

## DFS reinforces Toliara Project's status as a world class mineral sands development

### Highlights

- DFS outcomes consistent with PFS, with no material changes to any metrics
- Post-tax / pre-debt (real) NPV @ 10% discount rate of US\$652 million, measured at FID
- Average revenue to cost of sales ratio of 3.15
- Stage 1 capex cost of US\$442 million – to establish a 13Mtpa mining processing operation
- Stage 2 capex cost of US\$69 million – to increase the operation to 19Mtpa
- Ore Reserves estimate of 586Mt @ 6.50% HM for an initial LOM of 33 years
- Mineral Separation Plant recoveries of 94.6% ilmenite, 79.4% zircon and 58.4% rutile
- Annual averages (excluding first and last partial operating years):
  - Production of 780kt ilmenite (sulphate, slag and chloride), 53kt zircon and 7kt rutile
  - Revenue of US\$248.2 million – 65% ilmenite, 32% zircon and 3% rutile
  - Operating costs of US\$71.9 million or US\$76.9 million incl. 2% Government royalty
  - Non-operating costs of US\$7.1 million (community, external affairs, marketing etc.)
  - EBITDA of US\$164.3 million, NPAT US\$110.2 million
  - Free cash flow of US\$132.4 million
- An animated video of the Toliara Project can be viewed at [www.baseresources.com.au](http://www.baseresources.com.au)

African mineral sands producer, **Base Resources Limited** (ASX & AIM: BSE) (**Base Resources** or the **Company**) is pleased to release the outcomes of its Definitive Feasibility Study (**DFS**) on its Toliara Project in Madagascar. The DFS outcomes closely align with the Pre-Feasibility Study (**PFS**) outcomes released in March 2019 and confirm a post-tax/pre-debt (real) NPV<sub>10</sub> of US\$652 million and an average revenue to cost ratio of 3.15 over the initial 33-year mine life.

#### Executive Director Operations and Development of Base Resources, Colin Bwye, said:

“Building on the PFS outcomes, our Project Development Team carried out a rigorous process to further define all aspects of the Toliara Project. This included receiving firm tender submissions and project specific budget quotations for virtually all major capital works, geotechnical and hydrogeological investigation of the region, reviewing timeframes, and extensive consultation with experts and a number of third-party peer reviews. As a result of this, we are confident with the Project’s capital and operating metrics.”

“We are very pleased that the DFS has re-confirmed our view that the Toliara Project is a world class mineral sands development opportunity. In the first 26 years of full production, the Toliara Project is expected to produce an average of 814kt of ilmenite, 55kt of zircon and 7kt of rutile annually, over a period when a global supply deficit of titanium dioxide feedstocks and zircon is expected. This production profile, combined with a highly competitive revenue to cost of sales ratio, will generate estimated average annual free cash flows of US\$140.2 million over these years.”

#### Managing Director of Base Resources, Tim Carstens, said:

“We are pleased to share the DFS outcomes today, as we progress through another major milestone in the process of bringing the Toliara Project into production.”

“We will now focus on concluding offtake and funding arrangements as we work towards a Final Investment Decision, planned for September 2020. Over the course of 2020, we also aim to upgrade the Ranobe Mineral Resources and Ore Reserves estimates following the geological interpretation of definitional drilling completed earlier this year.”

“As the planned next large-scale mining investment in the country and the first for almost a decade, the Toliara Project is of national significance to Madagascar. With the application of the Base Resources’ development model, as demonstrated with the Kwale Operation in Kenya, the Toliara Project is expected to have catalytic impact. It will create transformational opportunities for our communities, economic stimulus for the Toliara region and a flagship foreign investment for the government that is forecast to directly generate in excess of US\$1 billion in government revenue and community development expenditure over the 33 year mine life.”

“Base Resources is engaging with the government of Madagascar in relation to fiscal terms applicable to the mining sector in Madagascar, including the Toliara Project. We are confident that mutually beneficial terms can be secured that will support a sound and sustainable Toliara Project and broader mining sector, while delivering clear benefits to the communities, the nation of Madagascar and shareholders.”

### Investment evaluation

Set out below are the key financial and production outcomes from the DFS, together with, in the case of the financial outcomes, a comparison of those outcomes against the equivalent PFS outcomes. In addition, enclosed with this announcement are supporting slides titled “Toliara Project Definitive Feasibility Study – Summary Outcomes” which contain detailed information about the DFS and its outcomes. That information includes the material assumptions and underlying methodologies for deriving the financial and production outcomes set out below, such as the material price and operating cost assumptions. Accordingly, this announcement should be read together with those supporting slides.

	Unit	DFS	PFS
<b>NPV<sub>10</sub> (at a discount rate of 10%), post tax, real</b>	<b>US\$ millions</b>	<b>652</b>	<b>671</b>
<i>NPV<sub>8</sub> (at a discount rate of 8%), post tax, real*</i>	<i>US\$ millions</i>	<i><b>910</b></i>	<i>926</i>
<i>NPV<sub>12</sub> (at a discount rate of 12%), post tax, real*</i>	<i>US\$ millions</i>	<i><b>461</b></i>	<i>483</i>
<i>NPV<sub>10</sub> – TZMI Q3-2019 price forecast, post tax, real*</i>	<i>US\$ millions</i>	<i><b>722</b></i>	<i>737</i>
IRR	%	<b>21.4</b>	22.4
Initial (Stage 1) Capex	US\$ millions	<b>442</b>	439
Construction time (Stage 1)	Months	<b>26</b>	24
Stage 2 Capex	US\$ millions	<b>69</b>	67
Capital Payback Period (Stage 1 and 2)	Years	<b>4.25</b>	4.0
LOM Operating Costs + 2% Royalty	US\$/t ore mined	<b>4.31</b>	4.49
LOM Operating Costs + 2% Royalty (A)	US\$/t produced	<b>94</b>	95
LOM Revenue (B)	US\$/t produced	<b>295</b>	292
LOM Cash Margin (B-A)	US\$/t produced	<b>201</b>	197
LOM Revenue : Cost of Sales Ratio (B/A)	Ratio : 1	<b>3.15</b>	3.06
LOM Free Cash Flow	US\$ millions	<b>3,692</b>	3,696

\* Alternative NPV calculations are provided for illustrative and comparative purposes only. Base Resources considers a 10% discount rate to be the most appropriate for evaluation purposes.

## Mining and Production Profile

Production Profile	Life of Mine (LOM)		Ops Yr1	Ops Yrs 2-4 annual ave	Ops Yrs 5-27 annual ave	Ops Yrs 28+ annual ave <sup>†</sup>
	Total	annual ave*				
Ore mined (tonnes)	586,019,054	18,008,919	12,300,408	12,612,768	18,588,216	18,581,844
HM%	6.50%	6.53%	7.61%	9.24%	6.64%	4.92%
HMC produced (tonnes)	38,452,018	1,186,171	939,348	1,184,581	1,244,130	920,510
Period	33 years	31 years	1 year	3 years	23 years	6 years
Produced (tonnes):						
Sulphate ilmenite	11,755,966	365,580	213,405	388,456	381,194	280,030
Slag ilmenite	6,803,453	211,570	123,502	224,809	220,606	162,060
Chloride ilmenite	6,512,282	202,519	118,052	214,836	210,905	156,552
<b>Total ilmenite</b>	<b>25,071,701</b>	<b>779,669</b>	<b>454,959</b>	<b>828,101</b>	<b>812,705</b>	<b>598,642</b>
Rutile	223,661	6,973	3,664	6,237	7,242	6,176
Zircon	1,683,454	52,588	23,713	58,103	54,748	39,346

\* Does not include the first and last years of operation as these are both partial operating years.

† Does not include the last year of operation as this is a partial operating year.

### Investor and Shareholder calls

Base Resources Managing Director, Tim Carstens, and Executive Director, Colin Bwye, will host two investor and shareholder conference calls to discuss the DFS outcomes. Tim, Colin, and other senior members of the Project Development Team will be available to answer questions following a summary of the DFS outcomes.

#### Asia Pacific conference call

Date: Monday 16 December 2019

Time: 12.00pm AWST / 3.00pm AEDT

Conference ID: 10003220

Telephone dial in details:

Australia Toll Free:	1 800 558 698	China Wide:	4001 200 659	Malaysia:	1800 816 294
Other international:	61 7 3145 4010	Hong Kong:	800 966 806	Singapore:	800 101 2785
New Zealand Toll Free:	0800 453 055	Japan:	0053 116 1281		

#### Europe conference call

Date: Tuesday 17 December 2019

Time: 6.00pm AWST / 10.00am GMT

Conference ID: 10003221

Telephone dial in details:

United Kingdom:	0800 051 8245	Ireland:	1800 948 625	UAE:	8000 3570 2705
Belgium:	0800 72 111	Italy:	800 793 500	United States:	1855 8811 339
Sweden:	020 791 959	Norway:	800 69 950	Canada:	1855 8811 339
France:	080 098 1498	Switzerland:	0800 820 030	Other international:	61 7 3145 4010
Germany:	0800 182 7617	South Africa:	0800 999 976		

## Reasonable basis for forward looking statements

This document and the enclosed supporting slides contain a series of forward-looking statements. Base Resources has concluded that it has a reasonable basis for providing these forward-looking statements. This includes a reasonable basis to expect that Base Resources will be able to fund development of the Toliara Project when required. The detailed reasons for these conclusions are disclosed in the supporting slides. The Disclaimer & Important Notices on page 2 of the enclosed supporting slides also apply to this document.

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This release has been authorised by the Board of Base Resources.

### About Base Resources

Base Resources is an Australian based, African focused, mineral sands producer and developer with a track record of project delivery and operational performance. The Company operates the established Kwale Operations in Kenya and is developing the Toliara Project in Madagascar. Base Resources is an ASX and AIM listed company. Further details about Base Resources are available at [www.baseresources.com.au](http://www.baseresources.com.au).

# Toliara Project Definitive Feasibility Study

## Summary Outcomes

12 December 2019



**BASE  
RESOURCES**



# Disclaimer & Important Notices

## Definitive Feasibility Study

This document has been prepared by Base Resources Limited (**Base Resources**). The information included in this document relates to the outcomes of the Definitive Feasibility Study for the Toliara Project. The Definitive Feasibility Study is based on technical, economic and other conditions and information as at the date of this document, which may be subject to change. Accordingly, the information and conclusions presented in this document should be viewed in this light. Information in this document should also be read in conjunction with other announcements made by Base Resources to ASX.

## Mineral Resources and Ore Reserves estimates, production targets and forecast financial information

This document contains estimated Mineral Resources, estimated Ore Reserves, production targets and forecast financial information for the Toliara Project.

The details included about the estimated Mineral Resources for the Toliara Project have been extracted from Base Resources' ASX announcement titled "Updated Ranobe Deposit Mineral Resources (corrected)" dated 23 January 2019. The details included about the estimated Ore Reserves for the Toliara Project have been extracted from Base Resources' ASX announcement titled "Maiden Ranobe Ore Reserves Estimate" dated 6 December 2019. Both announcements are available at <https://www.baseresources.com.au/investor-centre/asx-releases/>. Base Resources confirms that it is not aware of any new information or data that materially affects the information included in these announcements and that all material assumptions and technical parameters underpinning those estimates continue to apply and have not materially changed. The Ranobe Mineral Resources included in this document are reported inclusive of the Ranobe Ore Reserves. The reference point for the Ranobe Ore Reserves estimate was 2022, being operating year 1.

The estimated Ore Reserves for the Toliara Project underpin the production targets and forecast financial information for the Toliara Project included in this document. Those Ore Reserves have been prepared by competent persons in accordance with the requirements of the JORC Code. The material assumptions on which the production targets and the forecast financial information derived from those targets included in this document are based are included in this document.

## Forward-looking statements

Certain statements in or in connection with this document contain or comprise forward looking statements. Such statements may include, but are not limited to, statements with regard to capital cost, operating cost, capacity, future production and available grades, forecast global supply, product prices, sales projections and financial performance and may be (but are not necessarily) identified by the use of phrases such as "will", "expect", "anticipate", "believe" and "envisage". By their nature, forward looking statements involve risk and uncertainty because they relate to events and depend on circumstances that will occur in the future and may be outside Base Resources' control. Accordingly, results could differ materially from those set out in the forward-looking statements as a result of, among other factors, changes in economic and market conditions, success of business and operating initiatives, changes in the regulatory environment and other government actions, fluctuations in product prices and exchange rates and business and operational risk management. Some risks that could impact Base Resources' ability to achieve the outcomes or results expressed or implied by such statements include those set out on the slides titled "Pre-FID Risks". Subject to any continuing obligations under applicable law or relevant stock exchange listing rules, Base Resources undertakes no obligation to update publicly or release any revisions to these forward-looking statements to reflect events or circumstances after today's date or to reflect the occurrence of unanticipated events.

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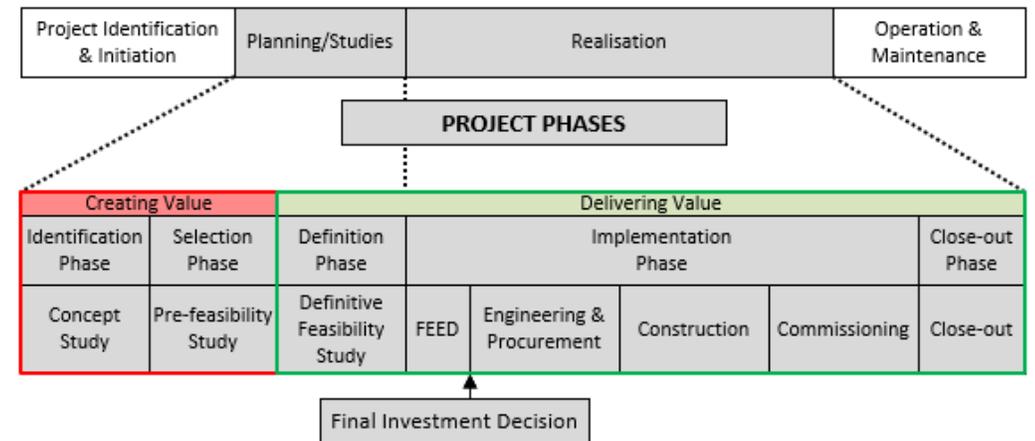
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# Introduction

To fully capitalise on Base Resources' capability built from the Kwale development in Kenya, Base Resources acquired the Toliara Project in January 2018. Project development immediately commenced - identifying value adding options and evaluating them before selecting the best options to progress through the pre-feasibility study (PFS) and then further defining that option and the broader business case in the definitive feasibility study (DFS)

- Base Resources acquired the Kwale Mineral Sands Project in Kenya in mid-2010 and over the ensuing three years successfully funded, engineered, constructed, and commissioned the project.
- In late 2013, mining started at Kwale and the final completion test was satisfied and normal operations established by mid 2015.
- To fully capitalise on Base Resources' organisational capability, business model and financial platform built at Kwale, Base Resources had been seeking the right growth opportunity from which to drive shareholder value and, after extensive evaluation of many opportunities, it acquired the Toliara Project in Madagascar in early 2018. The Toliara Project was held by local Malagasy company Toliara Sands SARL, which was subsequently renamed to Base Toliara SARL following the acquisition by Base Resources.
- The Toliara Project was identified by Base Resources as one of the premier mineral sands development opportunities in the world due to the size of the deposit, the consequent long mine life, its expansion potential, scope for operational scale up, technical simplicity and expected competitive positioning in the sector.
- Project development of the Toliara Project started immediately following Base Resources' clearly defined Project Development System (PDS).
- The PFS, completed in March 2019, evaluated development options and selected the preferred development option to progress to the DFS. A clear business case of the Toliara Project was confirmed.
- The DFS has further defined the project scope and how it will be implemented and confirmed that a requisite business case for future investment exists.
- Significant risks and critical issues were monitored and mitigated. No fatal flaws were identified.
- A detailed Early Works / Front End Engineering Development (FEED) plan and a draft Project Implementation Plan (PIP) were developed.
- A DFS report in accordance with BST809-4 standard has been delivered.

All references in this document to \$ are to US Dollars.



# Introduction

The world class mineral sands Ranobe deposit is located in south west Madagascar, 45km north of the regional port town of Toliara, 18km inland, approximately 640km southwest of Antananarivo, the capital of Madagascar

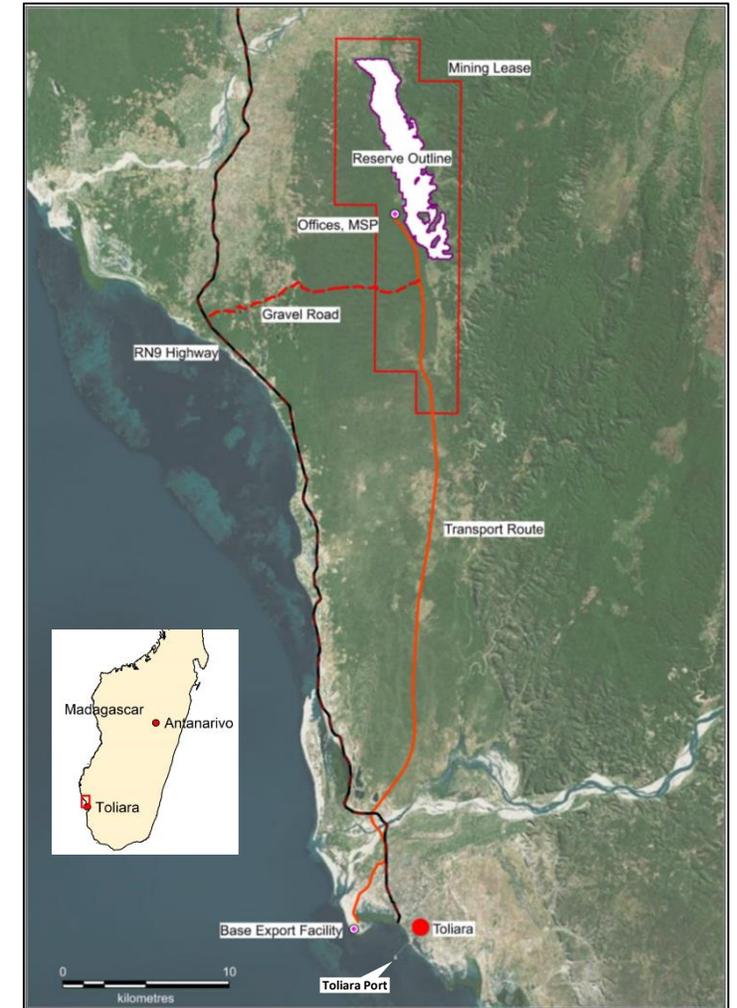
## The Toliara Project

- The Toliara Project is based on the Ranobe deposit, located 45km north Toliara on a 125.4 km<sup>2</sup> mining lease.
- The deposit comprises a single continuous body of mineralization approximately 20km long, 1.5 to 4.5km wide and 3 to 60m in thickness and situated immediately west of a prominent north-south escarpment. The heavy mineral (**HM**) mineralisation (including ilmenite, rutile and zircon) extends from the surface.

## History

- Madagascar Resources NL (**MRNL**) started exploring for minerals in Madagascar in 1995 and discovered several zones of HM mineralisation.
- In 2003, Ticor Ltd (now Exxaro Resources) negotiated an option over the project. Drilling occurred at Ranobe and Basibasy and a pre-feasibility study commenced on the Ranobe deposit. Between 2005 and July 2009, a BFS commenced, but was not completed (strategic focus shifted).
- MRNL, which became World Titanium Resources Limited (**WTR**) in 2011, engaged TZMI to undertake a comprehensive review of the project, resulting in a definitive engineering study being completed in September 2012.
- A concept to produce only an ilmenite and non-magnetic concentrate as the saleable product (at a time of weak overall market conditions) was developed.
- In early 2016, African Minerals and Exploration Development Fund II purchased a majority stake in WTR and increased the proposed project scale from a mining rate of 8Mtpa to 12Mtpa. A definitive study was completed by external consultants, Hatch.
- Base Resources acquired the project in January 2018 and has completed a concept study and the PFS in March 2019.

## Toliara Project Overview



# Project Description

The Toliara Project will be implemented in two stages following a 9 month Early Works / FEED program. Final investment decision (FID) is planned for September 2020

The Toliara Project is expected to deliver a combined ~840ktpa Chloride Ilmenite, Sulphate Ilmenite, Slag Ilmenite, Zircon and Rutile over a predicted 33-year mine life based upon exploiting the existing Ranobe Ore Reserves.

The project will be implemented in two stages to take into account higher ore grades in the early years.

**Stage 1** consists of engineering, procurement, construction and commissioning of:

- Heavy Mining Equipment (**HME**).
- A dozer mining unit (**DMU**).
- 1,750tph wet concentrator plant (**WCP**).
- 150tph mineral separation plant (**MSP**).
- Field services (pipes, pumps, powerlines, roads).
- Power generation facility.
- Borefield.
- Camp.
- Offices, laboratories and workshops.
- Haul/access road and bridge.
- Export facility storage shed, workshop and offices.
- Jetty, multi buoy mooring (**MBM**) facility and ship loader (located at Batterie Beach).

