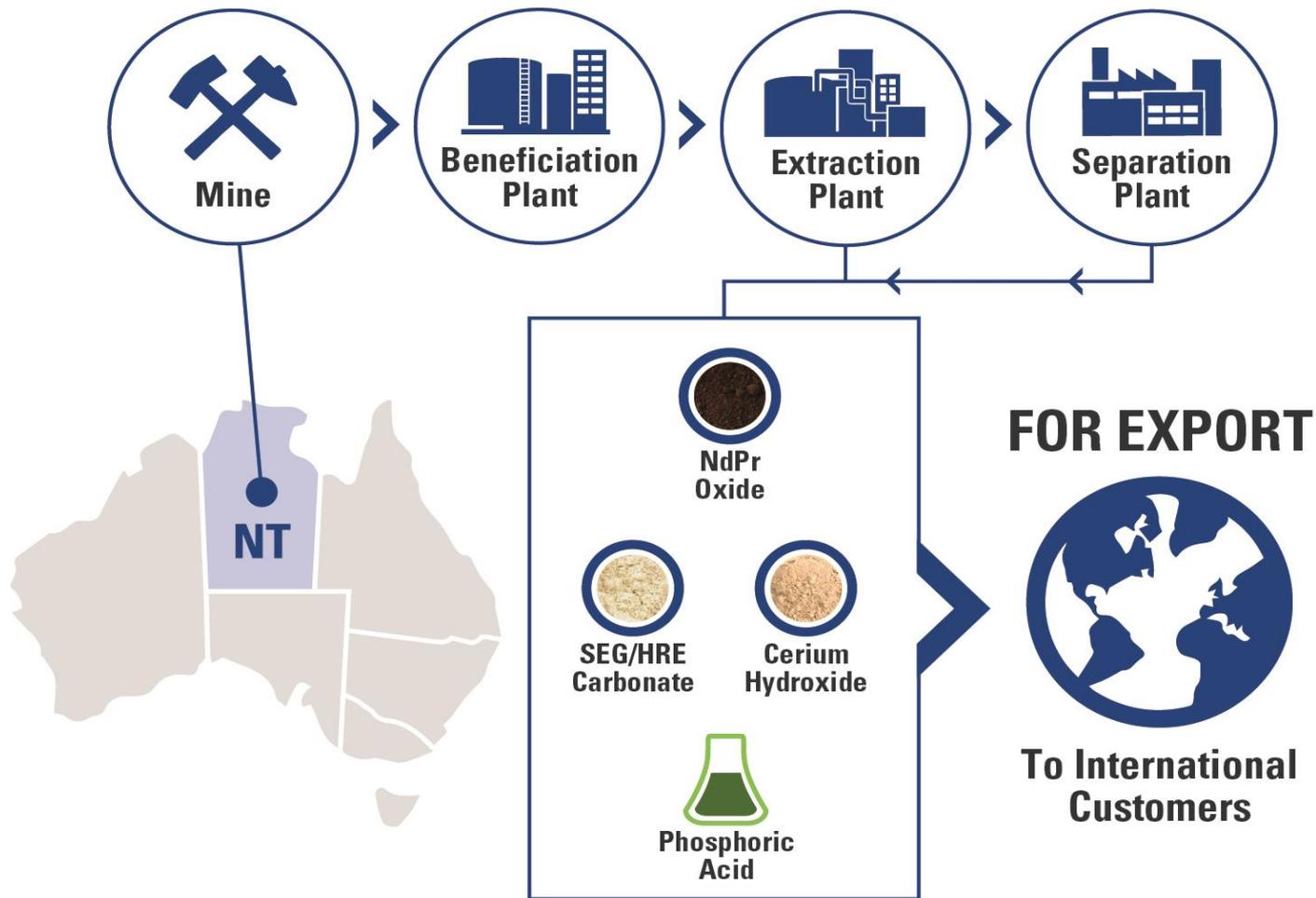


Mineral Resources



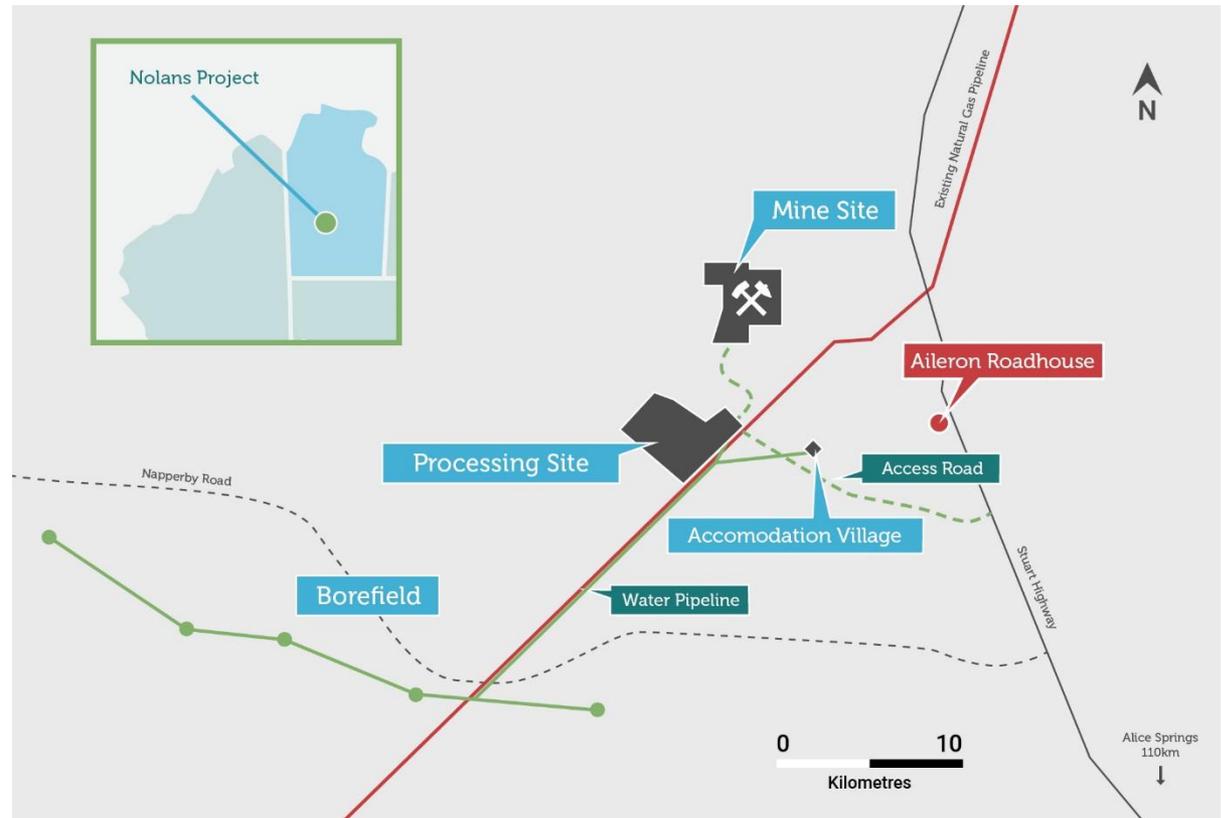
Ore Reserves

# 100% Australian Domiciled

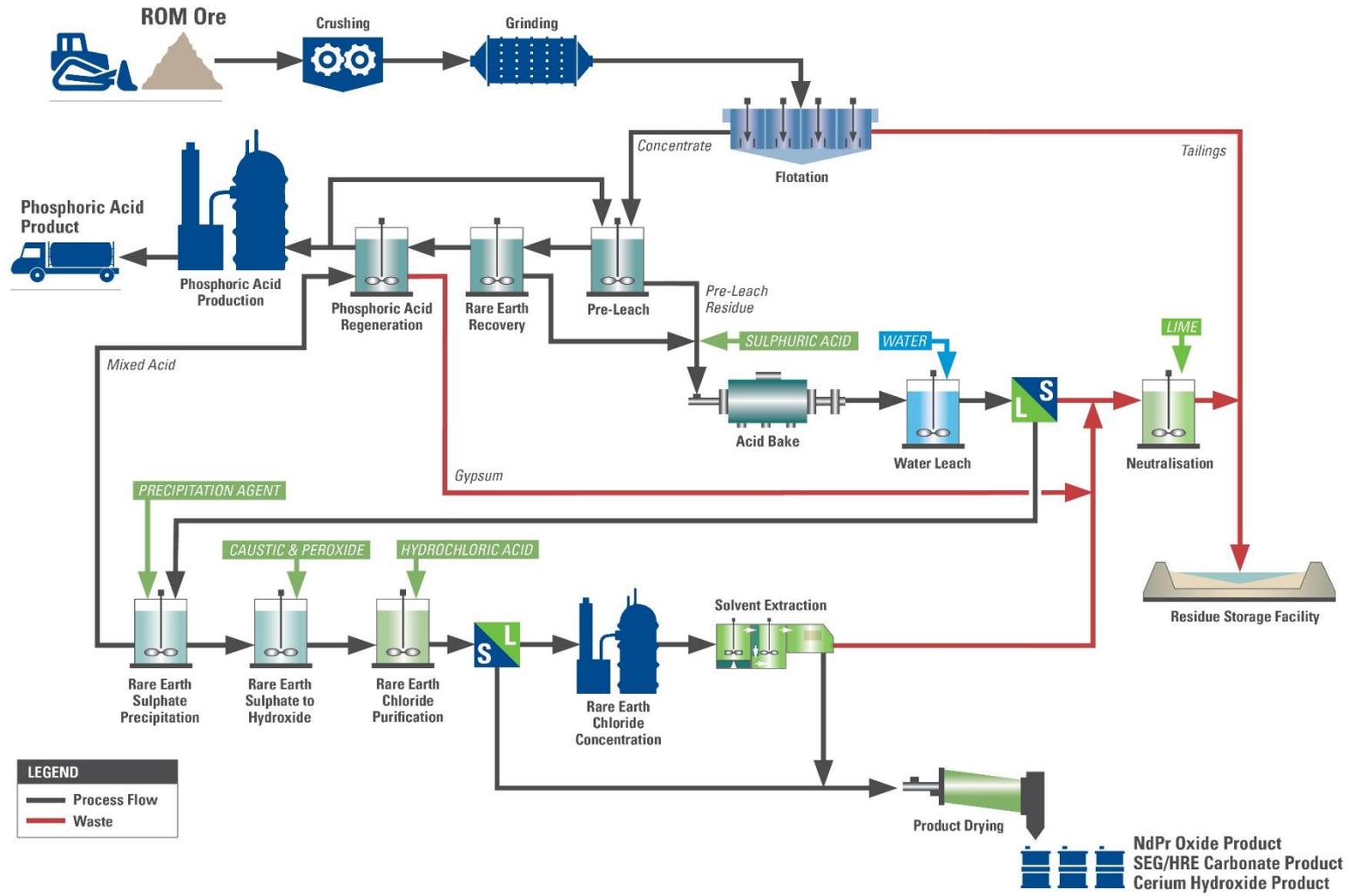


# Single Site Close to Key Infrastructure

- Stuart Highway – 10 km east
- Alice Springs railyard, airport and other services – 135 km south
- Amadeus natural gas pipeline – adjacent to project site
- Water supply – 30 km south
- Tailings and process wastes – at site
- Single site offers product traceability and waste management certainty



# Process Flowsheet



# DFS Financials & KPIs

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Mining & Processing		
Mine Life (years)	23	
Concentrate (tpa)	293,000	
Production		
TREO equivalent (tpa)	13,343	
NdPr Oxide (tpa)	4,357	
