

## MARDIE SALT & POTASH PROJECT

### FEASIBILITY STUDY CONFIRMS WORLD CLASS OPPORTUNITY

BCI Minerals Limited (ASX: BCI) is pleased to report the key results of the Definitive Feasibility Study (DFS) on its 100% owned Mardie Salt & Potash Project. This announcement should be read together with the cautionary statements on page 3 and the attached DFS Summary.

The DFS confirms Mardie can become a globally significant Tier 1 salt and sulphate of potash (SOP) project offering attractive financial returns for more than 60 years, potentially making it one of the longest life projects developed in Australia for decades.

Based on the positive DFS results, the BCI Board has approved the Company advancing the Project towards a final investment decision by early 2021.

Key results of the DFS include:

- Positive business case established for production of 4.4Mtpa of high purity salt and 120ktpa of premium SOP fertiliser.
- DFS demonstrates NPV<sub>7</sub> of \$1,197M (pre-tax real), annual steady state EBITDA of \$197M, total revenue of \$22 billion and total net cash flow of \$10 billion over 60 years.
- Direct capital cost estimate of \$580M for all production and port infrastructure. Additional capital cost provision for detailed design, owner's costs, project management, growth allowances and contingencies of \$199M, resulting in total capital cost of \$779M. Additional working capital and funding costs to be incurred during construction.
- Operating cost estimates show competitive salt costs with other Western Australian operations, and SOP operating costs in the lowest quartile globally.
- Project funding initiatives well progressed, including negotiation of indicative debt term sheets with the Australian Federal Government's Northern Australia Infrastructure Facility (NAIF) and a number of Australian and international banks. Discussions with potential cornerstone equity investors are underway and expected to gain further momentum upon completion of the DFS.
- Experts forecast attractive long-term salt and SOP prices based on strong demand growth in the Asian region.
- Thirteen non-binding salt offtake memoranda of understanding (MOUs) and two SOP non-binding offtake MOUs secured with credible Asian buyers, accounting for 100% of Mardie's three-year salt production and 75% of five-year SOP production.
- Regulatory approvals and tenure well advanced. Mardie's Environmental Review Document (ERD) endorsed by the WA Environmental Protection Agency (EPA) for public review. Native Title agreements including compensation arrangements in place, and port lease documentation being negotiated with the Pilbara Ports Authority (PPA).

- Development schedule targeting final investment decision in Q1 2021, construction commencement in Q2 2021, first salt sales by mid-2024, and first SOP sales by mid-2025.
- DFS workstreams covering engineering, technical, commercial and approvals were managed by BCI with support from industry leading consultants including GR Engineering, Preston Consulting, RPS, Roskill, Argus, Braemar, KPMG and others.

As optimisation potential to the DFS base case, BCI will consider relocation of crystallisers to the recently acquired tenements north of Mardie, which will allow for increased production and lower operating costs. The new tenements also offer sufficient area for additional evaporation ponds which could increase production capacity to 6Mtpa salt and 160ktpa SOP production, making Mardie one of the largest solar evaporation operations globally.

Mardie's green credentials and sustainability are evidenced by its utilisation of an inexhaustible seawater resource, 99.9% of the energy requirements being derived from natural sun and wind energy, and secondary processing of excess salt brine into a high-quality SOP fertiliser.

BCI has ~\$42M cash (as at 31 May 2020) and is well positioned to reach final investment decision without requiring any new capital.

## DIRECTOR COMMENTARY

BCI's Managing Director, Alwyn Vorster, said: *"The DFS delivered positive outcomes in all key project areas and indicates Mardie is technically robust and financially attractive with a potential net present value of more than one billion dollars. An investment of \$20M has been made over the past 18 months to deliver the high-quality DFS and we will continue to derisk and add value to the Project over the next few months. This should further increase lender and investor confidence, supporting funding solutions."*

BCI's Chairman, Brian O'Donnell, said: *"Completion of the positive DFS gives BCI the green light to progress confidently towards a final investment decision. The Board views the DFS results as confirmation that the Mardie Project is a compelling value proposition with an attractive market opportunity, green credentials and no insurmountable obstacles to development. Attractive financial returns over many decades, and expansion potential from the new tenements, should result in substantial long-term value and dividends being created for shareholders. We believe Mardie will be a multi-generational asset for northern Australia, delivering new multi-user export infrastructure, tax and royalty revenues, jobs and indigenous engagement."*

-END-

This ASX announcement has been authorised for release by the Board of BCI Minerals Limited.

For further information:

P: +61 8 6311 3400

E: [info@bciminerals.com.au](mailto:info@bciminerals.com.au)

Alwyn Vorster  
Managing Director

Simon Hodge  
Chief Financial Officer

Brad Milne  
Investor Relations Manager

## IMPORTANT NOTICES

The Project aims to produce salt and SOP from a seawater resource, which is abundant, inexhaustible, readily accessible and has a known and consistent chemical composition. The JORC Code does not apply to a project of this nature and accordingly JORC Ore Reserves and Mineral Resources are not reported.

The DFS is based on material assumptions as outlined throughout this announcement and the attached DFS Summary, including as to capital and operating cost estimates, production targets, forecast financial information and the availability of funding. BCI has concluded that all material assumptions are based on reasonable grounds and there is a reasonable basis for making the forward-looking statements included in this announcement and the DFS Summary. However, there is no certainty that they will prove correct or the outcomes will be achieved.

The capital costs and operating costs reported in this announcement and the DFS Summary were prepared by GR Engineering Services Limited (GRES) based on the level of engineering and design completed during the DFS, and comply with the AACE International Class 3 to an accuracy of  $\pm 10-15\%$ . GRES is an experienced engineering consultancy and contracting company with extensive experience in study management and cost estimation. GRES consents to the inclusion of these estimates in this announcement and the DFS Summary in the form and context in which they appear. The production rates reported in this announcement and the DFS Summary, and associated process design and mass balance were prepared by BCI. The production rates have been reviewed by GRES, who consents to the inclusion of the production rates in this announcement and the DFS Summary in the form and context in which they appear.

Braemar AMC Shipbroking (Braemar) has provided a report on seaborne freight data to BCI, from which information has been incorporated into this announcement and the DFS Summary. Braemar does not assume any liability for the use that BCI has made of its report, including in this announcement or the DFS Summary, and neither Braemar nor any of its subsidiaries or its affiliates shall have any responsibility or liability to any person whatsoever in connection with its report and/or the information contained therein and/or any information derived from it and/or any use that any person makes of this announcement or the DFS Summary.

## FORWARD-LOOKING STATEMENTS

This announcement and the DFS Summary contain forward-looking statements. These forward-looking statements are based on BCI's current expectations and beliefs concerning future events at the date of this announcement, and are expressed in good faith. BCI believes it has reasonable grounds for making the forward-looking statements. However, forward-looking statements are subject to risks, uncertainties and other factors, a number of which are set out in Section 15.2 of the DFS Summary named "Risks", which could cause actual results to differ materially from future results expressed or implied by such forward-looking statements. Consequently, forward-looking statements should not be relied on as a guarantee of future performance. Other than as required by law, including the ASX Listing Rules, BCI does not undertake or assume any obligation to update or revise any forward-looking statement contained in this announcement or the DFS Summary.

## ABOUT BCI MINERALS

BCI Minerals Limited (ASX:BCI) is an Australian-based company that is developing a salt and potash business supported by iron ore royalty earnings.

BCI is rapidly advancing its 100% owned Mardie Salt & Potash Project, a potential Tier 1 project located on the West Pilbara coast in the centre of Australia's key salt production region.

Mardie will produce 4.4Mtpa of high-purity salt (>99.5% NaCl) and 120ktpa of sulphate of potash (SOP) (>52% K<sub>2</sub>O) via solar evaporation of seawater. Using an inexhaustible seawater resource and a production process driven mainly by natural solar and wind energy, Mardie is a sustainable opportunity to supply the salt and potash growth markets in Asia over many decades.

A Definitive Feasibility Study (DFS) on the Mardie Project was completed in Q2 2020. A Final Investment Decision (FID) is targeted in early 2021 with first construction planned to commence by mid 2021.

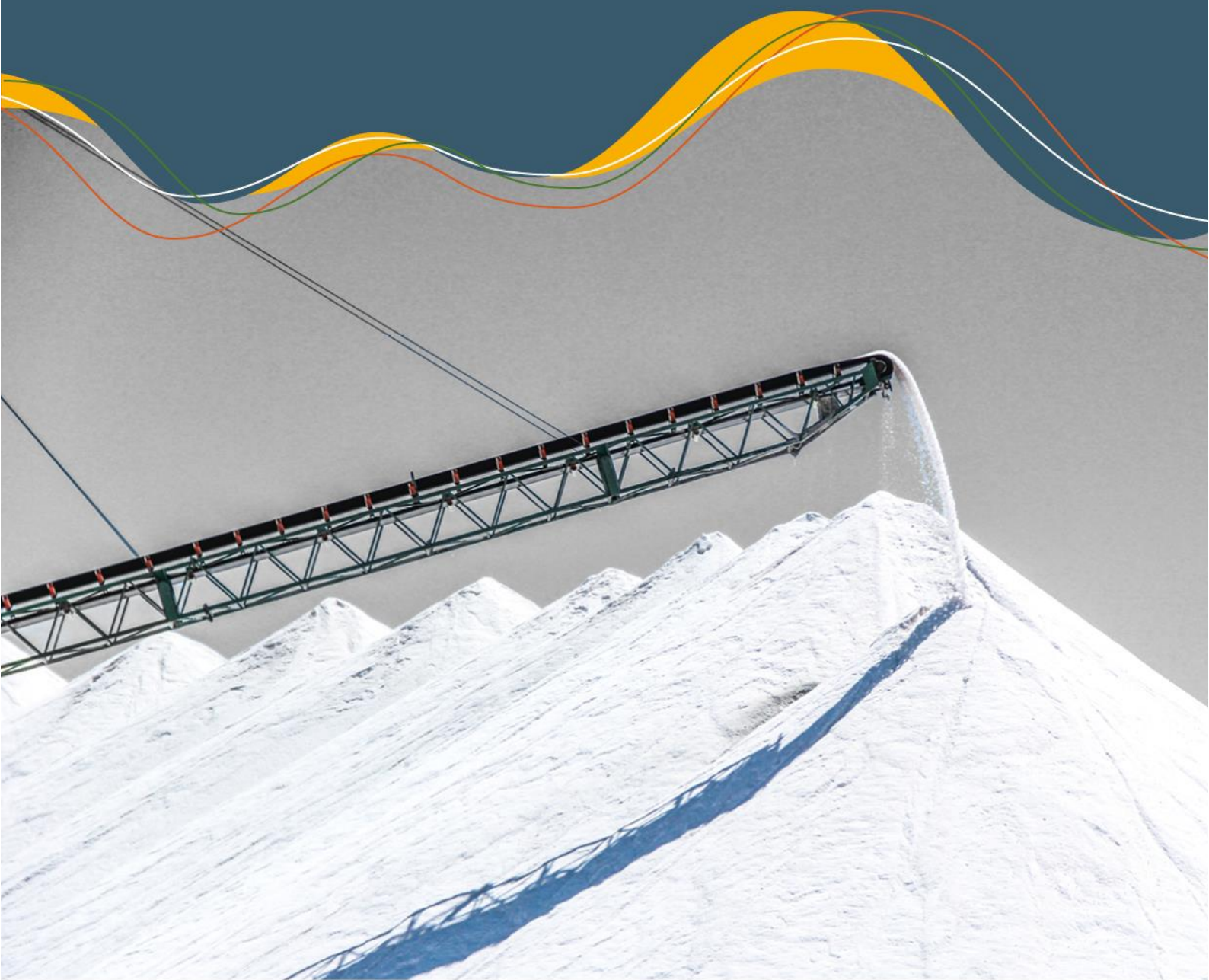
BCI receives quarterly royalty earnings from Iron Valley, an iron ore mine located in the Central Pilbara region of Western Australia which is operated by Mineral Resources Limited (ASX:MIN). BCI's EBITDA from Iron Valley for the first nine months of FY20 was A\$19.5M.

## KEY STATISTICS

<b>Shares on issue:</b>	398.9 million	
<b>Cash in bank:</b>	\$42.3 million	as at 31 May 2020
<b>Board:</b>	Brian O'Donnell	Non-Executive Chairman
	Alwyn Vorster	Managing Director
	Michael Blakiston	Non-Executive Director
	Jenny Bloom	Non-Executive Director
	Garret Dixon	Non-Executive Director
<b>Major shareholders:</b>	Wroxby Pty Ltd	29.2%
<b>Website:</b>	<a href="http://www.bciminerals.com.au">www.bciminerals.com.au</a>	

# MARDIE SALT & POTASH PROJECT

## DEFINITIVE FEASIBILITY STUDY



**DFS Summary**

30 June 2020

 **BCI** MINERALS  
LIMITED

## TABLE OF CONTENTS

SUMMARY .....	3
1. INTRODUCTION .....	10
2. GEOLOGY AND GEOTECHNICAL .....	14
3. CLIMATE AND HYDROLOGY .....	16
4. APPROVALS .....	17
5. TENURE AND LAND ACCESS .....	18
6. DESIGN AND PROCESSING .....	20
7. SUPPORTING INFRASTRUCTURE .....	29
8. PORT .....	31
9. PROJECT IMPLEMENTATION AND OPERATIONS .....	35
10. CAPITAL COST ESTIMATE .....	39
11. OPERATING COST ESTIMATE .....	43
12. MARKET ANALYSIS .....	46
13. FINANCIAL EVALUATION .....	55
14. PROJECT FUNDING .....	59
15. VALUE OPPORTUNITIES AND RISKS .....	61
16. CONCLUSIONS AND NEXT STEPS .....	64

## SUMMARY

The Mardie Salt and Potash Project (Mardie or the Project) is 100% owned by Mardie Minerals Pty Ltd, a wholly-owned subsidiary of BCI Minerals Limited (BCI). The Project presents a rare and attractive opportunity to develop a large-scale, multi-generational solar evaporation operation on the Pilbara coast of Western Australia (WA).

The Pilbara coast is one of the world's premier regions for solar salt production. Five existing solar evaporation salt projects owned by Rio Tinto and major Japanese companies have been operating successfully in this region for up to fifty years, producing a high quality and reliable salt product which is consistently in high demand in the chemical and other industries.

Mardie's site has all the critical characteristics for establishing a large-scale solar evaporation operation, including: optimum climate conditions (high temperatures, low rainfall, low humidity, and high windspeeds); a large area (~100km<sup>2</sup>) of impermeable mudflats as an ideal floor for evaporation ponds; minimal environmental and heritage sensitivities; and a coastal location for low cost shipping to Asian markets.

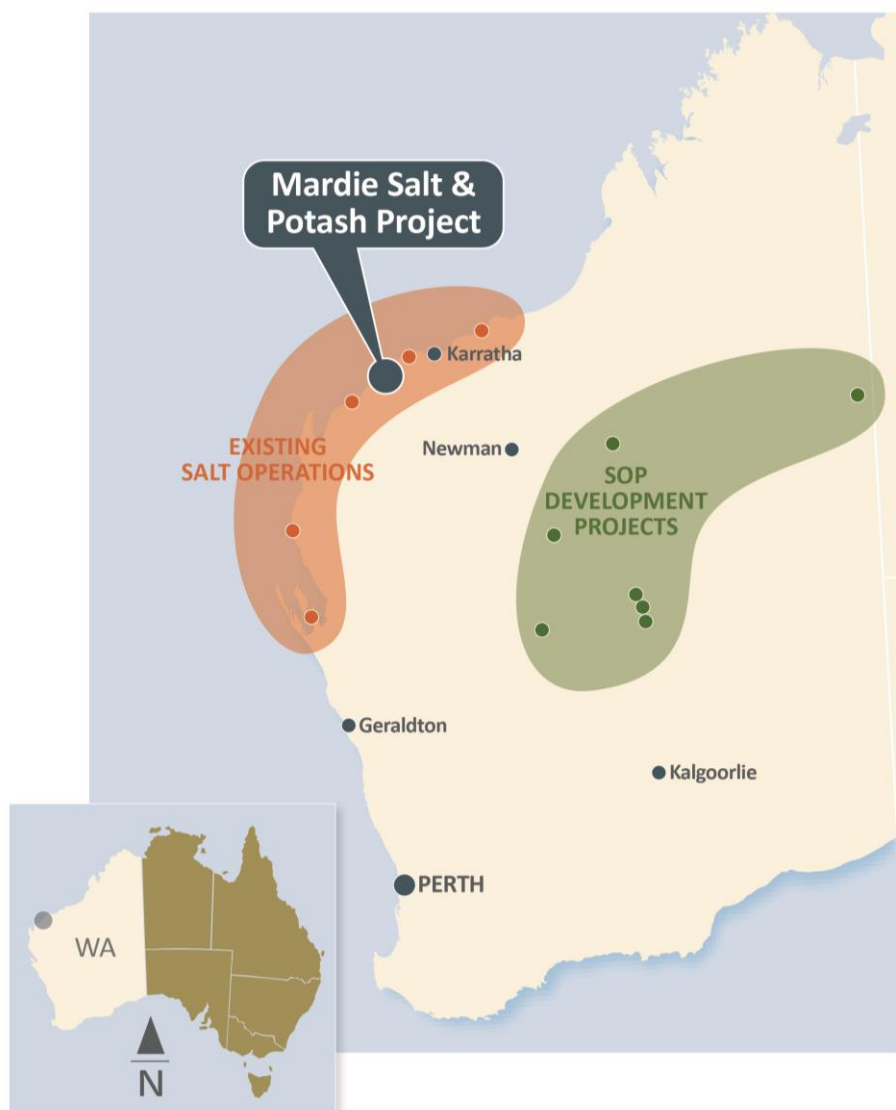


Figure 1: Mardie Project Location - Western Australia

At Mardie, an inexhaustible seawater resource will be concentrated through solar and wind evaporation to sustainably produce 4.4 million tonnes per annum (Mtpa) of high purity sodium chloride (NaCl) salt and 120 thousand tonnes per annum (ktpa) of sulphate of potash (SOP or  $K_2SO_4$ ) fertiliser for supply to the growing chemical and agricultural industries in Asia over an operating life of at least 60 years.

Salt is one of the most widely used substances on earth, with over 10,000 direct and indirect uses. It has a large and mature market with 350Mtpa consumed globally in 2019. SOP is a premium fertiliser containing essential macro-nutrients (potassium and sulphur) for plant growth. It accounts for approximately 10% of the global potash market of 70Mtpa, with the majority supplied as the chloride containing muriate of potash (MOP or KCl).

A Definitive Feasibility Study (DFS) commenced in Q1 2019 and was completed in June 2020 at a cost of \$20M. The DFS was managed by BCI with support from GR Engineering Services Limited (GRES) as lead DFS engineer, and with additional support from Worley, CMW Geosciences, Preston Consulting, RPS, Roskill, Argus Consulting, Braemar ACM Shipbroking, KPMG and others. Key Project parameters and highlights of the DFS are shown in Table 1.

**Table 1: Key Project Parameters**

Key Project Parameters	
Production Rate	4.4Mtpa Salt (>99.5% NaCl) 120ktpa SOP (>52% $K_2O$ ) (with optimisation and expansion potential)
Operating Life	Minimum 60 years <sup>1</sup>
Site Conditions	Coastal location with ready access to seawater High temperature, low rainfall, low humidity and high wind – 2,895mm annual net evaporation Extensive mudflats (100km <sup>2</sup> ) hosting clay soils ideal to retain water in ponds Availability of construction materials
Environmental Approvals	>3 years surveys and studies; Public review process underway Ministerial approval targeted by early 2021
Production Processes	9 evaporation ponds 34 salt crystallisers and 18 SOP crystallisers Salt plant and SOP plant
Port Facility	Multi-user port with third party access capability 2.3km trestle jetty 3,000tph shiploader
Shipping	Transshipping using 12,000dwt self-propelled, self-unloading transshipment vessel Supramax, Panamax and Capesize vessels loaded 28km offshore
Personnel	Construction: peak workforce (onsite and offsite) of 470 Operations: steady-state workforce of 190



Key Project Parameters	
Economics (real, 2020 \$) <sup>2</sup>	Capital costs - \$779M <sup>3</sup> Salt all-in sustaining costs (AISC) - \$20.3/t FOB SOP AISC - \$310/t FOB Pre-tax NPV <sub>7</sub> - \$1,197M (ungeared) <sup>4</sup> Annual EBITDA - \$197M Significant value upside via optimisation and expansion options

1 – Input resource is an infinite supply of natural seawater which could continue for 100+ years.

2 – All dollar values presented in Australian dollars unless specified.

3 – Excludes working capital and funding costs.

4 – Discount rate supported by low interest rate environment and very long project life. 7% real discount rate equates to ~9% nominal.

Mardie will be the first new major salt project developed in Australia in two decades and the only Australian operation producing commercially saleable salt and SOP. It will be one of the largest single salt operations in Australia, and with the potential expansion into newly acquired tenements (not included in the DFS), it can become one of the largest evaporative operations globally.

Production of a high value by-product from waste seawater adds downstream processing credentials to the Project, which aligns with the WA Government’s long-standing objective for the resources industry to include secondary processing in project planning.

In addition, the Project has strong “green” credentials given 99.9% of the energy requirement is derived from natural sun and wind to evaporate seawater, as defined by an independent KPMG study.

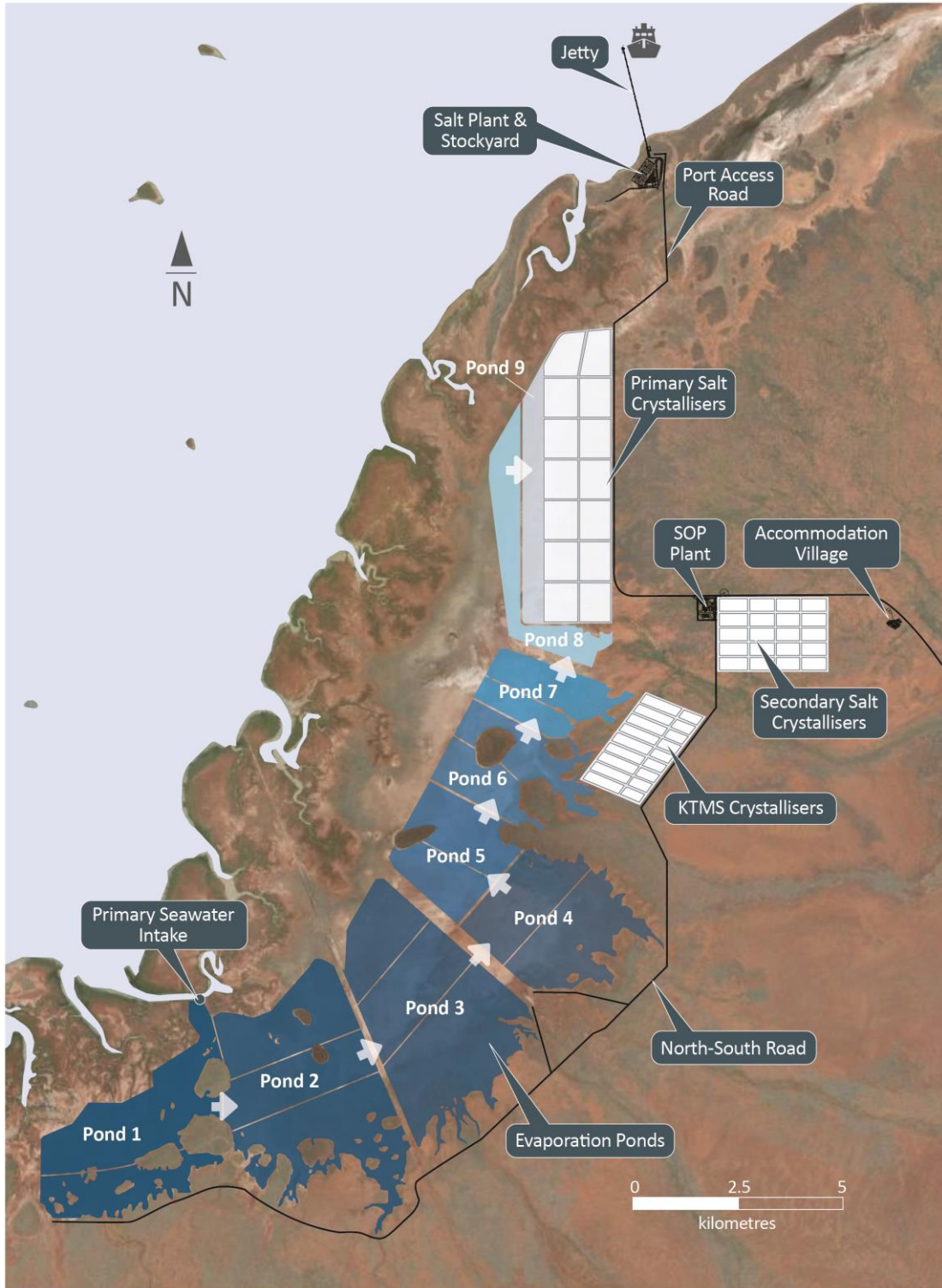
## Project Description

The primary project components are listed below and the layout is shown in Figure 2:

- Seawater intake pumping station, salt evaporation ponds and crystallisers
- Salt wash plant
- SOP crystallisers and SOP plant
- Port facilities
- Supporting infrastructure

The production concept involves a time-proven and low risk process. Seawater is pumped from the ocean into the first evaporation pond (Pond 1) and progressively concentrated via natural sun and wind evaporation energy through a series of nine evaporation ponds over an eighteen-month period. Upon reaching NaCl saturation point in Pond 9, concentrated brine is transferred to the salt crystallisers where salt precipitates in solid form. The remaining brine liquid (bitterns) is drained from the salt crystallisers and raw salt is then harvested and purified in a two-stage counter-current wash plant to produce 4.4Mtpa salt with >99.5% NaCl content.