**Stage 2** commences four years after initial production with the engineering, procurement, construction and commissioning of:

- A second DMU (identical to DMU1).
- A second 825tph WCP.
- Additional HME.
- Upgrading the power plant capacity by 30% and adding two boreholes to the borefield.
- Adding one 18 room dormitory to the camp.

The MSP, haul road, bridge and export facility are not impacted by Stage 2. The overall nominal production rate will not change as a result of the Stage 2 Works.

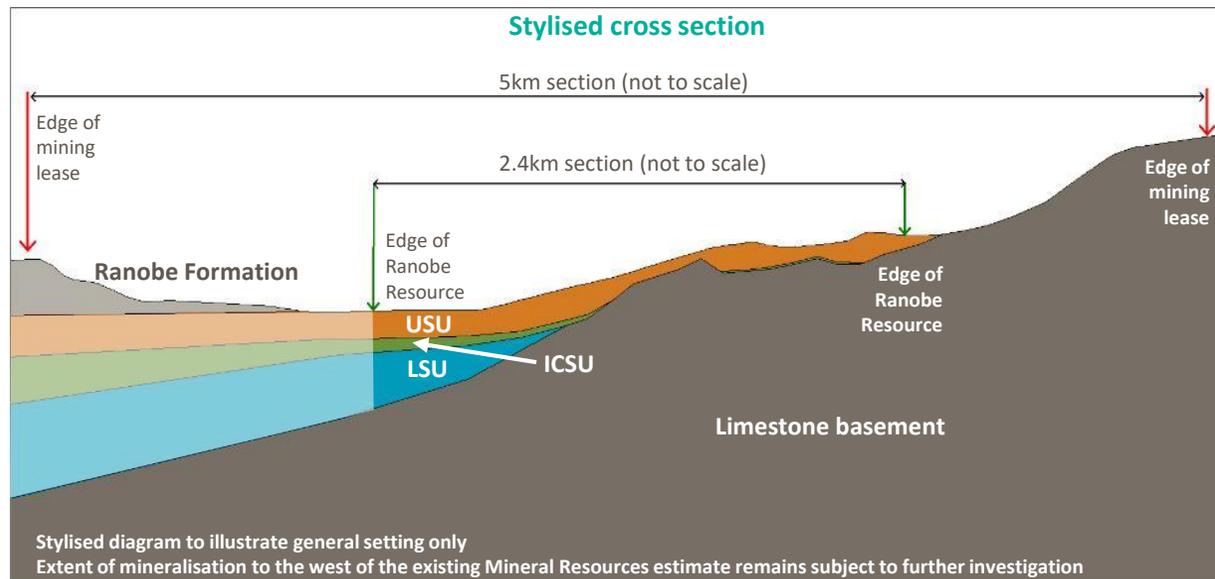
Stage	Commence	Finish	Duration (months)	Cost (USD M)
Early works / FEED	Jan 2020	Sep 2020	9	34
Stage 1 FID	Sep 2020	-	-	-
Stage 1 Implementation	Oct 2020	Nov 2022	26	442
Stage 2 Studies / FEED	Aug 2023	Jul 2025	24	-
Stage 2 FID	Aug 2025	-	-	-
Stage 2 Implementation	Sep 2025	Sep 2026	12	69

# Geology

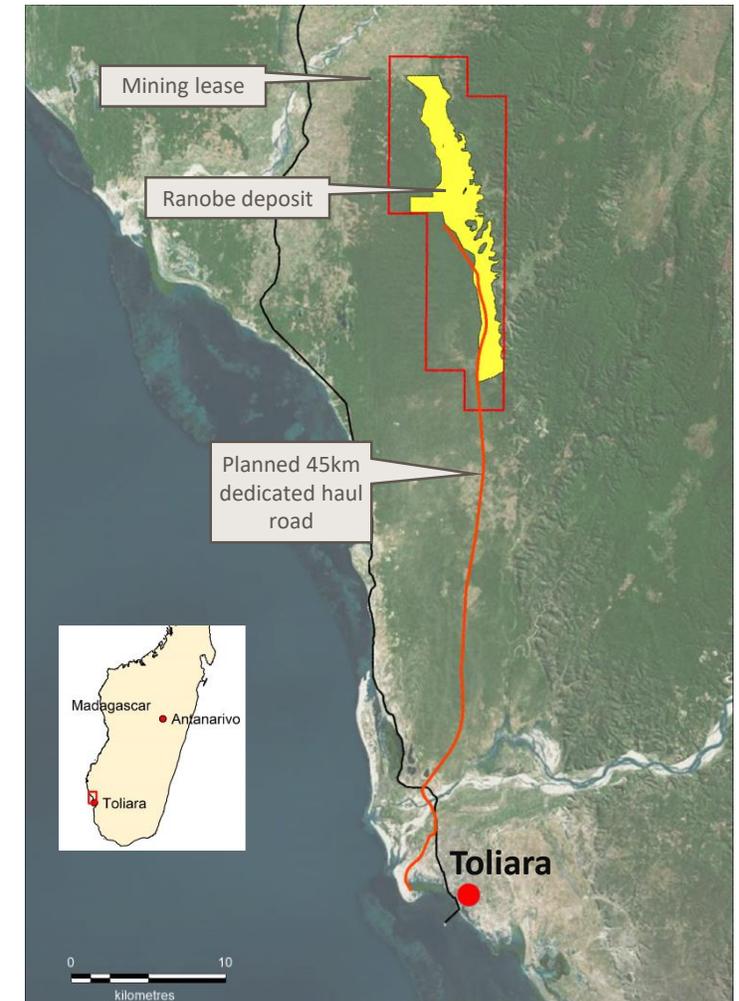
Located 45km north of the town of Toliara, the Ranobe deposit comprises three mineralised units

## Deposit geology

- Upper sand unit (**USU**) - a well sorted, fine-grained unconsolidated aeolian sediment mineralised unit. The HM is mainly ilmenite, zircon and rutile.
- Intermediate clay sand unit (**ICSU**) - a thin unit of high slime content with a dark red to orange brown sandy clay and clayey sand mineralised unit in a low energy lagoonal environment.
- Lower sand unit (**LSU**) - orange brown to yellow brown medium grained quartz sand mineralised unit with moderately low slimes content. The LSU overlies the limestone (**LST**) basement.
- The deposit thickness generally increases to the west.



## Toliara Project location



# Geology – Tenure and Drilling History

A Mining Lease exists over the entirety of the current Ranobe deposit Mineral Resources estimate

## Tenure

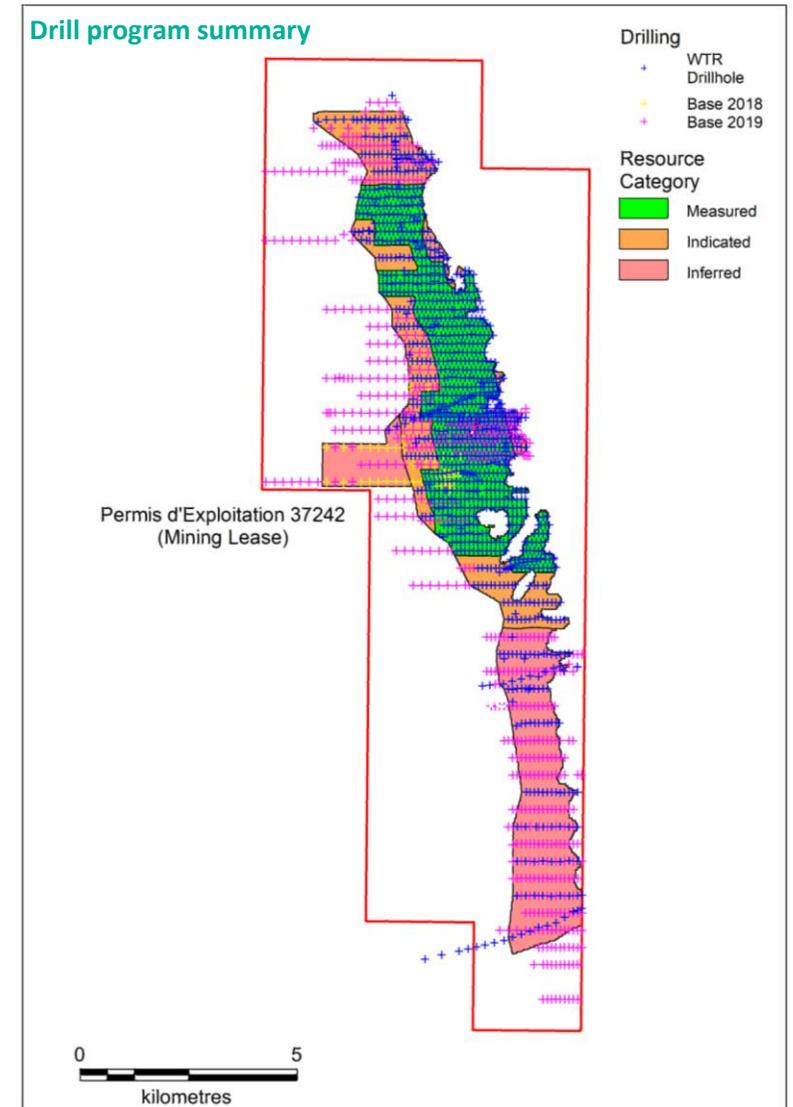
- The instrument securing the resource is Permis d’Exploitation 37242, which is a mining lease under Malagasy law.
- The lease has a term of 40 years from 21 March 2012 (the date of grant of the original pre-consolidation mining lease 37242). It may be renewed by increments of 20 years thereafter.
- The grant of the permit was made in respect of ilmenite, zircon, leucoxene, rutile, guano, basalt, and limestone.

## Drilling

- The Ranobe Deposit has had five reverse circulation drilling exploration programs, the first four were by the previous owner of the project and the last by Base Resources.
- All used Wallis Drilling to perform the drilling.
- Drilling and assays completed during 2019 (magenta crosses on the map) were completed after the resource estimation in 2018. They have the potential to significantly expand the resource base.
- Further drilling is planned which is aimed at providing more definition to the encouraging results from the LSU west of the resource boundary shown opposite.

## Historical drilling

Program	Company	# Holes	# Metres
2001	Madagascar Resources NL	120	3,068
2003	Ticor/Kumba Resources (Exxaro) joint venture	400	9,424
2005	Ticor/Kumba Resources (Exxaro) joint venture	289	6,135
2012	WTR	361	8,088
2018-19	Base Resources	770	29,760
<b>Total</b>		<b>1,940</b>	<b>56,475</b>



# Geology - Mineral Resources

The JORC compliant Mineral Resources estimate stands at 1,290Mt at 5.1% HM and 6.4% SL, including 790Mt at 5.8% HM in the Measured and Indicated categories. The estimate is unchanged from the PFS

## Mineral Resources

- An independent (IHC Robbins) November 2018 JORC compliant resource estimate at a HM cut-off grade of 1.5%, which approximates the economic cut-off.
- The mineral assemblage is dominated by ilmenite with significant zircon, rutile and leucoxene contribution.
- Measured and Indicated material from the upper sand unit, 720Mt of material @ 6.1% HM, was the basis for the Ore Reserves.
- The Mineral Resources reported below are inclusive of the estimated Ore Reserves.
- Samples from a 26,141m drilling program completed during 2019 are currently being processed, seeking to upgrade the Mineral Resources estimate over the course of 2020.

### Ranobe Deposit Mineral Resources Estimate at 1.5% HM cut-off grade

Category	Measured	Indicated	Total M&I	Inferred	Total USU	Indicated	Inferred	Total ICSU	Total
Zones	Upper Sandy Unit					Intermediate Clay Sandy Unit			USU + ICSU
Tonnes	420	300	720	420	1,140	73	79	150	1,290
HM %	6.6	5.3	6.1	4.1	5.3	3.2	3.1	3.2	5.1
HM tonnes	28	16	44	17	61	2.4	2.5	4.8	66
Slimes %	3.8	3.9	3.9	3.9	3.9	26	25	25	6.4
OS %	0.1	0.2	0.1	0.2	0.2	2.6	2.1	2.4	0.4
Ilmenite % of HM	75	72	74	70	73	71	71	71	72
Rutile* % of HM	2.0	2.1	2.0	2.1	2.0	2.2	2.3	2.2	2.1
Zircon % of HM	5.9	5.7	5.8	5.4	5.7	5.6	5.8	5.7	5.7

Table subject to rounding differences

\*Rutile reported in the table is rutile + leucoxene mineral species.

For further information about the Ranobe deposit Mineral Resources estimate, refer to Base Resources' announcements of 23 January 2019 "Updated Ranobe Deposit Mineral Resources (corrected)" available at <https://www.baseresources.com.au/investor-centre/asx-releases/>. Base Resources confirms that it is not aware of any new information or data that materially affects the information included in that announcement and all material assumptions and technical parameters underpinning the estimates in that announcement continue to apply and have not materially changed.

# Geology - Ore Reserves

The JORC compliant Ore Reserves estimate stands at 586Mt at 6.5% HM

## Ore Reserves estimate

- Ore Reserves estimate based on the IHC Robbins JORC compliant Mineral Resources estimate (Measured and Indicated material from the USU only) and modifying factors (operating costs, recoveries etc.) from the Toliara Project PFS.
- Resource model optimised to generate pit shells via industry standard Lerch Grossman algorithm using PFS internally forecast product pricing, PFS test-work derived mineral recoveries and PFS derived operating costs.
- A shortlist of four pit shells (65%, 70%, 75% and 80% of revenue) were scheduled at high level and input into the PFS financial model to select the optimum pit.
- 70% of revenue shell was selected based on better match of heavy mineral concentrate (**HMC**) production with MSP design throughput of 150 tph and on better financial metrics (weighted towards NPV and revenue:cost ratio). This shell was subject to mine planning and scheduled in detail for DFS financial modelling.
- With further drilling and resource definition performed during 2019 expected to add to the existing Mineral Resources, a new JORC Ore Reserve estimate is expected to be generated later in 2020.

## Ranobe Ore Reserves Estimate

Category	Tonnes	HM	HM	SL	OS	HM Assemblage (% of HM)			
						ILM	RUT	LEUC*	ZIR
	(Mt)	(Mt)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
<b>Proved</b>	347	24	7.0	3.8	0.1	75	1.0	1.0	5.9
<b>Probable</b>	239	14	5.8	4.2	0.2	73	1.3	0.8	5.7
<b>Total</b>	<b>586</b>	<b>38</b>	<b>6.5</b>	<b>3.9</b>	<b>0.1</b>	<b>74</b>	<b>1.1</b>	<b>0.9</b>	<b>5.9</b>

Table subject to rounding differences

\*Recovered Leucoxene will be split between Rutile and Chloride Ilmenite products depending on product specification requirements.

For further information on the Ranobe deposit Ore Reserves estimate, refer to Base Resources' announcements of 6 December 2019 "Maiden Ranobe Ore Reserves Estimate" available at <https://www.baseresources.com.au/investor-centre/asx-releases/>. Base Resources confirms that it is not aware of any new information or data that materially affects the information included in that announcement and all material assumptions and technical parameters underpinning the estimates in that announcement continue to apply and have not materially changed.

# Mining Approach

The selected mining method is conventional dozer trap with in-pit tailings deposition, enabling a short 3 to 4-year cycle from initial land clearing to final land rehabilitation

## Planned mining activity cycle

- Scrub clearing – removal of trees and scrub by bulldozers, excavators or front-end loaders (**FEL**) and dump trucks. Stockpiled for community use or mulching.
- Topsoil stripping – using FELs, bulldozers, graders and dump trucks with dust suppression. Topsoil is stockpiled for later rehabilitation or directly placed onto rehabilitation areas. The aim is to preserve seed viability by minimising time in stockpile.
- Mining – using D11 bulldozers, in 200m x 100m blocks, into the DMU with some excavator assistance. Run of mine feed (**ROM**) enters the DMU through a grizzly (400mm screen), passes up the DMU conveyor which discharges to a slurry area where water is added, and then screened at 4mm. The screen undersize is pumped to the WCP. Oversize is disposed of in the pit void.
- Coarse tailing – Quartz sand separated by the WCP is pumped, initially to an out of pit storage facility and later to the mining pit void where a moveable tails stacker de-waters the slurry. Water is recovered and pumped back to the WCP. Sand is stacked to a height approximating the planned finished surface level and then formed into fine tails evaporation ponds by bulldozer.
- Fine tailing – Flocculated clay tailings from the thickener at the WCP is pumped to the evaporation ponds built on coarse tails. Initially, until enough in-pit coarse tails area is available, some ponds will be constructed on ore and the dried tails removed to allow subsequent mining. The tails ponds will be filled to a depth of ~1.5m and when dry the clay will be about ~0.4m thick.
- Landform reconstruction and topsoil return – The desiccated fine tails are worked by bulldozer into the coarse tails to make a nominal 2m thick water retention layer at the surface, graded into final landform. The topsoil is then replaced on top using FELs, dump trucks and dozers or graders, following which the area will be ready for rehabilitation.
- The process from scrub clearing to final rehabilitation is expected to take 3-4 years.



# Mining Schedule

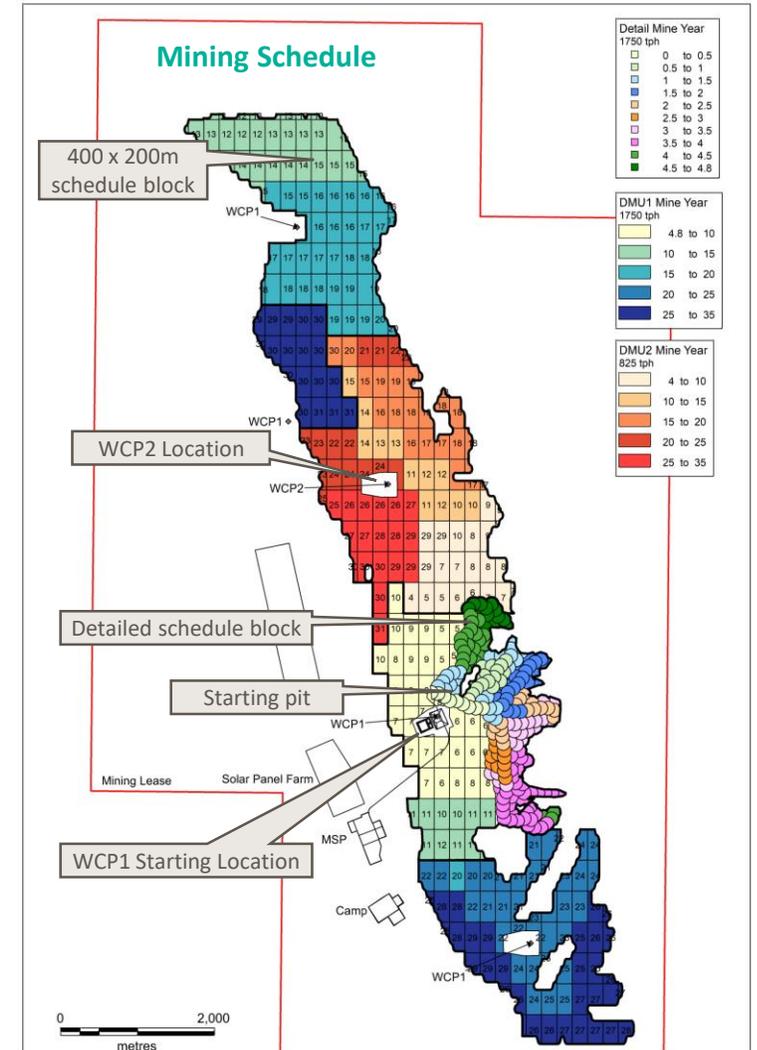
Mining will involve D11 bulldozers feeding a DMU to deliver 13Mtpa to the WCP in the first 4.25 years before increasing to 19Mtpa, with the addition of a second DMU and WCP for the remaining mine life

## Mining schedule

- Stage 1: 0 - 4.25 years - Single DMU and WCP, a fleet of three D11 bulldozers mining at a combined 1,750tph. Mining of high-grade ore averaging 8.8% HM.
- Stage 2: 4.25 - 32.9 years – Additional DMU, D11 bulldozer and WCP operating at 825tph. Combined mining rate of 2,575tph, total D11 fleet of four. Average ore grade of 6.3% HM.
- To maintain acceptable overland pumping distances, the 1,750 tph WCP moves in operating years 12, 19, 29.
- 825tph WCP does not move.

## Water Consumption

- Stage 1: 544m<sup>3</sup> per hour.
- Stage 2: 786m<sup>3</sup> per hour.
- Approved bore-field abstraction: 886m<sup>3</sup> per hour.