Cerium Hydroxide (tpa TREO basis)	8,383	
SEG-HRE Carbonate (tpa TREO basis)	603	
Phosphoric Acid (tpa 54% P <sub>2</sub> O <sub>5</sub> MGA)	135,808	
Financial	US\$	A\$
Capital Cost (\$m)	726	1,006
Rare Earth Sales Revenue (\$m pa)	379	539
Phosphoric Acid Sales Revenue (\$m pa)	35	50
Mining Costs (\$m pa)	(30)	(43)
Processing Costs (\$m pa)	(103)	(148)
General & Administration Costs (\$m pa)	(15)	(21)
EBITDA (\$m pa)	266	377
KPI Analysis	US\$	A\$
Operating Cost \$/kg NdPr	34.07	48.40
Operating Cost \$/kg NdPr with MGA credit	25.94	36.85
NPV <sub>10</sub> after tax (\$m)	497	729
IRR after tax (%)	17.43%	
After tax payback	Year 5	
IRR 15% @ US\$/kg NdPr	76	
IRR 10% @ US\$/kg NdPr	59	

\* Production and financial data is calculated as the annual average following a three year ramp-up and excluding the partial final year production

Long-life asset – 23-year mine life

Significant supply – 4,357 tonnes p.a. NdPr

Robust economics – EBITDA A\$377m p.a.

Ultra low OPEX – US\$25.94/kg NdPr

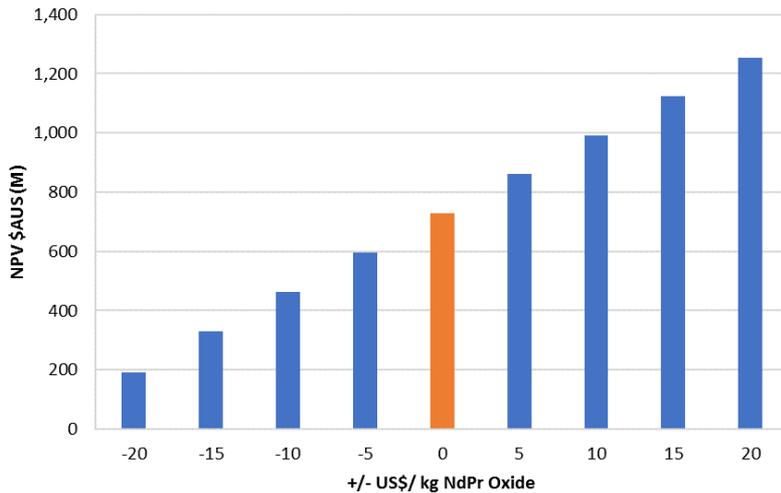
Capital payback – Year 5

Highly leveraged to NdPr price

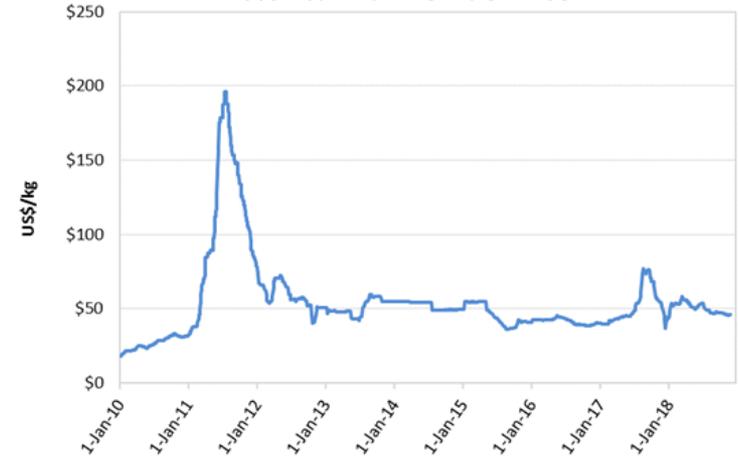
# NdPr Pricing

- 80% of Nolans revenue derived from NdPr oxide
- New supply pipeline will not be sufficient to meet demand
- EV drivetrains rely on high quality and high efficiency NdFeB magnets
- Roskill forecast a tight market and escalating NdPr oxide prices driven by EVs being introduced to the mass market
- Nolans is highly leveraged to the NdPr oxide price – US\$5/kg change moves NPV by A\$130m