A unique attribute of Mardie compared to WA's five existing salt producers is that it will also produce SOP as a by-product. Bitterns from the salt crystallisers, which is deficient in sodium but rich in potassium and magnesium, is pumped to the SOP crystallisers where kainite-type mixed salts (KTMS) precipitate. Approximately 770ktpa of KTMS is harvested and converted to 120ktpa of granular SOP product with >52% K<sub>2</sub>O in a chemical flotation processing plant.



**Figure 2: Mardie Project Layout**

Final salt and SOP products will be exported from a purpose-built port facility at the Mardie site. A range of port options have been studied and a transshipment facility best satisfies the marine environment and product volumes to be exported by BCI. DFS studies confirmed the optimum port solution is a 2.3km jetty and a 4.5km dredged navigation channel into open waters. The jetty has been designed to withstand a 1-in-500 year extreme weather event. A navigation channel will accommodate a 12,000 deadweight tonnes (dwt) self-propelled and self-unloading transshipment vessel (TSV).

Salt product will be conveyed from salt stockpiles to the jetty head and loaded onto the TSV at a rate of 3,000 tonnes per hour (tph). SOP will be transported by truck from a SOP storage shed to a receival hopper, conveyed to the jetty head and loaded onto the TSV at a 700tph rate. The TSV will transport product 15 nautical miles (28km) offshore to ocean-going vessels (OGVs) at anchor.

BCI is planning to ship salt to customers in OGVs ranging from Supramax (50,000dwt) to Capesize (160,000 dwt). The use of larger average OGVs will reduce overall freight costs materially compared to other WA salt operations with berth constraints. SOP can be shipped by either small vessels or together with salt shipments, where the products have customers with a common or nearby port.

## Tenure and Approvals

Significant project tenure and approvals activities have been completed over the last 18 months as part of the DFS. Mardie will require approximately 180km<sup>2</sup> of tenure granted through a combination of Mining Leases, General Purpose Leases, Miscellaneous Licences and Port Leases. Key tenure required for the construction phase is targeted to be secured by Q1 2021, subject to finalising access agreements with third parties.

Mardie's environmental review document (ERD) has been completed incorporating three years of surveys, studies and reports in collaboration with the WA Environmental Protection Authority (EPA) and the Federal Department of Agriculture, Water and Environment (DAWE). The ERD was accepted by the EPA and released for public comment in late June 2020, with final Ministerial environmental approval targeted by early 2021.

Native Title agreements have been executed with two Traditional Owner groups and compensation arrangements agreed which facilitates the commencement of construction and operations. Heritage surveys have been completed across the entire Project footprint over the past three years. Registered sites and other heritage places have been identified with the assistance of the Traditional Owner groups and will be managed according to the agreed protocols.

## Market Analysis

Extensive salt and potash industry analysis has been completed by BCI prior to and during the DFS period with the support of independent market experts. BCI has concluded there is an attractive market opportunity for both salt and SOP over the medium to long term.

There is a large, diversified and contestable market for high purity salt in the Asian chemical industry, which is forecast to grow strongly over the next decade. Historical prices for Australian salt delivered into Asia have ranged from approximately US\$33/t to US\$60/t CIF over the last 10 years, with an average of US\$44/t CIF.

Similarly, the global SOP market has a positive outlook driven by growing food demand and an increasing requirement for high quality fertilisers to deliver higher crop yields from reducing arable land. The most commonly reported pricing benchmark for SOP is the FOB NW Europe price for bulk SOP fines (50% K<sub>2</sub>O), which has ranged from US\$417/t to US\$630/t over the last decade, with an average of US\$532/t.

During the DFS, Mardie has achieved positive initial offtake support with 15 non-binding memoranda of understanding (MOUs) executed by credible Asian end-users, for 100% of 3-year salt production and 75% of 5-year SOP production. BCI will aim to convert these non-binding MOUs to binding offtake contracts in support of financing milestones.

## Project Economics

The direct capital cost estimate compiled by BCI's DFS lead engineer, GRES, to an ACE International Class 3 level for all production and export infrastructure is \$580M. The indirect capital cost, including owner's cost, project management, growth allowances and contingencies, is \$199M, resulting in a total capital cost of \$779M. The capital costs are based on the level of engineering and design developed during the DFS.

All-in sustaining operating cost (AISC) estimates compiled by GRES to an ACE International Class 3 level are \$20.3/t for salt (FOB) and \$310/t for SOP (FOB). This equates to US\$13.8/t (FOB) for salt and US\$211/t (FOB) for SOP, converted at an AUD:USD exchange rate of 0.68. Mardie's delivered salt cost of \$36.5/t (US\$25/t) is expected to be competitive with existing large WA salt operations. If SOP is included in the salt cost structure as a by-product credit, Mardie will be one of the lowest cost suppliers of salt into the Asian market.

The DFS delivered robust financial metrics as presented below:

**Table 2: Project Financial Summary<sup>1</sup>**

Item	DFS Outcome
Pre-tax NPV <sub>7</sub> (ungeared) <sup>2</sup>	\$1,197M
Pre-tax IRR (ungeared)	15.3%
Steady-state EBITDA per annum	\$197M
NPV <sub>7</sub> to capex ratio	1.5x
Payback period (from first salt sales)	6.7 years
Life of Production	60 years (minimum)

1 – All dollar values presented in Australian dollars unless specified.

2 – Discount rate supported by low interest rate environment and very long project life. 7% real discount rate equates to ~9% nominal.

BCI is targeting a funding mix comprising 65-70% debt and 30-35% equity to fund the \$779M capex plus additional working capital, debt interest and other funding costs. BCI's existing shareholder base has the capacity to support a large proportion of the equity required to develop the Project and additional equity will be sought from other large investors and the general investor market. Discussions with the Northern Australia Infrastructure Facility (NAIF) and commercial bank debt providers are well advanced to support the required debt funding.

BCI's recent acquisition of tenement rights immediately north of the Mardie Project presents significant value upside. Optimisation changes could involve increasing the capacity by reconfiguring and expanding the evaporation ponds and relocating all crystallisers closer to the port. This is likely to result in a production increase of up to 10% and lower operating costs based on scale. The optimisation opportunity has not been included in the DFS and will be developed further in the next 6-9 months in parallel with Front End Engineering Design (FEED) work. The new northern land area also offers a longer term opportunity for larger scale expansion of the Project to 6.0Mtpa salt and 160ktpa SOP, which would make Mardie one of the largest solar evaporative operations globally, and should result in further value upside. This expansion opportunity has not been included in the DFS and will be developed in the longer term.

## Conclusions

The Mardie DFS outcomes indicate that the production of 4.4Mtpa of high purity salt and 120ktpa of premium SOP fertiliser is technically and financially viable. DFS results confirm a compelling value proposition with a pre-tax NPV<sub>7</sub> or more than \$1B, supported by an attractive market opportunity and no insurmountable obstacles to development.

Mardie can become a potential Tier 1 asset categorised by its long life (minimum 60 years), top quartile scale, lowest quartile salt operating costs (after SOP by-product credits) and high-quality salt and SOP products.

With attractive financial returns over many decades and expansion potential from the new tenements, development of the Mardie Project should result in considerable long-term value and dividends being created for shareholders.

## Next Steps

Substantial additional FEED, approvals and tenure, ongoing site trials and early construction works are planned prior to first construction. This further commitment to de-risk the Project will provide a high confidence level in the cost estimates and the Project's value and risk profile ahead of a Final Investment Decision (FID).

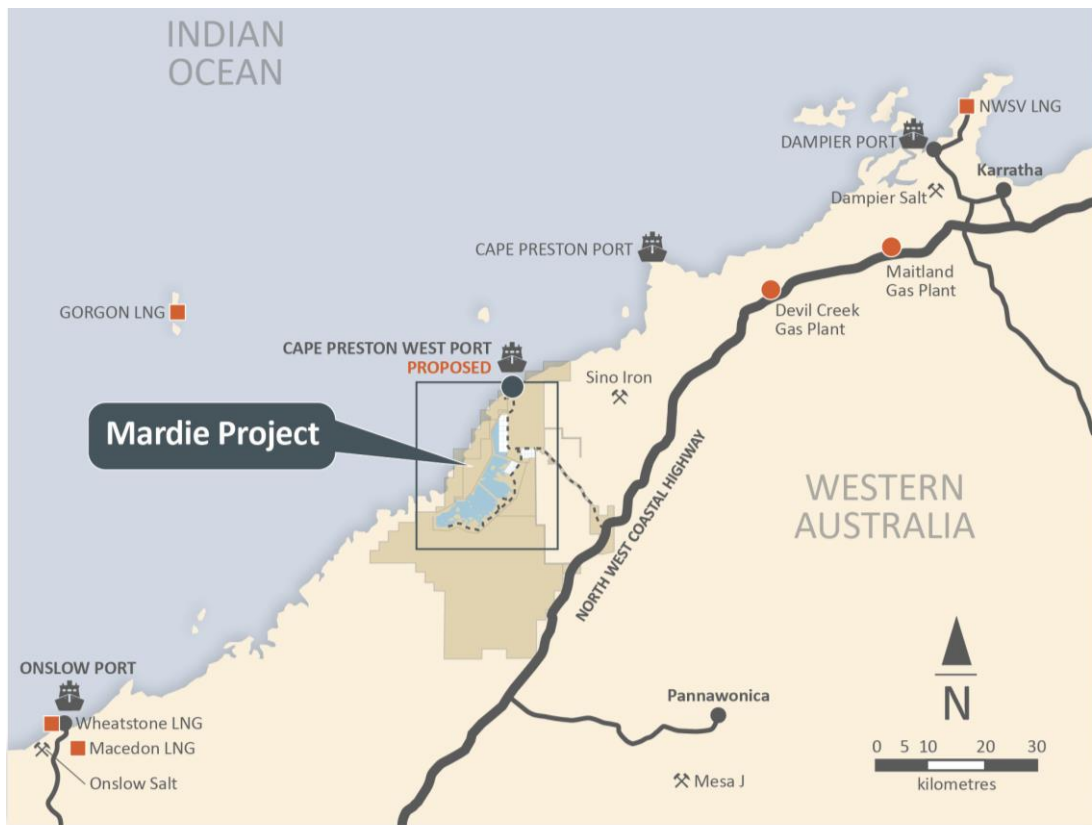
BCI has a strong cash position at June 2020 and ongoing royalties from its iron ore interests, making it well placed to complete this next phase of work at Mardie.

An FID by the BCI Board is targeted in early 2021, which will be followed by completion of the funding task. Construction can commence in Q2 2021, which will allow for first salt sales by mid-2024 and first SOP sales by mid-2025.

# 1. INTRODUCTION

## 1.1 Location

The Mardie Project is located on the WA Pilbara coast, approximately 135km by road from the regional city of Karratha, a major mining and natural gas service centre. The location of Mardie in a regional context is shown in Figure 3.



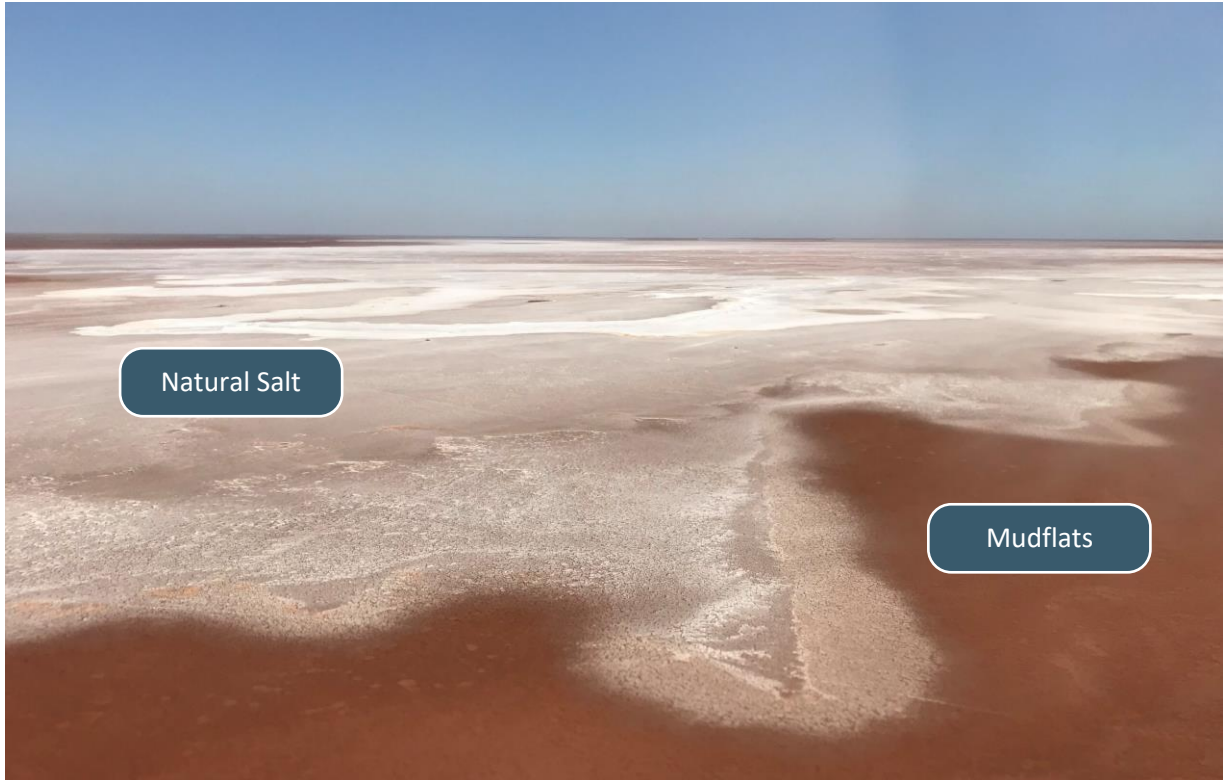
**Figure 3: Mardie Project Location – Pilbara WA**

The Project site has all the essential pre-requisites for the production of salt and SOP from solar evaporation of seawater, such as climate, topographical and geotechnical ground conditions. The Mardie tenements include an area with naturally-occurring mudflats that are inundated by seawater during high tides (see Figure 4).

## 1.2 Previous Studies

A number of studies have been completed over the last few years to evaluate the technical and economic viability of a solar salt project at Mardie, including:

- Mardie Salt Project Scoping Study, ASX announcement released on 18 July 2017
- Mardie Salt and Potash Project Pre-Feasibility Study (PFS), ASX announcement released on 1 June 2018
- Mardie Salt and Potash Project PFS Optimisation Study, ASX announcement released on 17 May 2019



**Figure 4: Mardie Site - Natural Salt Crystallisation on Mudflats**

### 1.3 DFS Scope and Management

The DFS commenced in Q2 2019 with the objective of establishing a positive business case (with design and costing to an AACE International Class 3 standard) for a ~4Mtpa salt and ~100ktpa SOP project. Boundary conditions included for the Project layout to remain within the current BCI Exploration Licence area, the protection of coastal vegetation and the protection of culturally sensitive areas. The DFS was completed in an eighteen-month period at a cost of \$20M.

BCI's DFS team consisted of multiple workstreams managed by BCI executives: Project design, engineering and costing (Project Director, T Chamberlain); approvals and tenure (GM Sustainability, M Klvac and General Counsel, S Majteles); marketing (Marketing Manager, M Gurr); commercial including financial modelling and funding (CFO, S Hodge and Commercial Manager, B Milne). All DFS teams reported to the BCI Managing Director.

All teams were supported by a number of specialist consultant companies including the key consultants listed in Table 3. GRES was engaged as the lead DFS engineer and assisted BCI in jointly managing the various sub-consultants for the DFS.

GRES has compiled and reviewed the overall capital and operating cost estimates based on the level of engineering and design completed to-date, and has confirmed the estimates to be Class 3 as defined by AACE International with an estimate accuracy of  $\pm 10-15\%$ .

**Table 3: Consultants' Scope of Work**

Consultant	Component	Scope of Work
GR Engineering Services	Lead DFS engineer	<ul style="list-style-type: none"> <li>• Overall DFS lead consultant</li> <li>• Mass and energy balance (with BCI)</li> <li>• Salt and SOP process design by others and reviewed by GRES</li> <li>• Pond and crystalliser layouts</li> <li>• Civil and bulk earthworks design and estimation</li> <li>• Structural, Mechanical and Piping (SMP) design</li> <li>• Electrical engineering and design</li> <li>• Project infrastructure</li> <li>• Overall capital and operating cost estimates</li> </ul>
Worley	Marine and ocean engineering	<ul style="list-style-type: none"> <li>• Piling design</li> <li>• Jetty and platform design</li> <li>• Mooring analysis</li> <li>• Operability analysis</li> <li>• Jetty capital and operating cost estimates</li> <li>• Coastal engineering for civil rock armour and levee design</li> </ul>
Salt Partners Limited	Salt Purification Plant	<ul style="list-style-type: none"> <li>• Basic design package for the HYDROSAL-XP® salt purification plant</li> </ul>
CMW Geosciences	Geotechnical design	<ul style="list-style-type: none"> <li>• Management of geotechnical drilling program</li> <li>• Geotechnical diamond core logging and testing (landside and marine)</li> <li>• Embankment wall design review and geotechnical modelling</li> </ul>
Hagstrom Drilling, Probedrill, TAMS and Surrich	Geotechnical studies	<ul style="list-style-type: none"> <li>• Landside diamond drilling and CPTu program by Hagstrom and Probedrill</li> <li>• Offshore diamond drill program by TAMS</li> <li>• Seismic survey of jetty and navigational channel alignment by Surrich</li> </ul>
RPS Australia West Pty Ltd	Surface hydrology	<ul style="list-style-type: none"> <li>• Tidal inundation modelling</li> <li>• Surface water run-off modelling</li> <li>• Road culvert and drainage channel modelling</li> </ul>
RPS Australia West Pty Ltd	Extreme weather modelling	<ul style="list-style-type: none"> <li>• Tidal inundation modelling</li> <li>• Surface water run-off modelling</li> <li>• Road culvert and drainage channel modelling</li> <li>• Extreme weather modelling</li> <li>• Ambient steady-state marine modelling</li> </ul>



Consultant	Component	Scope of Work
Project Consultancy Services Pty Limited	Power supply	<ul style="list-style-type: none"> <li>Gas supply and transmission tariff</li> <li>Independent Power Provider (IPP) tariff</li> </ul>
XCy IT Solutions	IT and communications	<ul style="list-style-type: none"> <li>Telecommunications design and engineering</li> <li>Telecommunications capital cost estimate</li> <li>Telecommunications operating cost estimate</li> </ul>
Braemar ACM Shipbroking	Shipping and ocean logistics	<ul style="list-style-type: none"> <li>Freight strategy</li> <li>Seaborne freight costs</li> <li>Transshipping pre-qualification tender</li> </ul>
Preston Consulting	Environmental approvals	<ul style="list-style-type: none"> <li>Environmental Review Document</li> </ul>
O2 Marine	Environmental impact studies	<ul style="list-style-type: none"> <li>Various environmental impact studies</li> <li>Dredge spoil impact assessment</li> </ul>
Baird Australia	Environmental impact studies	<ul style="list-style-type: none"> <li>Sedimentation study of navigation channel</li> <li>Dredge spoil plume modelling</li> <li>Waste bitterns outfall modelling</li> </ul>
Hetherington Exploration and Mining Title Services	Tenement applications and compliance	<ul style="list-style-type: none"> <li>Tenure management consultants</li> </ul>
KPMG	Commercial and debt funding advisory services	<ul style="list-style-type: none"> <li>Energy study and Indigenous engagement strategy</li> <li>Debt funding coordination</li> <li>Financial modelling</li> </ul>
Gilbert + Tobin	Tenure and access agreements	<ul style="list-style-type: none"> <li>Legal support in securing land access and Project tenure</li> </ul>
Saskatchewan Research Council (SRC) and ALS Metallurgy	Salt and SOP testwork	<ul style="list-style-type: none"> <li>Salt testwork program</li> <li>SOP testwork program</li> </ul>
Roskill and Shanghai Metals Market (SMM)	Salt market and marketing	<ul style="list-style-type: none"> <li>Salt supply and demand modelling</li> <li>Salt forecast pricing</li> <li>Project competitiveness</li> </ul>
Argus Consulting	SOP market and marketing	<ul style="list-style-type: none"> <li>SOP supply and demand modelling</li> <li>SOP forecast pricing</li> <li>Project competitiveness</li> </ul>

## 2. GEOLOGY AND GEOTECHNICAL

The Project area straddles the coastal plain and salt marshes, extending offshore across tidal flats and into the shallow marine environment along the Pilbara coast. The coastal plain in the Project area is a broad expanse of low-lying alluvium sloping gently seawards, fringed by tidal flats, mangroves, sand dunes and sandy shoals.

BCI conducted extensive landside and offshore geotechnical site investigations across the Project area.

### 2.1 Landside Geotechnical Investigations

To confirm the geological continuity of the clay material across the pond area and understand the foundation conditions for the pond walls, landside diamond drilling and cone penetrometer testing were undertaken by Hagstrom Drilling and Probedrill Geotechnical Survey under the supervision of CMW Geosciences (CMW). A total of 54 HQ3 rotary diamond drill holes (DDH) and 162 cone penetrometer tests (CPTu) were completed for a total drill depth of 1,092m and 609m of recovered diamond core. A further 121 test pits were excavated to supplement the drilling and CPTu program. Figure 5 shows the locations of the geotechnical drill holes and test pits.

Surface mapping of the Project's geology and field investigations identified suitable borrow materials for construction and provided design input parameters for the pond embankment walls.

The geotechnical studies confirmed the geotechnical characteristics of the landside area pose limited constraints on the project design and outcomes were incorporated into the DFS engineering design.

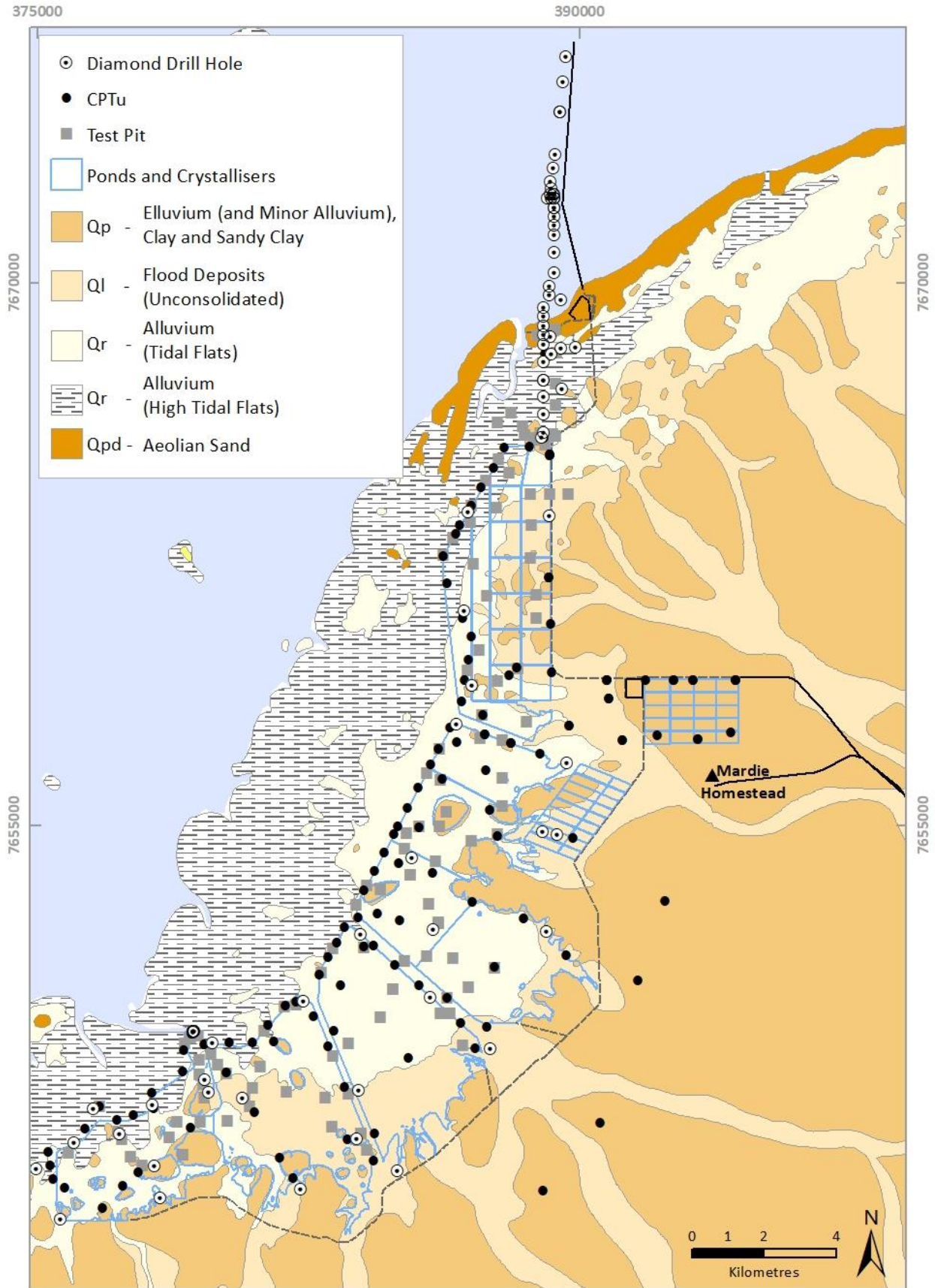
### 2.2 Offshore Geotechnical Investigations

In the offshore area, the focus of the geotechnical site investigations was to assess the potential for a piled jetty foundation and the nature of the material to be dredged for navigational requirements (refer Figure 5). Offshore diamond drilling was completed by TAMS Group and geotechnical assessment was completed by CMW and Worley.