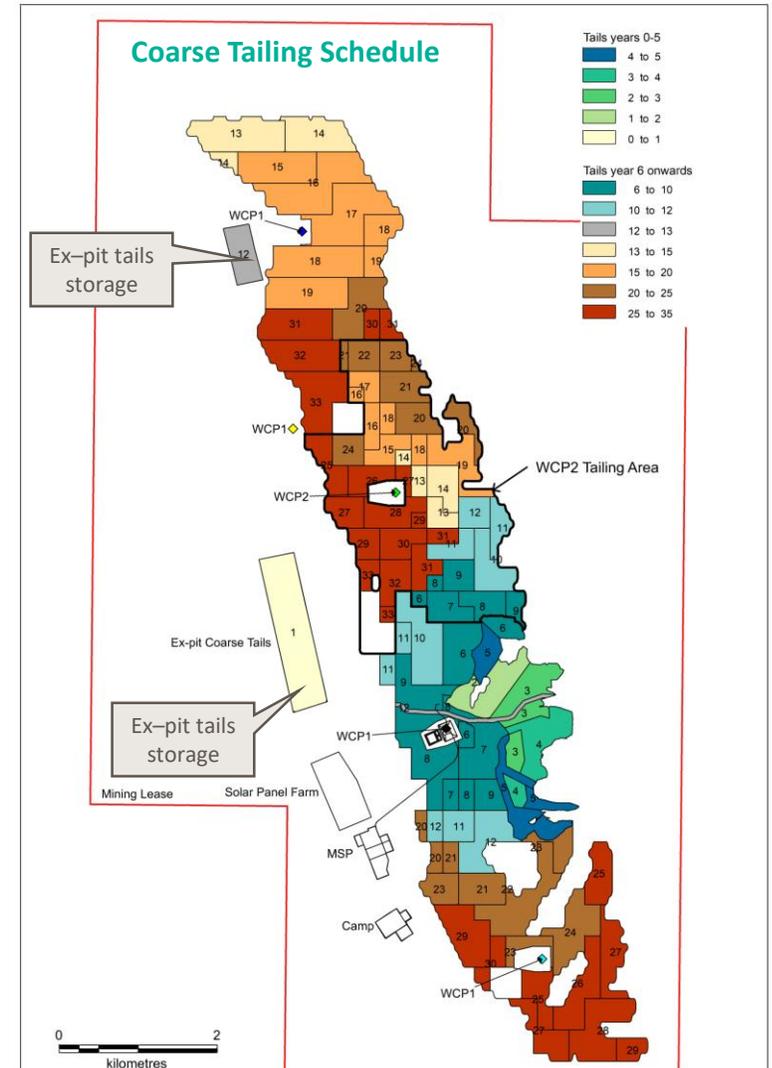


# Tailings Schedule

The tailings management plan allows creation of viable final landforms for land rehabilitation about 18-24 months after mining

## Tailings schedule

- Initial out-of-pit tailings storage until sufficient pit void is available after 15 months of mining.
- Second out-of-pit tailings storage to service the first nine months of operation at the second location of the 1,750tph WCP (Year 12).
- Subsequent WCP locations will use remnant pit voids for their initial tailings.
- Generally, coarse tailings will fill pit voids created 6-12 months earlier.
- Coarse tailings will be used to form evaporation ponds for fine tailings deposition.
- Initial fine tailing areas will be created on ore, and the dry tailings removed prior to mining.
- Fine tailings will normally fill evaporation ponds created on coarse tailings.
- Landform restoration will take place when fine tailings have dried and been reincorporated into upper layer of coarse tailings.
- Topsoil will be placed on reinstated landform, approximately 18-24 months after mining.
- Co-disposal of coarse and fine tails together to create a mix of clay and sand that reflects in-situ levels and promotes regrowth of native vegetation will be refined during the initial 15 months of operation when ex-pit tails storage is undertaken.



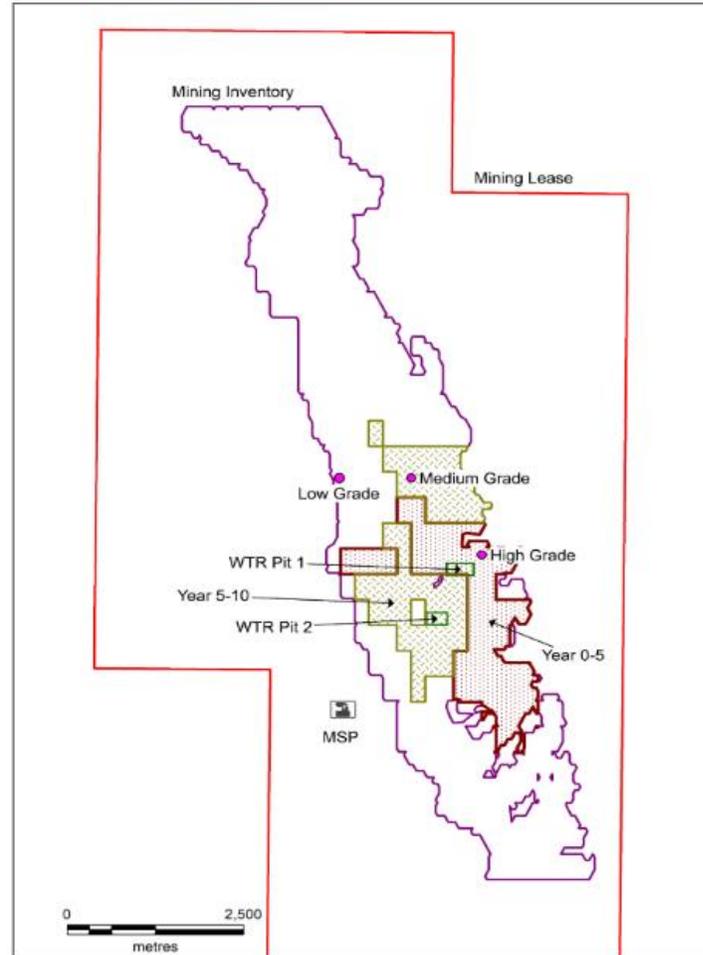
# Metallurgical Testwork and Flowsheet Design

DFS metallurgical testwork program confirmed WCP flowsheet design and established mineral recoveries

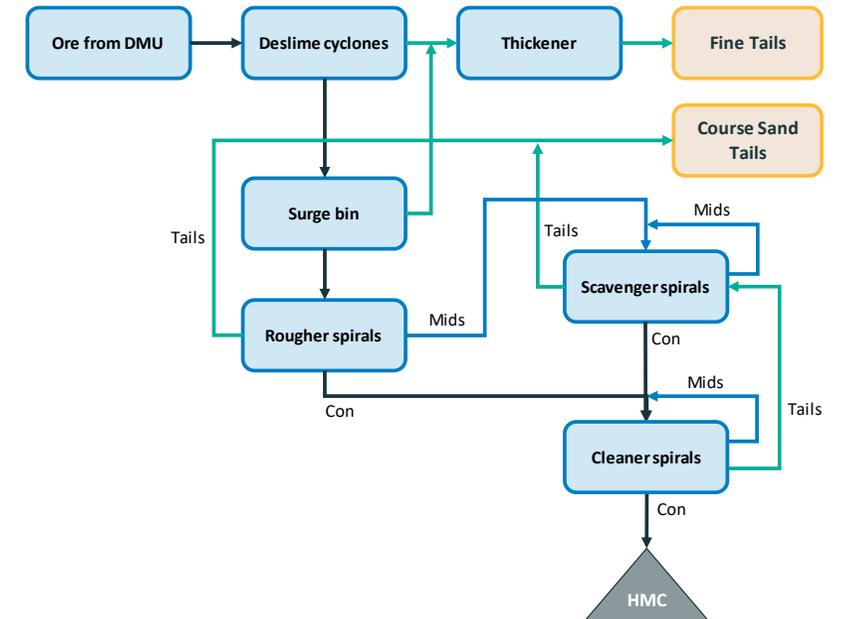
## Wet concentrator plant

- In early 2018, Base Resources generated three bulk samples (low grade - 4.8% HM, medium grade – 8.2% HM, high grade – 10.5% HM) to represent a range of ore grades on which to base the WCP design.
- Base Resources' mineralogy methodology, MinModel, was adapted for the Ranobe deposit and used to calculate WCP performance during the testwork.
- A three-stage spiral wet gravity circuit was tested on the low, medium and high-grade bulk samples using a combination of MG12 and VHG spirals. The testwork was performed by Mineral Technologies in Brisbane.
- The testwork results were modelled using industry proven programs to optimise the flowsheet design, mass balance and resultant performance metrics.
- Bulk HMC samples were generated from each HM grade test as feed for MSP testwork and market sample generation.

## Source of Bulk Testwork Samples



## WCP Flowsheet

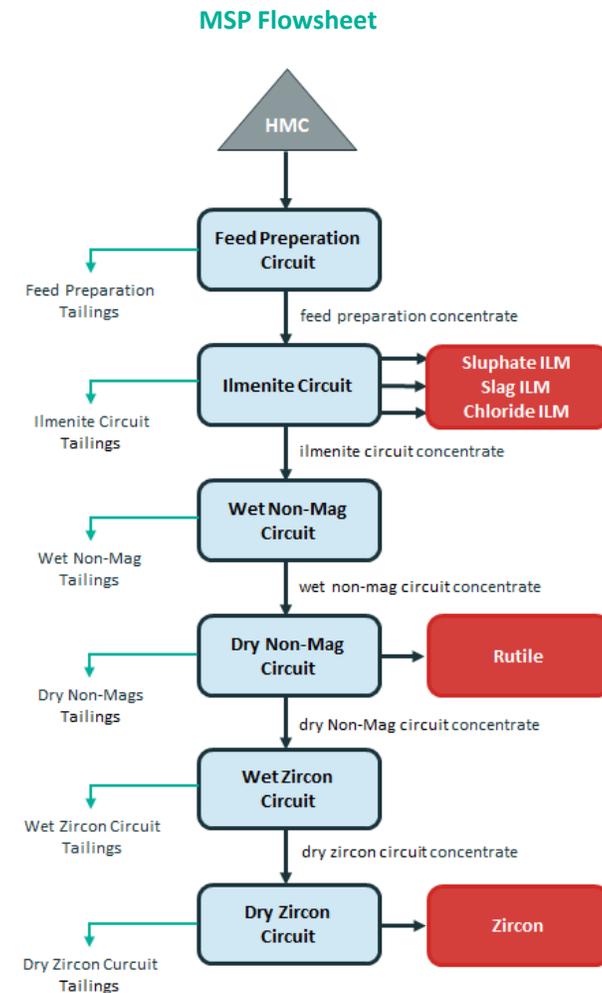


# Metallurgical Testwork and Flowsheet Design

DFS metallurgical testwork program confirmed MSP flowsheet design and established mineral recoveries and final product qualities

## Mineral separation plant

- Three feed samples representing HMC from low, medium and high-grade ore generated from WCP testwork in the PFS were used as feed for MSP flowsheet development testing. The testwork conducted by IHC Robbins provided final product samples for marketing and established mineral recoveries and final product grades.
- The ability to produce three ilmenite products, sulphate, slag and chloride grades from the full range of HMC feedstock optimised to match market conditions was confirmed.
- A comprehensive and iterative series of tests were completed to establish flowsheets for each processing stage, consistent with the design intent:
  - Feed Preparation – removal of coarse and fine quartz using wet gravity separation.
  - Ilmenite circuit – produce three ilmenite products under varying ore types and generate a non-magnetic stream, using magnetic and electrostatic separation.
  - Wet Non-Magnetics circuit – remove residual quartz to enable efficient rutile separation using wet gravity separation.
  - Rutile circuit – produce a rutile product and a non-conductor zircon stream using electrostatic and magnetic separation.
  - Wet Zircon circuit – remove alumina silicates using wet gravity separation.
  - Dry Zircon circuit – remove Fe and Ti contaminants to produce a standard zircon product using electrostatic and magnetic separation.



# Product Recoveries

An extensive suite of testwork was undertaken that provides a sound basis for product recovery estimation

## Wet concentrator plant

- Testwork on each of the low, medium and high-grade bulk samples was used to generate a model (Mineral Technologies) from which the WCP recoveries (ilmenite, rutile and zircon) were estimated.
- High-grade scenario recoveries were assumed after further reducing them (ilmenite, rutile and zircon) by 1.5% to allow for plant operations not being run continuously at peak conditions.
- Insufficient data and accuracy was available for leucoxene recovery estimation using the MinModel mineralogy method and the Mineral Technologies WCP simulation. This was calculated based on the non-mag TiO<sub>2</sub> recovery.

## Mineral separation plant

- Ilmenite recovery – derived from the MSP testwork and calculated on a circuit by circuit basis, an average total recovery (from 3 bulk samples processed) of 94.4% was established.
- The proportion of each ilmenite product produced (sulphate, slag and chloride) used testwork results adjusted for product quality targets using a mathematical model with interpolation algorithms. The quality targets and splits were optimised for NPV.
- Rutile recovery – derived from the MSP testwork and calculated on a circuit by circuit basis, giving an average total recovery (from 3 bulk samples processed) of 54.1%.
- Zircon recovery - derived from the MSP testwork. A recovery was calculated on a circuit by circuit basis to give an overall zircon recovery of 79.4%.
- Leucoxene is recovered to a HiTi stream which is redirected to both rutile and ilmenite products.
- Leucoxene recovery - derived from the MSP testwork. A leucoxene recovery of 23.2% was calculated that is distributed to ilmenite and rutile, 79% and 21% respectively. This increases the ilmenite and rutile total recoveries to 94.6% and 58.4% respectively.

## WCP Recoveries

	Low Grade Ore	Medium Grade Ore	High Grade Ore	Avg	DFS Design
Rutile	97.1	95.8	93.8	95.6	92.3
Zircon	98.5	98.6	98.7	98.6	97.2
Ilmenite	97.1	96.6	96.4	96.7	94.9
Leucoxene	85.0	80.0	70.0	78.3	75.0
% HM in HMC	91.0	91.0	91.0	91.0	91.0

## MSP Recoveries

	Base	Leucoxene re-distributed
Ilmenite	94.4	94.6
Zircon	79.4	79.4
Rutile	54.1	58.4
Leucoxene	23.2	0

## Ilmenite Splits

Ilmenite	Proportion %	Target %TiO <sub>2</sub>
Sulphate Ilmenite	47.0	48.5
Slag Ilmenite	27.2	50.5
Chloride Ilmenite	25.8	57.0

# Process Engineering – Dozer Mining Unit

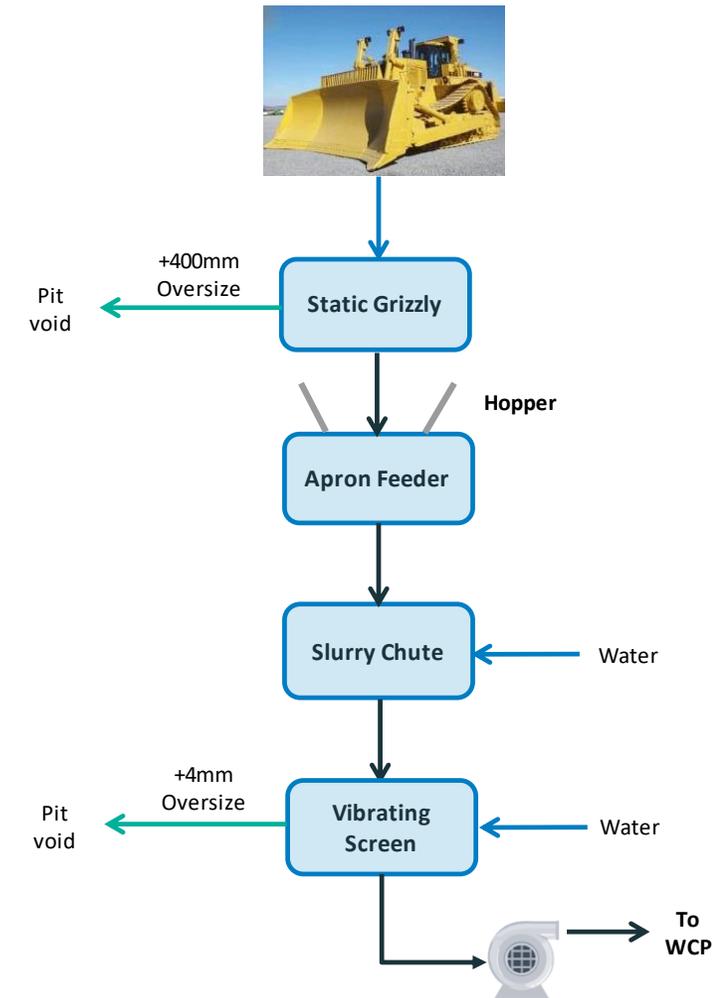
The processing plants design includes the two mining units and associated pumping system, two WCPs (1,750tph and 825tph), 150tph MSP, water circuit, tails disposal and electrical reticulation

## Dozer mining unit

- Existing Kwale DMU built by Piacentini & Son will be refurbished and shipped to Toliara. Piacentini & Son will be commissioned to supervise the DMU installation at Toliara as well as supply a second identical DMU in year 4.
- A 4mm screen will be installed on the DMU hopper to remove all +4mm material in the mining area.
- The DMU pump will be supported by ROM booster pumps to pump ore to the WCP from the DMU when the distance between the two plants is greater than ~600m.
- Each DMU is designed to be relocatable (using D11 bulldozers), which is anticipated to be every 2-4 weeks.



## Mining process flowsheet



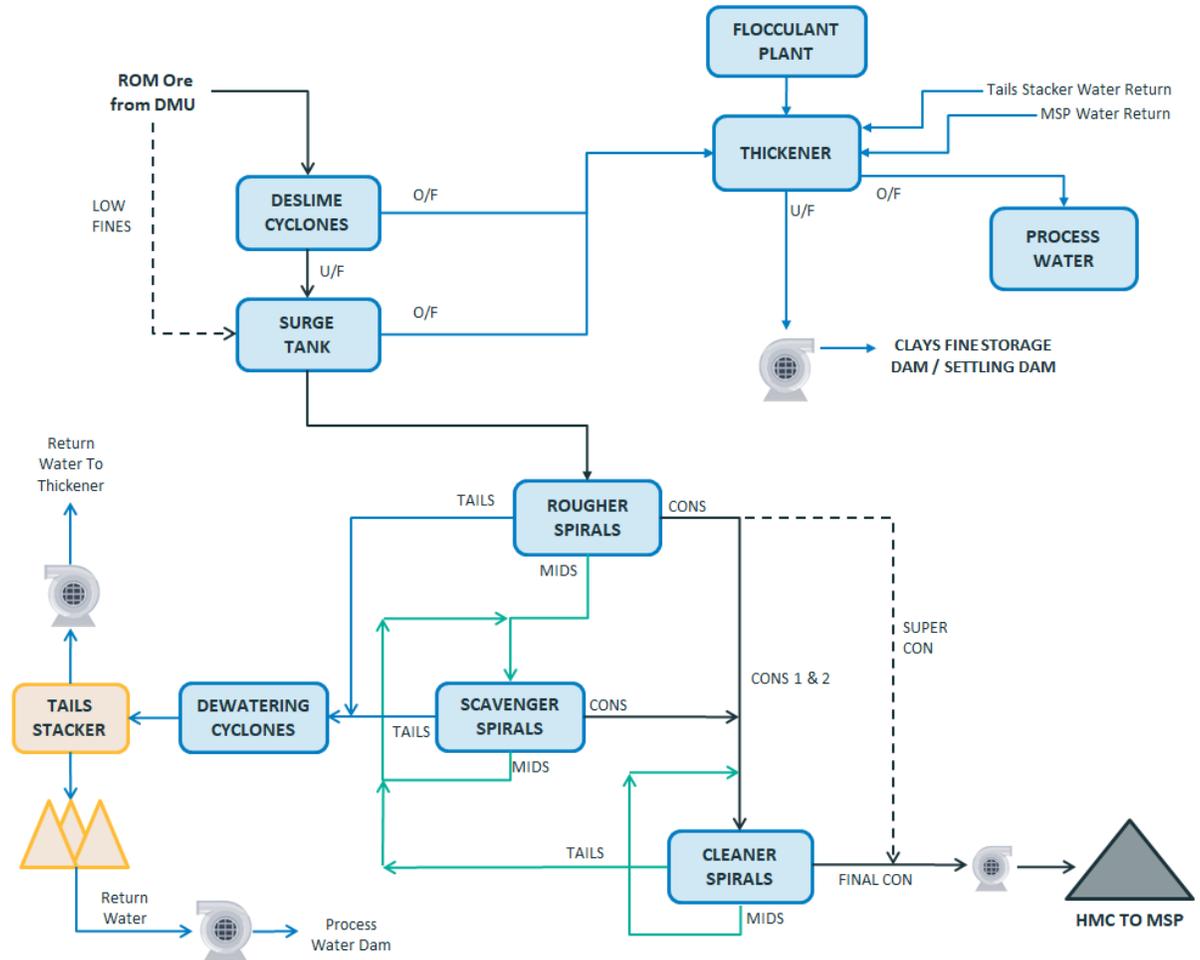
# Process Engineering – Wet Concentrator Plant

The WCP is a simple but robust 3-stage spiral plant design based on bulk sample testwork programs conducted at Mineral Technologies metallurgical facilities and caters for the range of heavy mineral grades within the Ranobe deposit. WCP1 will operate at 1,750tph with WCP2 commissioned in year 4 to operate at 825tph

## Wet Concentrator Plant

- The flowsheet developed uses proven spiral technology to produce a HMC grade above 90% HM.
- De-sliming cyclone and thickening circuit designed for wide range of ore clay content.
- A constant density surge tank provides a one-hour buffer between the DMU and WCP.
- MG12 spirals, operating at 2.5tph per start, used in rougher and scavenger stages minimises footprint and simplifies the design, reducing pumping costs and power requirements.
- The cleaner spirals are twin start VHG operating at 1.5tph per start.
- Cross launders have been incorporated in the design to simplify material flow and reduce the number of gravity launders by 75%.
- HMC will be pumped to the MSP.
- Tailings are pumped back to the mine void as back fill and water will be recovered from tailings operations to minimise make up water required from the mine borefield.