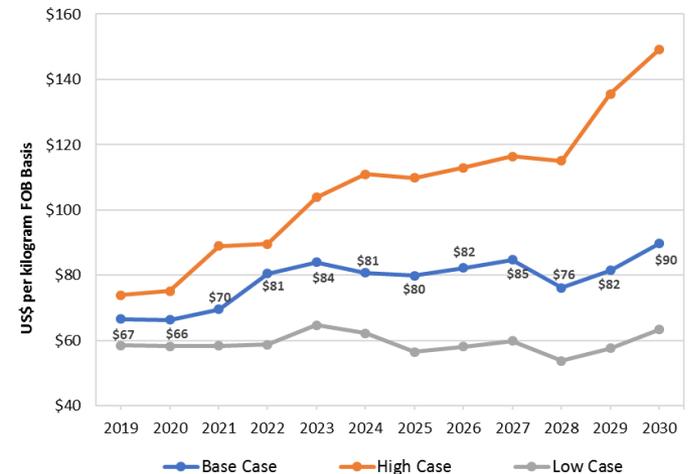
Sensitivity Analysis



Historical NdPr Oxide Price



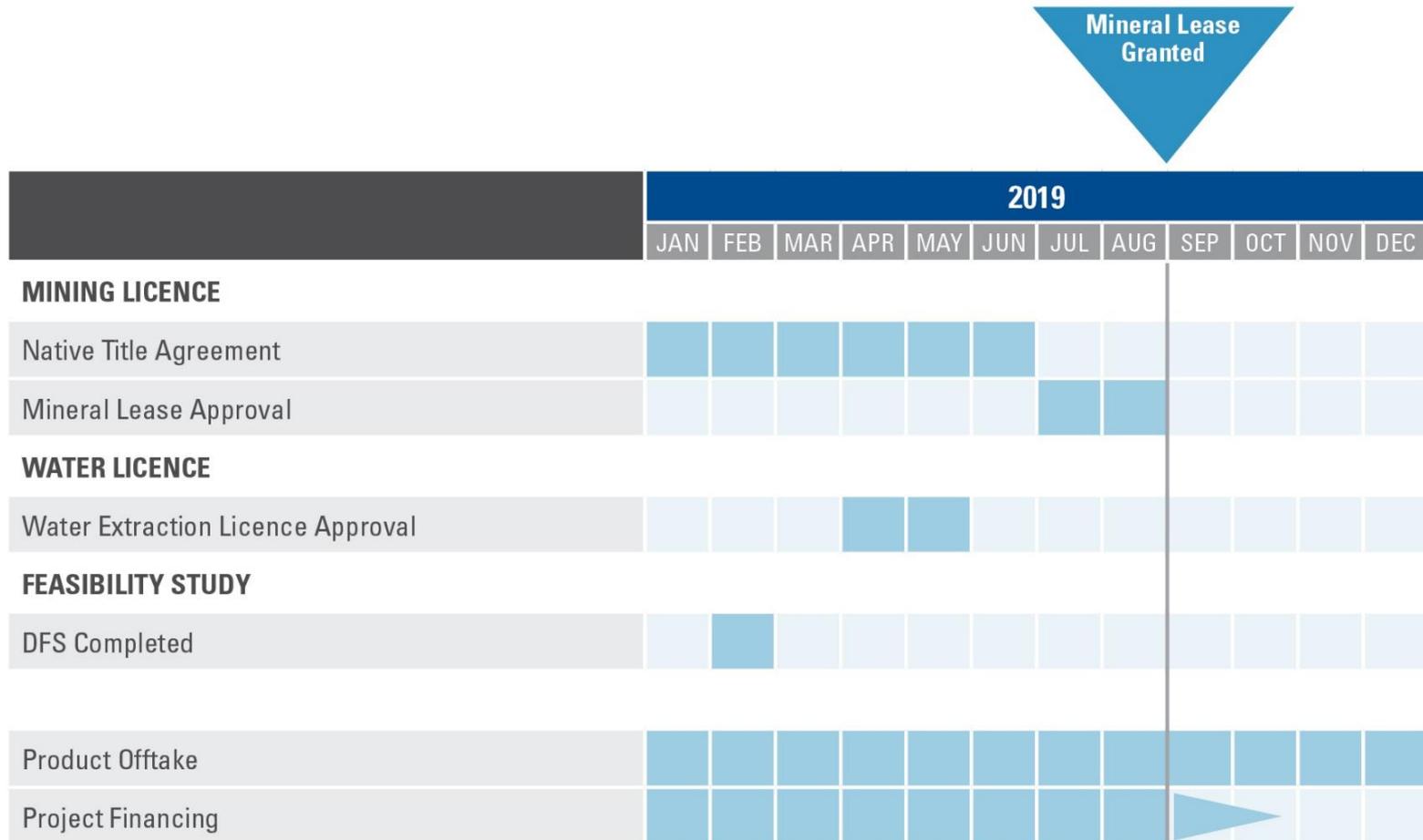
Forecast NdPr Oxide Price (Real)