The investigation was completed using a submersible track-mounted diamond drill rig, operating with diver control in the intertidal zone with a land rig onshore. A total of 29 HQ3 DDH and 13 CPTu holes were completed to depths of between 4m and 22m. A seismic survey was also completed along the jetty alignment and six push tube samples were collected along the navigation channel alignment to depths of between 0.3m and 0.85m. Site investigations were supplemented with a range of field and laboratory test work to provide the necessary design input parameters.

Results confirmed there are satisfactory sub-surface foundation conditions to support the jetty structure and a steel piled foundation will be the most appropriate structural system to support the jetty loads.

Navigational requirements for the proposed transshipment vessel will necessitate dredging of a channel and swing basin to a depth of -3.9m Chart Datum (CD) and a berth pocket to -6.7mCD. Subsea geology indicates the majority of dredging is expected to encounter mixed clayey and sandy sediments, which are expected to be mostly soft to firm, or loose to medium dense. Excavation conditions are expected to be well within the range of most common types of dredging equipment.



**Figure 5: Geological Map and Geotechnical Testwork**

### 3. CLIMATE AND HYDROLOGY

A range of climate and hydrological studies have been conducted to inform the DFS design and to address the operational risks associated with surface water management, storm surge and wave energy.

#### 3.1 Climate

Mardie's long dry season and high net evaporation rates are ideal for a highly productive solar evaporation project. The regional climate of the Mardie Project site is classed by the Bureau of Meteorology (BOM) as 'Grassland' which is characterised by hot weather year-round with a summer drought.

Climate data collected from the meteorological station located at the Mardie Station homestead, 1km from the eastern boundary of the Project, has been processed through the Scientific Information for Land Owners (SILO) database and used in the evaporation pond and crystalliser process design. Key input parameters include an annual average rainfall of 295mm per year and a net evaporation rate of 2,895mm per year. These are important input parameters for the production flowsheet. Other factors such as salinity factor on evaporation rates and floor seepage have been verified by BCI through onsite pilot scale operations and testing.

#### 3.2 Hydrology

Understanding the surface hydrological regime of the Project area is important to address the potential impact of water movement to the evaporation ponds and crystallisers with appropriate engineering. A number of studies have been completed including storm surge level analysis, hinterland surface water flow modelling and inundation modelling, with the results incorporated into the DFS design.

Mardie's convenient location on higher ground between the Fortescue and Robe river systems and associated water catchment areas means that surface water flows from land to sea through the Project area are minimal. The Project design also includes an elevated access road to the east of the pond system which acts a diversion bund and directs water flow through drainage channels and around the pond system.

The Project area is protected from damaging sea to land water movement (i.e. storm or cyclone induced surges and waves from west to east) by the island system directly adjacent to the coast and the mangrove forests lining the coast adjacent to the Project area. These two lines of defence, in addition to the Project ponds being located 3-5km from the coast, ensure that the Project has a high level of natural protection.

## 4. APPROVALS

### 4.1 Regulatory Engagement

BCI has been working closely with numerous State and Federal Government departments and other stakeholders to progress the approvals, tenure and Native Title consents required for development of the Project. In recognition of Mardie's importance to WA, the WA Department of Jobs, Tourism, Science and Innovation (DJTSI) has been appointed Lead Agency to support BCI in its interactions with various State Government departments.

### 4.2 Approvals

The Mardie environmental approval has been set a Public Environmental Review (PER) level of assessment administered under a joint agreement by the WA Environmental Protection Authority (EPA) and the Federal Department of Agriculture, Water and Environment (DAWE).

BCI has been working closely with the EPA and DAWE over the last three years and has completed significant environmental surveys and investigations to inform the Environmental Review Document (ERD) and the DFS design.

The EPA and DAWE has recently endorsed the ERD for publication and the ERD was released for a ten-week public review period in late June 2020. EPA and DAWE assessment of the Project is targeted to be completed in Q4 2020 and Ministerial Approval targeted by Q1 2021.

Once approval is granted, BCI can secure the remaining secondary approvals from other government agencies, including the Department of Mines, Industry Regulation and Safety (DMIRS) and the Department of Water and Environment Regulation (DWER).

### 4.3 Native Title and Heritage

The Mardie Project is situated on land of cultural significance to the Yaburara Mardudhunera (YM) People and the Kuruma Marthudunera (KM) People. BCI has Land Access Deeds in place with both Traditional Owner Groups and compensation arrangements for salt and SOP operations have been agreed.

Heritage surveys have been completed across the entire Project footprint over the past three years and registered sites and other heritage places have been identified with the assistance of the Traditional Owner groups. BCI is collaboratively working with Traditional Owners to ensure the areas of higher cultural interest are avoided and appropriately protected, and other areas of cultural interest are managed in alignment with the management plans endorsed by the Traditional Owner groups.

BCI is finalising its Indigenous Engagement Strategy (IES) with support from KPMG, which includes management of Native Title agreements, heritage management, relationship and ongoing structures for engagement, potential Aboriginal employment and procurement management. The strategy is supported by and highly aligned to the existing Land Access Deeds.

## 5. TENURE AND LAND ACCESS

The Mardie Project requires approximately 180km<sup>2</sup> of tenure granted pursuant to the *Mining Act 1978* (WA), the *Land Administration Act 1997* (WA) and the *Port Authorities Act 1999* (WA) - refer Figure 6. All key tenure is anticipated to be granted by Q1 2021, subject to access agreements being reached with third parties.

### 5.1 Land Tenure

The Project's production facilities (such as seawater intake, evaporation ponds, crystallisers and the SOP Processing Plant) will be located on Mining Leases. Stockyard and salt processing facilities in the port area close to the ocean will be on a General Purpose Lease. Supporting infrastructure including roads, power reticulation, water transfer pipes and the accommodation village will be situated on Miscellaneous Licences.

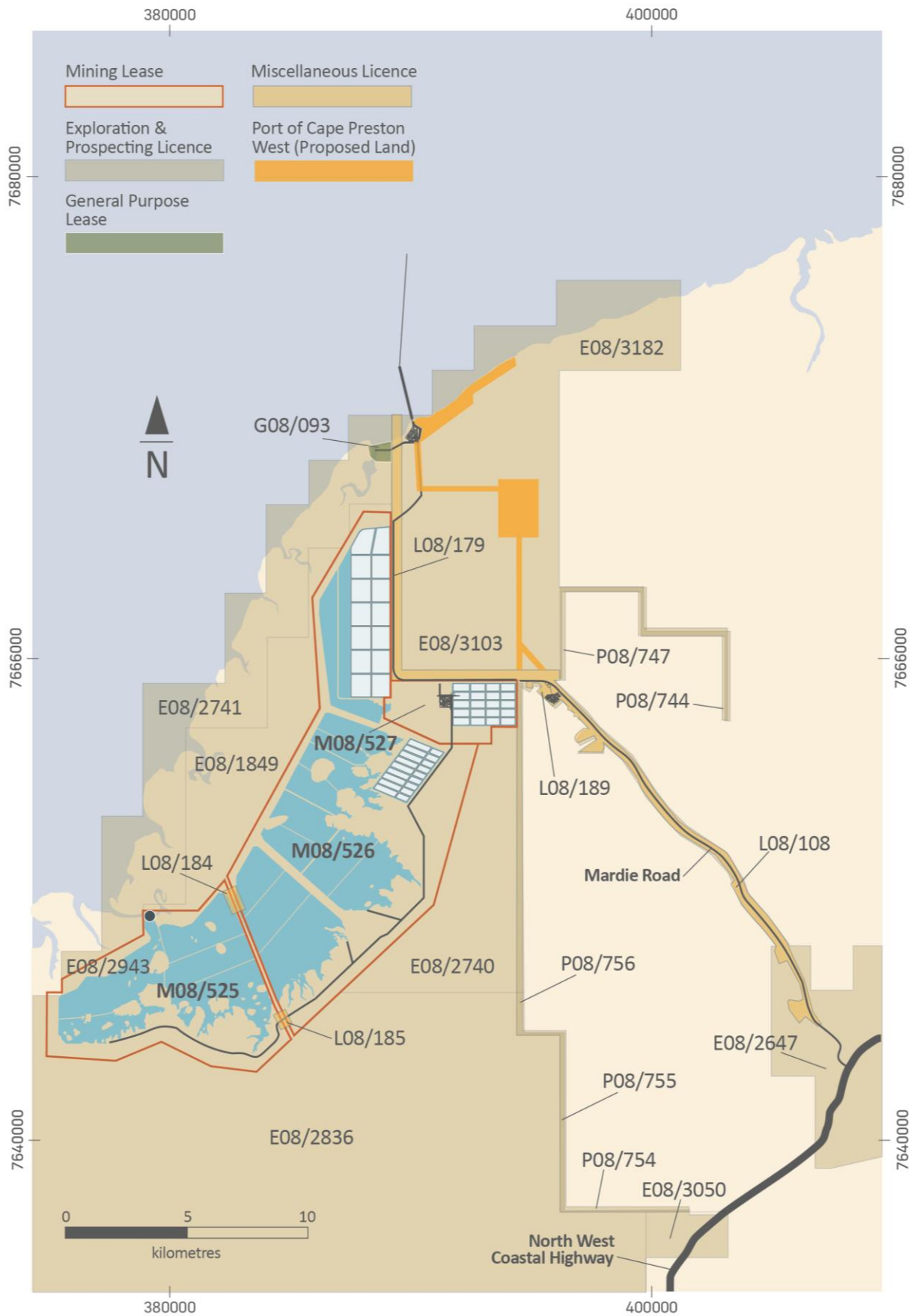
This Mining Act tenure will have an initial 21-year term and can be renewed for another 21-year term at BCI's election. A third term of 21 years can be approved at the discretion of the WA Minister for Mines, who has formally confirmed to BCI the reasonable and achievable criteria for renewal of a third term. A 63-year project term is therefore assumed as the minimum period of tenure, with ongoing renewals realistically achievable, making it a potential 100+ year project.

Access agreements are being negotiated with the pastoral lease holder and the owners of domestic gas pipelines situated below ground in an easement in the southern area of the Mardie Project footprint.

### 5.2 Port Tenure

The Mardie port facilities will be situated on land that will become vested in the Pilbara Ports Authority (PPA) for a new multi-user port known as Cape Preston West. The Cape Preston West port land is located mainly on tenement rights recently acquired by BCI immediately north of Mardie. The port land and marine areas are being finalised with the PPA and a consultation process for the taking of the land and vesting in the PPA has commenced.

During 2019, BCI received formal support from the WA Minister for Ports for the creation of a multi-user port at Cape Preston West. In late 2019, BCI and the PPA executed a non-binding term sheet setting out the framework for development of that port. As foundation proponent of Cape Preston West, BCI is aiming to enter into an initial 50-year port lease arrangement with the PPA to construct and operate the Mardie Port Facility, and the port common user infrastructure within the Cape Preston West port area. Negotiation of the port lease documentation is underway with the PPA.

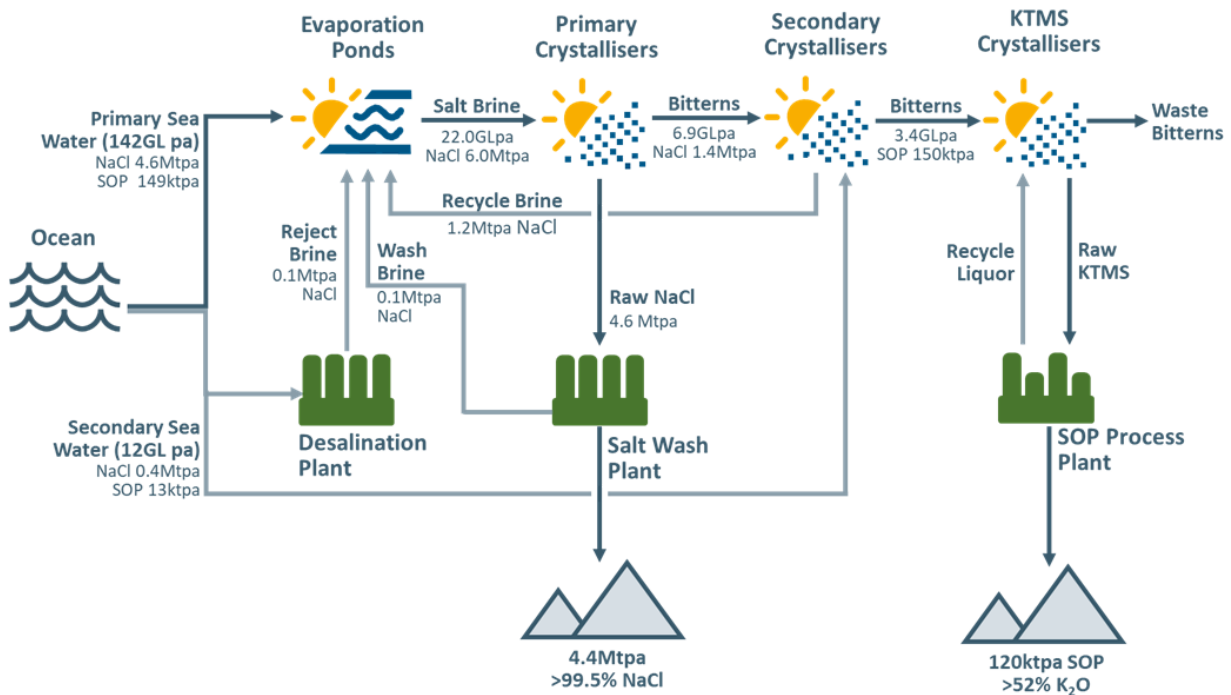


**Figure 6: Planned Project Tenure**

## 6. DESIGN AND PROCESSING

### 6.1 Process Flowsheet

Mardie has been designed to produce 4.4Mtpa of high purity salt (>99.5% NaCl, dry basis) and 120ktpa of SOP fertiliser (>52% K<sub>2</sub>O) via solar evaporation of 154GLpa of primary and secondary seawater according to the flowsheet depicted in Figure 7.



**Figure 7: Salt and SOP Production Flowsheet**

Extensive testwork and flowsheet optimisation work was completed during the DFS to ensure salt and SOP production have been maximised for the available project footprint. Table 4 provides a summary of the testwork performed as part of the DFS.

The results from the testwork have been used to define the process design criteria and flowsheet, which led to development of a detailed steady-state mass and energy balance model for the Project using Kenwalt SysCAD software in conjunction with the US Geological Survey's (USGS) hydrogeochemical modelling package PHREEQC.

Further flowsheet optimisation was performed using the SysCAD model as part of the DFS. Identification of optimum operating conditions for the ponds, crystallisers, salt wash plant, SOP processing plant, as well as non-process infrastructure facilities such as the desalination plant, enabled maximum recovery and production of salt and SOP from the Mardie Project.



**Table 4: DFS Testwork Summary**

Testwork Program	Testwork Location	Key Outcomes
Seawater sampling program	Mardie Site	<ul style="list-style-type: none"> <li>Confirmation of seawater composition at Primary Seawater intake station</li> </ul>
Pond / Crystalliser evaporation trial (1:40,000 scale)	Mardie Site	<ul style="list-style-type: none"> <li>Confirmation of pond and crystalliser specific gravity setpoints</li> <li>Confirmation of raw salt composition</li> <li>Commencement of KTMS production required for piloting to be performed during Front End Engineering Design</li> </ul>
Salt washing program	BCI Perth	<ul style="list-style-type: none"> <li>Confirmation of product salt quality of &gt; 99.5% NaCl</li> <li>Generation of product samples for marketing purposes</li> </ul>
Pan evaporation trial	Mardie Site	<ul style="list-style-type: none"> <li>Confirmation of impact on evaporation rate of brine salinity factor</li> </ul>
Bench-scale salt evaporation program	ALS Metallurgy, Balcatta WA	<ul style="list-style-type: none"> <li>Confirmation of pond chemistry including onset of gypsum precipitation</li> </ul>
Salt brine evaporation program	SRC, Saskatoon Canada	<ul style="list-style-type: none"> <li>Confirmation of salting path for production of quality KTMS suitable for conversion to SOP</li> </ul>
Secondary salt and pre-KTMS dissolution program	SRC, Saskatoon Canada	<ul style="list-style-type: none"> <li>Confirmation of recovery methodology for secondary salt and pre-KTMS via seawater dissolution</li> <li>Confirmation of seawater dissolution process design criteria requirements for plant design</li> </ul>
SOP production program	SRC, Saskatoon Canada	<ul style="list-style-type: none"> <li>Confirmation of SOP conversion flowsheet using flotation</li> <li>Confirmation of SOP conversion process design criteria requirements for plant design</li> <li>Confirmation of SOP product quality of &gt;52%w/w K<sub>2</sub>O</li> </ul>
Alternate SOP Flowsheet Program	SRC, Saskatoon Canada	<ul style="list-style-type: none"> <li>Confirmation of alternate SOP conversion flowsheet using cold leaching technology</li> <li>Confirmation of SOP conversion process design criteria requirements for plant design</li> <li>Confirmation of SOP product quality of &gt;52%w/w K<sub>2</sub>O</li> </ul>

## 6.2 Pond and Crystalliser Layout

The Project layout as shown in Figure 8 includes a series of nine Evaporation Ponds and three distinct groups of crystallisers: Primary Salt Crystallisers (C1 and C2); Secondary Salt Crystallisers (C3 to C6); and KTMS Crystallisers (C7 and C8).

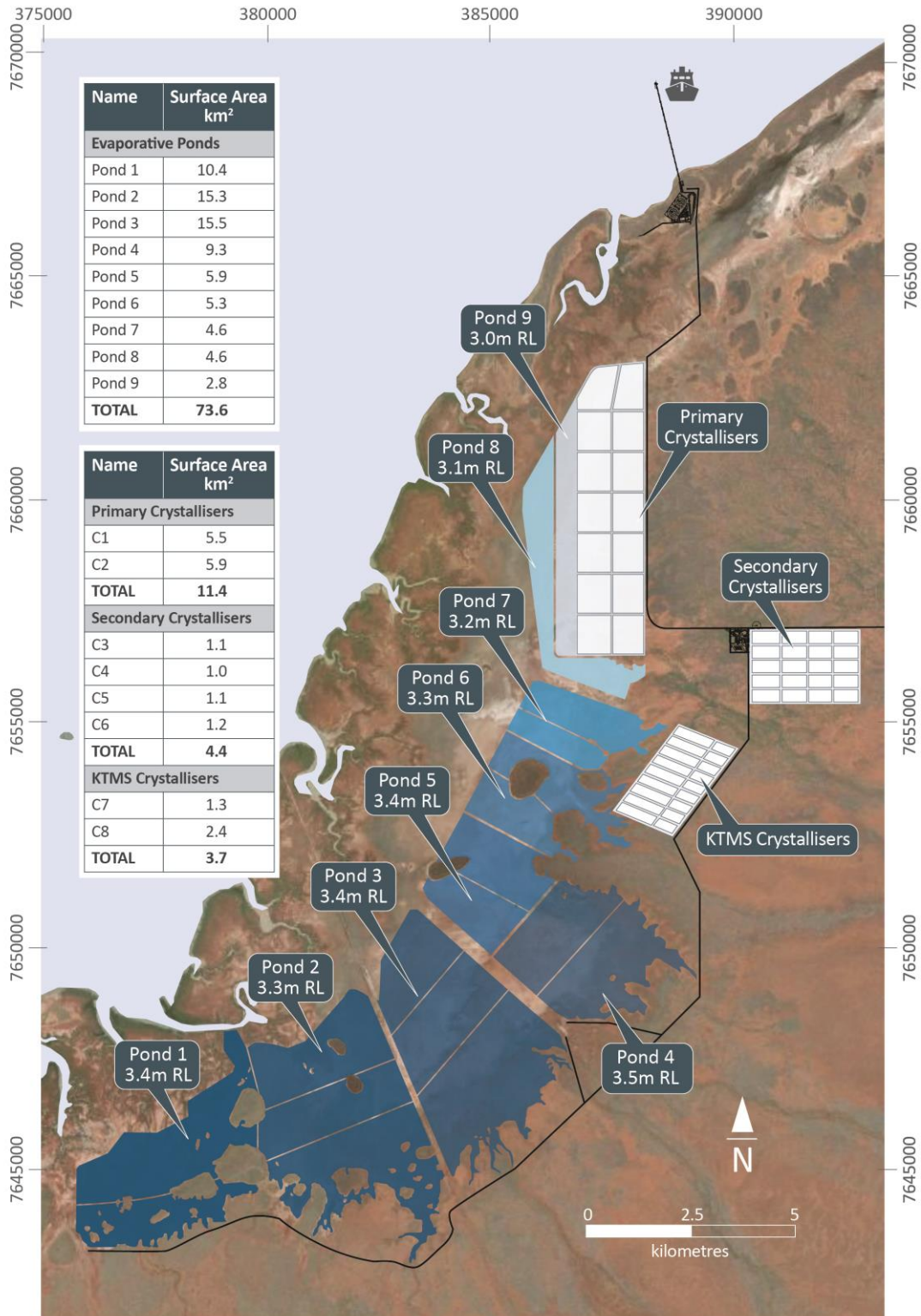


Figure 8: Pond and Crystalliser Layout

## 6.3 Salt Processing

The salt production process commences with the extraction of seawater from the ocean and the movement of seawater of increasing concentration through a series of nine evaporation ponds. The movement and chemistry of seawater is carefully managed to ensure the output from Pond 9 is ready for precipitation of raw salt in the crystallisers. Raw salt is harvested from the salt crystallisers, hauled to a salt wash plant for processing into a high purity salt and then conveyed onto the product stockpile ready for export.

### 6.3.1 Seawater Intake

The main seawater pump station consists of five diesel direct drive pumps with the inlets located in a tidal creek and discharging into Pond 1. A stainless steel mesh screen is fitted to the pump inlet to protect pumps from debris and prevent the entry of marine fauna.

The pump station configuration was designed to ensure a required seawater pumping rate of 142GLpa, containing 4.6Mtpa of NaCl, is achievable.