WCP flowsheet



# Process Engineering – Mineral Separation Plant

Extensive design optimisation was undertaken to balance plant availability (by reducing the number of drives), operating costs and capital costs

## Mineral Separation Plant

- Feed rate of 150tph, decoupled from the mining operation by a HMC stockpile which buffers changing ore grades and differing plant run times.
- Ilmenite (sulphate, chloride, slag), rutile and zircon final products will be produced at the MSP through the six circuit flowsheet.
- Substantial testwork program undertaken at IHC Robbins to verify the flowsheet.
- Flowsheet allows ilmenite production ratios to be optimised for market conditions.
- Tall building (~50m) design adopted with multiple machine floors to reduce operating cost (by utilising gravity to reduce materials handling equipment and drives).
- The MSP is fixed for the life of mine and all major mine infrastructure will be located at the MSP site (including power generation, administration, workshops, stores and camp).
- Final products will be stored in 1,000t bins (350t for rutile). Additional site storage is provided for the three ilmenite products (two weeks' production).
- Tails from the MSP are pumped back to the WCP to be disposed with the main tails lines.
- A larger dryer and belt filter included in the current design to minimise future downtime should the MSP be upgraded to 210tph.

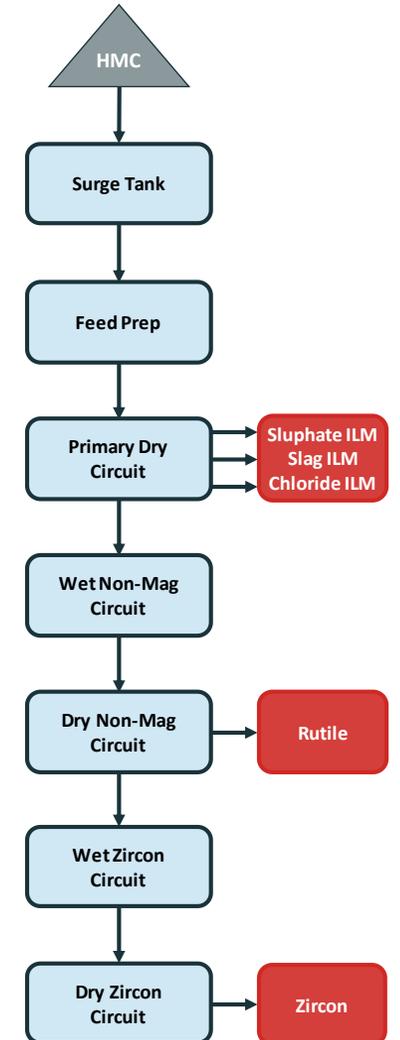


- The ilmenite circuit design incorporates a facility to isolate a single machine for cleaning and maintenance.

## Sampling

- All incoming and outgoing streams throughout the plant are automatically sampled, including dry stream analysers on the zircon and rutile circuits.
- Sampling allows for full metallurgical balancing of the circuits and strict adherence to the required product specifications.

## MSP flowsheet



Toliara Project DFS Summary

# Design Progression

The plant design has progressed substantially during the DFS in preparation for detailed design

## Electrical

- Majority of the power requirements are in overland pumping.
- Site HV reticulation is at 11kV.
- Switchrooms, electrical equipment rooms and field skid-mounted switchrooms designed to be modular pre-fabricated buildings with main equipment pre-installed to minimise construction time.
- Site wide power distribution system is well developed, with a significant effort put into power consumption on a year by year basis, matching the mine plan.
- High degree of integration across multiple sites (IPP, DMU, WCP and MSP) to enable efficient operation.
- Modelling and sizing of plant cabling requirements well developed.
- Completed lighting study with lux level modelling and selection of optimal luminary locations.

## Control systems

- Fully automated and supported by instruments measuring density, flow, level, temp, tonnage etc.
- Completed datasheet sets for all instrumentation packages.
- Operating and control philosophy developed for control system design.
- The operator interface system is typical of supervisory control and data acquisition (**SCADA**) systems. The SCADA monitors and controls instruments in the plant through a programmable logic controller (**PLC**) located in instrument junction boxes inside each switch room and equipment rooms.

## DFS design deliverables produced:

- Scope of work documents and firm pricing received from vendors for all mechanical equipment in the processing plant.
- Mechanical equipment lists [3].
- Electrical load list.
- Piping and instrumentation diagrams [110].
- Processing plant 3D models, including piping, instrumentation, pipe racks, cable trays and valves.
- Process design criteria, flowsheets and mass balances [18].
- Site layouts, general arrangements and sections [71].
- Standard drawings for electrical, structural, instrumentation, civil, mechanical and piping [68].
- General Specifications.
- Preliminary tender reviews on mechanical equipment.
- Preliminary platework drawings for vendor pricing [186].
- Single line electrical diagrams [28].
- Valve schedule and piping material take offs.
- Instrument list and datasheets [25].
- Detailed structural calculations and material take-offs.
- Detailed pump calculations for all slurry and water lines.
- Fire protection and fire detection system equipment schedules.

# Marketing – Product Quality

Testwork indicates the targeted specifications for all products will ensure they are suitable for a wide range of applications

Producing three ilmenite products with qualities that specifically target different ilmenite markets:

- **Sulphate Ilmenite**

Of similar quality to Kwale ilmenite which suits a major portion of sulphate pigment production in China.

- **Slag Ilmenite**

A higher TiO<sub>2</sub> (>50%) makes this ilmenite more attractive to chloride slag producers where elevated Fe<sub>2</sub>O<sub>3</sub> has no detriment. An option exists to re-blend it with sulphate ilmenite and have more volume targeting either the sulphate pigment market or the slag market.

- **Chloride Ilmenite**

A typical 57.0% TiO<sub>2</sub> ilmenite optimises revenue while producing a product that suits direct feed chloride pigment production as well as Chinese slag production. It is also suitable as a synthetic rutile feedstock.

Processing plant design flexibility and testwork indicates that the split between the ilmenite products and qualities can be adjusted within specification constraints to respond to ore variations and market requirements.

**Final Product Typical Specifications**

%	Kwale Ilmenite	Sulphate Ilmenite	Slag Ilmenite	Chloride Ilmenite
	Typical	Typical	Typical	Typical
TiO <sub>2</sub>	48.3	48.5	50.5	57.0
Cr <sub>2</sub> O <sub>3</sub>	0.09	0.08	0.08	0.10
ZrO <sub>2</sub>	0.12	0.02	0.04	0.03
CaO	0.02	0.01	0.03	0.02
MgO	0.7	0.6	0.4	0.3
MnO	0.6	0.8	1.0	1.5
Fe <sub>2</sub> O <sub>3</sub>	20.4	21.0	27.5	30.5
FeO	27.6	26.8	16.0	6.0
P <sub>2</sub> O <sub>5</sub>	0.02	0.02	0.07	0.06
Nb <sub>2</sub> O <sub>5</sub>	0.06	0.12	0.15	0.20
V <sub>2</sub> O <sub>5</sub>	0.23	0.24	0.23	0.22
SiO <sub>2</sub>	0.7	0.6	1.2	1.0
Al <sub>2</sub> O <sub>3</sub>	0.6	0.5	1.0	0.9
U+Th (ppm)	55	40	167	145

# Marketing – Product Quality

A very good standard grade zircon product is produced with slightly elevated U + Th and a rutile product suitable for chloride pigment production

## Zircon

- A very good standard grade zircon product will be produced.
- The quality is acceptable to all key end use sectors, particularly in China.
- The zircon will be sold as standard grade due to slightly elevated levels of U+Th.

%	Kwale Standard Grade Zircon	Toliara Zircon
	Typical	Typical
ZrO <sub>2</sub> +HfO <sub>2</sub>	65.8	65.6
TiO <sub>2</sub>	0.14	0.09
Fe <sub>2</sub> O <sub>3</sub>	0.12	0.12
SiO <sub>2</sub>	32.4	32.9
Al <sub>2</sub> O <sub>3</sub>	1.15	0.89
U+Th (ppm)	400	550

## Rutile

- A rutile very similar to Kwale rutile suitable for chloride pigment production will be produced.

%	Kwale Rutile	Toliara Rutile
	Typical	Typical
TiO <sub>2</sub>	95.5	95.0
Cr <sub>2</sub> O <sub>3</sub>	0.22	0.15
ZrO <sub>2</sub>	0.64	0.84
CaO	0.02	< 0.01
MgO	0.05	0.01
MnO	0.03	0.01
Fe <sub>2</sub> O <sub>3</sub>	1.08	0.8
P <sub>2</sub> O <sub>5</sub>	0.02	0.03
Nb <sub>2</sub> O <sub>5</sub>	0.28	0.47
V <sub>2</sub> O <sub>5</sub>	0.61	0.59
SiO <sub>2</sub>	0.8	1.1
Al <sub>2</sub> O <sub>3</sub>	0.4	0.6
U+Th (ppm)	53	240

# Infrastructure

Existing infrastructure required for development of the Toliara Project is limited. The project scope addresses this through building a dedicated, product haulage and access road, bridge, export facility, hybrid power plant, bore field for water supply and a permanent camp

## Existing infrastructure

- Toliara has an existing container port able to accommodate coastal vessels, an airport with scheduled domestic and international flights and good mobile and data communications.
- The RN9 national route, although upgraded and sealed during the last few years, is not suitable for oversize and heavy construction loads or road train product haulage. The existing bridge over the Fiherenana river has limited capacity.
- There is no electrical power grid in the vicinity of the mine. Power supply at Toliara is limited, unreliable and currently not adequate for the new export facility site although plans are in place to upgrade the local generation facility by addition of solar power.
- There is limited existing accommodation in Toliara for the anticipated non-local construction and operations personnel requirements.
- There is no suitable sewage treatment facilities in the area but there is a solid waste recycling plant some 10kms north of Toliara.
- Toliara has a diesel bulk storage facility at the port with limited HFO storage capacity that is shared amongst four distributors.

## Roads

- Early construction access will be via the RN9 and by upgrading an existing road westwards through Ranobe village and then extending on to the mine site. Early haul road construction will allow later construction access, particularly for the larger loads.
- A 45km long, sealed, dedicated, haul and permanent access road, including a new 630m long concrete bridge over the Fiherenana river, will be built. Provision is made for several community crossing points as well as an underpass at the RN9 crossing. The bridge will be designed to withstand 1:100 year floods.



# Infrastructure

Groundwater modelling has confirmed that adequate water can be abstracted from an aquifer without negative impacts. Tender submissions have been received from IPPs for bulk power supply. An accommodation camp for operations personnel will be constructed in time to meet construction accommodation requirements

## Water

- Ground water modelling (Knight Piesold) has confirmed the ability to sustainably source the required make-up water when operating at the maximum Stage 2 mining rate of 19Mtpa, from two borefields within the mining permit area.
- Raw water requirement for Stage 2 is 786m<sup>3</sup> per hour. With tailings water recovery, the net annual groundwater abstraction associated with this equates to 8.7 % of the estimated aquifer recharge. Two bore fields (eastern and southern) each with four 30l/s wells will be established. An additional two wells will be installed in Stage 2.
- Installation of production bores to enable step testing and refinement of the groundwater model is planned during the pre-FID phase.

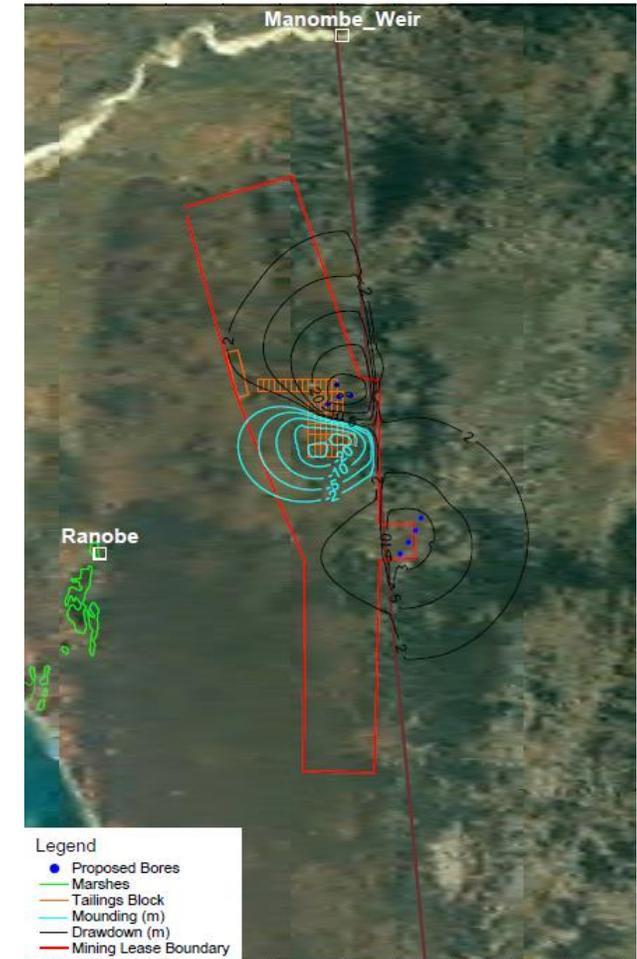
## Power

- Power for the mine site will be supplied by an Independent Power Producer (IPP). Generation will be based on a hybrid HFO, solar PV and battery storage system located near the MSP and camp. Design will aim at optimising solar contribution.
- Stage 1 installed power is 23.5MW with a maximum demand of 15.1MW with an average usage of 9.1MW.
- Stage 2 will increase installed power to 29MW with a maximum demand of 19.5MW an average usage of 12.6MW.
- Export facility power will be self-generated using high speed diesel generators with a small contribution of solar PV for offices and ancillary buildings.

## Accommodation camp

- An accommodation camp will be constructed to house 263 operational people and the 630 people expected during construction for expatriate and non-local skilled personnel. The maximum number of people that can be housed during construction is 810. National labour and off-site contractors will be housed in the local communities. Local workforces will be bused in daily.
- Early camp construction is aimed to maximise local content utilising block building methodology.
- Additional accommodation for 19 personnel will be required for Stage 2.

## Bore field locations and drawdown



# Infrastructure

Sufficient engineering design and market testing has been undertaken to ensure DFS accuracy level Capex and Opex estimates for the new infrastructure requirements. Full bridge simulations have confirmed the operability of the multi-buoy mooring berth for vessels up to Panamax class and has established the metocean operability windows

## Mine complex

- Provision has been made for fencing, security, offices, workshops, laboratories, stores, change houses, ablution blocks, control rooms, weighbridge, clinics and first aid facilities, water storage dams and tanks, firefighting systems, storm water management and landscaping as required for future operations.

## Waste treatment

- A sewage treatment plant will be constructed at the mine complex and serve the process plant, mine complex buildings and accommodation camp. Conservancy tanks will be utilised at remote sites such as the export facility and sewage transported to the sewage treatment plant for treatment.

## Product haulage

- Up to a maximum of ~900kt of product will be hauled annually from the mine to the export facility by a transport contractor utilising 90t triple trailer road trains operating 12 to 13 hours per day on a seven days a week basis.

## Export facility

- An export facility at Batterie Beach will include a storage shed for 135kt of ilmenite, 10kt rutile, with a separate shed to store 15kt of zircon.
- Ground improvement (rigid inclusion piles), required for the shed foundations.
- Material handling operations will be similar to Kwale Operations.
- A 550m long jetty with pipe conveyor and a fixed ship loader will load vessels up to Ultramax draft (loading 63kt) or partially loaded Panamax moored on a multi-buoy mooring berth.
- A charter contract will be placed for a fully crewed tug with minimum bollard pull of 40 tonne and a mooring line handling vessel for the operations phase.

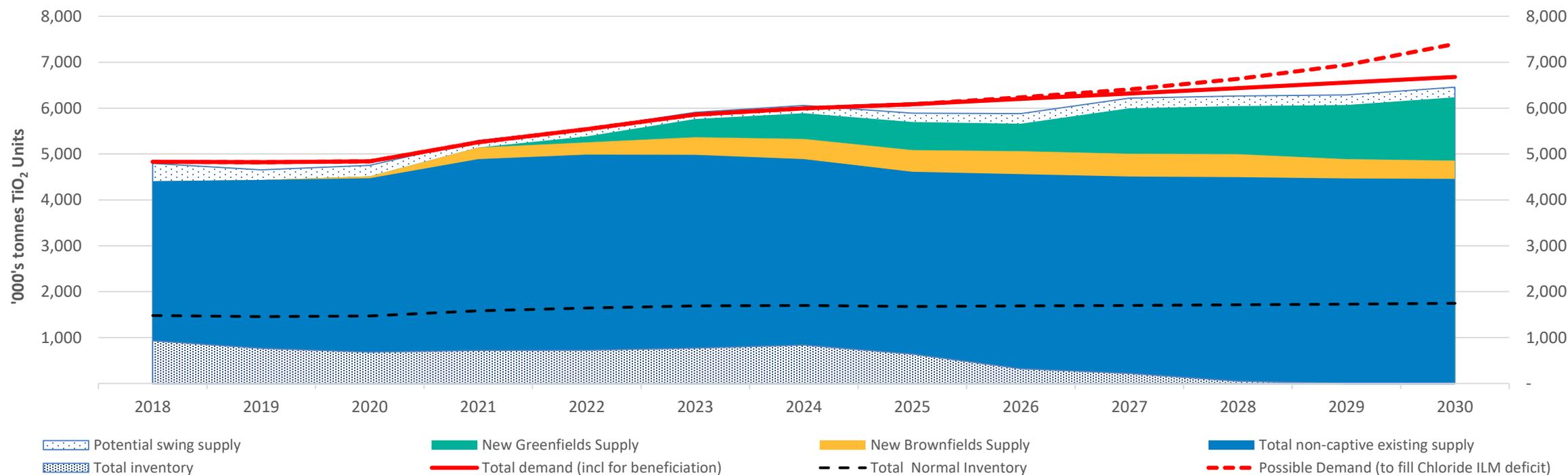


# Marketing Outlook – Sulphate TiO<sub>2</sub> Feedstock

A future sulphate feedstock supply deficit is forecast, providing robust support for the development of the Toliara Project

## Sulphate and slag ilmenite

- Longer term there is an emerging supply gap forecast, which is assumed to be filled by the Toliara Project and other new greenfield projects.
- Medium term outlook subject to high cost “swing” supply (concentrates and Vietnam). Prices in the range of \$180 to \$230 are generally considered necessary to stimulate swing supply.
- Demand for sulphate ilmenite as a feedstock for chloride feedstock production (SR and chloride slag) is expected to grow significantly on the back of substantial new planned chloride slag production.
- Future chloride feedstock deficits, unless filled, will drive more sulphate pigment production and therefore accelerate sulphate ilmenite demand.



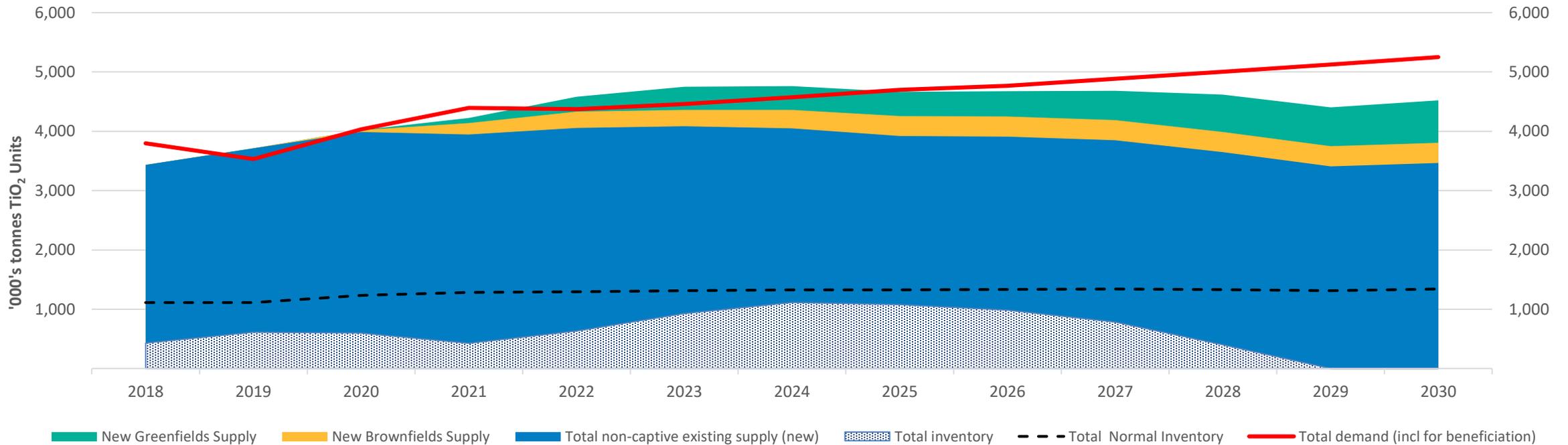
\*Base Resources internal analysis. Refer to page 29 for the applicable methodology for this analysis.