Source: Roskill

# Project Implementation

# Project Timeline – 2019



# Marketing & Offtake

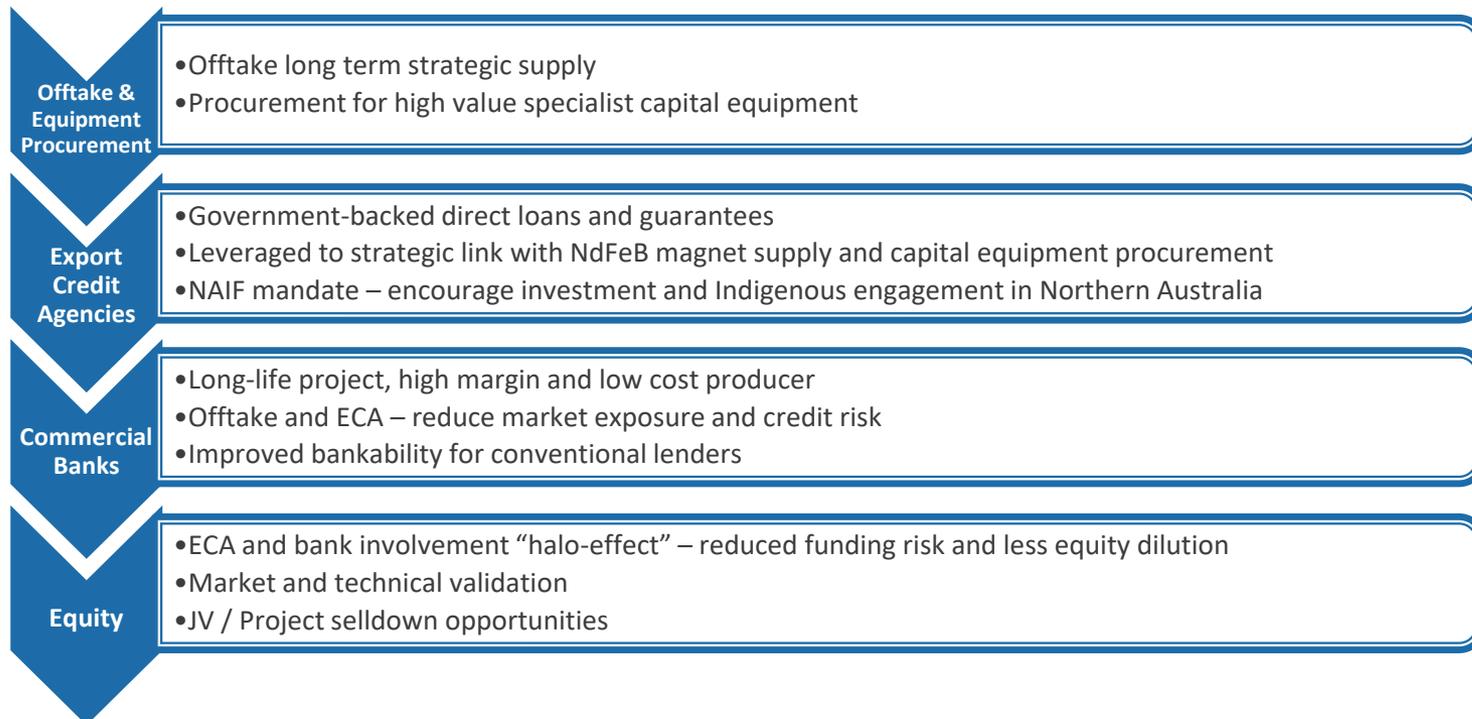
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- NdPr oxide marketing strategy underpinned by targeting customers in the high-growth NdFeB supply chain for EVs, clean energy technologies, factory automation and electronics
- NdPr supply imbalance will be more pronounced for stakeholders not aligned with the *Made in China 2025* strategy. Market effort focused on customers incentivised to diversify their Chinese NdPr supply risk:
  - Japan – NdFeB magnet manufacturers and trading houses for eventual use in Japanese automotive sector and factory automation
  - Europe – automotive OEMs and wind turbine makers seeking more control over NdPr supply
  - China – tier one NdFeB magnet manufacturers that have significant export sales where business strategy not aligned with China’s value add strategy
- Product offtake discussion has already commenced with key potential customers for NdPr oxide and with Indian fertilizer groups for sale of phosphoric acid
- Non-binding offtake MoUs completed for NdPr oxide with tier 1 Chinese magnet manufacturer JingCi Material Science Co, and for phosphoric acid with major Indian fertilizer producer
- More offtake MoUs to come in NdPr, other rare earths and phosphoric acid