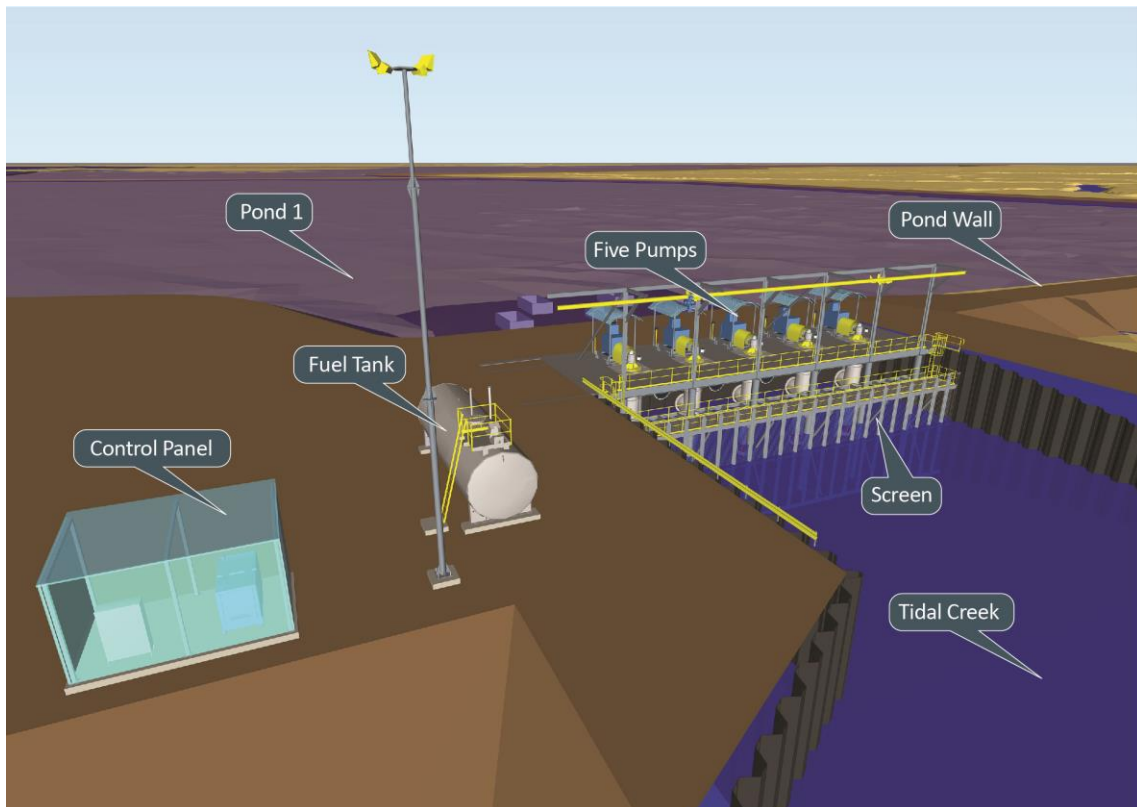


Figure 9: Seawater Intake Pump Station

### 6.3.2 Evaporation Ponds

The civil design of the evaporation ponds and crystallisers has considered three main engineering aspects:

- Coastal engineering – wave and storm surge impact on pond walls
- Geotechnical engineering – pond wall foundation system
- Civil engineering – pond wall design to withstand construction and operating loads

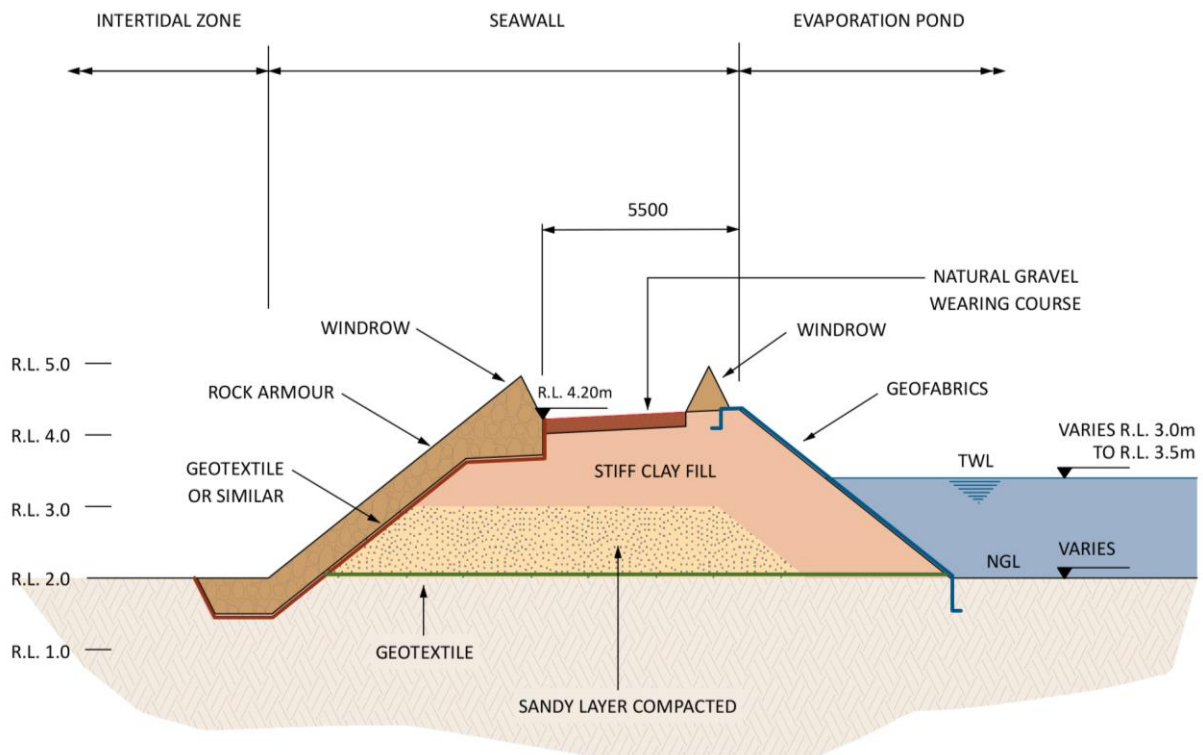
Detailed modelling has been carried out as part of the design process to evaluate and mitigate the impact of coastal waves, geotechnical ground conditions and wall stability on the design of the evaporation pond and crystalliser embankment walls.

The nine evaporation ponds vary in size and layout. A large sea wall extends approximately 26km along the full length of the seaward side of the pond system as shown in Figure 8 and serves to protect the ponds from daily tides and storm surges. The evaporation ponds also have side pond walls and internal levees.

Geotechnical parameters relevant to the sea wall and pond wall designs have been developed by CMW. Parameters have been adopted for the in-situ ground profile and expected fill materials for undrained and drained loads under static and seismic conditions. CMW has completed preliminary geotechnical stability modelling for the highest expected equipment load cases during construction and operations that will travel along the pond walls.

The pond walls have been designed to comply with DMIRS safety requirements ANCOLD standards which are applicable to hazardous tailings dam facilities. The sea wall is designed to withstand a 1-in-100 annual return interval (ARI) weather event with only minor damage.

External rock armour protection varies depending on the location of the pond wall and potential risk to damage. Rock armour is required for the seaward face of the sea wall and rip-rap along the external slopes of the pond walls in the gas pipeline corridor and flood diversion channels between Ponds 3 and 4, and Ponds 7 and 8. Internal faces of the pond walls are protected using a stabilising geofabric. The height of the pond walls are set at 4.2m AHD and trafficable widths vary between 3.0m to 4.0m depending on the type and amount of traffic expected. Figure 10 shows a typical cross section of the sea wall.



**Figure 10: Typical Trafficable Seawall Section (Vertical Exaggeration x2)**

Levees will be constructed inside each pond to segment the ponds, limiting waves inside the ponds during extreme weather events to prevent potential wall damage. Segmentation also assists with brine flow and evaporation. Geofabric and rip rap is used to protect levees from wave action and erosion.

Transfer of seawater between ponds will occur on a 24-hour basis and will be via a combination of gravity flow between adjacent ponds, and pumped flow between ponds separated by surface water drainage channels.

The seawater progresses from Pond 1 to Pond 9 over a period of approximately eighteen months during which time the volume is reduced to 12% of the original volume, and the specific gravity is increased close to the NaCl saturation point.

In addition, Pond 8 receives approximately 1.4Mtpa of recovered salt from three sources; the Secondary Salt Crystallisers (1.2Mtpa), the Salt Wash Plant (0.1Mtpa) and the Desalination Plant (0.1Mtpa), maximising recovery of salt to final product.

### 6.3.3 Salt Crystallisers

The Primary Salt Crystallisers (C1 and C2) are divided into 14 cells comprising seven cells across two rows, with the area of each cell being essentially identical (1km x 1km dimension), resulting in the quantity of salt within each cell being similar - refer Figure 8.

The Primary Salt Crystallisers receive approximately 22GLpa of brine containing 6.0Mtpa of NaCl from Pond 9 (including secondary brine recycle streams). The brine is deposited into the crystalliser cells where further evaporation crystallises 4.6Mtpa of raw salt. The brine, now termed bitterns, is transferred from the Primary Salt Crystallisers to the Secondary Salt Crystallisers via pipeline for further salt recovery.

The Primary Salt Crystallisers are mechanically dry harvested. Once a year brine is drained from each crystalliser cell, and a tractor-driven mechanical harvester is used to harvest raw salt from the floor of the cells into a fleet of 100t bottom dump haul trucks, which transfer the harvested raw salt to the Salt Wash Plant for treatment.

The Primary Salt Crystallisers have been designed to allow for one-way heavy vehicle access to the crystallisers for harvesting operations.

The Secondary Salt Crystallisers receive approximately 6.9GLpa of bitterns containing 1.4Mtpa of NaCl from the Primary salt crystallisers. The bitterns is deposited into a series of fifteen crystalliser cells consisting of five parallel trains of three crystallisers (C3/C4/C5). The Secondary Salt Crystallisers are periodically harvested by dissolving crystallised salt with fresh seawater and 1.2Mtpa of salt recycled to Pond 8 for recovery in the Primary Salt Crystallisers.

The final bitterns discharged from the Secondary Salt Crystallisers (containing less than 7.5% of the NaCl contained within the initial seawater pumped into Pond 1) is transferred to the KTMS Crystallisers.

### 6.3.4 Salt Wash Plant and Stockyard

The dry-harvested raw salt from the Primary Salt Crystallisers is hauled to a 700tph Salt Wash Plant for processing and is then moved onto the product stockpile. The proposed plant is based on a design by Salt Partners Ltd (Switzerland) using their proprietary HYDROSAL-XP salt purification process - refer Figure 11. To minimise maintenance and ensure a 25-year service life, the plant will be constructed using stainless steel for wetted components and additional protective coatings on structural steel. The 700tph production rate is sized for the maximum seasonal flow rate resulting in considerable annual spare capacity.

The HYDROSAL-XP purification process has higher efficiencies in comparison to standard salt wash plants and delivers low NaCl losses and a high impurity rejection rates, resulting in a product purity of >99.5% NaCl on a dry basis.

The purified salt product is conveyed to the Salt Stockyard, consisting of a 100m radial stacker and stockpile capacity of 0.6Mt for further dewatering and export.

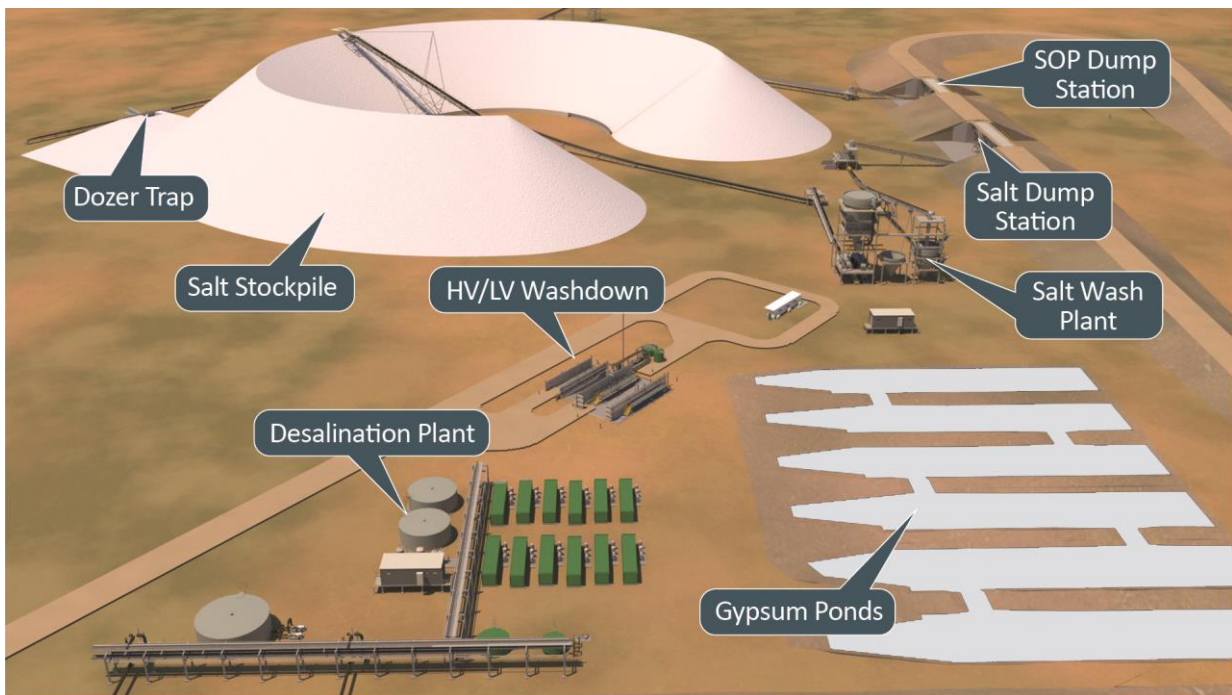


Figure 11: Salt Wash Plant and Stockyard

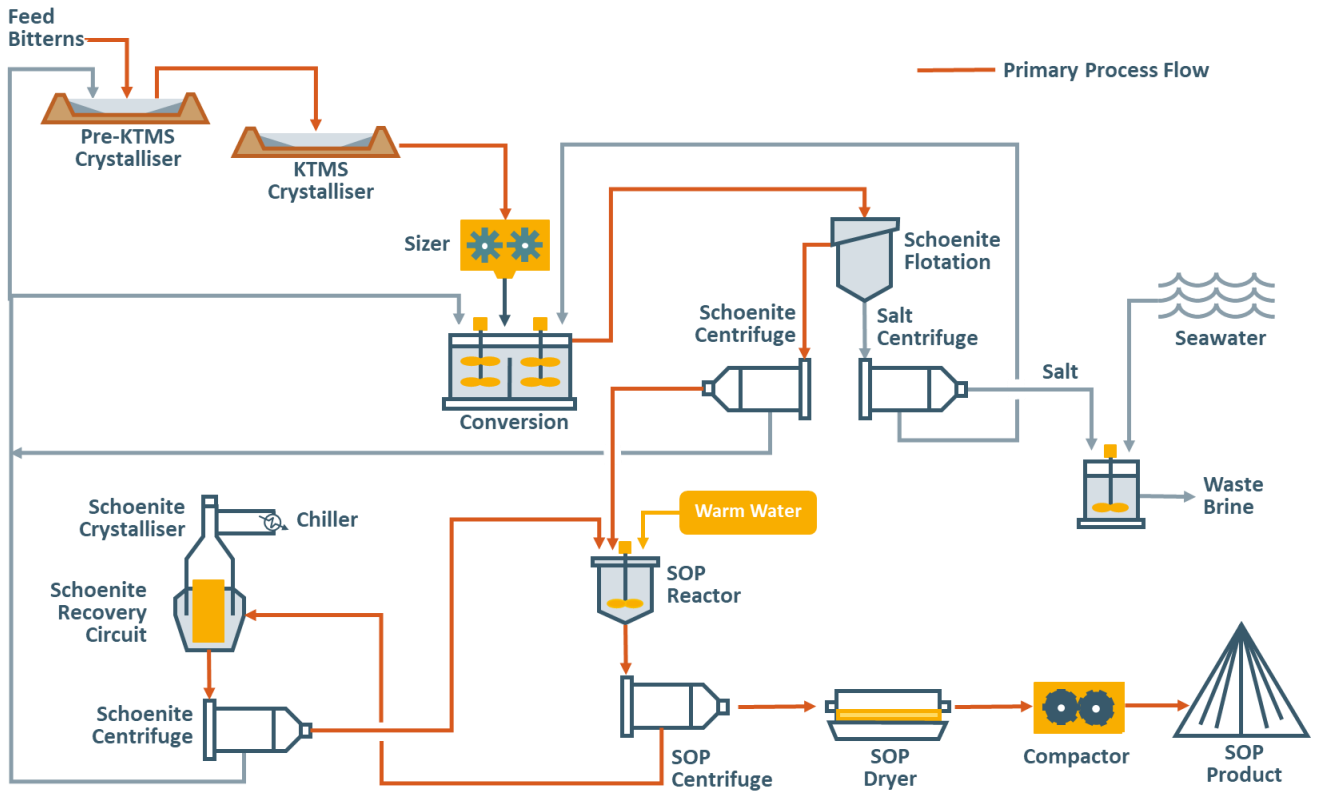
## 6.4 SOP Processing

The SOP processing circuit consists of a series of large crystalliser cells to concentrate bitterns from the Secondary Salt Crystallisers and precipitate a kainite-type-mixed-salts (KTMS) ( $KCl \cdot MgSO_4 \cdot 3H_2O$ ) for harvesting and refining in an SOP plant to a granular SOP product. The simplified flowsheet is shown in Figure 12.

### 6.4.1 Pre-KTMS Crystallisers

The SOP production process commences with the removal of magnesium impurities from the Secondary Salt Crystalliser bitterns in the Pre-KTMS Crystallisers (C6) - refer Figure 8. The Pre-KTMS Crystallisers receive approximately 3.4GLpa of salt bitterns containing 150ktpa of SOP equivalent tonnes.

The bitterns flows into five crystalliser cells operating in parallel, where approximately 25% of the magnesium within the bitterns is precipitated as epsomite ( $MgSO_4 \cdot 7H_2O$ ). Two recycle brines are added to the Pre-KTMS Crystallisers to optimise the KTMS salting path and ensure the KTMS is suitable for refining to SOP.



**Figure 12: SOP Flowsheet**

### 6.4.2 KTMS Crystallisers

The KTMS Crystallisers (C7 and C8) receive approximately 3.8GL pa of bitterns containing equivalent to 225ktpa of SOP, including recycle streams to the Pre-KTMS Crystallisers. The bitterns is deposited into a series of eighteen crystalliser cells operating in nine parallel trains of two cells, where approximately 770ktpa of KTMS is crystallised containing equivalent of 210ktpa SOP.

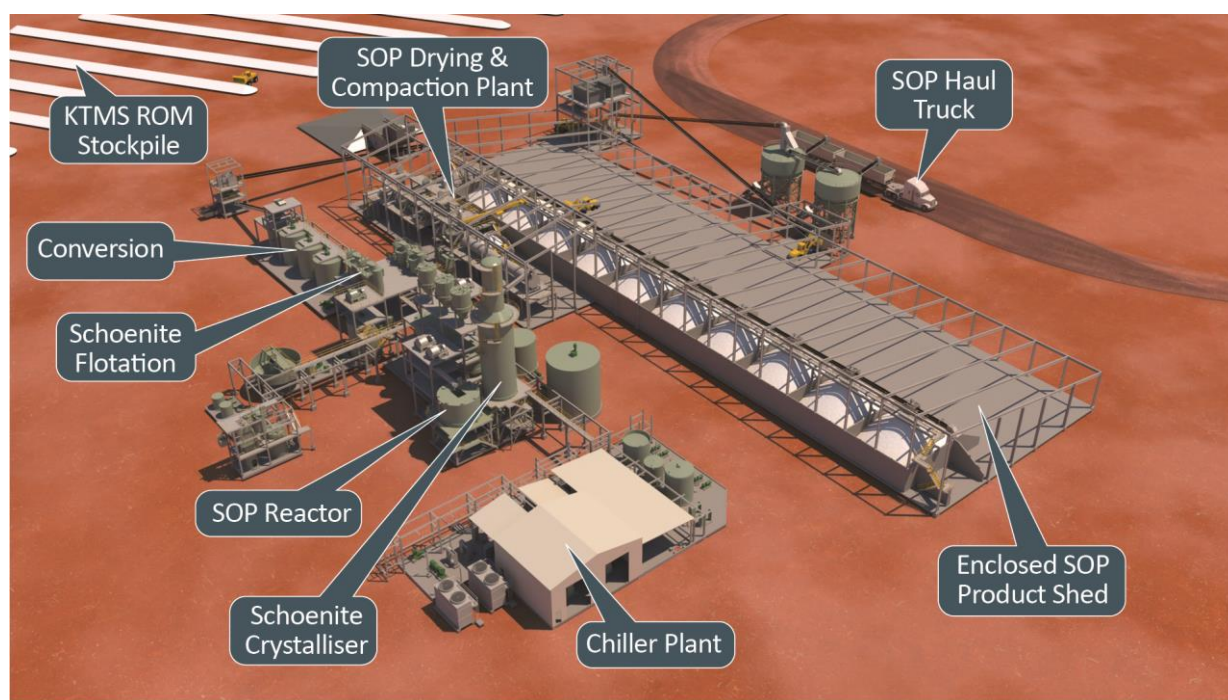
The KTMS Crystallisers are dry harvested using a front-end-loader (given the lower tonnage of KTMS salts). The harvested KTMS is loaded into side tipper haul trucks, which transfer the KTMS to the SOP Processing Plant.

The KTMS Crystallisers have been designed to allow for one-way heavy vehicle access to the crystallisers for harvesting operations.

### 6.4.3 SOP Processing Plant

The SOP Processing Plant design is based on an industry standard flowsheet applied in other SOP operations globally and proposed in some new WA SOP projects.

The harvested KTMS is trucked to the SOP Processing Plant and refined to SOP. The refining process occurs according to the following unit operations: KTMS is reclaimed from the KTMS ROM stockpile using a front-end loader and fed into the SOP Processing Plant at approximately 110 tph. KTMS is then converted to schoenite ( $K_2SO_4 \cdot MgSO_4 \cdot 6H_2O$ ) salt in stirred tanks using potassium-rich mother liquor recycled from downstream in the SOP Processing Plant. The next step involves the separation of sodium chloride salt from schoenite via flotation and the decomposition of schoenite salt to SOP by adding warm water. Potassium dissolved by the warm water is recovered by chilling the waste stream from the SOP reactor, re-crystallising schoenite from solution and recycling it to the SOP reactor. SOP product is then dried via fluidised air dryer, compacted into a granular form and stored in fully enclosed stockpiles. SOP product is ultimately reclaimed via front-end loader, screened to remove any fines and an anti-caking agent applied. The final SOP product is loaded into haul trucks for transport to the Mardie Port Facility.



**Figure 13: SOP Process Plant**



## 7. SUPPORTING INFRASTRUCTURE

The Project site is accessed via Mardie Road, which is 25km in length and connects the processing facilities, jetty and non-processing infrastructure to the North West Coastal Highway (NWCH).

There are two other main internal roads, namely the North-South Road and Port Access Road. The North-South Road is 25.5km in length and provides access to the KTMS Crystallisers and Evaporation Ponds. This road also acts as a protective bund to prevent flood water from flowing into the Evaporative Ponds. The Port Access Road is a 12.8km dual-lane gravel road that provides access from the SOP Processing Plant to the Mardie Port Facility.



**Figure 14: Mardie Project - Supporting Infrastructure and Utilities**

An accommodation village will be located near the Mardie Road approximately 20km from NWCH. The accommodation village will contain 400 rooms (200 temporary construction rooms and 200 permanent rooms) and all required services. A 36-room accommodation village has already been constructed for a large-scale trial pond and other early works.

The main administration building will be a pre-fabricated modular building serviced with power, communications, IT infrastructure, water and sewerage.

The Mardie site will be supported with emergency response and first aid medical facilities. These services will be located at the main administration area and the accommodation village due to the large distances between the various areas of operations.

Electrical power will be supplied by diesel fuelled generators in the initial construction phase with a central gas-fired power station constructed in time for commissioning of the Salt Wash Plant and jetty. A natural gas lateral pipeline will interconnect with the Dampier to Bunbury Natural Gas Pipeline located approximately 15km from the Mardie Project. There is a total installed load of 14MW with a maximum contracted electricity demand of 13.8MW and an estimated average demand of 10.2MW.

Two 110kL self-bunded above-ground diesel storage tanks, located at the SOP Processing Plant, will support the Mardie mobile equipment and vehicle fleet. Temporary diesel power generation will be supported by a separate 15kL above ground, self-bunded fuel tank, located at the power station.

The main maintenance workshop, where regular servicing of heavy vehicles and mobile equipment will be undertaken, is located adjacent to the SOP Processing Plant. There is also a small maintenance workshop and washdown bay located at the salt stockyard for routine servicing of the stockpile dozers.

The Mardie site laboratory will provide a number of services including evaporative pond management; raw salt quality and condition; salt product quality control and SOP process control and product quality control. The laboratory is anticipated to analyse twelve samples per day from the salt circuit and 48 samples per day for SOP Processing Plant.

A boat launching ramp is located at the main seawater pump station to perform minor maintenance on the seawater intake screens and environmental monitoring. An emergency response boat and vessel launch hoist is located on the jetty head to recover personnel in an event of an emergency. This launch provides round-the-clock access to the marine operations.

The Mardie Project requires both clean seawater and potable water for various applications. Local groundwater has been assessed in terms of both quality and quantity and was found to be insufficient for long-term use as plant and village water supply. A secondary seawater pump station located in a creek adjacent to the salt stockyard area will be used to supply seawater for direct use and as feed for a desalination plant and a reverse osmosis plant.

The accommodation village will be provided with a package waste water treatment plant. Other areas will use underground sullage tanks which will be pumped out and transferred to the village for treatment. The discharge water from the waste water treatment plant will create effluent meeting medium "exposure risk level" quality standards as specified by the Department of Health guidelines. Treated waste water will be applied to a designated irrigation area.

Major communications systems infrastructure runs along NWCH from Karratha to Onslow and is connected to an existing Telstra tower located within 2km of the Mardie Project. The Project will interconnect to the existing Telstra fibre and a new tower will be located at the SOP Processing Plant. Microwave data links will interconnect to the seawater pump stations, stockyard and jetty head.

## 8. PORT

The new port will be known as the Port of Cape Preston West and will be managed by Pilbara Ports Authority (PPA) as a multi-user port. BCI will be the foundation proponent and will be responsible for developing the Mardie Port Facility in accordance with PPA Port Development Guidelines, which will include jetty and related infrastructure, maintenance and administration facilities, central services, stockyard and berth areas. Common user infrastructure will also be developed and include breakwater, shipping channel, turning basins, navigational aids, administration facilities, access roads and security gates.

### 8.1 Port Design

The Mardie marine environment is characterised by shallow water and a high tidal range with the seabed gently sloping seaward. A range of port locations and design options have been studied and it was concluded that a transshipment facility will be the most applicable approach to suit the marine environment and product volumes to be exported from Mardie.

A trade-off study evaluating the capital cost of dredging a navigational channel inshore versus constructing a trestle jetty to deep water was assessed using geotechnical and bathymetric data at the site. The study confirmed the optimum combination is a trestle jetty length of 2.3km together with a 4.5km dredged navigation channel to open waters.