# Marketing Outlook – Chloride TiO<sub>2</sub> Feedstock

A future chloride feedstock supply deficit is forecast, providing robust support for the development of the Toliara Project

## Chloride ilmenite and rutile

- Longer term deficits forecast for chloride pigment feedstocks support a positive outlook for rutile and chloride ilmenite from the Toliara Project.
- Chloride ilmenite is a unique feedstock within the overall chloride feedstock sector which has its own dynamics – see next slide.
- Rutile is a preferred high-grade feedstock for chloride pigment production and the relatively small quantities produced from the Toliara Project will be easily absorbed.
- The longer-term supply deficit should either:
  - stimulate further chloride slag production which will result in higher demand for slag and sulphate ilmenite suitable as a feedstock for chloride slag; or
  - constrain chloride pigment production (lack of feedstock availability) which would result in more sulphate pigment being produced and more demand for sulphate ilmenite.



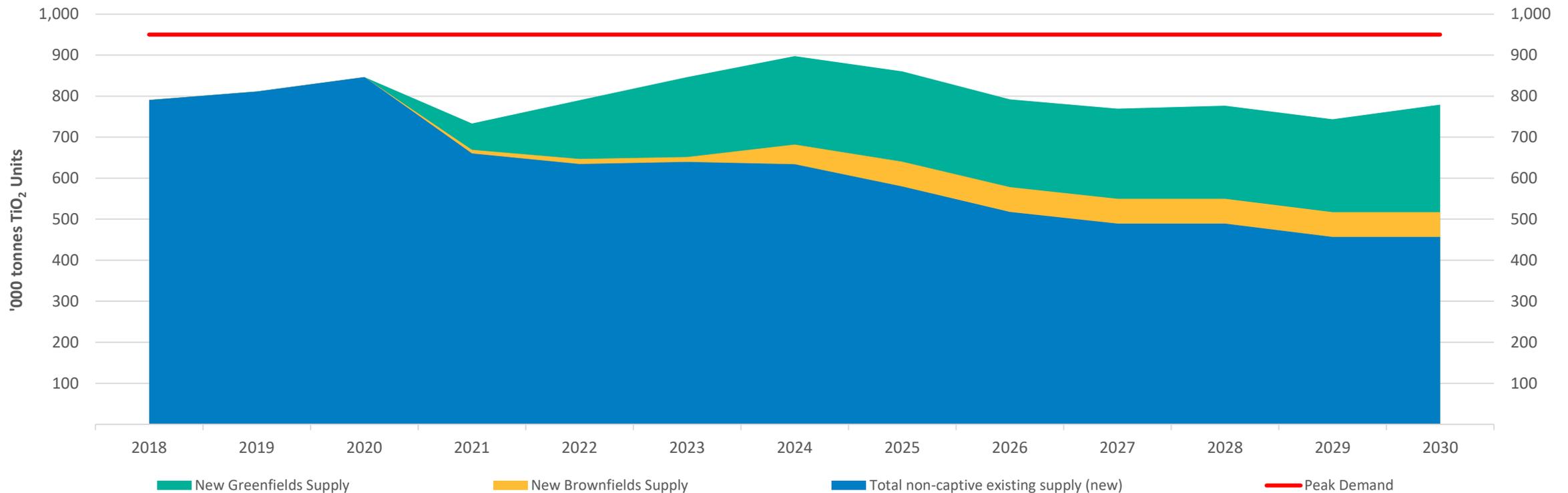
\*Base Resources internal analysis. Refer to page 29 for the applicable methodology for this analysis.

# Marketing Outlook – Chloride Ilmenite

The forecast chloride ilmenite supply deficit is more significant than overall chloride feedstocks, providing a source of high value for development of the Toliara Project

## Chloride ilmenite

- Within the first two years of start up Toliara Project chloride ilmenite will add ~ 20% to supply in a global market that is forecast to be in substantial deficit.
- Demand for chloride ilmenite is expected to easily absorb Toliara Project chloride ilmenite as a few very large consumers have the capacity (and preference) to consume much more chloride ilmenite than is currently forecast to be available. In recent years, consumption of chloride ilmenite peaked at 950kt pa (TiO<sub>2</sub> units). Only a lack of available supply has resulted in consumption falling below this level since then. Pigment capacity expansions and an increased focus on external sourcing of chloride ilmenite for SR production suggests that actual demand for chloride ilmenite is already above the recent peak consumption level and is expected to continue to increase into the future.



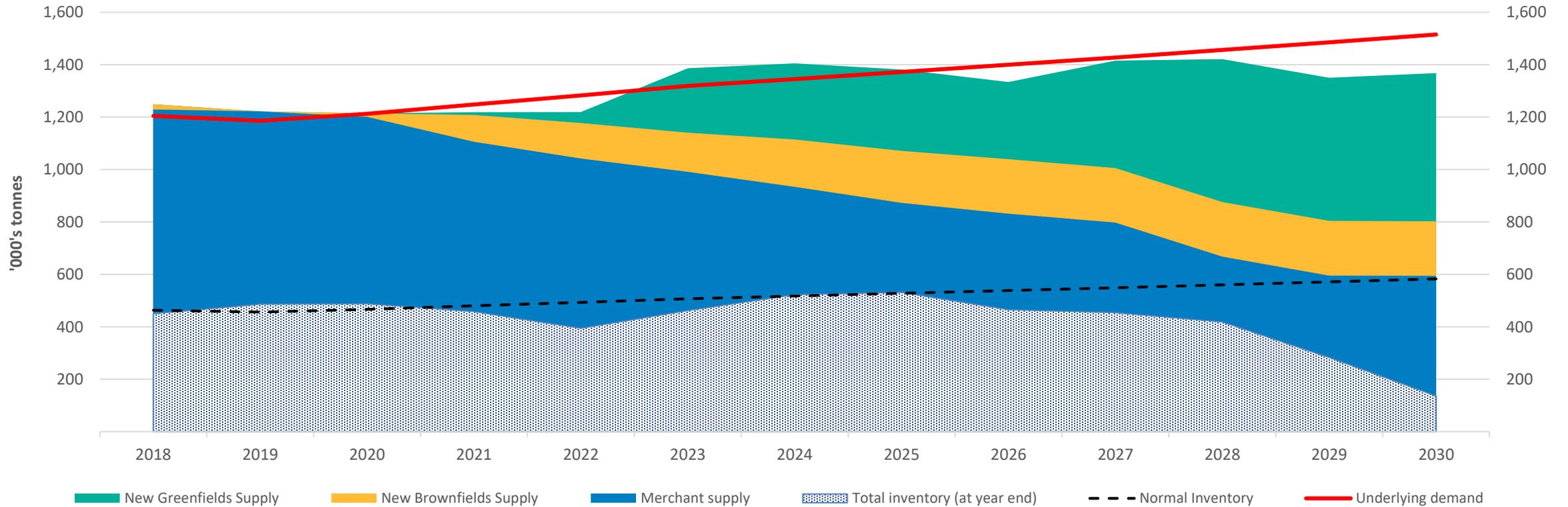
\*Base Resources internal analysis. Refer to page 29 for the applicable methodology for this analysis.

# Marketing Outlook – Zircon

A future zircon supply deficit is forecast, providing robust support for the development of the Toliara Project

## Market outlook – zircon

- Significant new supply is needed from new supply to meet forecast zircon demand.
- There is limited opportunity of “swing” supply from concentrates and other sources to manage this in the medium term.
- In the longer term there are emerging shortages forecast.



\*Base Resources internal analysis. Refer to page 29 for the applicable methodology for this analysis.

# Marketing – Pricing

Product pricing forecasts through to 2030 are derived from Base Resources’ internal supply/demand analysis before moving to TZMI’s long term inducement prices from 2035

## DFS forecast product prices

- Base Resources’ internal price forecast for each product is used until 2030.
- From 2035 prices are assumed to be the long-term inducement prices, as forecast by TZMI, re-based to 2019 real. The exception to this is chloride ilmenite, which is derived from Base Resources’ internal long-term outlook specific to the chloride ilmenite sector and a pricing structure that is more consistent with traditional practice within that sector.
- Prices transition between 2030 and 2035 in a straight line.
- All forecast prices are FOB, real 2019, after adjusting for expected product quality.

## Base Resources’ internal supply/demand analysis and price forecast methodology

Base Resources’ internal price forecast is derived from continuous supply and demand analysis. In broad terms, when a supply deficit is forecast prices are predicted to trend upwards and when a supply surplus is forecast, prices are predicated to trend downwards. However, the direction and extent of forecast price movements also take into consideration:

- Industry inventory levels relative to levels considered to be normal.
- Estimated “floor” and “ceiling” prices derived from historical precedents, for example, where low price levels would threaten the economic viability of many producers or excessively high prices encourage product substitution to take significant effect.
- The anticipated behaviour of key suppliers actively managing production to support prices.

Base Resources’ internal supply and demand analysis utilises historical production and consumption data. Base Resources’ forecast product demand utilises TZMI’s five year demand outlook before transitioning to a steady annual growth rate, generally consistent with global GDP growth forecasts, adjusted for product specific considerations where applicable.

Over the short term, Base Resources’ supply forecast is generally aligned with TZMI’s five year outlook for existing producers, but Base Resources forms its own view on the anticipated timing of new brownfield and greenfield projects coming into production. Base Resources’ medium to long term supply forecast is based on the Company’s internal view of future production from existing operations as well as new brownfield and greenfield projects. For each new project forecast to commence production in the future, Base Resources considers the stage of development, estimated economics, mine life, applicable risks and the forecast market supply gap to determine a likely start-up date.

Product Prices USD	Average 2022 – 2030	Average 2031-2034	From 2035	LOM Average
Sulphate ilmenite	\$165	\$179	\$183	\$179
Slag ilmenite	\$174	\$188	\$193	\$188
Chloride ilmenite	\$252	\$284	\$285	\$277
Rutile	\$1,194	\$1,321	\$1,142	\$1,172
Zircon	\$1,544	\$1,600	\$1,450	\$1,487

# Implementation Strategy

The Toliara Project is a “greenfields” mineral sands project that will be constructed on a remote site in a developing country with limited construction resources. The delivery approach addresses this and incorporates Base Resources’ experience in delivering and operating Kwale

## Toliara Project Execution Strategy

A number of factors drive the implementation strategy:

- Complex scope (mineral sands) and long life requires continual owners input to ensure an enduring, fit for purpose and world class design is delivered.
- Remoteness of the project and the country risk limits the appeal of “lump sum” contracts (to a limited contractor market for complex processing plants) making this approach high cost with minimal increase in delivery certainty.
- Government and community engagement and approval processes are more effectively conducted by Base Resources due to the complexity, risk, and existing/future relationships.
- Utilising Base Resources’ knowledge gained through the Kwale project delivery and operation.
- Outsourcing or fixed price contracts where Base Resources doesn’t have the requisite knowledge (power supply) or competitive value is tied to a contractor's unique methods or capability (marine and power supply).

## The preferred broad delivery approach is as follows:

- Mining – Owner Implementation.
- Processing plants and field services – EPCM.
- Infrastructure – EPCM.
- Fiherenana bridge – EPC.
- Jetty, shiploader and marine infrastructure – EPC.
- Power supply – Independent power provider (IPP).

# Implementation Strategy

Delivery of the Toliara Project will follow Base Resources' proven project development system and standards

## Project development phases

Base Resources has followed its proven project development system and standards for the concept, pre-feasibility and definitive feasibility study phases. This was achieved by retaining engineering companies and key staff from PFS through to the DFS. Subject to performance and cost, this will continue into implementation.

### Early Works and FEED:

- The nine month period between DFS completion and FID will aim to de-risk the overall implementation schedule by progressing engineering designs and selecting preferred contractors to start construction of the export facility shed piling, haul road, bridge, jetty and power plant immediately following FID. To achieve this camp construction and FEED work will start prior to FID. The project implementation plan will be updated during FEED.

### Final Investment Decision (FID):

- The Board principally considers the DFS, market conditions and funding availability in order to make a FID. Nine months are allowed between completion of the DFS and FID (September 2020).

### Implementation Phase:

- Planned in two stages.
  - Stage 1 includes DMU1, WCP1, MSP, haul road, bridge, export facility and all associated infrastructure and is scheduled over 26 months from October 2020

to November 2022.

- Stage 2 comprises the construction of a second DMU and WCP over a 12 month period between September 2025 and September 2026.

### Transport and logistics:

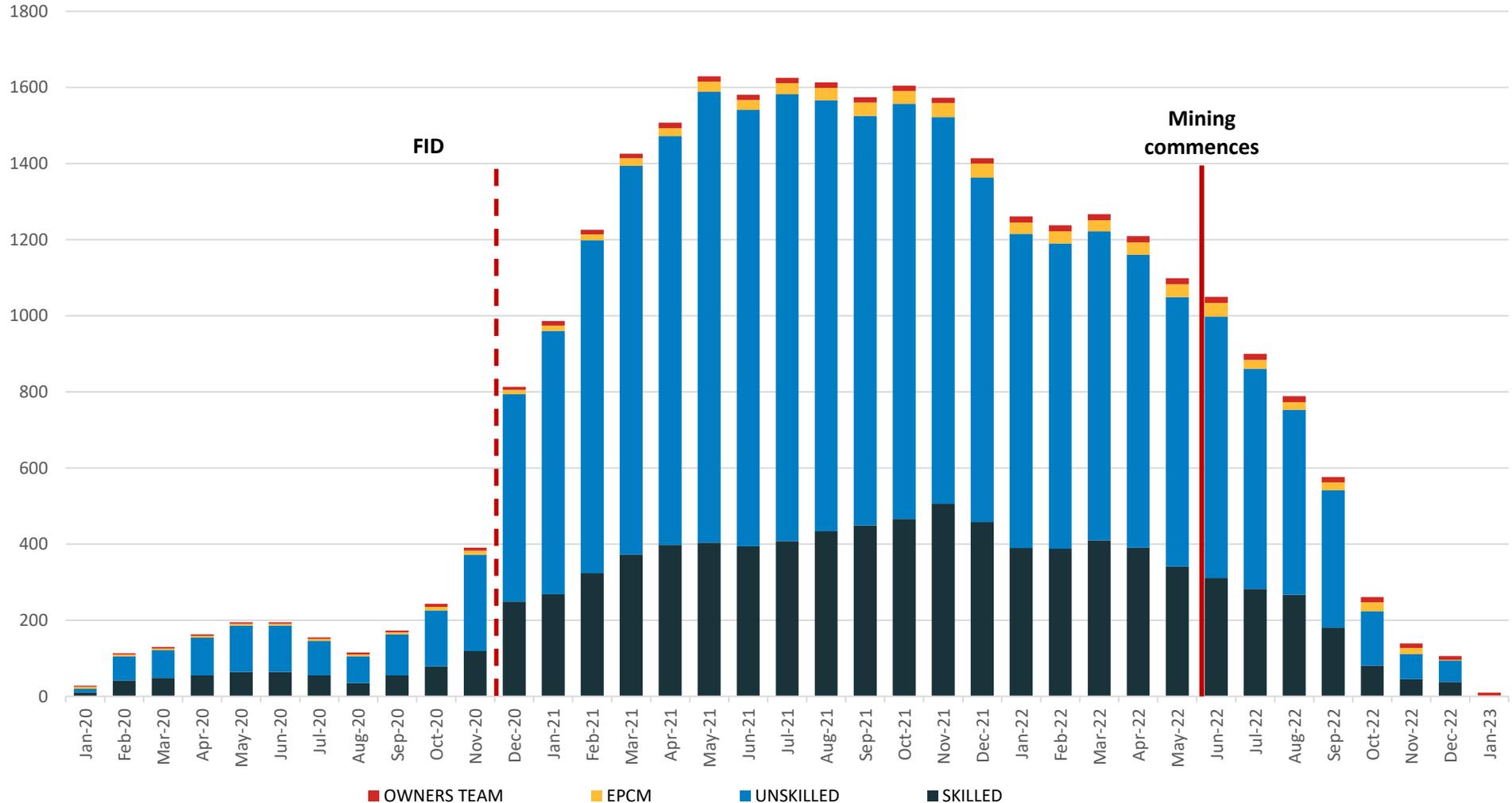
- Will be a significant component of implementing the project. An experienced logistics contractor will be engaged to manage freight forwarding, customs clearance and organise road transport to site.

Stage	Commence	Finish	Duration (months)	Cost (USD M)
Early works / FEED	Jan 2020	Sep 2020	9	34
Stage 1 FID	Sep 2020	-	-	-
Stage 1 Implementation	Oct 2020	Nov 2022	26	442
Stage 2 Studies / FEED	Aug 2023	Jul 2025	24	-
Stage 2 FID	Aug 2025	-	-	-
Stage 2 Implementation	Sep 2025	Sep 2026	12	69

# Construction Workforce

The construction effort will be spread over a wide geographic area covering the MSP, WCP, mine infrastructure, road, bridge and export facility. These works will be performed by multiple civil, structural mechanical & pipework (SMP), electrical & instrumentation (EI) and marine contractors, with a workforce peaking at 1,629

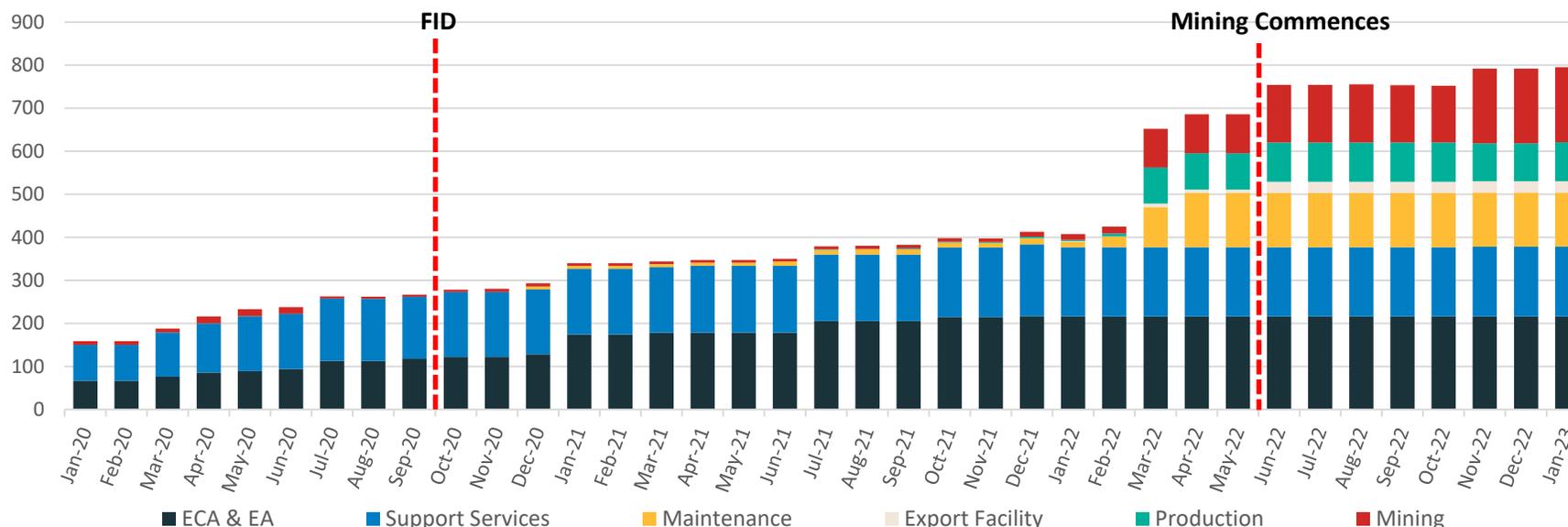
- Peak workforce of 1,629 personnel excluding Base Resources operational, community, environmental and administration personnel.
- The accommodation camp facilities will be completed early and are sized to cater for the non-local workforce and supervisory staff working on the process plant site facilities.
- Those working on facilities other than the process plant site, will be accommodated in Toliara and local towns.



# Operational Workforce

A detailed manning ramp-up plan has been developed using Kwale experience to estimate the requirements for the operational phase. A total of 754 employees is forecast for mining and WCP start-up in June 2022, increasing to 795 by December 2022 following commissioning of the MSP and the Export Facility

2022 Start up	No. of People
Unskilled	236
Semi-skilled	67
Skilled	281
Professional	118
Supervisors	32
Superintendents	4
Managers	16
<b>Total Employees</b>	<b>754</b>
Contractors	226
<b>Combined workforce</b>	<b>980</b>



- An operational workforce of 754 is expected to be in place when mining and the WCP start up in June 2022, increasing to 849 in January 2027 when stage 2 commences.
- 303 unskilled and semi-skilled people are expected to be employed, mainly sourced from the Toliara region. 70 expatriates (67 operations, 3 non-operational - exploration, external affairs and environment & community affairs) are estimated to be required at start up in 2022, reducing to 35 by the time the second Stage 2 is implemented.
- Accommodation objectives balance a number of factors including community impact, benefits to the community, availability of accommodation, fit for work imperative and attraction and retention of capability.
- On-site camp accommodation is planned for expatriate FIFO, shift workers on nights, emergency response teams, apprentices, clinicians, on-call tradespeople and consultants.
- Malagasy employees from outside the Toliara region are expected to relocate to the surrounding communities and transported in on a daily basis.