# Project Funding Strategy

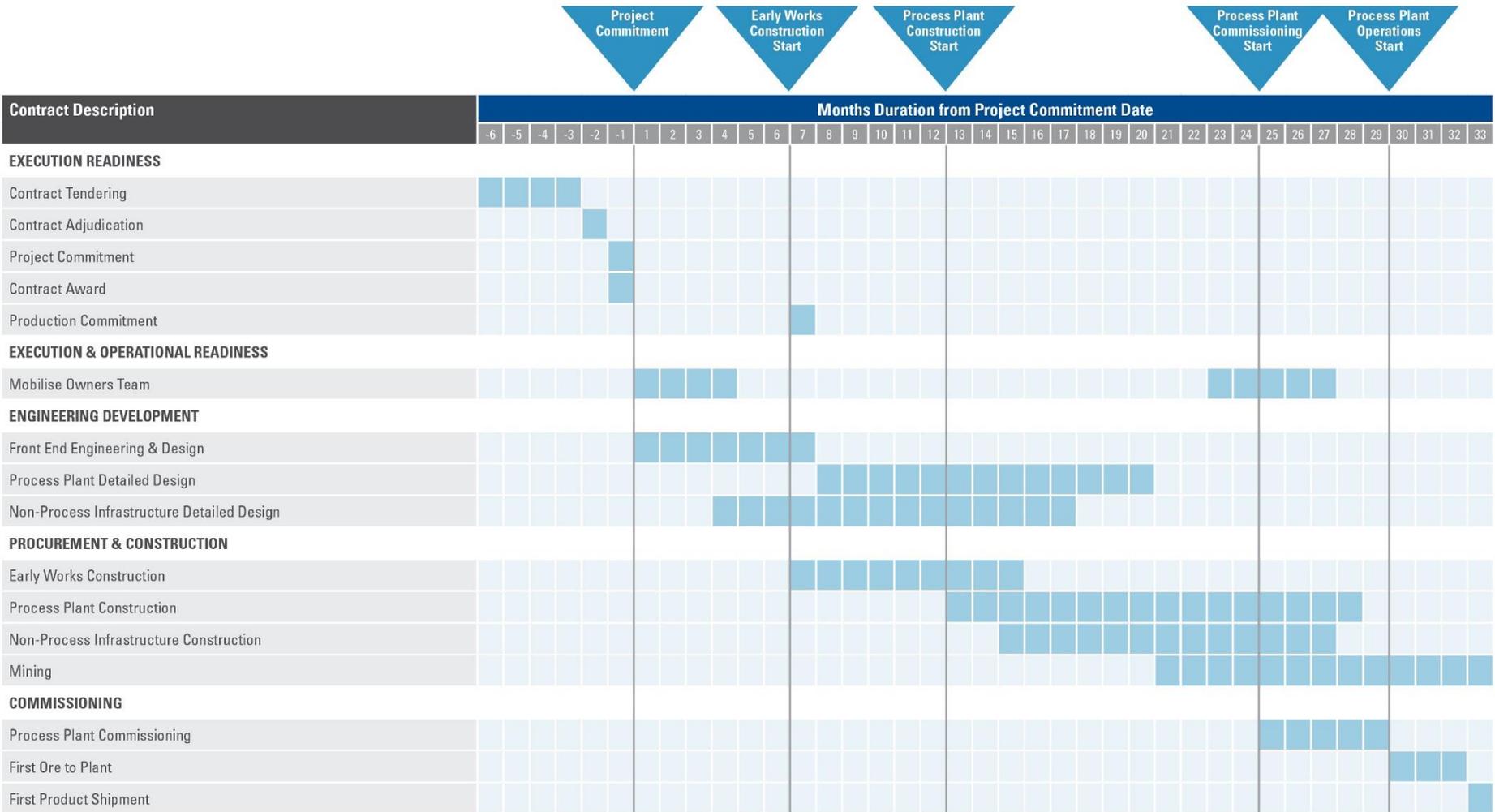
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- Arafura looking to secure a A\$1,146m<sup>(1)</sup> in new capital to execute the Nolans Project
- Potential capital sources include equity, debt, JV and/or project selldown with a strategic investor
- DFS completion and environmental approval are critical enablers for engagement with funding partners



*(1) Expected peak funding includes pre-production capital, sulphuric acid plant, working capital and capital escalation. Excludes financing costs.*

# Production Timeline





## Contact:

Level 3, 263 Adelaide Terrace  
Perth, WA, 6000, Australia

T: +61 8 6210 7666

E: [arafura@arultd.com](mailto:arafura@arultd.com)

# Appendices

# Experienced Board



**IAN KOWALICK**  
NON-EXECUTIVE CHAIRMAN

Ian Kowalick has qualifications in science, engineering, economics, and finance. From 1995 to 2000, he held the most senior management position in the South Australian public sector, and is currently the Chairman of the South Australian Forestry Corporation Board. Ian is a board member of the Northern Territory Power and Water Corporation.