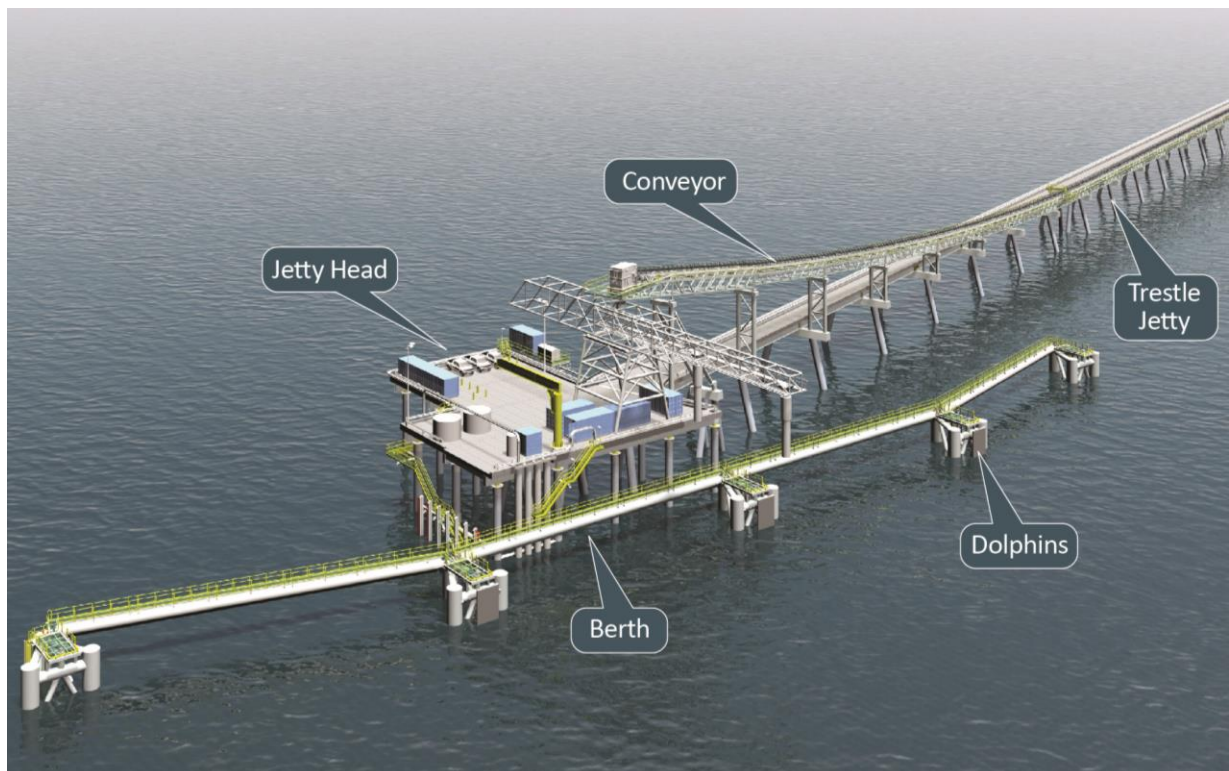


Figure 15: Jetty, Platform and Berth

The main elements of the port landside and marine development are summarised below.

Salt is reclaimed from a 0.6Mt stockpile and is then conveyed by a cross feed conveyor and bulk product transfer station onto the main 3,000tph jetty conveyor. SOP product is hauled from the SOP bulk storage shed to the port where a drive-over SOP bottom dump transfer station receives 100t of product from each truck.

The jetty conveyor is 2.5km long and connects with the salt stockyard and SOP bulk product cross feed conveyors via the stockyard transfer station which has an integrated product sample station.

The jetty trestle is a suspended steel framed structure supported on piles. It is 2,330m in length and carries a single lane access road, jetty conveyor and services. The trestle deck level is located above the instantaneous water level for a 1-in-500 ARI cyclonic wave condition.

The jetty crossheads have sufficient space to allow installation of a future second conveyor leading to a second berth on the opposite side of the salt and SOP berth.

The jetty head foundation is a combination of vertical and raked driven tubular steel piles supporting a grillage of fabricated beams and precast concrete deck panels capable of supporting normal standard highway rigid vehicles and a 70t mobile crane for maintenance.

A small landing craft will be located at the northern end of the jetty head to take advantage of water depth created by the berth pocket batter slopes. The small craft landing accommodates vessels for environmental monitoring, navigation channel survey, inspection of navigation aids and general water-based activities. Crew transfer from the transshipment vessel may also use this facility.

The berth facilities at the jetty head have been designed to accommodate a nominal 12,000dwt self-propelled transshipment vessel (TSV) and are operatable under all states of tide. Dolphins are a fixed head flexible design, capable of normal berthing loads and restraining the TSV under design ambient conditions.

The swing basin is tidally constrained and has a diameter of 200m. A berth pocket is 165m long and 40m wide and dredged to -6.7mCD, allowing the fully laden TSV to remain at berth in all states of tide.

The total estimated dredge volume is 600,000m<sup>3</sup>, with the majority of the dredge volume extracted from the southern 1.5km of the navigation channel, swing basin and the berth pocket.

Seven anchor berths are available in a water depth of 11m to 18m and are suitable for loading vessels up to Ultramax size (65,000dwt) or, where applicable, to part load Capesize vessels (110,000-160,000dwt). A further six anchor berths are located in water depths of 19m or greater for the loading of Capesize vessels (160,000-210,000dwt).

There are a number of supporting utility systems located on the jetty head, including a potable water system, wastewater storage, bulk diesel storage tank and dispensing system, fire water system, communications, security and reticulated power.

A TSV will load up to 10,000t of product and will be fitted with a self-unloading system that is capable of loading an ocean going vessel (OGV) from 25,000t to 180,000t anchored in deep water approximately 30km offshore.

To demonstrate the likely port performance, assessments were made of TSV movements and mooring under maximum operating ambient conditions. Wave climates were derived from a ten-year set of historical data, supplemented by field instrumentation data for representative summer and winter periods and transposed with outputs close to the location of the jetty head and berth. The data sets

indicate ambient wind and wave conditions are relatively benign with Significant Wave Height (Hs) less than 0.63m for 90% of the winter period and calmer during summer. These sea state conditions are unlikely to adversely impact the ability of one large TSV to deliver more than 5Mtpa of product to OGVs.

## 8.2 Port Construction

It is proposed that the jetty will be constructed via an overhand construction method using canti-lever equipment. This is a well proven construction method in shallow waters, such as at the Mardie Project site, where construction from barges is impractical.

The selected dredging methodology includes a back-hoe dredge which will load the spoil into hopper barges for transport to the approved offshore spoil ground. The dredging works are expected to take approximately nine months to complete and are completed early in the overall jetty construction schedule to provide access for the jetty head construction barge and support vessels. Multiple competitive quotes for dredging were obtained for executing the scope of work and have been used as input for the capital cost estimate.

## 8.3 Transhipment

Two transhipment options were simulated for bulk products from stockpile to ocean-going vessel (OGV): (1) Tug and barge operation, using crane grabs aboard geared OGVs for barge unloading, and (2) self-propelled TSV that self-unloads onto the OGVs.

Dynamic simulation of the tug and barge system demonstrated it was not capable of exporting the required volumes at a competitive cost. A single TSV carrying a 10,000t payload with a minimum load-out rate of 15,000t/day was recommended. This solution provides a maximum capacity of 5.7Mtpa and can load a 75,000dwt OGV within a 75-hour window. Transhipment contractor submissions validated the outcomes of the simulation and additionally confirmed that a single TSV was the most economical and lowest risk transhipment option.

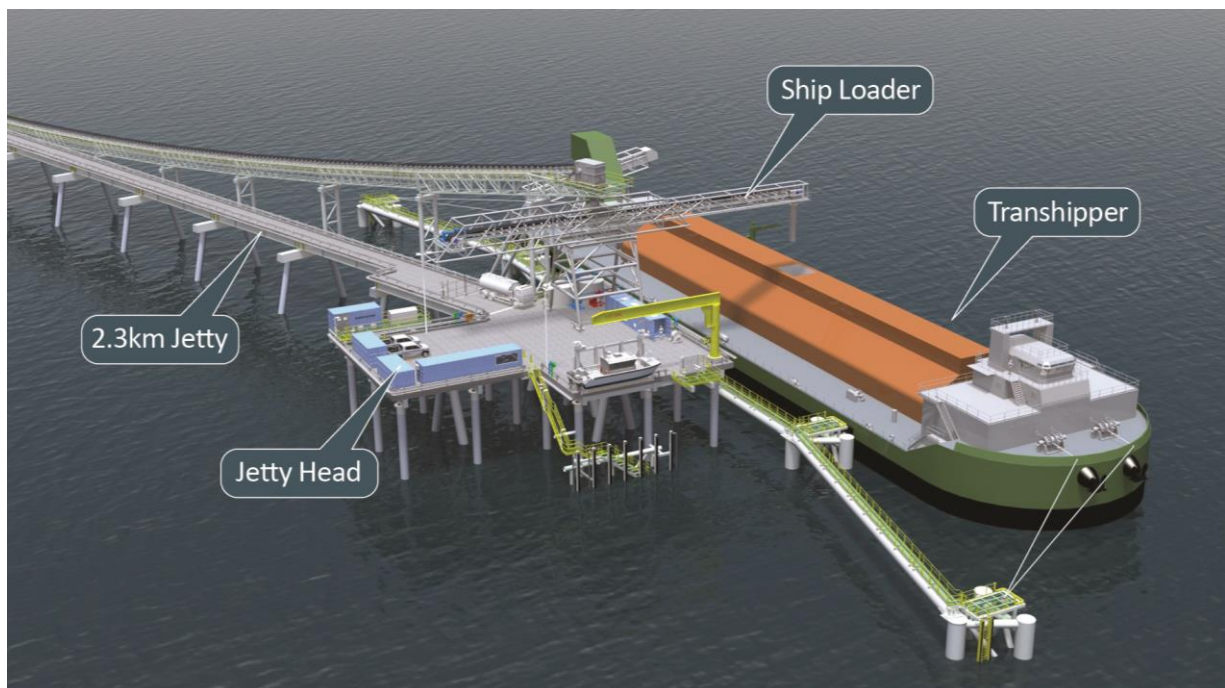


Figure 16: Self Unloading Transhipper

## 8.4 Shipping

Ocean freight will account for approximately 40% of the delivered cost of salt and is therefore a key component of Mardie's cost competitiveness.

Braemar ACM Shipbroking (Braemar) was engaged as an independent consultant to provide specialised advice on all shipping aspects related to the Project. Braemar developed a detailed freight strategy and outlook on the freight market. The study included historical freight analysis and forecasting future freight costs to designated ports based on BCI's product placement strategy.

Forecast freight costs were calculated based on Baltic Exchange Forward Assessments to calculate daily time charter earnings for a particular vessel/shipment size, fixed price forward bunker swap prices, and estimated port costs at Mardie. Port costs of other nearby Western Australian bulk commodity port operations and destinations were investigated and benchmarked in the study. Mardie port costs related to the OGV will be relatively low compared to all other major WA ports as the OGV will not incur berthing, quarantine or customs related costs, and only occupy one offshore anchorage point during its stay.

Based on Braemar's forecast freight rates, discharge port charges, turn time provisions, broker fees, and Mardie target discharge port distances, a freight matrix and associated freight rates were developed for production ramp-up and steady-state operations as input to the financial model.

The transshipping method allows Mardie to load salt on larger average OGV sizes than other WA salt operations that are berth constrained, which will considerably reduce the overall salt freight cost.

The most attractive option for SOP is to co-ship 5,000t to 10,000t parcels (one hold) on a salt OGV, where end-customers are in the same discharge region. Given the frequency of salt vessels and the number of shipments planned for Asian destinations, a material portion of Mardie's SOP can be shipped in this manner. Alternatively, SOP will be shipped in small standalone vessels or as co-shipments with other third-party products.

## 9. PROJECT IMPLEMENTATION AND OPERATIONS

### 9.1 Project Schedule

The Mardie Project has a three-year construction timeline as shown in Figure 17. The critical path for commencement of construction in Q2 2021 is securing the remaining primary and secondary approvals for the Project, and raising the required equity and debt funding.

Future key project development milestones are:

- Commencement of FEED – Q3 2020
- Contracting strategy and key terms settled with lenders and investors – Q4 2020
- Board Final Investment Decision – Q1 2021
- Ministerial Part IV Environment Approval – Q1 2021
- Financial close of equity raise – Q2 2021
- Secondary approvals – Q2 2021
- Commencement of construction – Q2 2021

BCI has sufficient funds to achieve the above key milestones (as outlined in Figure 17), to progress the Project up to the equity financial close.

The Project execution phase is planned to occur on a “just in time” basis, commencing with early works on key infrastructure, including the accommodation village, temporary power, main seawater pump station and key access roads. The main construction phase will commence with building Pond 1. Once complete, the construction team will transfer responsibility of Pond 1 and the seawater pump station to the operations team for the introduction of seawater, signalling “commencement of operations”.

The size of the evaporation ponds and salt crystallisers required to service the production of 4.4Mtpa of salt is significant. As a consequence, the ramp-up of salt production does not follow traditional mining or chemical industry ramp-up durations, with first salt shipment expected within 38 months of construction commencement. Nameplate production of 4.4Mtpa will be achieved after 66 months from commencement of construction.

The peak construction workforce (onsite and rostered-off) will be 470 personnel, with an average number of workers onsite during the construction period of 216. The steady-state operations workforce will be 190 personnel.

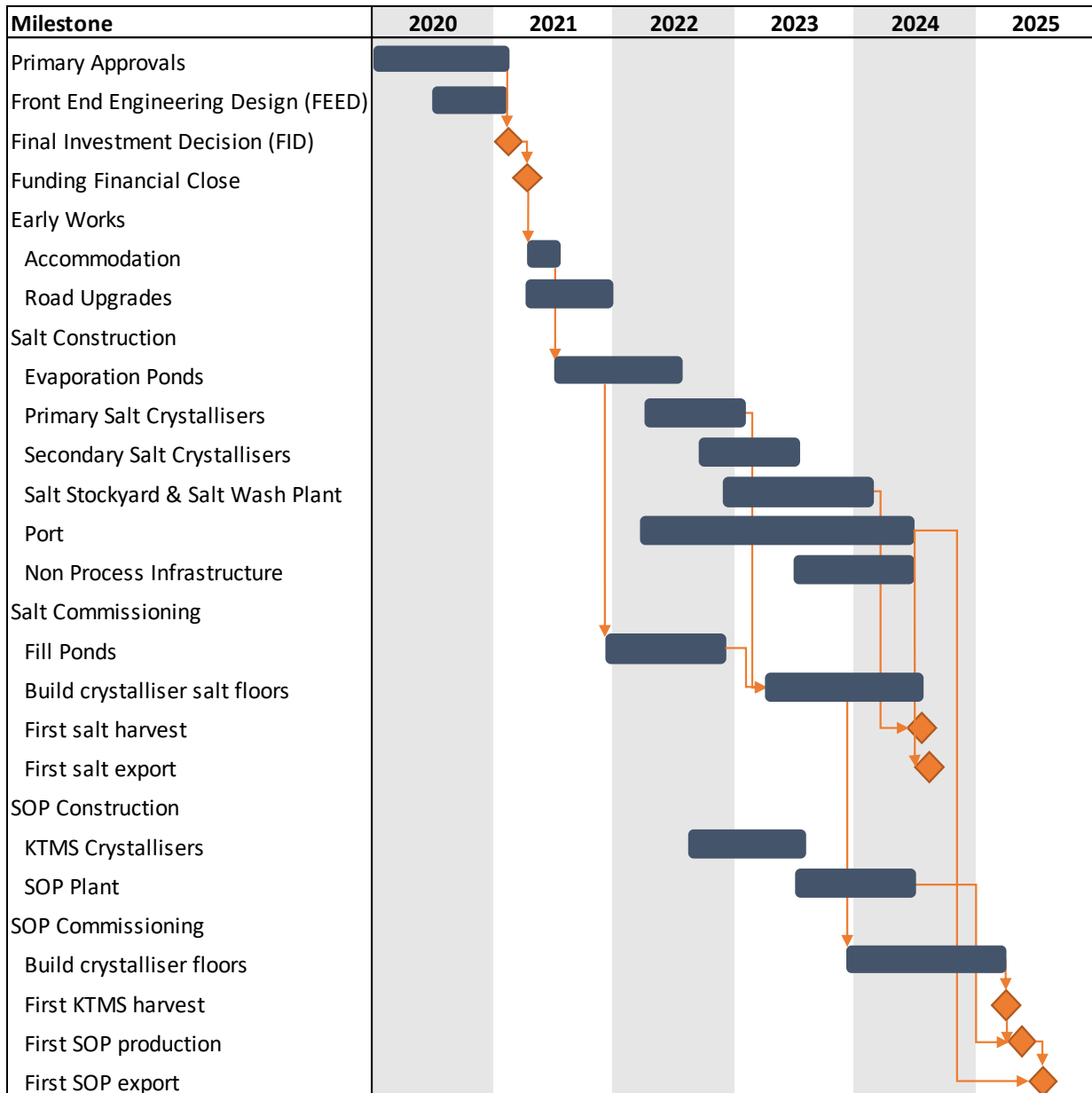


Figure 17: Mardie Project Schedule

## 9.2 Construction Contracting Strategy

An indicative contracting strategy has been developed for the Mardie Project and articulates the management of risk, pricing, and execution schedule of the main contracts.

BCI’s planned execution model involves the engagement of an experienced Project Management Contractor (PMC) to manage and deliver the Mardie Project as an extension of the BCI Owner’s team. The PMC will manage engineering, procurement and construction contracts via a range of EPC and D&C lump sum contracts, BOOT type contracts and schedule of rates contracts with qualified contractors who can demonstrate relevant experience in civil construction, marine works, processing plants, transportation and supporting infrastructure.

The Project will be delivered using a variety of different contractual structures as appropriate for specific areas of the project scope. The key objectives of the contracting strategy include providing cost certainty



by maximising the number of “lump sum” contracts; reducing construction interfaces and execution complexity by minimising the number of contract packages; maximising single point of accountability through contract models where the contractor is responsible for the design; and achieving cost and schedule targets.

The number of contract packages will be minimised by consolidating contract packages where possible, taking into consideration factors such as scope, complexity, specialist requirements, construction schedule, contractor capabilities and the appropriate allocation of risk.

BCI intends to start the FEED phase immediately after the DFS, which will enable the design risk for the majority of the construction packages to be transferred to the respective construction contractors and maximise the number of lump sum or fixed price contract types.

BCI is developing an Australian Industry Participation (AIP) plan for the Mardie Project which will define goods and services to be acquired for the Project, contracting and subcontracting arrangements (including reviewing relevant procurement documentation) and existing Project procurement strategies that align with the AIP plan requirements. During this process, there will be consultation with the AIP Authority and the final report will be lodged with the AIP Authority prior to construction commencement.

### 9.3 Operational Readiness

The Operational Readiness Plan is based on assets being constructed, commissioned and sequentially handed over to Operations. The cost to operate each asset until first salt shipment has been capitalised in the Project financial model.

The designated Chief Operating Officer will become responsible for a small Perth-based team to develop and implement the required critical business systems, production and maintenance planning, operating procedures, training materials, health and safety, finance, store inventories, supply and service contracts along with recruitment and training of the initial operating personnel.

This Operational Readiness team is included in the Owner’s capital cost estimate and will develop the required systems, contracts and personnel over a three-year period.

The Mardie Project assumes an Owner Operator model for the operational phase. Some service functions are contracted, such as accommodation, desalination plant, transshipping, salt and SOP harvesting and haulage. Table 5 summarises the operator and ownership of the operating assets.

**Table 5: Indicative Operations Contracting Strategy per Area**

Area Description	Owner	Capex	Operator
<b>Production</b>			
Salt production	BCI	BCI	BCI
SOP production	BCI	BCI	BCI
<b>Haulage</b>			
Salt product harvesting and haul fleet	Contractor	Contractor	Contractor
SOP product harvesting and haul fleet	Contractor	Contractor	Contractor
<b>Mardie Port Facility</b>			
Port	PPA	BCI	BCI
Transhipper	Contractor	Contractor	Contractor
<b>Supporting Infrastructure</b>			
Village	Contractor	Contractor	Contractor
Power station	Contractor	Contractor	Contractor
Waste management and recycling	BCI	BCI	Contractor
<b>Corporate</b>			
Sales and marketing	-	-	BCI <sup>1</sup>
Corporate services	-	-	BCI

*1 – sales agents to be involved where required*

BCI will aim to recruit a proportion of the Mardie operational workforce from the local region. The remaining operations workforce will be fly-in fly-out (FIFO) from Perth. FIFO personnel will fly to Karratha and a bus service will transport them to site. Transshipment crew will live onboard the vessel and will come ashore during roster changeout. Local contractors and suppliers in the Karratha region (in particular indigenous contractor groups) will be included on all practical vendor lists and will be favourably considered during the tender assessment phase if goods and services can be supplied at acceptable quality and a competitive price.

## 10. CAPITAL COST ESTIMATE

### 10.1 Basis of Estimate

The overall DFS capital cost estimate was compiled by GRES and is based on an Engineering, Procurement, Construction and Management (EPCM) approach for civil earthworks, process plants and infrastructure. The capital estimate for the jetty and marine components of the Project was estimated by Worley on a design and construct (D&C) basis, consistent with the indicative contract strategy.

The capital cost estimate covers all costs associated with the construction and associated expenditure to develop the project to a capacity of 4.4Mtpa of salt and 120ktpa of SOP. The estimate includes all costs associated with engineering, drafting, procurement, construction, construction management, wet commissioning of the processing facility and associated infrastructure, first fills of plant reagents and consumables, spare parts, Owner's costs, project management, design growth allowances and contingency allowance.

The estimate is based on an agreed level of engineering, material take-offs (MTO), and budget price quotations for major equipment and bulk commodities. Unit rates for installation were based on market enquiries specific to the Mardie Project and benchmarked to those achieved recently on similar projects undertaken in the Australian minerals processing industry.

The estimate has a base date of 1 May 2020 and is in Australian dollars. Where pricing was received in foreign currency these have been converted to Australian dollars at the foreign exchange rates prevailing at the base date.

The overall capital estimate is considered to be a Class 3 estimate, based on the level of engineering and design developed during the study, according to the AACE International Recommended Practice No 18R-97 with an estimate accuracy of  $\pm 10$  to 15%.

### 10.2 Estimate Structure

The capital estimate was prepared using a project work breakdown structure which delineates the various areas of the Project. Individual estimates were prepared for each area covering all engineering disciplines. Table 6 provides a summary of the basis of estimate.