# Construction and Operational Readiness

The required construction and operational skills are not readily available in the Toliara area. Base Resources has implemented strategies to maximise the availability of skills for the implementation and operational phases of the Toliara Project

## Construction and operational readiness

To ensure the required skills are available Base Resources has planned and is implementing:

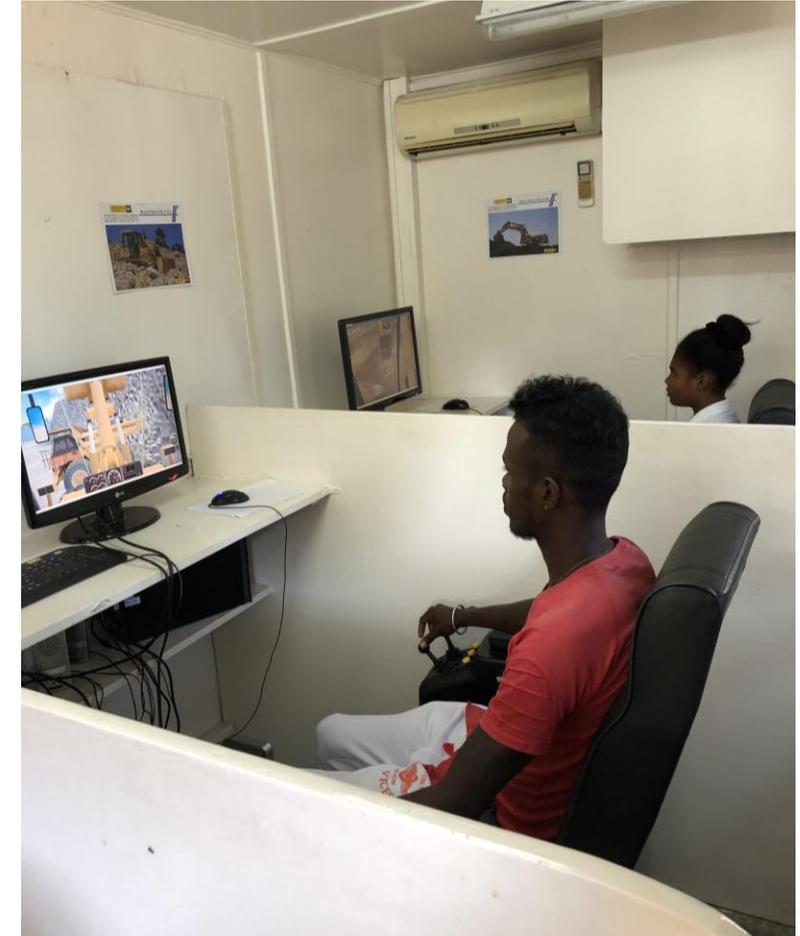
- A system of preferential recruitment, agreed with community stakeholders, where skills are first sourced locally and, where they are not available in Toliara, then nationally and, failing that, internationally. This arrangement is embodied in the labour resources implementation plan (**LRIMP**).
- A program of community capacity-building and training to develop local construction and other work skills.

Consistent with the LRIMP:

- Registration of ~7,000 people was followed by a screening process (~2,000 people), from which approximately 600 locals have completed or commenced Base Resources' construction and operational traineeships in trades, mobile equipment operation, maritime operations and computing, which is combined with English literacy, numeracy and leadership training and will continue over the next three years.
- During construction and into operations, contractors will be required to utilise local labour to the extent possible, with management, supervisory and specialist roles the exception. To assist with this requirement, the contractors will have access to the Base Resources registration database for skilled, semi-skilled and unskilled local labour.

Inductions and training will be used to prepare construction workers for shift work, which will serve as an introduction to the long term shift work required for operations.

## Mobile equipment operator training



# Operational Management and Readiness

## Operating philosophy

Most parts of the operation will be owned and operated by Base Resources. Where specific skills are required for support services to allow Base Resources to focus on core activities, or there is a financial benefit, the activity will be outsourced:

- Mining – owner operator.
- Processing – owner operator.
- Administration – owner operator.
- Product transportation – contractor.
- Export facility operation (land) – owner operator.
- Export facility operation (marine) – contractor.
- Power generation – IPP.
- Laboratory services – owner operator.
- Camp services – contractor.

## Management

Key operational positions appointed to date:

- General Manager Operations.
- General Manager External Affairs.
- Manager OHS & Training.

- Human Resources Manager.
- Finance & Administration Manager.

## Management systems

- Health and safety systems address the relative inexperience of locals working in the mining industry.
- Administrative systems are computer based and integrate with existing Base Resources applications.
- Maintenance systems reflect the need for the operations to be self-sufficient due to remoteness.

## Mobile equipment operator trainees



# Stakeholder Engagement

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## Stakeholder mapping

Through analysis of the various stakeholders' ability to influence Toliara Project development, stakeholder mapping provides an understanding of the potential for persons, organisations and institutions to play a supportive or disruptive role in development of the Toliara Project.

Base Resources has been able to form an understanding of the “on ground” situation in the Toliara area through its own stakeholder mapping in conjunction with stakeholder mapping performed during the environmental and social impact assessments (**ESIA**) study by the previous owners (**WTR**).

## Consultation process

Community consultation programs have been commenced to improve information sharing, and bring communities and other stakeholders closer to the Toliara Project. An overview of the Community Stakeholder Engagement Plan (**CSEP**) process, together with the participants in that plan, is as follows:

- The Regional Coordination Committee was established by the government to manage stakeholder engagement during WTR's ownership of the project. It comprises 45 members and sits monthly to discuss progress, grievances and give feedback. Its current function remains focused on high-level communication and information sharing amongst regional players.
- The Resettlement Working Groups (**RWGs**), one for the mine site and another representing communities along the haul road and at the export facility site, are committees that bring together communities that will be subject to the resettlement requirements of the Toliara Project, enabling them to participate in the decision making process and provide input into how to achieve positive outcomes for the process. These committees consist of communities that will be directly affected by resettlement and relevant government agencies and local administrators that have a participatory role in delivering positive resettlement outcomes aligned to IFC Performance Standard 5 – Involuntary Resettlement.
- Community Liaison Committees (**PLL** in French) are the main stakeholder and communication link between communities outside the Toliara Project's footprint. The PLL will be formed once the RWG process is well established. The PLL committees are intended to be very mobile reaching out to remote areas to establish trust with local communities and avoid issues of information distribution shortcomings which can be a result of closed-door static committees. Each village will have a representative in a PLL to enhance the community's ability to share information amongst themselves.

# Land Acquisition

Foreign controlled companies are not permitted to own land in Madagascar, but can obtain surface rights through a lease arrangement with the government

A high level overview of the process for obtaining surface rights being employed by Base Resources is as follows:

- Establish title/ownership of land – This stage has been completed. Only a small number of the land parcels required have an existing formal legal title (106 of 1041), the rest are held through customary interests.
- Agree/determine the land value. There are two options to do this, both of which are currently being run in parallel:
  - Private treaty negotiations directly with landowners.
  - Compulsory acquisition of land through the Declaration of Public Utility (**DUP**) process. In order to call upon the government of Madagascar (**GoM**) to acquire land under the DUP, Base Resources must first have attempted to reach agreement via private treaty negotiations, acting in good faith.
- As Base Resources (including its local operating subsidiaries) cannot own land, it will fund the GoM (on the basis of the values determined above once the process is completed) to:
  - Acquire land titles where available; or
  - Acquire the customary interests where no land title exists.
- Where the GoM acquires customary or privately owned interests through compulsory acquisition, a title must be created for that land in the name of the State.
- Base Resources will then negotiate a lease with GoM for the surface rights to the land held by the GoM.

Subsequent to obtaining surface rights, a total of 20 households on the land acquired for the project will be relocated in compliance with IFC Standards.

A parallel process deals with livelihood replacement, relocation of tombs and other requirements under IFC Standards, which Base Toliara seeks to comply with, is being run in conjunction with the RWGs.

# Land Acquisition - DUP Process

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Compulsory acquisition of land can be achieved through the Declaration of Public Utility (DUP) process

## An overview of the DUP process:

- The process commences with public notification of the intention to undertake compulsory acquisition. **Completed.**
- Those affected are given 30 days to register their interest. **Completed.**
- Following registration the DUP Decree is issued and land parcel identification and socio-economic studies are undertaken. The DUP Decree for the haul road and export facility was issued on 15 April 2018 and the mine site issued on 19 July 2018. **Completed.**
- A list of land interests is prepared and posted in the community for a 30 day public review period. **Completed.**
- Following a review process, the issuance of the Act of Transferability confirms land parcels impacted by the Toliara Project. The applications for the Acts must be submitted within 12 months of issuance of the DUP Decree or it expires. **Completed.**
- Concurrently, the evaluation and compensation committee (**CAE**) is established to manage the final steps. The CAE is responsible for confirming the eligibility of landowners of each of the parcels listed and the evaluation of any associated private assets such as structures and crops. Following this, negotiation of compensation rates is undertaken, culminating in agreed amounts for the various assets involved. **CAE established – eligibility and values being determined with field confirmations awaiting issuance of the Acts.**
- Once compensation amounts are finalised, the CAE will advise Base Resources of the total cost of compensation.
- Following payment of the compensation amount to the GoM, the compulsory acquisition is finalised by transfer of land title to the GoM.

# Community Development, Employment and Local Content

## Community development

Base Resources recognises the significance community development plays in building positive relationships and ensuring locals benefit from development of the mineral resource.

The approach is focused in specific areas of development:

- The health sector.
- Education programs.
- Community infrastructure.
- Livelihood enhancement projects.

A Community Development Management Plan will be developed in consultation with affected communities, NGOs and regional authorities.

Funding for community development activities is by way of:

- Distribution of 70% of mineral royalties by legislative requirement to communities in the region affected by the Toliara Project.
- Planned annual community development expenditure of \$2 million by Base Resources from commencement of operations.
- Expenditure of \$2.5 million prior to the commencement of operations.

## Employment

Affected communities will be prioritised for employment during both the construction and operations stages. To facilitate this, community training programs have commenced. Though not all who participate in this training will be employed, it will give people, particularly youth, valuable skills to secure employment elsewhere.

The Base Resources LRIMP has been approved for use by the Committee for Transparency in Recruitment (**CTR**), a regional committee set up to oversee the Toliara Project recruitment process. The LRIMP identifies job seekers and prioritises them based on impact (i.e. if they were resettled) and their proximity to the project. A lower priority is assigned to those living further away.

This system is also a commitment under the ESIA approval process outlining the need for both skills development and local employment prioritisation as mitigation for social impacts.

## Local content

The procurement of goods and services from local organisations creates benefits through direct and indirect job creation and helping to build the local economy. Local businesses will be given training on Base Resources minimum standards to prepare them for tendering and their possible selection as a supplier or contractor.

# Environment

## Environmental setting

Madagascar is the world's fourth largest island and is recognised as one of the world's top ten hotspots for biodiversity, owing to its unique biota and the high degree of threat to its natural habitats.

It is estimated that there are about 10,000 plant species on the island. Of these, 80% or more occur nowhere else. Human settlement commenced in Madagascar 2,000 years ago and has resulted in the clearing of much of the island's forest habitats.

Madagascar is globally important in terms of its biodiversity and is within the Madagascar and Indian Ocean Islands Biodiversity Hotspot as designated by Conservation International. Despite considerable biological interest, knowledge of the faunal biodiversity in the region is still hampered by unresolved taxonomic problems and poor sampling.

The Toliara Project area falls into the Madagascar Spiny Thicket Ecoregion, which is divided into succulent woodlands and Madagascar spiny thickets. The total size of the ecoregion is 124,000km<sup>2</sup>, falling into the deserts and succulent shrublands habitat type of Madagascar and is classified as a Critically Endangered region.

The spiny thicket is exceptional in this regard, with 95% of all plant species, and 48% of the genera being endemic to this ecoregion. The thicket is dominated by members of the endemic Didiereaceae family.

Fauna is also important for this region, with Madagascar and the Spiny Thicket Ecoregion, with high levels of endemism. The conservation of forested habitats is a

priority as they are subject to the greatest threats (slash-burn agriculture and charcoal production). There are few protected areas covering the ecoregion with very little known about the biodiversity and ecology of the region.

Reserves protect approximately 3% of the region, leaving the rest susceptible to degradation. The main threats include charcoal production, logging for construction, grazing of domestic animals (primarily zebu cattle, but also goats) and agriculture. Invasive plant species also cause a loss of habitat, as does illegal collecting of endemic and endangered species for commercial trade.

## A rare opportunity to make a significant contribution to conservation

The environmental setting of the Toliara Project within a Biodiversity Hotspot and one of the ecoregions of the Madagascar and Indian Ocean Islands supporting a rich fauna and flora with high levels of endemism presents a significant opportunity for Base Resources to make a meaningful contribution to the region's biodiversity and conservation efforts through:

- Targeted environmental programs.
- Collaboration with conservation partners – government environmental departments, research institutions, NGOs and communities.
- Collaborations with regional, national and international researchers such as Missouri Botanical Garden and the African Butterfly Research Institute.

# Environment

## Regulatory framework

- Environment Permit No 55-15/MEEMF/ONE/DG/PE is granted and valid.
- Approved *Plan de Gestion Environnementale Spécifique (PGE)* (an environmental management plan) in place. An updated PGE to reflect Toliara Sands' name change to Base Toliara and Project changes is scheduled to be completed in Q1 2020.
- Office National Pour l'Environnement (**ONE**), the Malagasy environmental management authority, have advised that subsequent amendments to the Toliara Project should be made through the updated PGE and the Construction and Operations PGES' – see below.
- The Construction PGES', prepared during FEED and submitted to ONE three months prior to commencement of construction, will present project changes to date.
- Operational PGES' will be prepared and submitted to ONE three months prior to commencement of operations.

## ESIA documentation

A number of Environmental and Social Impact Assessments (**ESIAs**) have been prepared and approved over the years for the Toliara Project, with the principle documents being:

- 2005-2006: Scoping Report prepared and submitted to ONE.
- 2006-2007: Specialist studies conducted, not submitted to ONE.
- 2012: Revised Scoping Report submitted to ONE for public review.
- 2012-2014: Specialist assessments redone, detailed ESIA completed and submitted to ONE.
- 2015: PGE issued by ONE together with the Environmental Permit.
- 2017: Addendum ESIA submitted to ONE. PGE Addendum1 issued by ONE.

## Base Resources is committed to international best practice

The Toliara Project will develop and operate a comprehensive environmental and social management system to meet the requirements of Base Resources' policies, Malagasy legislation and international best practice, including Equator Principles, IFC performance standards and Environmental, Health and Safety Guidelines.

## Environmental and social management system (ESMS)

- ESMS will give effect to Base Resources' commitments.
- ESMS based on a 'Plan-Do-Check-Act' business performance improvement cycle utilising risk and impact assessments as a key tool.
- ESMS components will include:
  - Update of the PGE to reflect name change and Project changes.
  - Summary ESIA to consolidate ESIAs and reflect Project changes.
  - PGES' for construction, operational and decommissioning phases for submission to ONE three months before the start of associated activities.
  - Construction phase, operational phase and decommissioning phase ESMPs.
  - Baseline studies – update of previous studies, new studies and modelling.
  - Comprehensive environmental monitoring program, including ecological monitoring.
  - Environmental programs to support Base Resources' commitment to improving biodiversity, promoting conservation and sustainability, including an indigenous tree nursery to research propagation methods of the region's unique flora, establishment of biodiversity corridors and Offset and reforestation programs.

# Government and Political

## Overview

Madagascar is a country with a heightened degree of political risk, with a history of regular events of instability, most recently with the political crisis in 2009. Madagascar does not have a history of civil war and most of its troubles are characterised by political paralysis rather than widespread violence. The Presidential elections concluded in December 2018 were relatively free from social unrest, regarded as materially free and fair and the result met with general acceptance, including by the key opposition candidates. Consequently, the new President can be considered to have a clear mandate and there is an expectation of a period of relative political stability. The presidential term is five years.

## Government engagement

The President has expressed support for development of the Toliara Project both during the late-2018 election campaign and subsequently. This, combined with statements from key advisers, is considered to represent a genuine commitment by the GoM to support the Project's development. A structured and intensive stakeholder engagement strategy has been focused on rapidly establishing and building relationships with the relevant national and local government authorities.

In early November 2019, the GoM required the suspension of on-the-ground activities at the Toliara Project whilst discussions on fiscal terms applying to the project were progressed.\* Base Resources is engaging with the GoM in relation to the fiscal terms applicable to the mining sector in Madagascar, including the Toliara Project. Base Resources is confident that mutually beneficial terms can be secured that will support a sound and sustainable Toliara Project and broader mining sector, while delivering clear benefits to the communities, the nation of Madagascar and shareholders.

## Sovereign risk

There are several mechanisms that mitigate sovereign risk in Madagascar, the most significant of which is through the contractual arrangements set out in the Large Mining Investment Law (**LGIM**), described further below. However, there are a number of other available protections against expropriation or nationalisation. The following key protections to expropriation exist in Madagascar, pursuant to applicable local and international laws and treaties.

- The investment law (*Loi N° 2007 036 du 14 Janvier 2008 sur les Investissements à Madagascar*) protects investors from any expropriation or nationalisation, except in case of public utility. In this regard, the Malagasy State is required to pay compensation to the investor although the precise method for calculation is not specified.
- The Malagasy Constitution guarantees the right to individual property. It provides that nobody can be deprived of their right to individual property except by expropriation for public utility and with the payment of compensation.
- Madagascar has concluded and ratified eight bilateral investment promotion and protection agreements (*Accord de promotion et de Protection Réciproque des Investissements*). These bilateral investment agreements require that expropriation can only be carried out with payment of compensation. Madagascar is party to a bilateral investment agreement with Mauritius, with Base Resources holding its interest in the Toliara Project through its Mauritius subsidiaries.

# Applicable Legal Regime

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## General

The legal system in Madagascar is based upon the French civil law system. This is a codified legal system based on the Napoleonic model. As in all civil law systems, statute law (which is contained in a series of codes) has the greatest importance. In contrast with common law systems, the doctrine of precedent (jurisprudence) has little weight.

## Mining law

The *Code Minier* or Mining Code and the LGIM (and their implementing decrees) are the main pieces of legislation that govern the mining sector in Madagascar.

Under the Mining Code, Madagascar is divided into squares of 625m. Only one permit exists per square.

Mining permits are administered by the *Bureau de Cadastre Minier de Madagascar (BCMM)*, the Madagascar Mining Registry. It operates on a first-come, first-served basis. The system operates in a reliable, stable fashion and the risk of outright expropriation is considered low.

A royalty is payable to the government based on the value of the product extracted. The Mining Code currently prescribes the rate as 2% of the value of the first sale.

## Environmental laws

Any entity wishing to perform exploration activities is required to obtain an environmental authorisation, and any entity wishing to perform exploitation activities is required to obtain an environmental permit.

## Land laws

There is a system of land registration in Madagascar. Land that is registered is recorded in the books at the land registry. The Topographic Service holds an official plan drawn up by a surveyor, showing the boundaries of the land. In practice, regional land registries (including the one in Toliara) are largely paper-based and often incomplete.

Foreign controlled entities are not entitled to own land in Madagascar. Instead, occupation of land by foreign entities is typically through a long term lease, up to a maximum of a 99-year lease.

# LGIM Explained

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## Overview

The Large Mining Investment Law, or **LGIM**, which was drafted with the assistance of the World Bank and is intended to create a beneficial legal and financial platform to attract investment in the mining sector.

To date, only the Ambatovy project has been certified under the LGIM.

Certification requires completion of environmental studies, obtaining of exploration or exploitation permits, and certification of the investment plan, including evidence that the proposed investment will exceed MGA50 billion (approximately \$15 million).

## Key benefits of the LGIM

- Guaranteed stability of taxes, customs and no restrictions on the sale of mining products.
- Entitlement to use foreign currencies and hold foreign bank accounts.
- Beneficial tax regime, including reduced income tax rates and VAT exemptions.
- Beneficial customs regime.
- Protections from expropriation.
- International arbitration for the resolution of disputes with the Government.

Base Resources is preparing its application for certification under the LGIM, with this application to be finalised and submitted following completion of the DFS. Base Resources is confident that the Toliara Project will satisfy the criteria for certification under the LGIM.

The process after submission of a complete application may take up to five months from the date of application (potentially more) depending on the number of documents or clarifications required by the Government. The timeframe for certification may also be delayed subject to the Government's proposed review of the Malagasy mining regime.

Generally, the LGIM eligibility period runs from the date of LGIM certification until the expiry of the mining permit granted to the permit holder. For the Toliara Project, the eligibility period would be expected to end on 20 March 2052, to coincide with the end of the initial term of PE 37242.