**GAVIN LOCKYER**  
MANAGING DIRECTOR

Gavin Lockyer's diverse, global experience has provided management and leadership opportunities in a range of disciplines including; Accounting, Financial & Investment Banking, Major Resource Development & Operations, and Global Bank Treasuries. Over the past 20 years his career has exposed him to business practices in North America, Europe, and Australasia.



**CHRIS TONKIN**  
NON-EXECUTIVE DIRECTOR

Chris Tonkin has over 35 years' experience as a senior business executive with a broad industry background in business generation, management, and strategy development. He is a member of Arafura Resources' Remuneration and Nomination and Audit and Risk Committees and is also Chairman of Lakes Oil NL.



**QUANSHENG ZHANG**  
NON-EXECUTIVE DIRECTOR

Quansheng Zhang holds a Doctoral degree in Engineering and a Masters degree in Geophysical Prospecting. He is based in Nanjing in the Peoples Republic of China and is the General Manager of Hong Kong East China Non-Ferrous Mineral Resources Co Ltd (HKECE). Quansheng has over 30 years of mineral prospecting and exploration experience, and expertise in mineral resource surveys and geophysics.



**MARK SOUTHEY**  
NON-EXECUTIVE DIRECTOR

Mark Southey has previously held senior executive positions with Honeywell and ABB both in Australia and internationally, and more recently was part of the global executive leadership team within WorleyParsons, where he held the position of Group Managing Director for the Minerals, Metals and Chemicals Sector.

# Experienced Management



**RICHARD BRESCIANINI**  
GENERAL MANAGER EXPLORATION &  
DEVELOPMENT

Richard has over 30 years' experience in the minerals industry. He worked with BHP Minerals on base and precious metals exploration programs throughout Australasia and North America, contributing to significant economic discoveries at Eloise (copper-gold) and Cannington (silver-lead-zinc). Thereafter he led the Northern Territory Government's Geological Survey as its Director from 2003 to 2007 before joining Arafura.



**LLOYD KAISER**  
GENERAL MANAGER SALES &  
MARKETING

Lloyd has more than 10 years' experience in the sales and marketing of industrial minerals into high value sector markets including the nuclear, automotive, and advanced ceramics sectors. Prior to joining Arafura, he held several senior positions in account management, business development and marketing across a diverse range of commodities and chemicals including alumina, coal, industrial minerals, refractories, and ceramics.



**PETER SHERRINGTON**  
CHIEF FINANCIAL OFFICER & COMPANY  
SECRETARY

Peter commenced employment with Arafura in 2008 as Commercial Manager and was appointed Chief Financial Officer in July 2013. He has more than 20 years' experience in professional and corporate roles in Perth. Prior to working with Arafura, he held senior finance and commercial positions with several ASX and public unlisted entities. He has also worked in public practice for 10 years in the areas of business services and corporate advisory.



**BRIAN FOWLER**  
GENERAL MANAGER NT & SUSTAINABILITY

Brian has worked for over 40 years in private sector mineral companies developing a range of commodities, including rare earths, base metals, and gold. Brian is a member of the Northern Territory Mining Board, Management Board of the Northern Territory Minerals Council of Australia, and a member of Work Health & Safety Advisory Council of the Northern Territory.