**Table 6: Basis of Capital Estimate**

Category	Level of Development	Cost Estimation Methodology
Bulk earthworks	<ul style="list-style-type: none"> <li>Detailed light detection and ranging (LIDAR) survey</li> <li>Sub-base and civil geotechnical assessment</li> <li>Detailed 12D modelling to determine Bill of Quantities (BOQ)</li> </ul>	<ul style="list-style-type: none"> <li>Budget pricing from multiple contractors</li> </ul>
Civil works	<ul style="list-style-type: none"> <li>Preliminary general arrangement and layout drawings</li> <li>Preliminary design and MTO by experienced civil engineer</li> </ul>	<ul style="list-style-type: none"> <li>Sole source quotation for all-in unit rate including mobilisation and demob costs of batching plant</li> <li>Equipment quotations for pond weirs</li> </ul>
Structural	<ul style="list-style-type: none"> <li>Preliminary layouts, general arrangements and 3D designs of major steel structures to determine BOQ</li> </ul>	<ul style="list-style-type: none"> <li>Multiple quotations for all-in rates to supply, fabricate, paint and deliver</li> </ul>
Equipment	<ul style="list-style-type: none"> <li>Equipment sizings based on project mass balance derived from process design criteria</li> <li>Specifications and data sheets were developed for major equipment and packages</li> </ul>	<ul style="list-style-type: none"> <li>Multiple vendor budget prices for major equipment (&gt;\$50k)</li> <li>In-house database for minor equipment (&lt;\$50k)</li> <li>Specifications and data sheets were issued with tenders</li> </ul>
Platework	<ul style="list-style-type: none"> <li>Fabricated plate work component list (covering tanks, bins, chutes and launders) developed from project mass balance</li> <li>Preliminary general arrangement and layout drawings to determine BOQ</li> <li>Material of construction determined from corrosion coupon testing</li> </ul>	<ul style="list-style-type: none"> <li>Multiple quotations for supply, fabrication, surface preparation and painting</li> <li>Salt wash plant and SOP plant datasheets were issued for multiple quotations to supply, fabricate, transport to site and erect</li> </ul>
Piping	<ul style="list-style-type: none"> <li>Preliminary line and valve lists developed from piping and instrumentation diagrams (P&amp;IDs)</li> <li>Piping quantities and pipe supports were calculated using layout drawings</li> <li>Overland piping quantities calculated from layout drawings</li> </ul>	<ul style="list-style-type: none"> <li>Supply rates from multiple piping suppliers for various specification pipes, valves and fittings</li> </ul>

Category	Level of Development	Cost Estimation Methodology
Electrical and instrumentation	<ul style="list-style-type: none"> <li>Electrical, instrumentation and control quantities have been compiled from single line diagrams, instrument list, P&amp;IDs, layouts, equipment list and electrical load list</li> <li>Switchroom requirements based on substation general arrangements</li> </ul>	<ul style="list-style-type: none"> <li>Budget pricing obtained for all major electrical components including transformers, switchrooms, motor control centres (MCCs), and variable speed drives (VSDs)</li> <li>Budget pricing obtained for overhead powerlines inclusive of materials, installation, freight, overheads and margin</li> <li>In-house database used for electrical cabling, cable ladders, instrumentation and instrument control cabling</li> </ul>
Buildings	<ul style="list-style-type: none"> <li>Floor plans developed for all buildings, workshops and product storage shed</li> </ul>	<ul style="list-style-type: none"> <li>Multiple budget quotes including supply, installation and freight</li> </ul>
Installation labour	<ul style="list-style-type: none"> <li>Installation man-hours were estimated for each equipment and fabrication item to be installed</li> </ul>	<ul style="list-style-type: none"> <li>Construction labour rates for civil; structural, mechanical and piping (SMP); and electrical, instrumentation and control (E&amp;IC) are based on current GRES site installation rates</li> </ul>
Project indirect costs	<ul style="list-style-type: none"> <li>EPCM estimated based on man-hours required for engineering and project delivery team</li> <li>EPC allowance estimated by applying a margin to all costs identified as EPC associated costs</li> </ul>	<ul style="list-style-type: none"> <li>GRES commercial rates used for EPCM disciplines required</li> <li>Multiples quotations for flights, meals and accommodation services</li> </ul>
Growth allowance	<ul style="list-style-type: none"> <li>Growth allowance commensurate with the level of engineering completed and estimating confidence for each item within capital estimate</li> </ul>	<ul style="list-style-type: none"> <li>The overall growth allowance for the project, excluding contingency, is 4.3%</li> </ul>
Owner's costs	<ul style="list-style-type: none"> <li>Owner's costs include allowances for Owner's project team, insurances, approvals, computing system, home office costs, systems development and training</li> </ul>	<ul style="list-style-type: none"> <li>Owner's cost was developed from quotations and first principles</li> </ul>
Contingency	<ul style="list-style-type: none"> <li>Contingency is a provision for unforeseen costs associated with project execution risk or changes in scope</li> </ul>	<ul style="list-style-type: none"> <li>A 6.7% contingency provision was estimated for all major components of the Project</li> </ul>

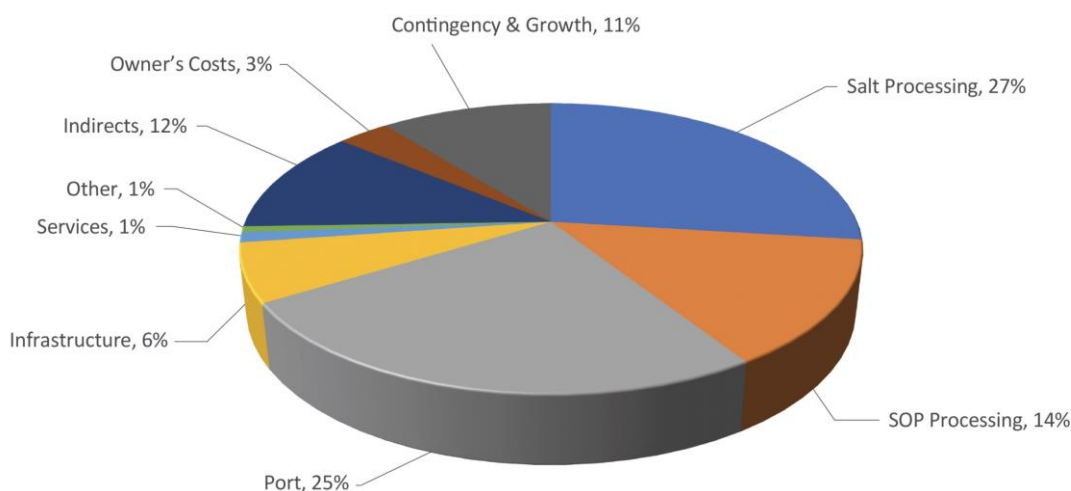
### 10.3 Capital Cost Estimate

The direct capital cost for the Mardie Project is \$580M, plus indirect costs covering owners cost, project management, growth allowances and contingencies totalling \$199M (or approximately 25% of the total project costs) for a total capital cost of \$779M. Capital breakdown by project area is presented in Table 7 and Figure 18 shows the percent capital distribution by project area.

The capital estimate excludes the capital costs for components of infrastructure which are to be provided by contractors or service providers under a Build Own Operate (BOO) arrangement. These items are covered in the operating cost estimate.

**Table 7: Capital Estimate Summary**

Area Description	Total \$M
Salt	210.0
SOP	108.8
Port	196.6
Supporting Infrastructure	50.6
Services	8.8
Other	5.1
<b>Direct Capital Cost</b>	<b>579.9</b>
Indirects (EPCM and Construction Facilities)	90.5
Owner’s Costs	25.0
Contingency and Growth Allowance	83.1
<b>Total Capital Cost</b>	<b>778.6</b>



**Figure 18: Mardie Capital Cost Breakdown by Area**

## 11. OPERATING COST ESTIMATE

The operating cost estimate has been developed by GRES with inputs from various sources including BCI, Worley and other service providers, and is based on the process design criteria, steady-state mass and energy balance, and process testwork undertaken as part of the DFS. The estimate is considered to be a Class 3 estimate according to the AACE International with an estimate accuracy of  $\pm 10$  to 15%.

### 11.1 Basis of Estimate

The operating cost model developed by GRES and BCI shows costs on a monthly-basis over the entire life-of-project (LOM), and details the operating cost of the Project through ramp-up and into steady-state operation.

The ramp-up of salt and SOP production to reach nameplate has been estimated using the pond and crystalliser construction schedule for salt, and 'McNaulty<sup>1</sup> ramp-up curves' for SOP taking into account the level of testwork undertaken, severity of process conditions and complexity of the SOP process.

Based on production ramp up modelling, first salt on ship will take 38 months from commencement of construction, with first SOP on ship taking 49 months. Nameplate salt production of 4.4Mtpa is expected within 66 months, with SOP nameplate production of 120ktpa expected within 82 months from the start of construction.

The DFS base case conservatively assumes a fly-in fly-out (FIFO) roster operating on a 24/7 basis, utilising a two weeks on, one week off roster for shift personnel, and an eight days on, six days off roster for day time personnel. Personnel from Perth will travel to and from site via chartered aircraft to Karratha and then bus to site. BCI's overall objective is to maximise recruitment of the final operating workforce from the Karratha area.

An organisational structure has been developed for the operation, benchmarked against other salt operations. Labour costs for the various personnel categories are based on current labour market conditions and site location.

In addition to the operating costs incurred at the Mardie Project site, costs associated with BCI corporate head office located in Perth have been included to cover salaries and general office costs relating to owning and operating the Mardie Project.

Maintenance costs (inclusive of contract labour) have been estimated based on a percentage of equipment cost by area.

Reagent, diesel and natural gas consumption rates were derived from vendor information, test work and the steady-state mass and energy balance. Prices for the reagents and consumables were obtained from multiple quotations.

Power will be provided 'over-the-fence' from a natural gas fired power station via a build, own, operate (BOO) contract, supplemented by temporary power during the construction phase.

The laboratory to support salt and SOP production will be owned and operated by BCI. Costs for the reagents and consumables required to assay an estimated 22,000 samples per year have been included in the operating cost. The cost for laboratory personnel is included in the overall site labour cost.

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<sup>1</sup> McNaulty: Analysis of historical plant ramp-up performance based on four categories of flowsheet complexity.

The operating cost estimate assumes the following service contracts, with infrastructure, services and costs incorporated into estimate:

- Accommodation village (BOOT arrangement)
- Desalination plant (BOOT arrangement)
- Contract harvesting and haulage for salt and KTMS (service agreement including equipment)
- Contract haulage for SOP export (service agreement including equipment)
- Electrical power generation (BOO – electrical service agreement)
- Gas supply (supply agreement)
- Gas pipeline lateral (BOO arrangement)
- Mobile equipment (leases)
- Transshipping (BOO arrangement)

Third party operating charges have been estimated via a combination of vendor submissions for supply of power and logistics for movement of product.

General and administration costs have been included in the operating cost estimate for the following items: safety, training, travel, entertainment, IT support, office supplies, insurances, legal fees, tenement rents and rates, security, environmental monitoring, vendor support, and freight costs.

A detailed sustaining maintenance schedule has been developed to ensure mobile fleet and fixed plant remain in operable condition throughout the LOM. The sustaining capital allowance for the following has been estimated based on benchmarking against other salt operations.

An allowance has been made in the operating cost estimate for ongoing costs associated with the marketing of salt and SOP products. WA State Government royalties have been included in the operating cost estimate. The agreed Native Title royalties have been agreed with relevant parties and have been included in the operating cost model for salt and SOP. The Mardie Project does not attract any additional third-party royalties.



## 11.2 Operating Cost Estimate

Steady-state operating cost summaries are presented in Table 8 and Table 9 for salt and SOP production.

**Table 8: Steady-State Operating Cost Estimate for Salt**

Area Description	\$M per annum	\$/t
Evaporation ponds	4.6	1.05
Salt crystallisers	17.3	3.93
Salt wash plant	15.7	3.56
General and administration	11.1	2.52
Salt sustaining capital	4.4	0.99
<b>Salt cash cost (Ex-works)</b>	<b>53.1</b>	<b>12.05</b>
Salt port handling and transhipping	29.4	6.67
<b>Salt cash cost (FOB)</b>	<b>82.4</b>	<b>18.72</b>
Marketing and royalties	5.0	1.14
Corporate and overheads	1.7	0.40
<b>Salt AISC (FOB)</b>	<b>89.2</b>	<b>20.26</b>

**Table 9: Steady-State Operating Cost Estimate for SOP**

Area Description	\$M per annum	\$/t
KTMS crystallisers	3.5	29.3
SOP processing plant	18.9	157.8
Bitterns disposal	0.9	7.9
General and administration	5.3	44.1
SOP sustaining capital	1.8	15.0
<b>SOP cash cost (Ex-works)</b>	<b>30.5</b>	<b>254.1</b>
SOP port handling and transhipping	0.9	7.4
<b>SOP cash cost (FOB)</b>	<b>31.4</b>	<b>261.5</b>
Marketing and royalties	5.2	43.4
Corporate and overheads	0.6	4.8
<b>SOP AISC (FOB)</b>	<b>37.2</b>	<b>309.8</b>

## 12. MARKET ANALYSIS

### 12.1 Salt

Salt is one of the most widely used substances on earth, with over 10,000 direct and indirect uses. It has a large and mature market with 354Mtpa (2019) of various qualities consumed globally.

High purity salt is primarily used in the chemical industry to produce chlorine, caustic soda and soda ash, which are then used in various industrial processes to manufacture thousands of products. Key end-products which drive ultimate demand for salt include PVC products (from chlorine), alumina production, soaps and detergents (from caustic soda) and glass production (from soda ash) amongst others.

Salt is also essential for water purification (chlorine), is consumed in the dietary intake of humans and animals along with being used as a food preservative. Large amounts of salt are used annually for road de-icing.

#### 12.1.1 Salt Supply and Demand

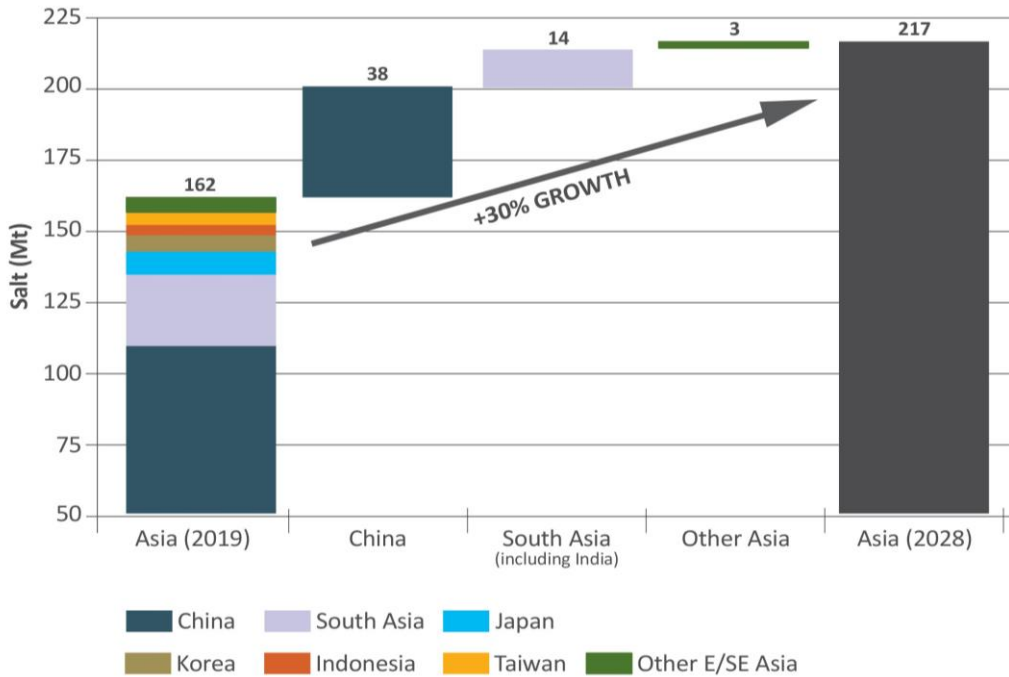
Salt is produced by three main methods globally: solar evaporation of brine from the ocean or lakes (40%); solution mining of underground salt deposits (40%); and hard rock mining of underground salt deposits (20%).

Asia is the largest salt producing region, producing 135Mtpa (2019). China (90Mtpa; solar and solution) and India (30Mtpa; solar) account for the majority. Australia produces up to 13Mtpa, the vast majority of which is from the five large WA solar salt operations and is exported into Asia. The other main supplier to Asia is an 8Mtpa solar evaporation operation in Mexico, jointly owned by Mitsubishi and the Mexican government, which exports approximately 5Mtpa into Asia.

Asia is also the largest consuming region, accounting for 162Mtpa (2019), of which 110Mt is consumed by China. The chemical industry accounts for a higher proportion of salt consumption in Asia (75%) than in the rest of the world (55%).

Salt demand is closely correlated with GDP due to its wide range of applications. GDP in Asia has risen from US\$9.7B to US\$20.3B since 2010, but on a per capita basis remains significantly below USA levels (China at 30% and Japan at 70% respectively of the USA). During this same period, salt demand in Asia has grown from 121Mtpa to 162Mtpa with a correlation factor ( $R^2=0.98$ ) to GDP growth.

Following the expected short term negative economic impact of the Covid-19 pandemic, Asian GDP is forecast to continue growing strongly over the next decade, driven by ongoing construction and urbanisation by a growing Asian middle class, requiring more PVC, glass, construction materials and other industrial products for which salt is a key raw material. By 2028, Roskill is forecasting Asian salt demand to be 217Mtpa, an increase of 55Mtpa compared to 2019 (see Figure 19). The majority of this demand growth (34Mtpa) is expected to be from the chloralkali industry requiring high-purity salt.

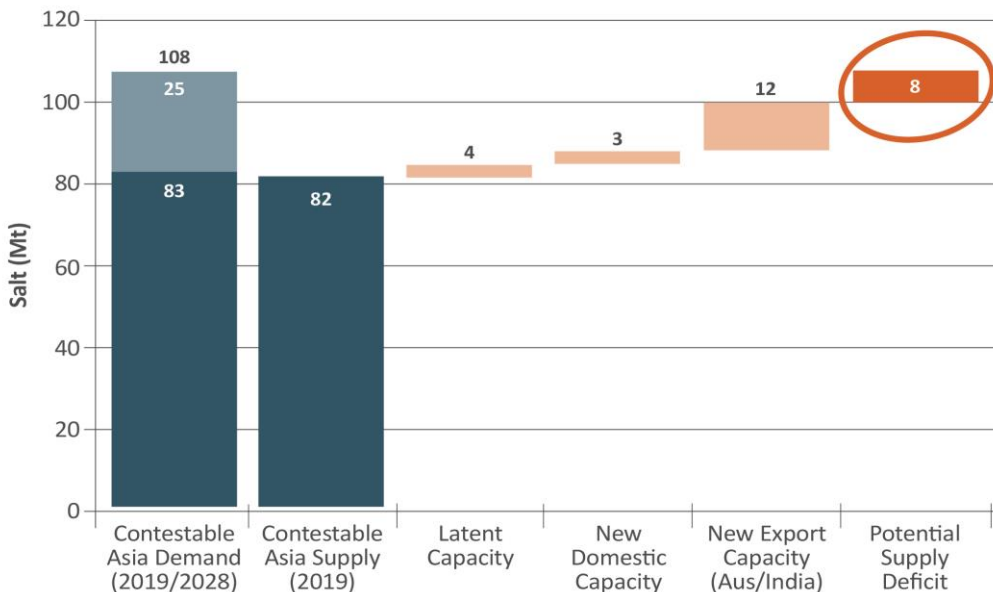


SOURCE: Roskill, SMM, BCI analysis

**Figure 19: Asian Salt Demand 2019-2028**

Within the Asian region, Mardie’s main target markets are where it can compete with existing and new suppliers on a cost and quality basis. This includes coastal provinces of China, Japan, Korea, Taiwan and South East Asia with demand of 83Mtpa in 2019 forecast to grow to 108Mtpa by 2028.

With solar salt production reducing in the China coastal regions, and insufficient new projects in the Asian region that can competitively supply these markets, BCI expects a potential supply deficit by 2028. This creates a significant opportunity for Mardie to supply high purity salt into this market (see Figure 20).



SOURCE: Roskill, SMM, BCI analysis

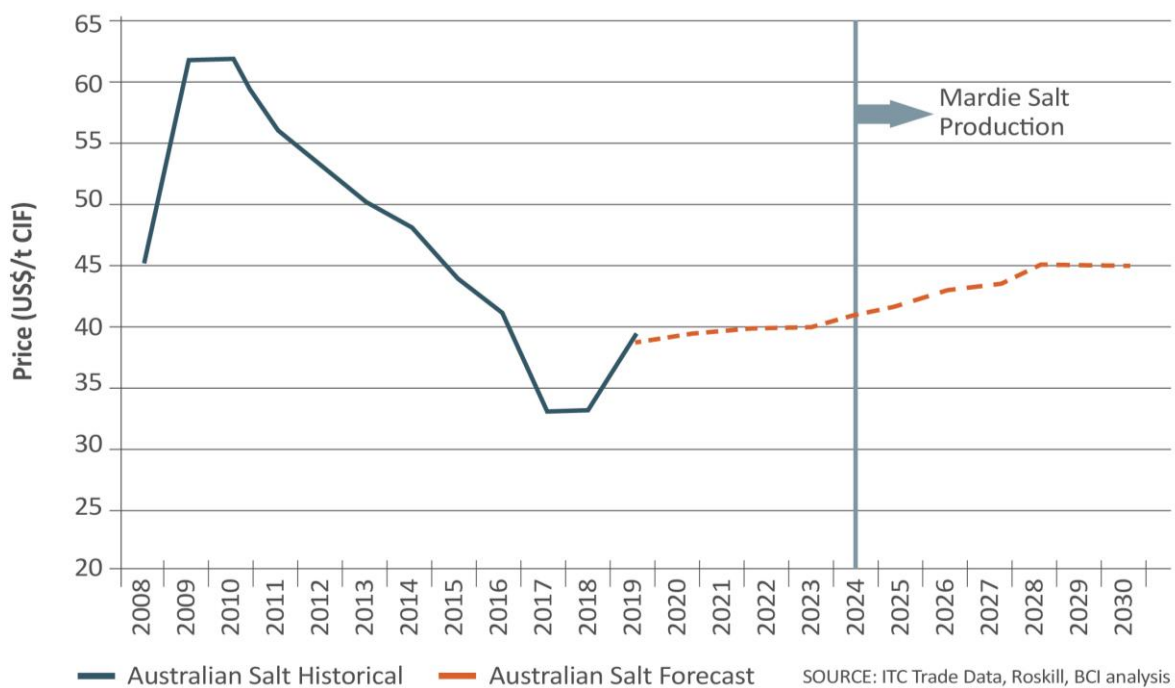
**Figure 20: Target Market Salt Supply/Demand Balance 2019-2028**

### 12.1.2 Salt Price

Salt prices vary depending on country of sale, end-use market, product quality and method of production. There is no exchange-traded or index price for salt, however the salt price can be inferred from official published import/export statistics.

Historical prices for Australian salt delivered into Asia have ranged from approximately US\$33/t to US\$60/t CIF over the last decade, with an average of US\$44/t CIF.

Prices are increasing off the low point in a 10-year cycle in 2017/2018, with the 2019 average price for Australian salt of US\$40/t CIF representing a 20% increase over the 2018 average price. In light of the positive demand and supply dynamics, Australian salt prices in Asia are expected by Roskill to increase during the coming decade (see Figure 21).



**Figure 21: Australian Salt Price into Asia (Forecast in Real \$)**

For the DFS financial evaluation, the Mardie salt price is based on Roskill’s price forecast (April 2020) for Australian salt delivered to various Asian countries, adjusted for Mardie’s product placement strategy to reflect price differentials per market segment.

Ocean freight costs are critical for salt as a bulk commodity and Mardie’s average (LOM) ocean freight cost is estimated at US\$11/t, based on forecasts from Braemar (June 2020) for the range of vessel sizes and ports in Mardie’s placement strategy. This results in a LOM average free-on-board (FOB) salt price of US\$34/t, increasing from US\$30/t FOB in 2024 to US\$34/t FOB for 2028 onwards.

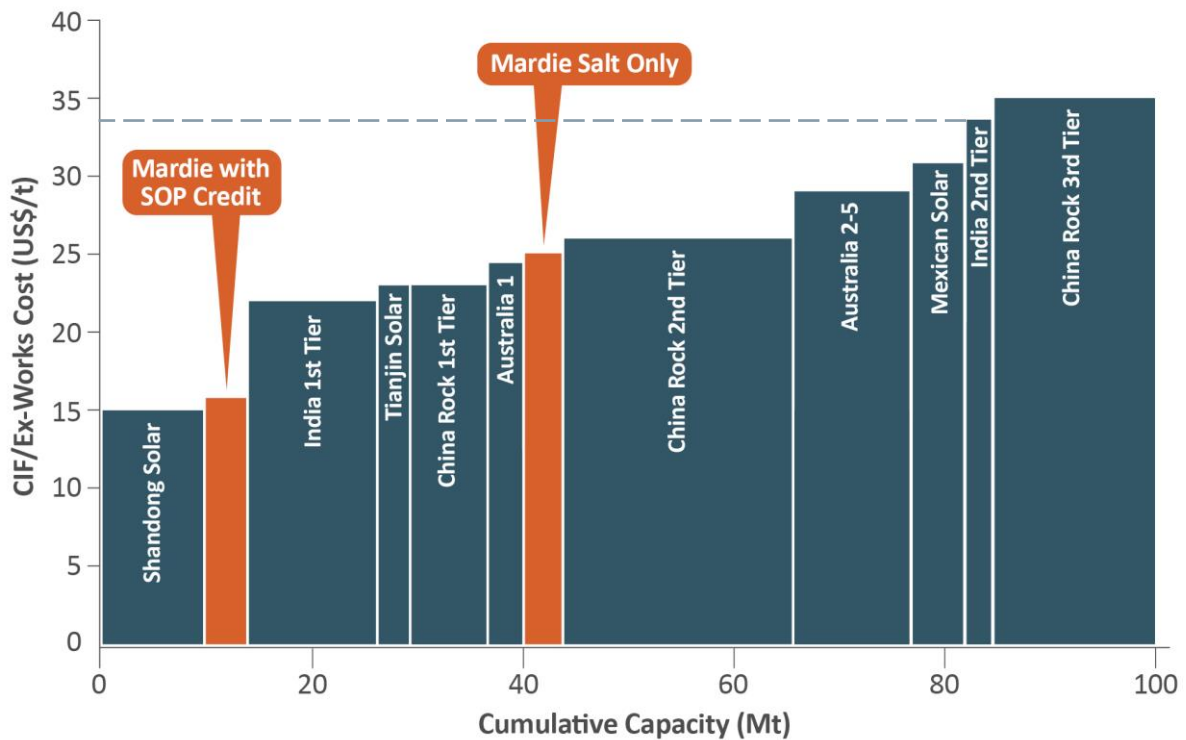
### 12.1.3 Mardie Salt Competitiveness

Mardie will supply a low cost, high quality product making it highly competitive in its target markets in Asia.

#### Cost

The cost curve for suppliers into Mardie’s target market is shown in Figure 22. Mardie’s average delivered cost to Asia of approximately US\$25/t is expected to be in the second quartile of the cost curve, competitive with the five existing large Western Australian operations. BCI’s ability to use larger vessels than other Australian salt operators that are draft-constrained can deliver a freight cost advantage.

If SOP is considered as a by-product credit (where the salt operating cost is reduced by offsetting the SOP profit margin), Mardie’s delivered cost would reduce by ~US\$9/t, shifting it further down the cost curve to be one of the lowest cost suppliers of salt into the Asian market.



SOURCE: Roskill, SMM, BCI Analysis

**Figure 22: Asian Salt Cost Curve – Supply into Mardie’s Contestable Market**

Mardie will be competitive with most of the competing Chinese sources in the target regions. The Chinese solar salt producers located within the China coastal region (Mardie’s target market) are generally of low cost, but often also of low-quality due to adverse weather conditions and limited salt washing. Produced in coastal parts of north-east China, production volumes are declining due to reallocation of land for ongoing industrial or urban development.

Chinese rock salt producers provide the marginal supply into the coastal region. While these operations can produce high quality product, they normally have energy intensive production processes and their inland location requires long distance road transport, resulting in high costs.