LGIM certification (or equivalent legal and financial stability regime) is considered to be a pre-requisite for successful funding of the Project.

# Key Project Development Approvals Required

Key project development approvals to be obtained as the Toliara Project progresses to FID

Key approval	Notes
<b>EXPORT FACILITY:</b>	
MOU	Provides the mechanism for land to be incorporated into the export facility site
Permission	Agreement to allow construction and operation of the export facility site
Design and construction approvals, and issue of construction permit	
<b>LAND ACQUISITION (EXPORT FACILITY, ROAD AND MINE SITE):</b>	
Private contracts and agreement	Used to acquire private land rights (either legal or customary title), where possible
Land decree classifying lands as State public domain	Compulsory land acquisition process for public utility
Government lease	Long term lease over government land ( <i>Domaine privé de l'Etat</i> ). Applies to haulage road and mine site
<b>HAULAGE ROAD:</b>	
MOU	Establishes the basis for the construction and use of the haulage route
Design and construction approvals	

Key approval	Notes
<b>CAMP:</b>	
Design and construction approvals, and issue of construction permit	
Borehole construction and water extraction	
<b>MINE CONSTRUCTION:</b>	
Design and construction approvals, and issue of construction permit	
Borehole construction and water extraction	
Authorisation to construct power facility ( <i>Autoproduction</i> )	
Electricity - supplier licence ( <i>Licence de fourniture</i> )	
<b>LARGE MINING LAW:</b>	
LGIM	Provides, financial and legal stability regime for large scale mining investments, favourable customs regime, guaranteed foreign exchange rights and certain tax benefits

# Capital Cost

Stage 1 Capital cost is estimated at \$442 million (+10%/-5%) based on definitive engineering designs, tendered pricing and budget quotes from vendors

## Basis of estimate

- The quantities estimate reflects the maturity of the design and is based on engineering layout and design drawings, equipment lists or general arrangement layouts and prices have been derived from a combination of the following sources:
  - 42% from project specific tenders supported by post tender meetings (including marine, export facility shed piling, bridge, IPP).
  - 50% from project specific budget quotations (including for all major mechanical and electrical equipment vendor packages).
  - 7% estimated or built-up rates.
  - 1% factored from similar works.
- The estimate base date is October 2019 and includes 10.6% contingencies but excludes VAT (which, being refundable, is included in working capital), escalation, currency fluctuations and Pre-FID costs.
- Material exchange rate exposures - 42% is USD based, 25% ZAR, 18% AUD and 11% MGA based.
- Contingency is based on a deterministic assessment approach which reviews the level of confidence in each of the inputs and applies the relevant contingency to that input.
- Owner's costs were developed from Kwale experience and the operational readiness plans for the Toliara Project.

## Capital Costs Estimate (USD millions)

Main Area	Stage 1	Stage 2
Mineral Process Plants	120	33
General Infrastructure	26	2
Plant Services & Utilities	5	1
Haul Road and Bridge	35	-
Permanent Accommodation	12	-
Product Storage & Export Facility	81	-
Mining Equipment	25	13
Management Costs (EPCM etc)	28	7
Owner's Costs (see table to right)	68	5
Contingency	42	8
<b>PROJECT TOTAL</b>	<b>442</b>	<b>69</b>

## Stage 1 Owners Costs Estimate (USD millions)

Owner's Costs	Stage 1
Integrated Management Team (Labour & Expenses)	13
Initial Clearing for mining, TSF & Starter Pit	3
Camp operating (based on Kwale + \$2m fuel)	6
Spares, tools and 1st fills	8
Owners In-country operations (community, environment, external affairs, operations team, finance and administration)	33
Light Vehicles	2
1% customs stamp duty on value of imports	1
Owner's Project Costs (Plant Mobile Equipment)	2
<b>STAGE 1 OWNER'S COST TOTAL</b>	<b>68</b>

# Operating Costs

Operating costs have been derived from first principles and experience gained at Kwale Operations, incorporating local Malagasy cost inputs where appropriate

Operating cost category	LOM Total US\$M	US\$M per annum	US\$/t mined	US\$/t produced	Comments
Power	577	17	0.98	21	Power sourced from an IPP and based on a solar hybrid solution using HFO as a fuel source. Assumes a HFO price of \$0.60/L, which results in an average power price of \$0.18/kWhr.
Maintenance	564	17	0.96	21	Maintenance is based on Kwale experience and scaled where appropriate.
Labour – expatriates	100	3	0.17	4	67 Operations team expats at start up, dropping to 35 after five years before reaching a steady state of six from 2033 onwards.
Labour – nationals	154	5	0.26	6	Excluding external affairs, community and environmental staff, operations commence with 467 national employees, before peaking at 635 in 2029 following completion of the Stage 2 expansion.
Fuel – drying	180	5	0.31	7	Diesel for the MSP drying process. Cost based on Kwale usage and a delivered diesel fuel price of \$0.85/L.
Fuel – mobile equipment	162	5	0.28	6	Mobile equipment fuel burn rates are based on Kwale and a delivered diesel fuel price is \$0.85/L.
Product transport & export facility rates	264	8	0.45	10	All products transported in bulk to the export facility at an estimated cost of \$3.45/t. Marine operations will be contracted to a chartering service at \$2.3M per annum.
Flocculant	10	1	0.02	1	Flocculant usage between 0.08 and 0.12kg/t slime at cost of \$3.67/kg.
Other operating costs	355	10	0.61	12	Other fixed operating costs, including insurance, camp management and training.
<b>Total operating costs</b>	<b>2,366</b>	<b>71</b>	<b>4.04</b>	<b>88</b>	
Royalties	159	5	0.27	6	Government royalty rate of 2% as prescribed in the Mining Code
<b>Total operating costs (incl. royalties)</b>	<b>2,526</b>	<b>76</b>	<b>4.31</b>	<b>94</b>	

# Contracts

A comprehensive strategy has been developed for the key contracts that will be required to obtain FID, construct the project or operate the assets

## Strategy

- Maintain project knowledge through continuing successful relationships with customers, key engineering and construction contractors developed into the Toliara Project implementation phase.
- Selecting contract delivery models (e.g. EPC, EPCM, BOOT, Supply, Services) with a combination of bespoke and standard FIDIC Terms and Conditions to provide optimum benefit/risk balance.
- Consolidate contract packaging to optimise contractor overhead costs.
- In addition to commercial terms, all implementation and operating contracts will include clauses related to Toliara Project specific objectives such as labour recruitment, remuneration, health, safety and environmental management.

## Key FEED/early works agreements

- Mineral Technologies and Lycopodium Alliance (**MTLA**) appointed as an EPCM contractor for the FEED and Early Works program.
- PRDW appointed to provide technical support on the export facility FEED work.
- Aurecon and Johnson Winter and Slattery appointed to support during IPP tender evaluation and Power Purchase Agreement negotiations.
- Professional Cost Consultants (**PCC**) have been appointed to provide support for project controls.

- Construction camp Early Works packages will be awarded to a mixture of first tier and local contractors on re-measurable rates contracts.

## Key implementation contracts to be finalised during FEED subject to FID

- EPCM Contract for EPCM services. Bespoke contract to be finalised by Q2 2020.
- Marine EPC Contract including the marine works, ship loader and jetty conveyor contract. Contract based on FIDIC Yellow Book conditions. Current tender valid to October 2020.
- Fiherenana River Bridge EPC Contract based on FIDIC Yellow Book conditions. Current tender valid to April 2020.
- Export Facility Piling Contract based on FIDIC Red Book conditions. Current tender valid to June 2020.
- Haul Road Construction Contract based on FIDIC Red Book conditions.
- Bulk Earthworks Construction Contracts based on FIDIC Red Book conditions. One contract at the mine site and one at the export facility.
- Accommodation Design and Construction (D&C) Contract based on FIDIC Red Book conditions for the design and construction of the balance of the camp.
- Bespoke contract for the IPP prior to FID.

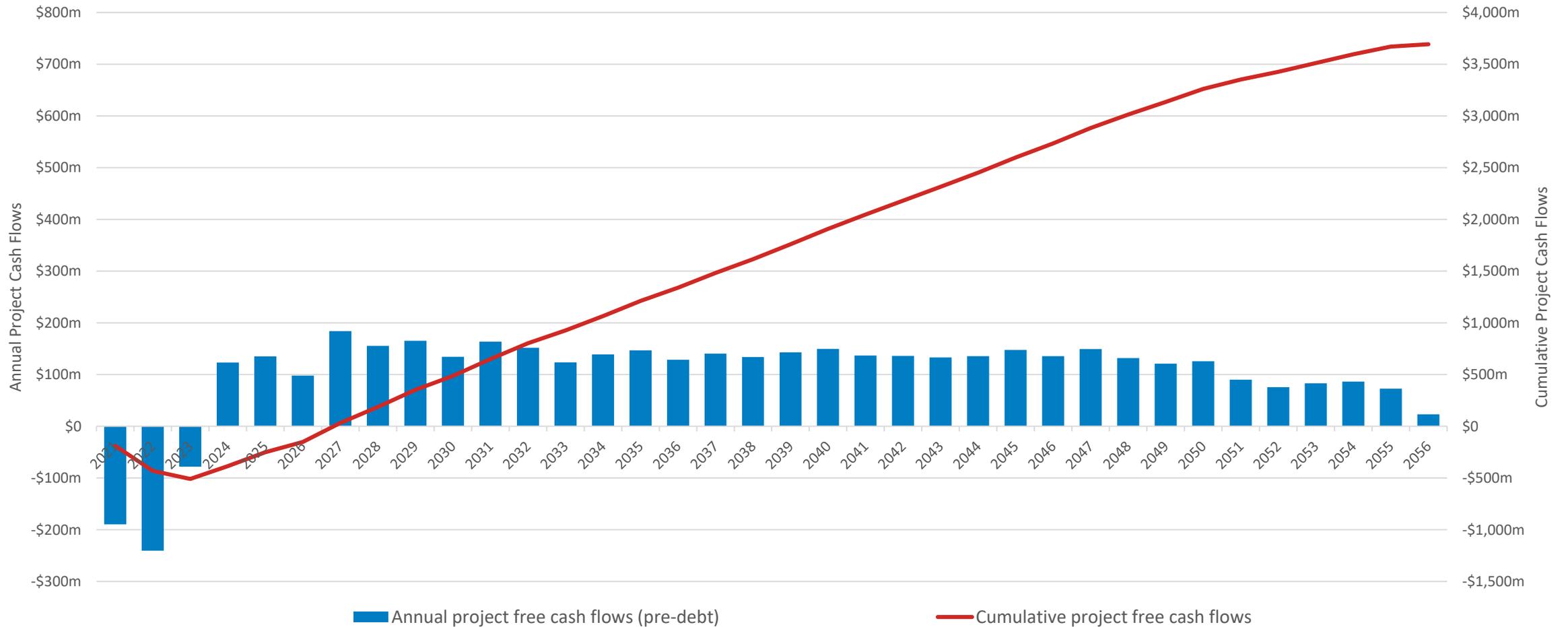
# Investment Evaluation

- Post Tax / Pre-Debt (real) NPV @ 10% discount rate of \$652m, measured at FID – assumed to be 30 September 2020.
- LOM - revenue \$7,958m, EBITDA \$5,196m, NPAT \$3,407m, free cashflow \$3,692m.
- Revenue to cost of sales ratio of 3.15.
- Stage 1 capex cost of \$442m – to establish 13Mtpa operation consisting of a single 1,750tph dozer mining unit paired with a relocatable primary WCP.
- Stage 2 capex cost of \$69m – to increase operation to 19Mtpa through the addition of a replica dozer mining unit paired to a second smaller 825tph WCP.
- Ore Reserves estimate of 586Mt @ 6.50% HM and 3.9% SL – all from existing Measure and Indicated Mineral Resources within the upper sandy unit, giving a LOM of 33 years.
- MSP recoveries of 94.6% ilmenite, 79.4% zircon and 58.4% rutile.
- Base Resources internal price forecasts used to 2030, moving to TZMI long term inducement prices from 2035.
- The fiscal terms used in the DFS are those currently prescribed in the Mining Code and General Tax Code.
- Annual averages (excluding first and last partial operating years):
  - Production of 780kt ilmenite (sulphate, slag and chloride), 53kt zircon and 7kt rutile.
  - Revenue \$248.2m – 65% ilmenite, 32% zircon and 3% rutile.
  - Operating costs of \$71.9m or \$76.9m incl. 2% royalties.
  - Non-operating costs of \$7.1m (community, external affairs, marketing etc.).
  - EBITDA \$164.3m, \$110.2m NPAT.
  - Free cash flow \$132.4m.

	Unit	Total
<b>NPV<sub>10</sub> (at a discount rate of 10%), post tax, real</b>	US\$ millions	652
<i>NPV<sub>8</sub> (at a discount rate of 8%), post tax, real</i>	<i>US\$ millions</i>	<i>910</i>
<i>NPV<sub>12</sub> (at a discount rate of 12%) , post tax, real</i>	<i>US\$ millions</i>	<i>461</i>
<i>NPV<sub>10</sub> – TZMI Q1-2019 price forecast, post tax, real</i>	<i>US\$ millions</i>	<i>722</i>
<b>IRR</b>	%	21.4
<b>Initial (Stage 1) Capex</b>	US\$ millions	442
<b>Stage 2 Capex</b>	US\$ millions	69
<b>Capital Payback Period (Stage 1 and 2)</b>	Years	4.25
<b>LOM Operating Costs + 2% Royalty</b>	US\$/t ore mined	4.31
<b>LOM Operating Costs + 2% Royalty</b>	(A) US\$/t produced	94
<b>LOM Revenue</b>	(B) US\$/t produced	295
<b>LOM Cash Margin</b>	(B-A) US\$/t produced	201
<b>LOM Revenue : Cost of Sales Ratio</b>	(B/A) Ratio : 1	3.15
<b>LOM Free Cash Flow</b>	US\$ millions	3,692

# Investment Evaluation – Free Cash Flows

Strong operating cash flows result in capital payback (for both Stage 1 and 2 capex) occurring after four years of operation



# Investment Evaluation - Mining & Production Profile

Mining starts in June 2022, MSP starting up in October 2022 and a current LOM of 33 years

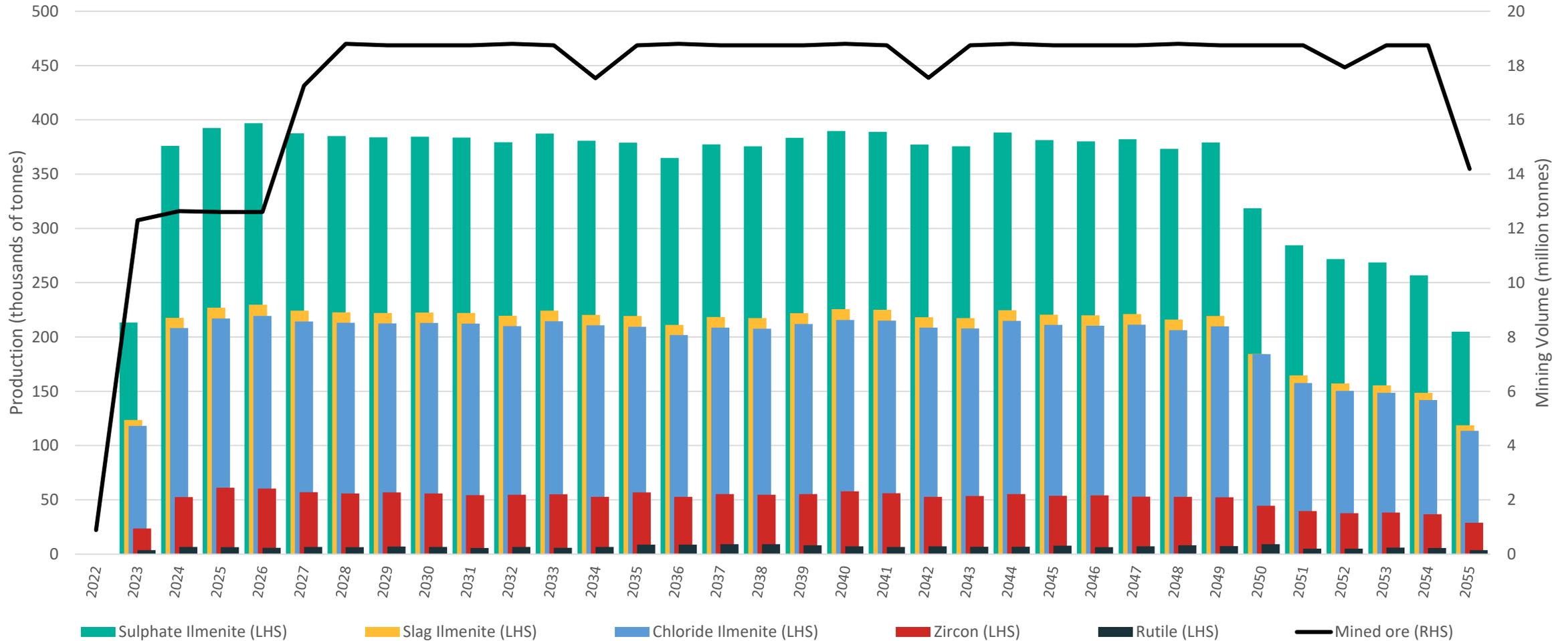
Production Profile	Life of Mine (LOM)		Operating Yr1	Operating Yrs 2-4	Operating Yrs 5-27	Operating Yrs 28+
	Total	annual ave*		annual ave	annual ave	annual ave <sup>†</sup>
<b>Ore mined (tonnes)</b>	586,019,054	18,008,919	12,300,408	12,612,768	18,588,216	18,581,844
<b>HM%</b>	6.50%	6.53%	7.61%	9.24%	6.64%	4.92%
<b>HMC produced (tonnes)</b>	38,452,018	1,186,171	939,348	1,184,581	1,244,130	920,510
<b>Period</b>	33 years	31 years	1 year	3 years	23 years	6 years
<b>Produced (tonnes):</b>						
<b>Sulphate ilmenite</b>	11,755,966	365,580	213,405	388,456	381,194	280,030
<b>Slag ilmenite</b>	6,803,453	211,570	123,502	224,809	220,606	162,060
<b>Chloride ilmenite</b>	6,512,282	202,519	118,052	214,836	210,905	156,552
<b>Total ilmenite</b>	25,071,701	779,669	454,959	828,101	812,705	598,642
<b>Rutile</b>	223,661	6,973	3,664	6,237	7,242	6,176
<b>Zircon</b>	1,683,454	52,588	23,713	58,103	54,748	39,346

\* Does not include the first and last years of operation as these are both partial operating years.

† Does not include the last year of operation as this is a partial operating year.