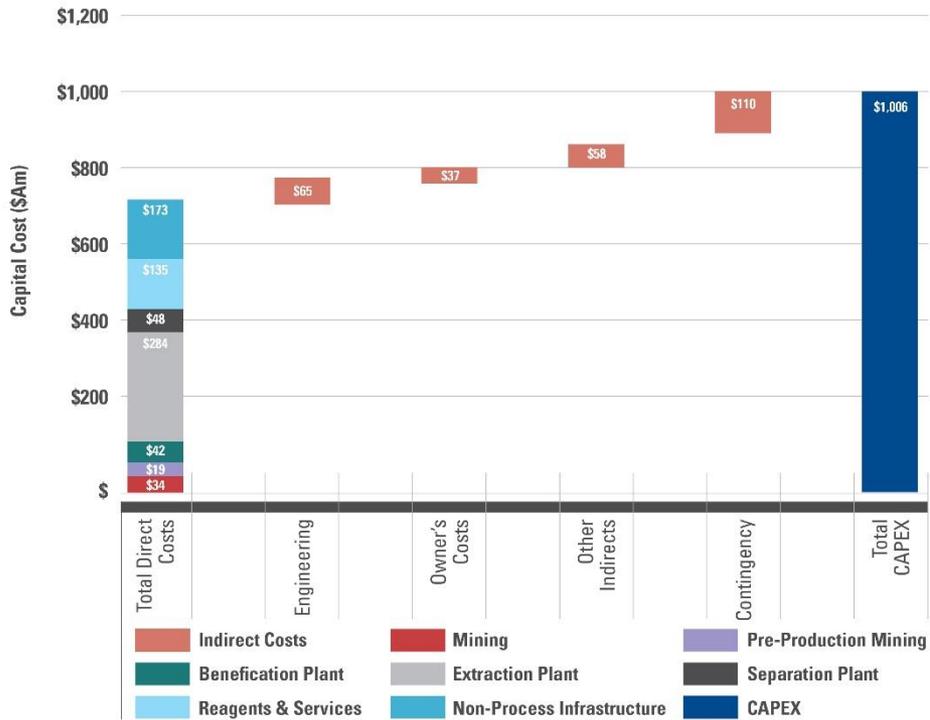


**STEWART WATKINS**  
GENERAL MANAGER PROJECTS

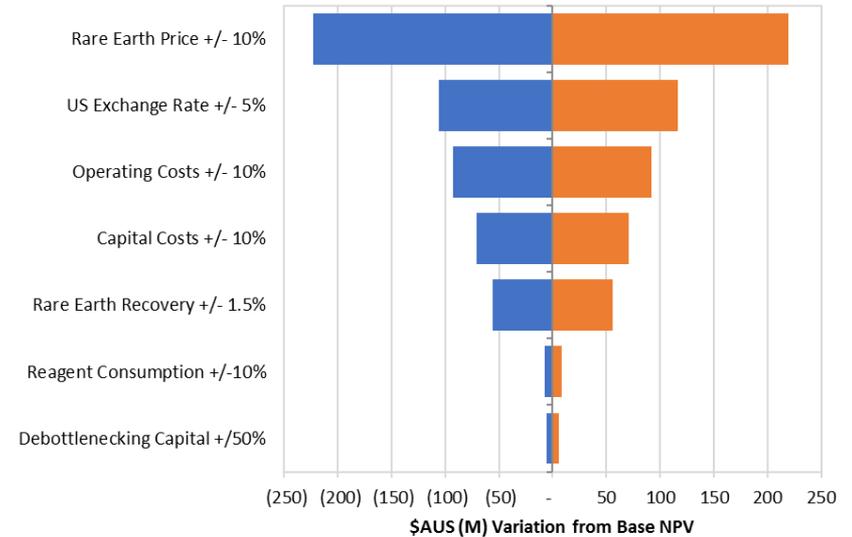
Stewart has 25 years' experience in many facets of the mining industry including operations, engineering consulting, project development and management. Stewart is a Fellow of the AusIMM.

# Capital Cost Breakdown & NPV Sensitivity

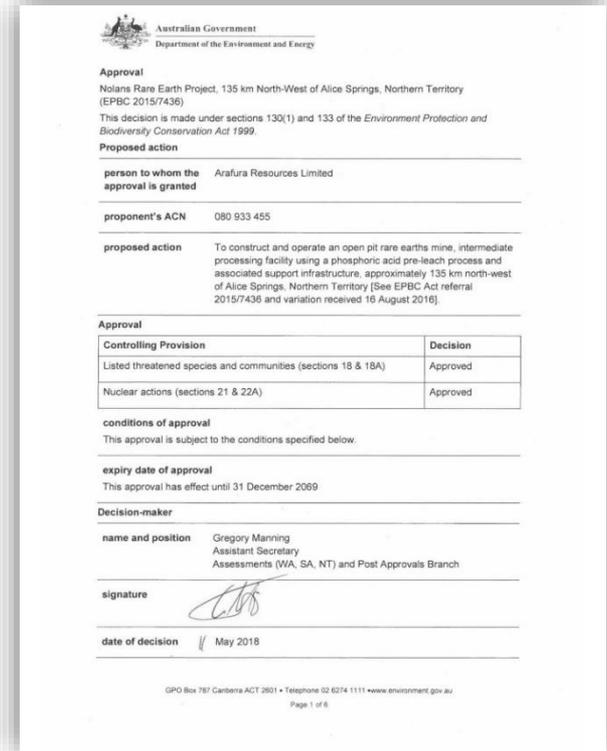
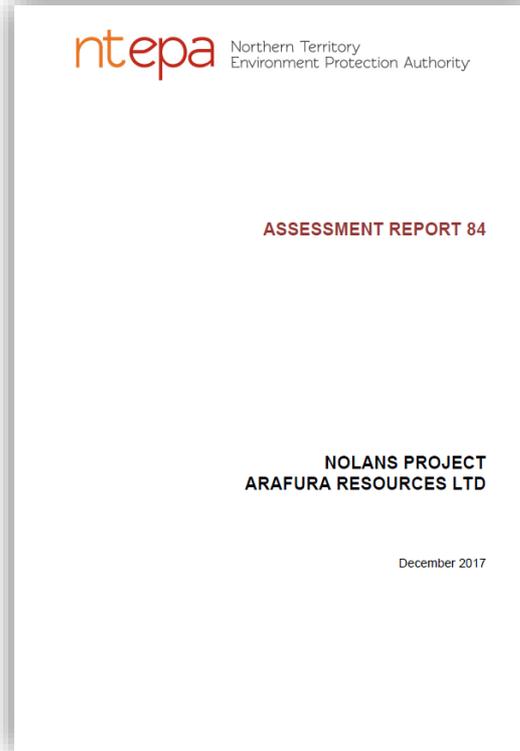
## Capital Expenditure Breakdown



## Key Sensitivities



# Environmental Approvals Secured



## NT Environment Protection Authority (EPA) Recommends Environmental Approval

*"The NT EPA considers that ..... the Project can be managed in a manner that ..... avoids significant or unacceptable environmental impacts and risks."*

Assessment completed for mining, beneficiation and extraction processing at the Nolans site