Mexican solar salt generally incurs multiple transshipping transfers, increasing logistics cost to deliver product to most Asian regions. Mexican salt delivered into a small number of East Asian Capesize ports is competitive low-cost supply.

Indian solar salt production is typically lower cost, but also lower quality. Higher quality Indian production undergoes multiple washing stages, which increases cost and reduces yield. Similar to the trend over the last decade in the iron ore industry, India has also increased the production of lower quality salt and exported it to China. This contributed to a large degree to the Asian salt price reduction in the 2017-2018 period. Since then, producers of high quality end-products in Asia have started moving back to buying the premium high quality salt from Australia and Mexico, increasing pricing in 2019 (see Figure 21).

## Quality

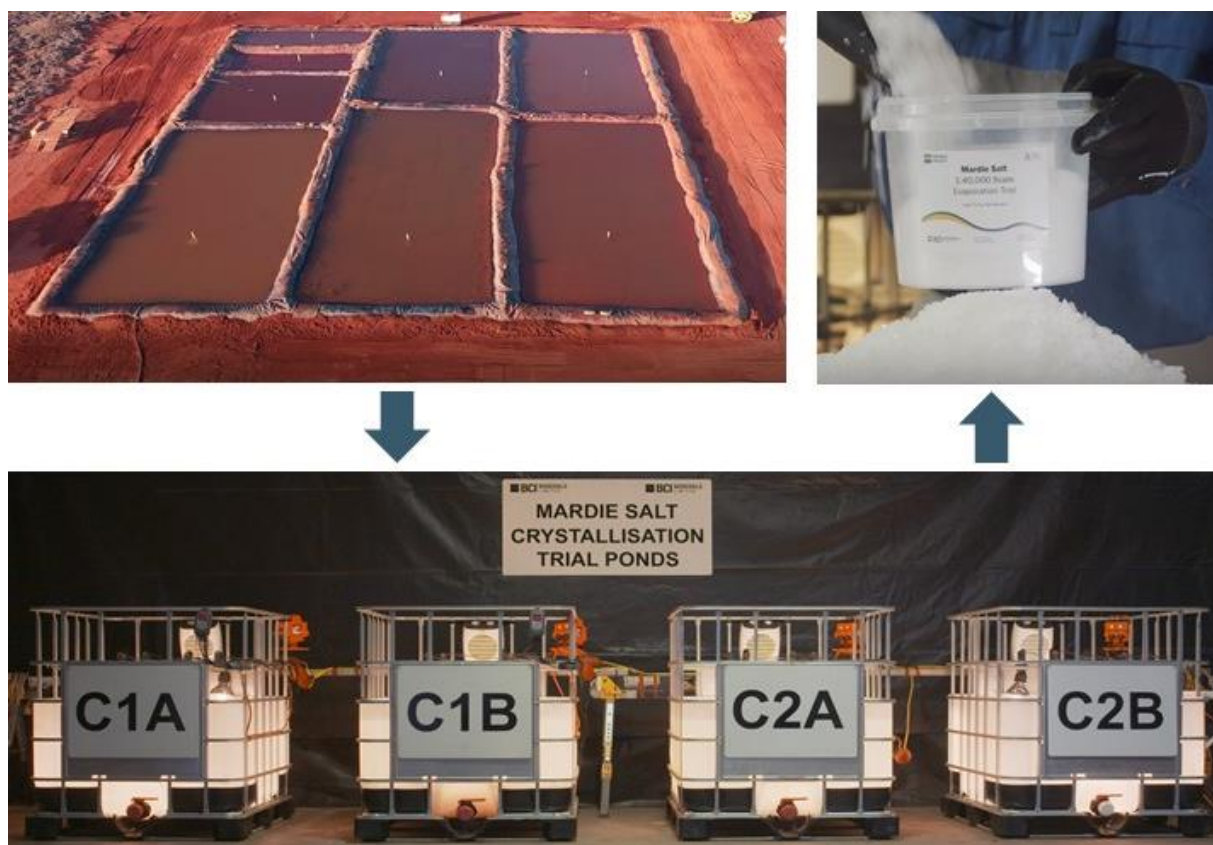
The chemical industry, which is driving Asian salt demand growth over the next decade, requires high purity salt. Australian salt is well regarded as a high quality and consistent product, with Mardie's product quality expected to be similar to existing Australian producers.

Mexican solar salt production is similar quality to Australian production and Chinese rock salt production is also high quality, however, both sources of supply have a cost disadvantage as noted above.

Indian product is a mix of grades with a large proportion being unwashed and of much lower quality. Chinese solar salt is also typically unwashed and lower quality. These products are usually unsuitable for high-end chemical production processes that manufacture chlorine and caustic soda.

The 1:40k scale Evaporation Trial at the Mardie site was established to verify flowsheet parameters and to produce small quantities of salt for testing by potential customers (refer Figure 23). Trial ponds were constructed on high ground to protect it from tidal movements. Brine representing the Pond 9 operating state was transferred to undercover facilities for final crystallisation. The crystallisation process simulated site conditions in terms of varying temperature and wind. Salt samples were harvested from the crystallisers and washed using various washing techniques to determine the optimum method.

Initial independent laboratory analysis results confirm Mardie salt has similar quality to other WA operations with high NaCl content and low impurities, and will meet (and exceed) all chemical criteria required by the Asian chloralkali industry.



**Figure 23: Mardie Small Scale Trials**

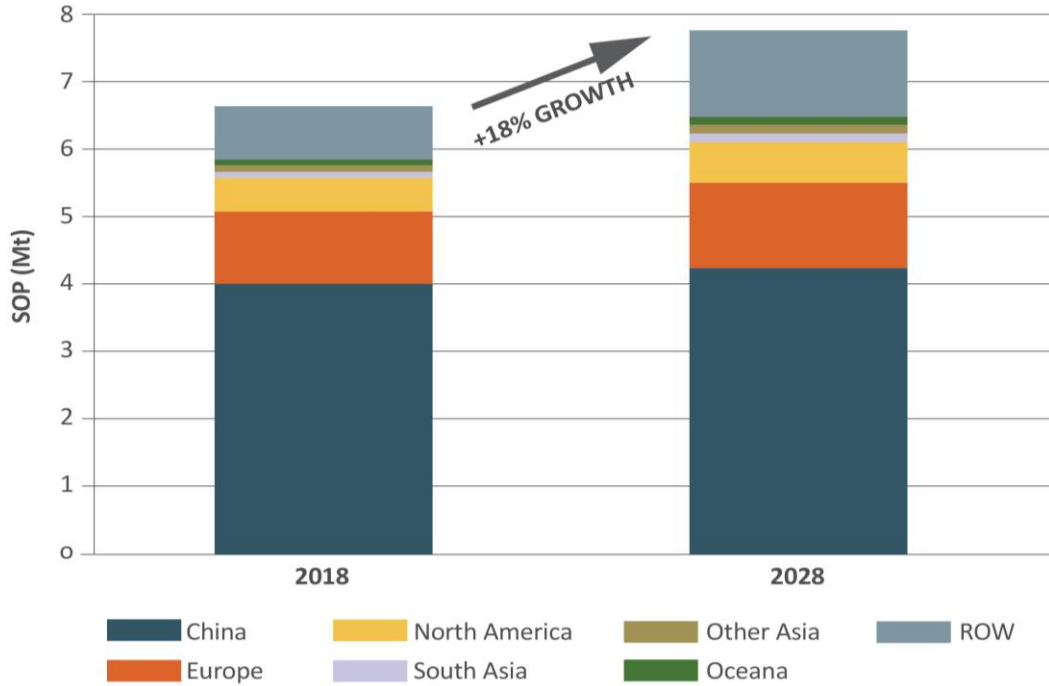
## 12.2 SOP

SOP (or  $K_2SO_4$ ) is a premium quality fertiliser used on high value crops such as berries, avocado and stone fruits. SOP provides a source of potassium, one of three key “macronutrients” required by plants, playing a major role in the uptake of water by the plant therefore improving resistance to drought and disease. SOP has the distinct advantage of increasing the crop yield per hectare, and is also valued for its sulphur content, which is the fourth macronutrient. SOP has a positive market outlook with the main driver being the increasing Asian middle class demanding greater quantities of high quality and high value produce.

### 12.2.1 SOP Supply and Demand

SOP can be produced via two methods: “primary” production of SOP typically from evaporation brines or seawater; or “secondary” production of SOP from the reaction of MOP and sulphuric acid in the Mannheim process. These two methods have distinctly different cost structures, with primary production being significantly lower cost.

Based on leading industry expert Argus Consulting, global SOP demand is expected to grow from 6.6Mtpa in 2018 to 7.8Mtpa in 2028 at an average growth rate 1.3% per annum, with a slightly lower rate after 2028. The largest demand increases are forecast by Argus Consulting to be from Europe, South America and China. Oceania (Australia and New Zealand) consumes around 90ktpa and with no domestic commercial scale SOP production, the majority of SOP is imported from Europe. Oceania demand is expected to increase to 110ktpa by 2028.

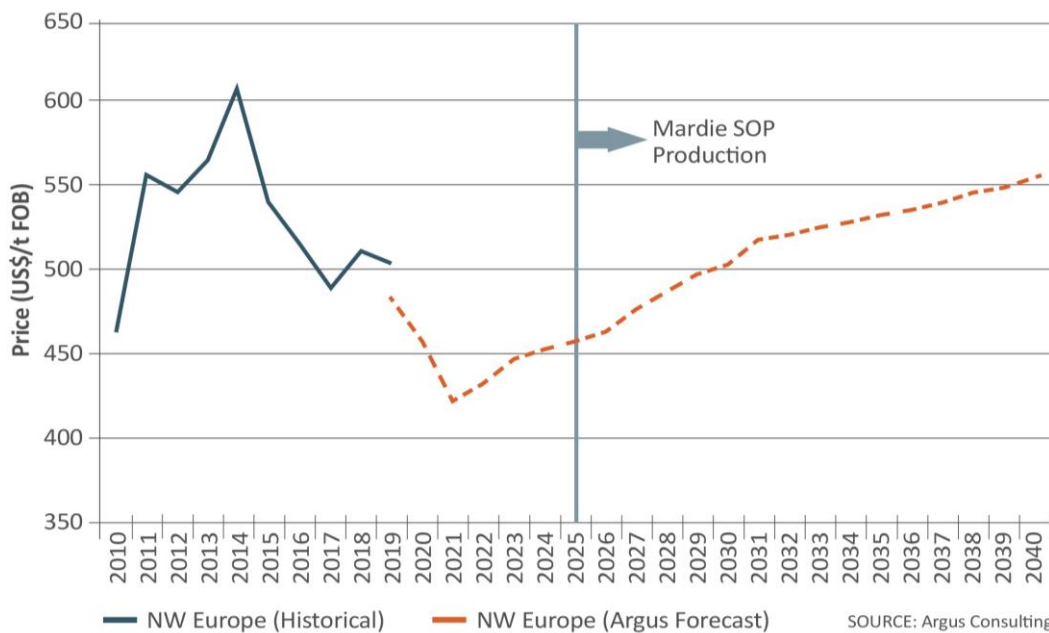


SOURCE: Argus Consulting

**Figure 24: SOP Global Demand Growth**

### 12.2.2 SOP Price

SOP prices vary depending on country of sale, product characteristics (e.g. grade, impurities, solubility, granular or fines) and packaging (e.g. bulk or bagged). There are various pricing benchmarks for SOP, with the FOB NW Europe price for bulk SOP fines (50% K<sub>2</sub>O) being the most commonly reported. The FOB NW Europe price as reported by Argus Consulting has ranged from US\$417/t to US\$630/t over the last decade, with an average of US\$532/t. As of June 2020, the price was approximately US\$475/t. Argus’s FOB NW Europe price forecast (November 2019) is shown in Figure 25.



SOURCE: Argus Consulting

**Figure 25: NW Europe SOP Price (Forecast in Real \$)**



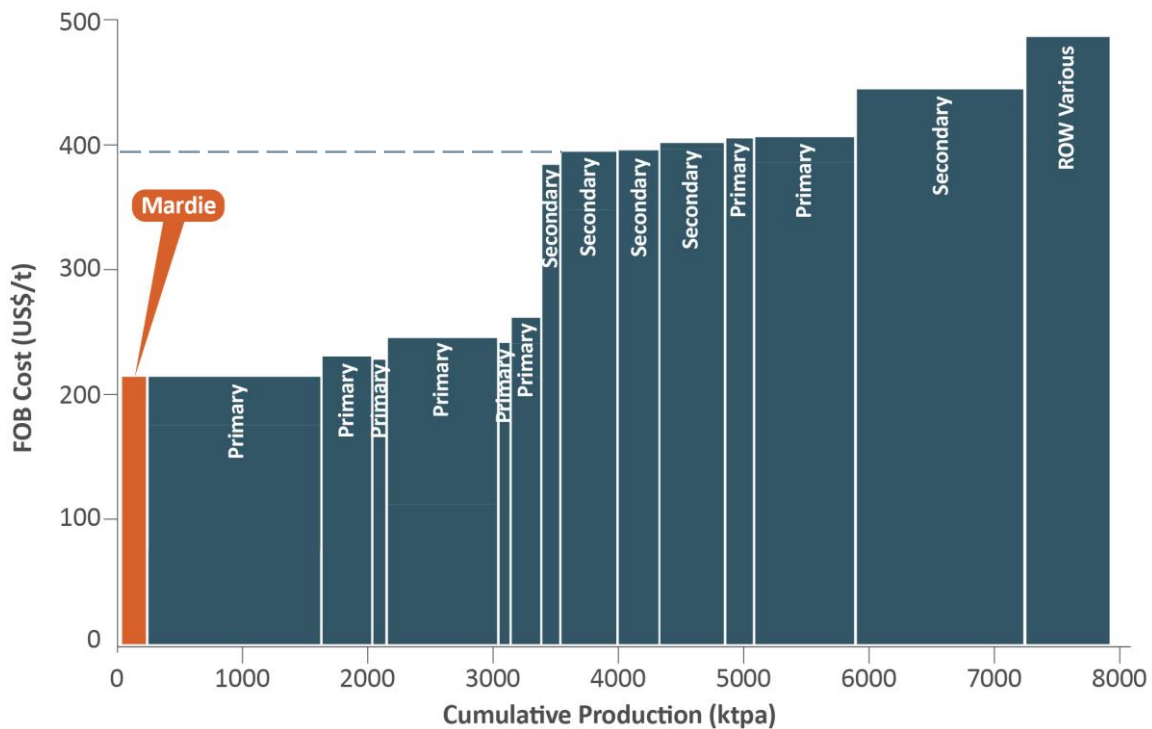
For the DFS financial evaluation, the Mardie SOP price is based on Argus’ price forecast, adjusted for (i) quality premiums for the Mardie SOP product (52% K<sub>2</sub>O, granular) and (ii) country specific netback adjustments which reflect prevailing prices in those countries and Mardie’s delivered cost advantage for those markets.

### 12.2.3 Mardie SOP Cost Curve Position

Mardie is expected to be one of the lowest cost SOP producer globally due to; (1) being a primary producer of SOP (as opposed to a secondary or Mannheim producer); (2) producing SOP as a by-product from salt, with significant costs allocated to salt production; and (3) being located on the coast with an adjacent export facility, thereby avoiding all road transport cost which inland projects need to incur.

The Mardie logistics solution could result in a \$60-100/t lower SOP delivered cost compared with other WA SOP projects, who will likely require up to an additional 1,000km road transport, port storage costs, product containerisation and container-related shipping costs.

A large volume of SOP produced in China via the high-cost Mannheim production process which underpins SOP pricing above US\$400/t FOB - see Figure 26.



SOURCE: Argus Consulting, July 2019: BCI analysis

Figure 26: Global SOP Cost Curve

## 12.3 Mardie Marketing Strategy

BCI is planning for a maximum of 80% of annual salt and SOP production to be sold through two to four-year offtake contracts (aligned to current market practice) with credible end-users and trading companies, with the remaining ~20% of production to be sold via short term and spot contracts. The objective will be to create a diversified sales book by having a maximum of 50% of annual production to any one country and initially a maximum of 20% to any one customer.

At June 2020, thirteen non-binding salt offtake MOUs have been entered into with Asian chemical companies and traders for potential salt offtake of up to 4.50Mtpa (Table 10). These MOUs are with a mix of credible and diversified end-users and traders across several countries and are typically for initial terms of three to four years, with options to extend.

**Table 10: List of Non-Binding Salt MOUs (Mtpa)**

#	Company	Location	Yr 1	Yr 2	Yr 3	Yr 4
1	Japanese Trading Co.	Japan & Other	0.3	0.5	0.8	0.8
2	Japanese Chemical Co.	Japan	0.2	0.2	0.2	0.2
3	Chinese Chemical Co.	Hebei	0.3	0.5	0.8	-
5	Chinese Chemical Co.	Zhejiang	0.3	0.5	0.5	-
5	Chinese Chemical Co.	Zhejiang	0.3	0.5	0.5	-
6	Chinese Chemical Co.	Anhui	0.3	0.5	0.5	-
7	Chinese Trading Co.	Fujian	0.3	0.5	0.5	-
8	Chinese Chemical Co.	Shandong	0.2	0.2	0.2	-
9	Chinese Chemical Co.	Fujian	0.1	0.1	0.1	-
10	SE Asian Chemical Co.	Philippines	0.15	0.2	0.2	-
11	SE Asian Diversified Co.	Malaysia	0.05	0.05	0.1	0.1
12	SE Asian Chemical Co.	Indonesia	0.05	0.05	0.05	0.05
13	SE Asian Diversified Co.	Indonesia	0.05	0.05	0.05	0.05
<b>Total</b>			<b>2.60</b>	<b>3.85</b>	<b>4.50</b>	<b>1.20</b>

Two non-binding SOP offtake MOUs have been entered into with Asian companies, including a five-year MOU with one of China's largest fertiliser companies (and an SOE) for sales within China and other regions, covering ~75% of Mardie's planned SOP production.

**Table 11: List of Non-Binding SOP MOUs (ktpa)**

#	Company	Location	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
1	Chinese Tier 1 Fertiliser Co.	Shandong	40	70	80	80	80
2	Chinese Trading Co.	Fujian	5	5	10	-	-
<b>Total</b>			<b>45</b>	<b>75</b>	<b>90</b>	<b>80</b>	<b>80</b>

For both salt and SOP, BCI expects to sign further MOUs over the coming months, before progressively converting MOUs into binding offtake contracts in the period leading up to debt drawdown and first sales.

## 13. FINANCIAL EVALUATION

### 13.1 Overview

Financial analysis of the Mardie Project has been undertaken using a discounted cash flow model (constructed by BCI and reviewed by KPMG) based on DFS estimates for production rates, capital costs, FOB operating costs, salt and SOP prices, ocean freight rates and currency exchange rates. This financial evaluation is based on pre-tax, ungeared (100% equity) project cash flows, modelled on a quarterly basis in real dollars.

The key financial metrics for the Project include net present value (NPV), internal rate of return (IRR), earnings before interest, tax, depreciation and amortisation (EBITDA) and measures of capital efficiency (NPV to capex ratio) and investment payback (payback period).

The financial evaluation demonstrates robust financial metrics as presented in Table 12 which support the Project's equity and debt funding plan.

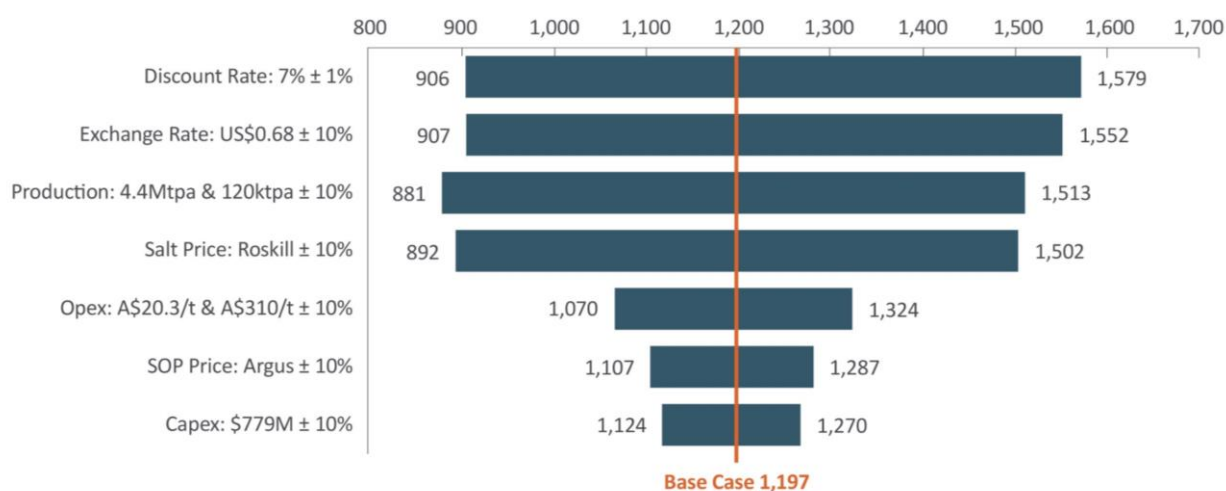
**Table 12: Financial Highlights<sup>1</sup>**

Item	Outcome
Pre-tax NPV <sub>7</sub> (ungeared) <sup>2</sup>	\$1,197M
Pre-tax IRR (ungeared)	15.3%
Steady-state EBITDA per annum	\$197M
NPV <sub>7</sub> to capex ratio	1.5x
Payback period (from first salt sales)	6.7 years

1 – All dollar values presented in Australian dollars unless specified.

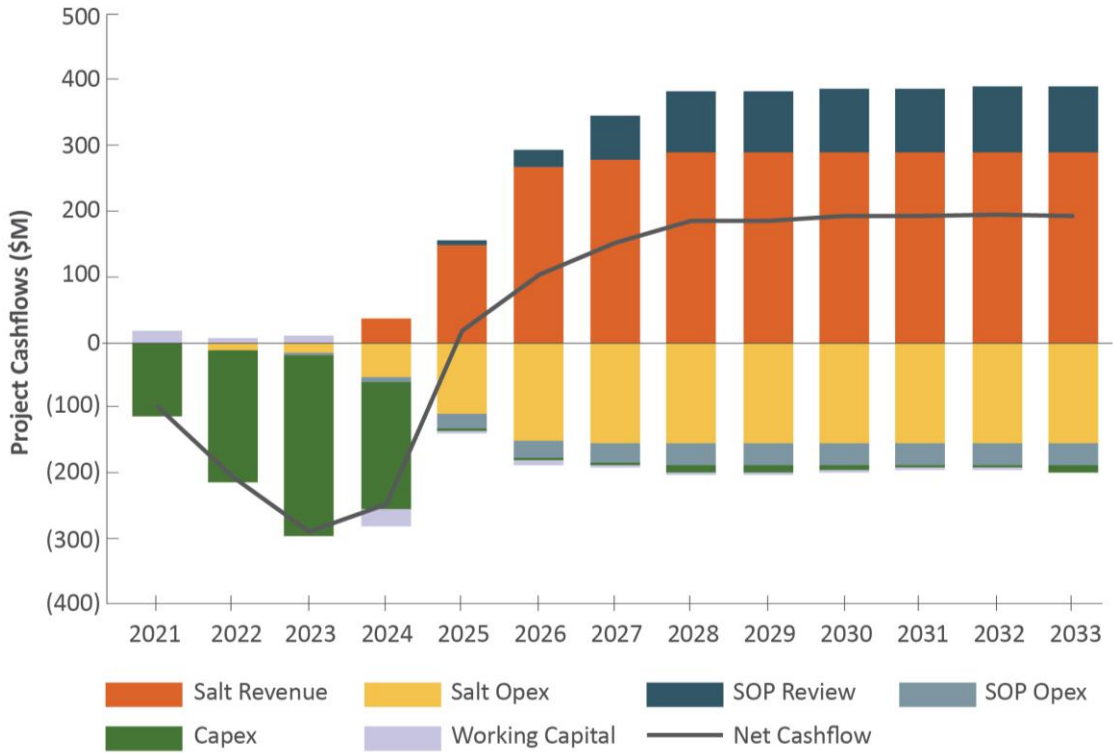
2 – Discount rate supported by low interest rate environment and very long project life. 7% real discount rate equates to ~9% nominal.

Sensitivity of the pre-tax NPV<sub>7</sub> to changes in key assumptions is set out in Figure 27 below. The Mardie Project NPV is most sensitive to changes in discount rate, exchange rate, salt price assumptions and production rates. The Project NPV is least sensitive to capex, SOP price and opex.



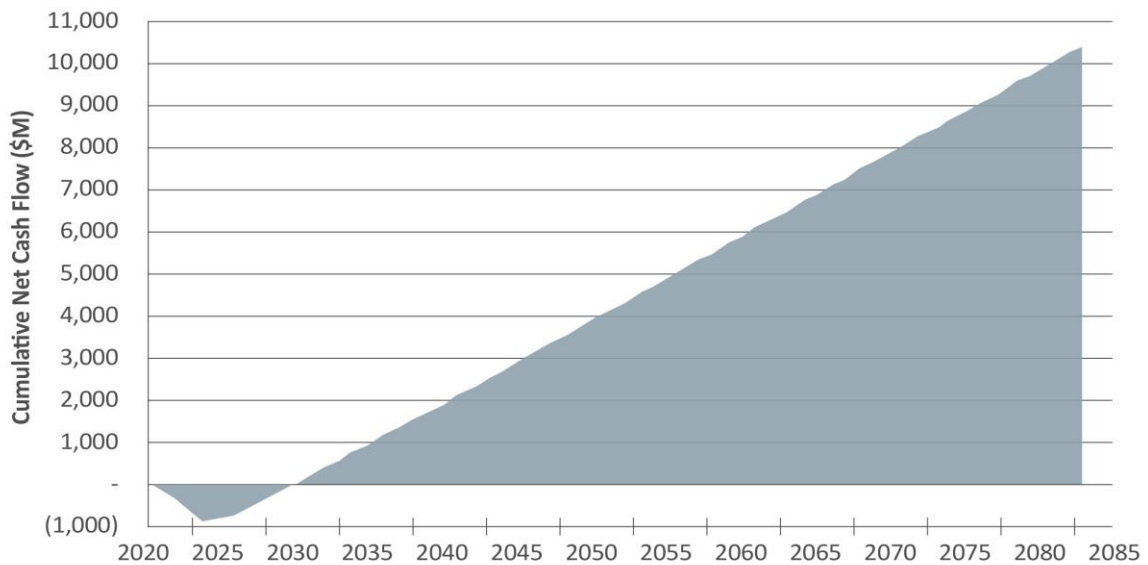
**Figure 27: Pre-tax NPV<sub>7</sub> Sensitivity Analysis (\$M)**

Pre-tax project cash flows for the construction period and first 10 years of production are shown in Figure 28. After a 3-year construction period starting in 2021, first salt sales commence in mid-2024 and SOP sales commence in mid-2025. Net cash flows become positive in 2025, ramping up to approximately \$190M per annum by 2028 which is maintained through the remainder of the 60-year project life.



**Figure 28: Pre-tax Project Cash Flows**

Cumulative net cash flows over the entire project life are shown in Figure 29. Total LOM revenue is >\$22B and total LOM pre-tax net cash flow is >\$10B.



**Figure 29: Cumulative Pre-tax Project Cash Flows**

### 13.2 Production Assumptions

The total construction and operating period modelled is 63 years, aligned with the three 21-year Mining Lease terms. Production and sales occur over approximately 60 years and total 260Mt for salt and 6.9Mt for SOP. Sales commence in mid-2024 for salt, with steady-state sales of 4.4Mtpa reached in 2027. SOP sales commence in mid-2025, with steady-state sales of 120ktpa reached in 2028 which is maintained through the remainder of the 60-year project life.

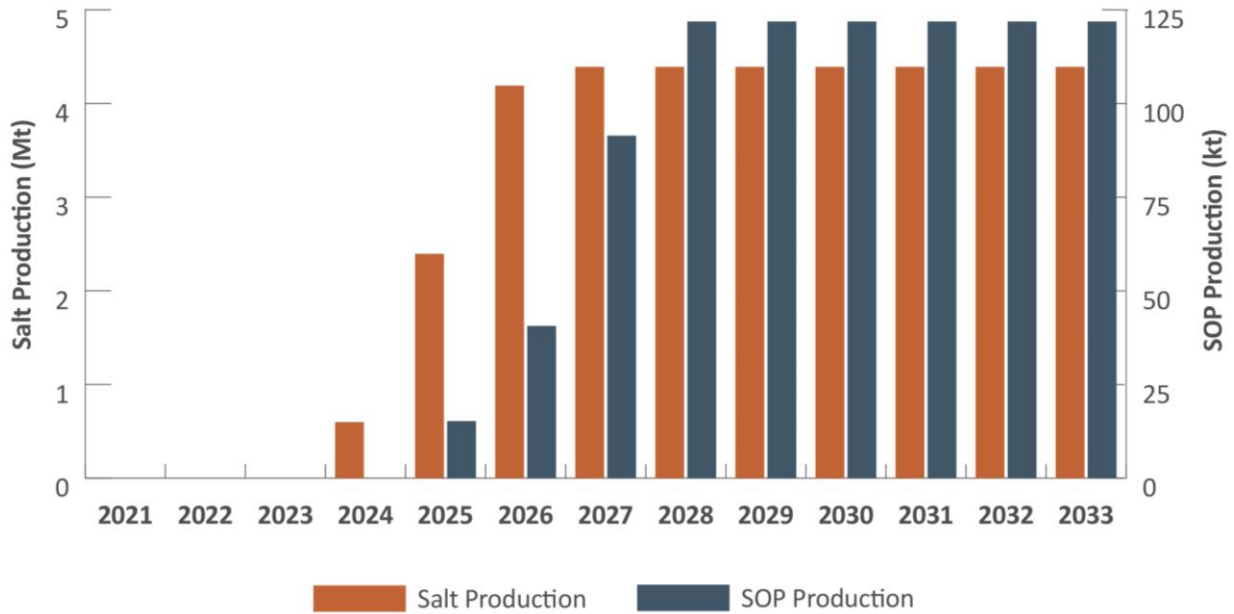


Figure 30: Salt and SOP Production

### 13.3 Pricing Assumptions

Forecast salt prices increase from US\$40/t CIF at first production in mid-2024 to a long-term price of US\$45/t CIF after 5-years of production onwards.

Forecast SOP prices increase from US\$480/t FOB when SOP production commences in 2025 to a long-term price of US\$583/t FOB after 15-years of production onwards.

The exchange rate adopted in the financial evaluation is US\$0.68 per A\$1, based on an average of the consensus forecast, forward curve rates and the average of the last 6 months spot rates.

### 13.4 Capital Cost Assumptions

Total capital costs of \$779M have been included in the financial model based on the estimate in Section 10. The quarterly spend profile by work breakdown structure area is shown in Figure 31.

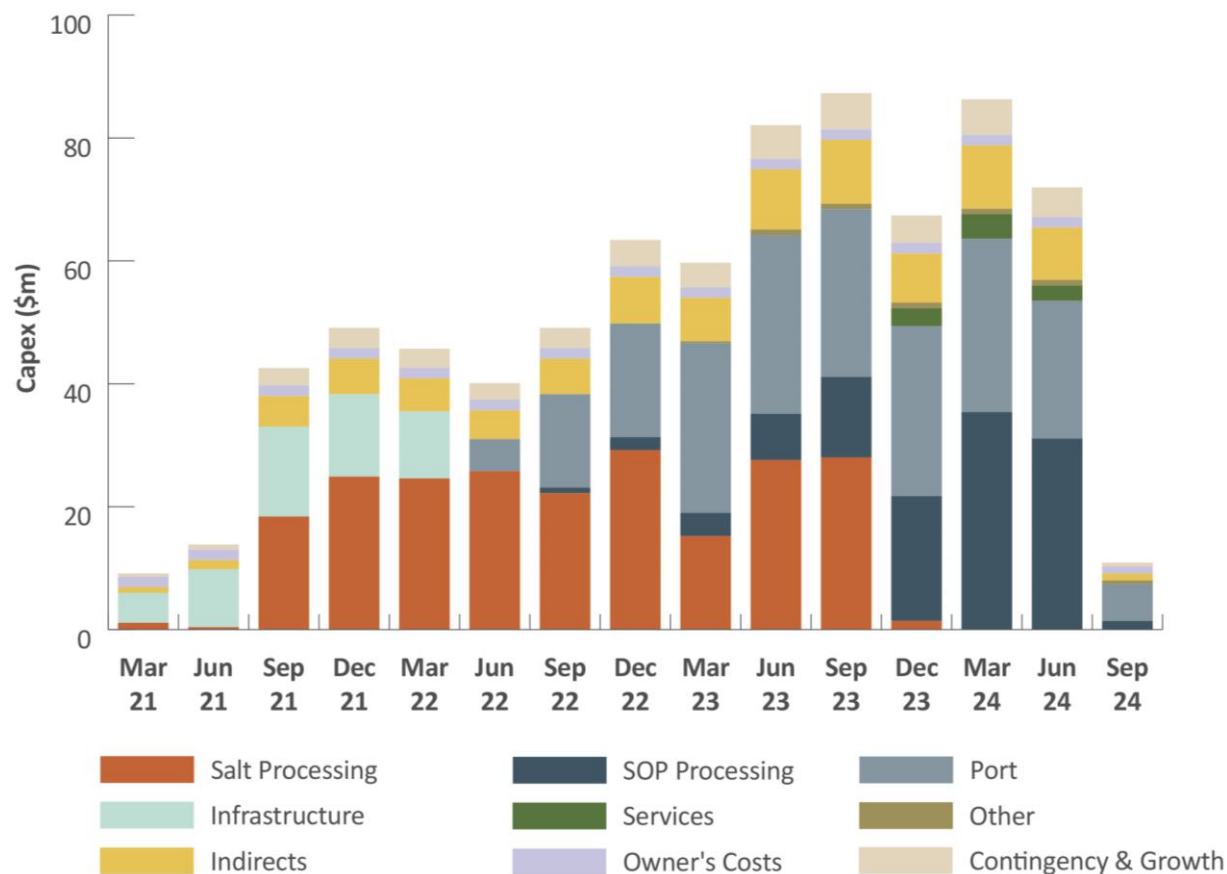


Figure 31: Capex by Area

### 13.5 Operating Cost Assumptions

Operating costs have been included in the financial model based on the estimates in Section 11, equating to steady-state AISC of \$20.3/t FOB for salt and \$310/t FOB for SOP. This equates to US\$13.8/t FOB for salt and US\$211/t FOB for SOP.

Operating costs commence in late-2021 when first seawater is transferred into Pond 1 and ramp up in line with the increase in operating activities and then salt/SOP production and sales. Operating costs incurred over the 3-year construction period up to first salt sales total \$53M.

### 13.6 Other Assumptions

The financial model also includes the following assumptions:

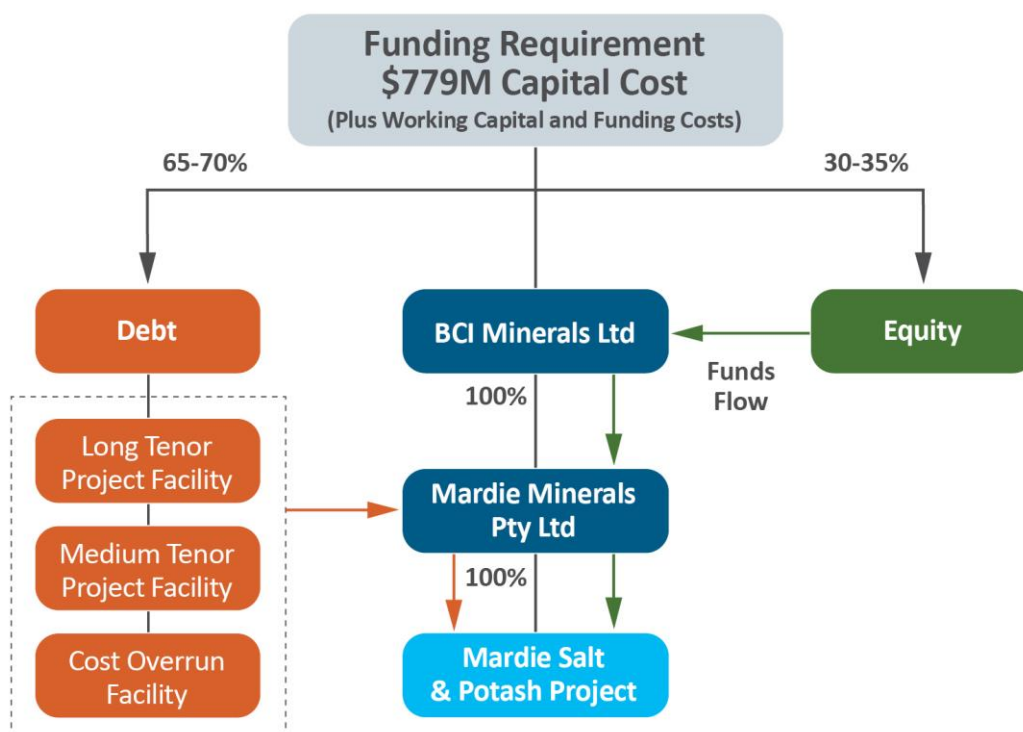
- Closure costs: \$70M based on full rehabilitation of the entire Project footprint, calculated using Mine Rehab Fund (MRF) methodology and rates, implemented over the last five years of operation
- Trade debtors: revenue received on average one month after incurred, aligned with expected payment terms of offtake contracts and letters of credit
- Trade creditors: costs paid on average one month after incurred, aligned to standard market practice

## 14. PROJECT FUNDING

The funding task includes the capital cost of \$779M, plus additional funds to cover working capital, cost overrun facilities, debt interest and other funding costs. BCI has developed a strategy to raise external funding in the form of debt and equity to fund the Mardie Project development as it does not have sufficient cash and earnings in its existing business.

The funding strategy for the Project takes into consideration the 3-year construction period to first salt sales and long-term operating cash flows (60+ years) available once in production. Strong Project cash flows provide the capacity to support a significant component of debt and BCI's target is to achieve a potential 65-70% gearing ratio. Project debt is expected to include a long tenor project finance facility, medium tenor project finance facility and a cost overrun facility.

The proposed funding structure is illustrated in Figure 32 below.



**Figure 32: Proposed Funding Structure**

Equity is expected to be raised at the BCI Minerals Ltd level. BCI will contribute equity funding to Mardie Minerals Pty Ltd for project development. Sufficient capital will be retained by BCI, which in combination with proceeds from iron ore royalties and selected asset sales, will ensure BCI overheads and other activities are funded.

BCI's existing shareholder base includes large and sophisticated investors with the capacity to support a large proportion of the equity required to develop the Project. Additional equity will be sought from other large financial and strategic investors and the general investor market.

Debt is expected to be raised at the Mardie Minerals Pty Ltd level and include a combination of long tenor and medium tenor project finance facilities. Financial modelling of the Project and associated

financing cash flows indicates that the Project has the capacity to support the levels of debt being contemplated.

BCI is progressing discussions with the Northern Australia Infrastructure Facility (NAIF) regarding longer term debt facilities potentially including concessional terms to support development of the Project. In July 2019, Mardie was assessed by NAIF Executive as having the potential to meet NAIF's mandatory eligibility criteria for funding support. BCI is currently working with NAIF to progress through the due diligence phase, agree debt funding terms and prepare an investment proposal.

Commercial debt providers including the bank market and institutional lenders (e.g. fund managers and insurance companies) are being considered to provide medium term project finance facilities. The facilities are expected to be provided by a small group (club or syndicate) of these lenders. Positive discussions with a number of Australian and international banks are ongoing and indicative debt term sheets have been received.

BCI has reasonable grounds to believe the required levels of equity and debt can be secured to fund the Project's development, however there are no certainties this will be achieved. The ultimate funding arrangements will be determined prior to FID and will be based on a number of factors including progress with FEED, contracting, approvals and offtake, as well as debt and equity market conditions at the time.



## 15. VALUE OPPORTUNITIES AND RISKS

Implementation of the Mardie Project will involve ongoing management of risk/reward scenarios, identifying and maximising opportunities to add value where practical and possible, and mitigating risks to acceptable levels that still allow achievement (or better) of technical and financial targets.

### 15.1 Value Opportunities

The DFS provides a business case and implementation strategy for the Mardie Project based on the preferred design options selected during the study. A number of business/value improvement opportunities have also been identified but have not been assessed to DFS level and therefore are not included in the DFS outcomes. In particular, BCI's recent acquisition of tenement rights immediately north of the Mardie Project presents significant value upside potential which BCI will investigate further during the pre-construction stage. The highest priority opportunities assessed in terms of potential feasibility and overall value impact are as follows:

#### Optimisation

Project layout optimisation can incrementally increase salt and SOP production (refer to Figure 33):

- The northern tenements offer opportunities to redesign Ponds 8 and 9, add a new Pond 10<sup>1</sup>, relocate and expand Primary<sup>2</sup>, Secondary<sup>3</sup> and KTMS<sup>4</sup> crystallisers and expand salt washing capacity<sup>5</sup>.
- It is estimated this optimisation could potentially add production capacity of 0.3Mtpa salt and 10ktpa of SOP, resulting in incremental EBITDA and NPV (refer sensitivity analysis illustrated in Figure 27).
- This optimisation case will be studied to a higher level of confidence over the next 6-9 months with implementation subject to financial results and final tenure and approvals being secured.

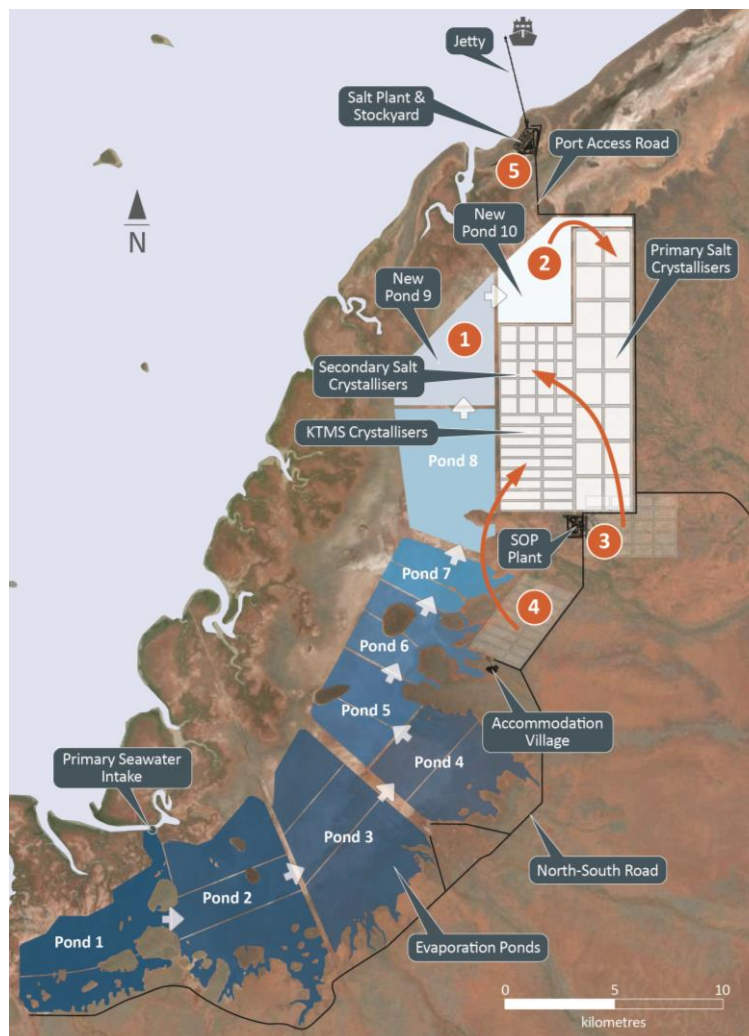
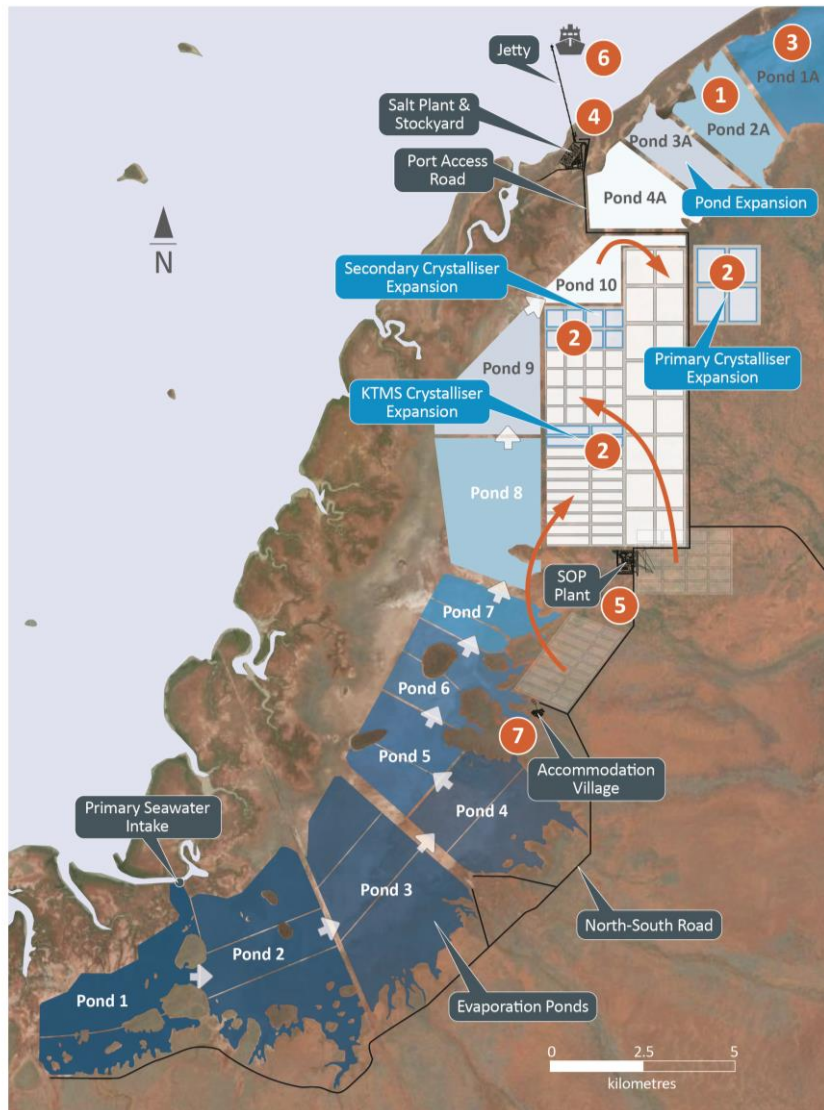


Figure 33: Potential Optimisation Layout

## Expansion

Project expansion can materially increase salt and SOP production (refer to Figure 34):

- The northern tenements also offer opportunities for a significant expansion of the project. This could involve development of four to five new evaporation ponds<sup>1</sup>, additional crystalliser area<sup>2</sup>, a second seawater intake<sup>3</sup> at the northern end of the new ponds; a second salt stockpile<sup>4</sup> and SOP plant expansion<sup>5</sup> (second salt wash plant assumed to be built as part of optimisation). A second transhipper<sup>6</sup> and expansion to the existing accommodation village<sup>7</sup> may also be required.
- Based on the area available, there is the potential to increase production capacity by up to 1.3Mtpa salt and 30ktpa of SOP, for total production (including the optimisation case above), of 6Mtpa salt and 160ktpa of SOP. This could result in significant additional earnings potential and project value – refer sensitivity analysis in Figure 27.
- This expansion case will be studied to a higher level of confidence over the next 12-months with implementation potentially after steady-state production has been achieved, subject to financial viability and approvals being secured.



**Figure 34: Potential Expansion Layout**

## 15.2 Risks

There are a number of potential risks which may impact BCI's ability to develop the Project. BCI has developed mitigating controls which should assist in adequately managing the identified risks.

The key pre-construction risks identified are as follows:

- 1. Economic downturn:** A prolonged global economic downturn (e.g. from COVID) during the pre-construction period, results in a negative investment environment and lack of Mardie funding support.
- 2. Tenure and access:** BCI is delayed in securing (or fails to secure) port leases, mining leases and third-party access agreements to allow construction to proceed.
- 3. Funding:** BCI is unable to secure Mardie debt and equity funding support in a timely manner or on reasonable terms.
- 4. Project cost:** Mardie construction costs increase leading up to first construction as a result of further design and engineering work and contracting.
- 5. Market price:** There is a material reduction in salt and SOP market prices and forecasts in the pre-construction period.
- 6. Offtake:** BCI is unable to convert sufficient MOUs to acceptable offtake contracts to support equity and debt funding requirements.
- 7. Environmental approvals:** Unforeseen factors emerging which cause a delay in securing environmental approvals.

Once the Project moves into construction and later operations, it will also be subject to a range of construction and operations risks that are typical for a project of this nature.

## 16. CONCLUSIONS AND NEXT STEPS

The Mardie DFS outcomes indicate that the production of 4.4Mtpa of high purity salt and 120ktpa of premium SOP fertiliser is technically and financially viable. DFS results confirm a compelling value proposition with a pre-tax NPV<sub>7</sub> of more than \$1B, supported by an attractive market opportunity and no insurmountable obstacles to development.

Mardie can become a potential Tier 1 asset categorised by its long life (minimum 60 years), top quartile scale, lowest quartile salt operating costs (after SOP by-product credits) and high-quality salt and SOP products.

Mardie will be the first new major salt project developed in Australia in two decades and the only Australian operation producing commercially saleable salt and SOP, adding downstream processing credentials to the existing salt industry. It will be one of the largest single salt operations in Australia, and with the potential expansion into newly acquired tenements (not included in the DFS), it can become one of the largest evaporative operations globally. In addition, the Project has strong “green” credentials given 99.9% of the energy requirement is derived from natural sun and wind to evaporate seawater.

Substantial additional FEED, approvals and tenure, ongoing site trials and early construction works expenditure of \$30M is planned in the period until first construction to support the Project assumptions and reduce construction risk. This significant capital commitment to de-risk the Project will provide a high confidence level in the cost estimates and the Project’s value and risk profile ahead of an FID.

With a strong cash position at June 2020 and ongoing royalties from its iron ore interests, BCI is well placed to complete this next phase of work at Mardie. An FID by the BCI Board is targeted in early 2021, which will trigger the commencement of an equity raising. Construction can commence in Q2 2021, which will allow for first salt sales by mid-2024 and first SOP sales by mid-2025.

With attractive financial returns over many decades and expansion potential from the new tenements, development of the Mardie Project should result in considerable long-term value and dividends being created for shareholders.