# Investment Evaluation – Mining & Production Profile

Stage 2 mining and concentrator starts in FY2027, lifting mining volume to 19Mtpa. Dips in mining volume are due to primary concentrator moves



# Investment Evaluation - Financial Performance Profile

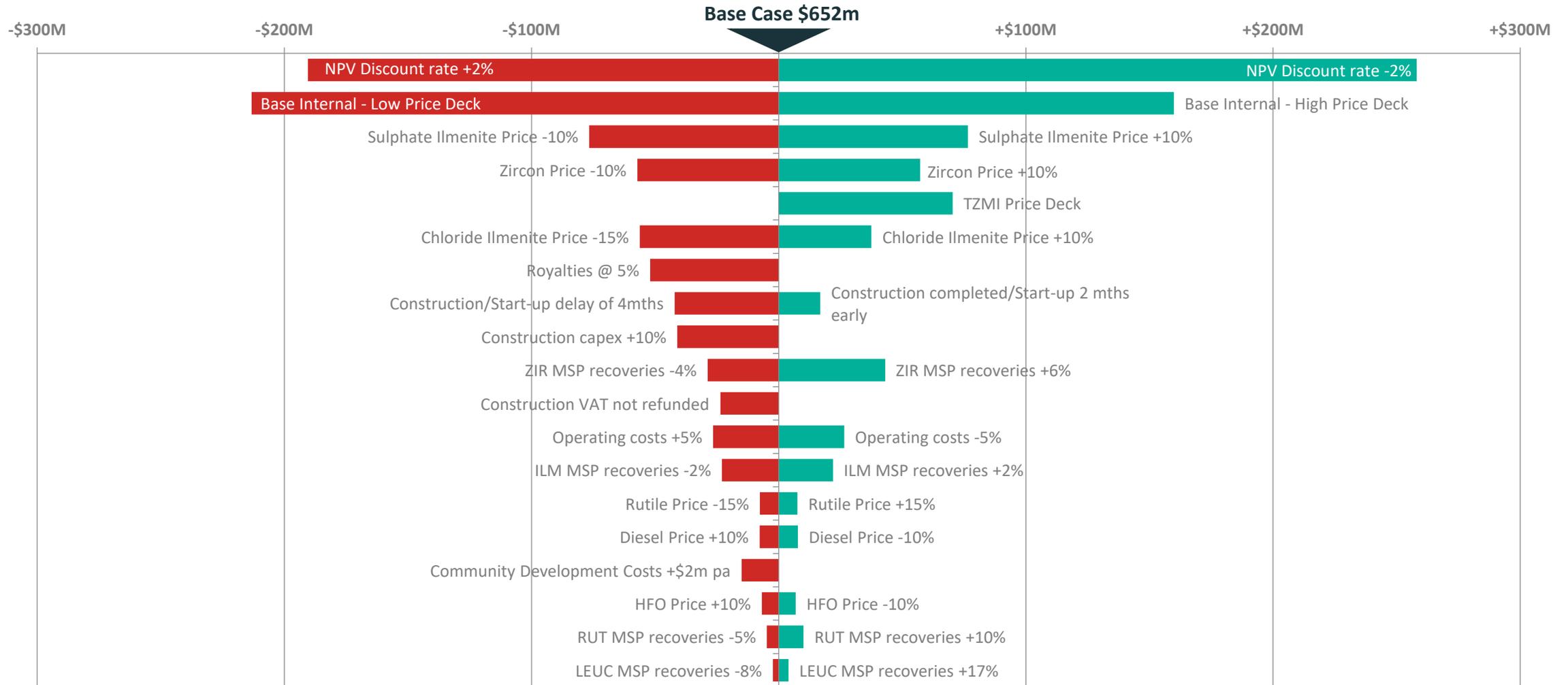
Financial Profile	Life of Mine (LOM)		Operating Yr1	Operating Yrs 2-4	Operating Yrs 5-27	Operating Yrs 28+
	Total	annual ave*		annual ave	annual ave	annual ave <sup>†</sup>
Ore mined (tonnes)	586,019,054	18,008,919	12,300,408	12,612,768	18,588,216	18,581,844
Total production (tonnes)	26,978,816	839,230	482,336	892,442	874,695	644,165
Revenue - Total	\$7,959m	\$248m	\$95m	\$240m	\$261m	\$184m
Operating Costs - Total	\$2,526m	\$77m	\$61m	\$77m	\$78m	\$70m
EBITDA	\$5,196m	\$164m	\$26m	\$157m	\$176m	\$107m
Free Cash Flow	\$3,692m	\$132m	(\$78m)	\$119m	\$143m	\$89m
Revenue - per tonne produced	\$295/t	\$296/t	\$196/t	\$269/t	\$299/t	\$300/t
Operating Costs – per tonne mined	\$4.31/t	\$4.33/t	\$4.98/t	\$6.07/t	\$4.19/t	\$3.94/t
Operating Costs – per tonne produced	\$94/t	\$93/t	\$127/t	\$86/t	\$89/t	\$115/t
Cash Margin – per tonne produced	\$201/t	\$203/t	\$69/t	\$183/t	\$210/t	\$184/t
Revenue : Cash Cost Ratio	3.15	3.23	1.54	3.14	3.36	2.62

\* Does not include the first and last years of operation as these are both partial operating years.

† Does not include the last year of operation as this is a partial operating year.

# Investment Evaluation - Sensitivities

NPV Sensitivities - Post tax / Pre debt, 10% discount rate, USD millions



# Pre-FID Expenditure

Pre-FID expenditure of \$33.9 million (from January 2020) is required to fund progression of the Toliara Project including early work activities required to meet overall project schedule timelines. The early works include FEED (process plant, bridge, accommodation camp and export facility storage shed) and commencement of the camp construction

## Pre-FID Budget

- The project implementation strategy has been further developed during the DFS and the total planned pre-FID spend is forecast as \$60.2 million, of which \$26.3 million will be incurred to the end of December 2019.
- Pre-FID spend is higher than the \$43.4 million estimated in the PFS due to the inclusion of all Toliara Project in-country operating activities (community, environment, training, external affairs and finance and administration) and the additional time to FID.

## Early Works

- To meet the project schedule and to de-risk key elements of the Toliara Project, the period between completion of the DFS and FID is planned to continue to progress early works and engineering design work (FEED).
- Early works include the upgrading of the site access road, the installation of camp infrastructure services, the construction of two 18 room blockwork dormitories and the construction of 10 two room accommodation units.
- The haul road, bridge, export facility shed piling, balance of camp, jetty and power plant construction are scheduled to commence immediately after FID. Detailed design and related contractor procurement activities will take place during pre-FID.
- Continuity of personnel and progressing FEED work on the processing plant and infrastructure designs.

Activity	Pre-FID Budget	Expenditure	Forecast
Period	Jan'18-Sep'20	Jan'18-Dec'19	Jan'20-Sep'20
In-country operations (community, environment, training, external affairs, finance and administration)	18.0	7.2	10.8
Land Compensation	9.3	-	9.3
<b>Project Development Cost</b>			
Project Development Team	7.3	5.0	2.3
Resource Definition	3.4	2.4	1.0
Metallurgical Testwork	1.1	1.1	-
Infrastructure (incl geotech drilling)	5.7	3.9	1.8
EPCM Service (PFS & DFS)	6.1	6.1	-
EPCM Services FEED / early works	4.6	0.3	4.3
Groundwater drilling/testing	0.9	0.3	0.6
Early works construction – Road/services	2.5	-	2.5
Early works construction - Buildings	1.3	-	1.3
<b>Total Project Development Costs</b>	<b>32.9</b>	<b>19.1</b>	<b>13.8</b>
<b>TOTAL PRE-FID COSTS</b>	<b>60.2</b>	<b>26.3</b>	<b>33.9</b>

All amounts above are US Dollar amounts.

# Funding

**Base Resources does not have the financial capacity to internally fund Toliara Project development on its own. External funding in the form of some combination of debt, JV interest and/or equity will be required to supplement internally generated cashflow.**

Funding for the Toliara Project can be broken down into three elements:

1. Deferred acquisition consideration of \$17 million payable to the Project's prior owners on receiving LGIM certification (\$7 million) and on FID (\$10 million).
2. Pre-FID funding (January to September 2020) of \$33.9 million to advance the project, comprising in-country operating activities (\$10.8 million), land acquisition (\$9.3 million) and project development cost (\$13.8 million).
3. Construction and operational start-up funding of \$595 million, consisting of:
  - Capex of \$442 million.
  - Working capital of \$110 million, including an estimated \$46 million for VAT (legally refundable but assumed for this funding analysis to not be recovered until operating year 5).
  - Debt establishment and servicing during construction of \$43 million (based on the funding mix assumed below).

It is anticipated that the deferred acquisition consideration and pre-FID costs will be funded internally, either from cash generated by Kwale Operations or utilisation of the existing \$75 million revolving credit facility (**RCF**) depending on timing.

The ultimate funding mix for construction and start-up will be determined prior to FID and will be dependent on Base Resources' internally generated cashflow position and forecasts for the construction and ramp-up period, market outlook, debt availability and cost, and scope of any strategic offtake joint venture at the time. For the purposes of the funding analysis, the following assumptions have been made for the \$595 million of construction and start-up funding:

- 40% Base Resources equity contribution - \$238 million sourced from cash generated from Kwale Operations (including the current \$75 million Revolving Credit Facility), equity contributions from a joint venture participant (in conjunction with substantial offtake arrangements) and/or a capital raising of up to \$110 million. Additionally, successful negotiation of a targeted VAT exemption could reduce the overall funding requirement by \$46 million and an increase in the debt funding level achieved would both contribute to reducing the required equity funding.
- 60% Debt - \$357 million sourced from traditional banks, DFIs and export credit agencies.

On the above basis, financial modelling confirms the project's ability to comfortably support this debt load.

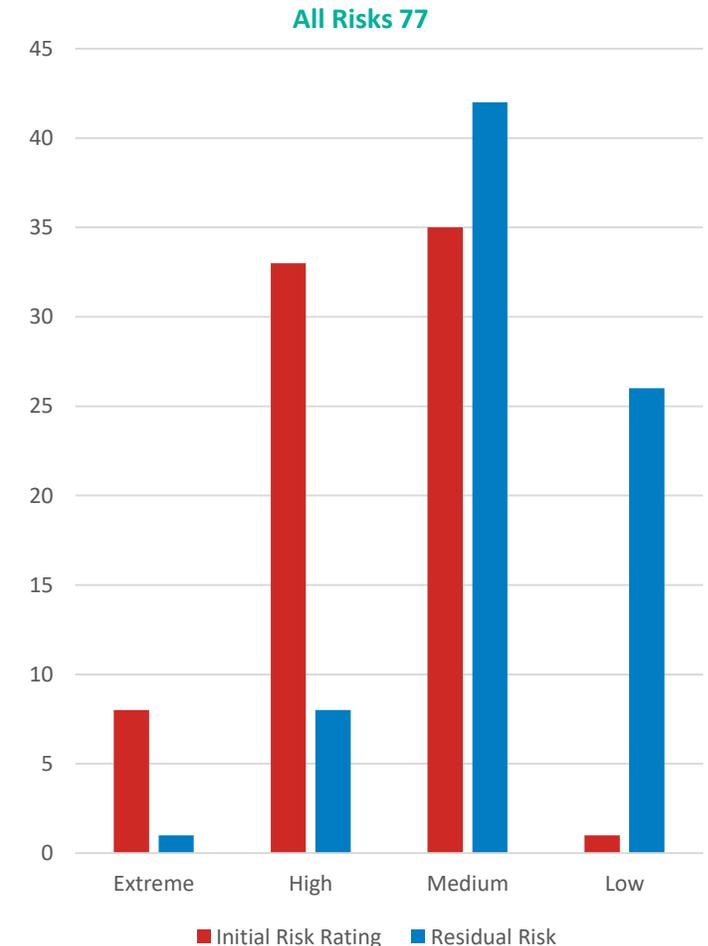
On the basis of the project economics established by the DFS (in particular free cash flow generation), the robust market outlook for mineral sands products (refer Marketing analysis), the Company's sound financial position (net cash and cash generation from Kwale Operations), track record of successfully developing and implementing and repaying financing on a similar project (Kwale Operations), prior success in capital raisings as and when required (including for the acquisition of the Toliara Project in early 2018) and preliminary work already undertaken in relation to debt and JV participation, Base Resources' considers that there is a reasonable basis that development of the Toliara Project can be successfully funded.

# Risks

77 pre and post-FID implementation risks are currently captured, of which 41 have an initial risk rating of “high” or “extreme” but, after factoring in identified mitigations, this reduces to nine risks

## Risk assessment process

- A subjective rating is applied to each risk or opportunity based on Base Resources’ likelihood and consequence matrix.
- Each risk is given an initial risk rating and, where risk mitigations are identified, a residual risk rating.
- All risks with ratings of "high" or "extreme" underwent a high-level review by management to ensure the rating was appropriate, followed by a moderation exercise.
- Risks are generally classified as "high" or "extreme" if there is both a reasonable (or higher) likelihood of occurrence and the consequence of such an occurrence is serious (or worse).
- A number of factors are considered when assessing likely consequence, including impact on finances, environment, personal safety, company reputation, legal or regulatory implications, operating continuity and strategic implications.
- Risks have been classified as pre or post FID, to identify those that will be resolved prior to FID and those that will need to be addressed post-FID. Of the 108 risks identified, there are 48 pre-FID risks and 60 post-FID risks.
- No risks were identified that would prevent the Toliara Project moving beyond the DFS phase.



# Pre-FID Risks

Of the 42 pre-FID risks identified, 21 have an initial risk rating of “high” or “extreme”, but this reduces to six risks after factoring in identified mitigations

## Community Risks

- Project delay caused by local political interference and/or civil unrest. (Initial rating: extreme -> Residual rating: high).

## Health & Safety Risks

- Traffic accident or incident during the upgrade of temporary access road during the early works which results in a death or serious injury. (Initial rating: extreme -> Residual rating: high).

## Government & Legal Risks

- Fiscal terms applicable to the Toliara Project are potentially subject to change with the Government indicating an intention to amend the Mining Code and undertake direct discussions with Base Resources.\* Increased GoM economic participation (e.g. by an increase to the 2% Government royalty currently prescribed under the Mining Code, provision for a Government interest in the project or increased minimum community development spend obligations) and other changes in mining regulation. Any change to the mining regime is expected to be negative, therefore these changes have the potential to impact economics and fundability of the project. Depending on the magnitude of any change, this may cause project delay, possibly for an extended period. Engagement with the GoM in relation to fiscal terms is ongoing. (Initial rating: extreme -> Residual rating: extreme).
- Project delay associated with obtaining remaining required approvals from the various regulatory bodies. (Initial rating: extreme -> Residual rating: high).
- Land acquisition is not finalised in time for construction activities at the Ranobe mine site to commence. (Initial rating: high -> Residual rating: high).

## Funding Risks

- Inability to secure sufficient long term take-or-pay offtake agreements with customers of sufficiently good standing to satisfy lender requirements for funding. (Initial rating: extreme -> Residual rating: high).

\* For further information refer to Base Resources' announcement on 7 November 2019 "Toliara Project – Government of Madagascar statement" available at <https://www.baseresources.com.au/investor-centre/asxreleases/>.

# Post-FID Risks

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Of the 60 post-FID risks currently identified, 18 have an initial risk rating of “high” or “extreme”, but this reduces to three risks after factoring in identified mitigations. In addition, two of the Pre-FID risks remain applicable to the post FID stage

## Marketing Risks

- A material portion of Toliara Project’s revenue comes from sulphate and slag ilmenite, for which the targeted customers are large slag/pigment producers. These volumes represent a material proportion of the contestable market, notwithstanding the anticipated supply shortfall. There is a risk of not being able to secure an underpinning strategic offtake relationship with target slag/pigment producers on terms acceptable to Base Resources and thereby raising offtake volume/penetration pricing risk. (Initial rating: high -> Residual rating: high).

## Health & safety Risks

- Fatalities or serious injury during construction. (Initial rating: extreme -> Residual rating: high).

## Government & Legal Risks

- VAT incurred during the project construction phase (\$47m) is not refunded or significantly delayed by the Government. (Initial rating: extreme -> Residual rating: high).

## Two Pre-FID risks remain applicable to the post FID stage:

- Project delay caused by local political interference and/or civil unrest. (Initial rating: extreme -> Residual rating: high).
- Traffic accident or incident during the upgrade of temporary access road during the early works which results in a death or serious injury. (Initial rating: extreme -> Residual rating: high).

# Opportunities

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**10 significant opportunities are currently identified that could add value to the project. Six of these are considered to offer a high potential to add value**

## Mineral Resources & Ore Reserves Opportunities

- Increasing the Mineral Resources and Ore Reserves estimates through additional drilling. The present Mineral Resources estimate remains open to the west and does not include the two deeper mineralised (ICSU and LSU) units.

## Environmental Opportunities

- Improved regional conservation. Through the implementation of effective conservation programs, knowledge and practices may improve species propagation, and may eventually lead to species being removed from the critically endangered list. While not impacting on project NPV, this would enhance the Project's contribution to regional and national betterment and Base Resources' reputation and strength of licence to operate.

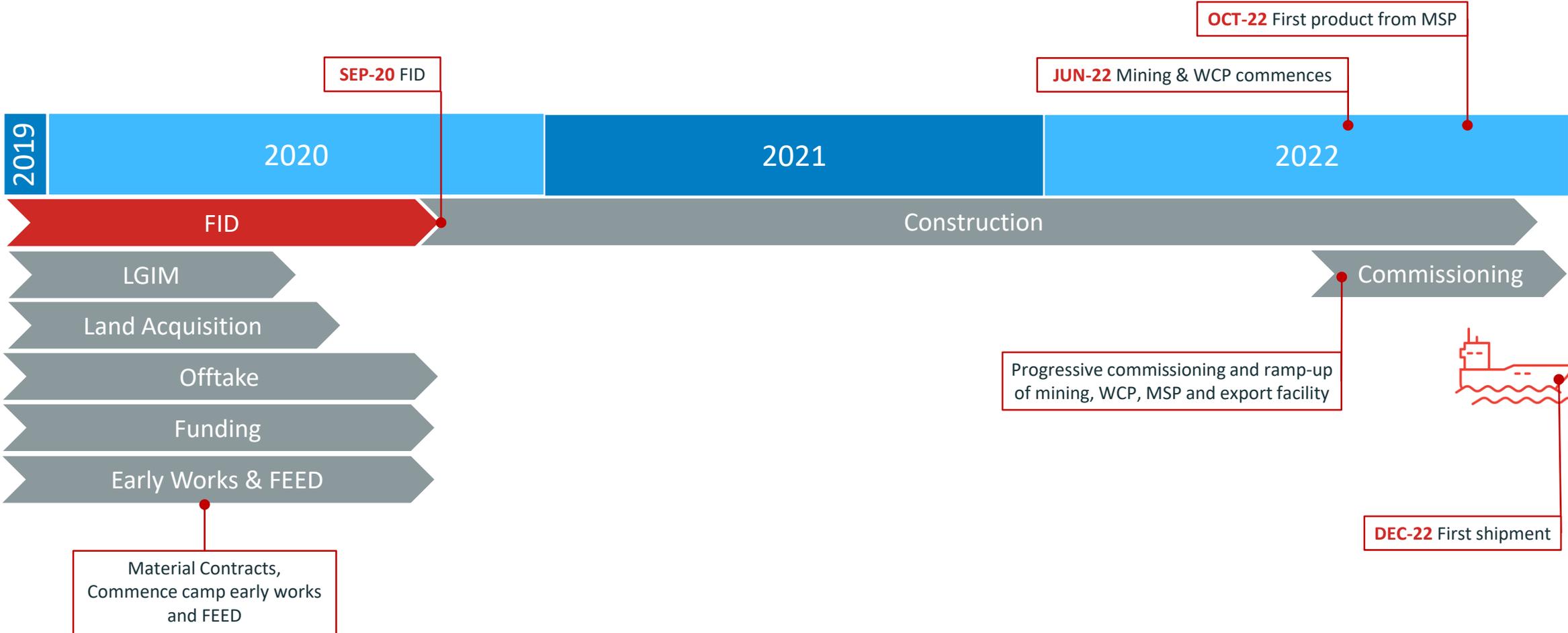
## Community Opportunities

- Engagement and positive interaction with the local community facilitated by the early skills training program, placement of block manufacture and early works contracts may provide a good foundation to build relationships prior to commencement of the mine, export facility and process plants.

## Implementation Schedule Opportunities

- The export facility storage shed construction is on the critical path for project completion. There is the potential to reduce the construction duration of the export facility storage shed by optimising the integration of the various disciplines and activities, bringing forward the start of operations and associated cash flows.
- Geotechnical investigations planned as part of the early works program will allow the optimisation of the export facility storage shed piling regime, potentially reducing the piling effort and duration compared to the current conservative design, lowering capital costs and bringing forward the start of operations and associated cash flows.
- Early contractor involvement with critical path areas such as the export facility shed piling, earthworks and geo grid installation can reduce schedule through detailed planning, providing a shorter construction duration, bringing forward the commencement of operations and associated cash flows.

# Indicative timeline



# Glossary

Term	Meaning
\$ or US\$ or USD	United States Dollars
Al <sub>2</sub> O <sub>3</sub>	Aluminum oxide
Base Toliara	Base Toliara SARL, Base Resources' Malagasy operating subsidiary
Base Resources or the Company	Base Resources Limited (ABN 88 125 546 910)
CAE	Evaluation and compensation committee
CaO	Calcium oxide
Capex	Capital expenditure
Competent person	The JORC Code requires that a Competent Person must be a Member or Fellow of The Australasian Institute of Mining and Metallurgy, or of the Australian Institute of Geoscientists, or of a "Recognised Professional Organisation". A Competent Person must have a minimum of five years' experience working with the style of mineralisation or type of deposit under consideration and relevant to the activity which that person is undertaking
Cr <sub>2</sub> O <sub>3</sub>	Chromium (III) oxide
CSEP	Community stakeholder engagement plan
CTR	Committee for transparency in recruitment
DFI	Development finance institution
DFS	Definitive feasibility study, the results of which are set out in this document
DMU	Dozer mining unit

Term	Meaning
DUP	Compulsory acquisition of land through the process called Declaration of Public Utility
EI	Electrical and instrumentation
EPC	Engineer-procure-construct
EPCM	Engineer-procure-construct-manage
ESIA	Environmental and social impact assessment
ESMS	Environmental and social management system
FEED	Front end engineering development
FEL	Front end loader
FeO	Iron oxide
Fe <sub>2</sub> O <sub>3</sub>	Iron (III) oxide
FID	Financial investment decision by the Board of Base Resources to commence construction of the Toliara Project
FOB	Free on board
FIDIC	International Federation of Consulting Engineers (previously <i>Fédération Internationale des Ingénieurs Conseils</i> ) is an international standards organization known for producing standard form contracts for the construction and engineering industry
FY	Financial year. 1 July to 30 June.
GoM or Government	Government of Madagascar
HFO	Heavy fuel oil
HiTi	High grade leucoxene
HM	Heavy mineral

# Glossary

Term	Meaning
<b>HMC</b>	Heavy mineral concentrate
<b>ICSU</b>	Intermediate clay sand unit
<b>IFC</b>	International finance corporation
<b>Indicated Mineral Resource</b>	An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade (or quality), densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit
<b>Inferred Mineral Resource</b>	An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade (or quality) are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade (or quality) continuity. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes
<b>IPP</b>	Independent power producer
<b>IRR</b>	Internal rate of return
<b>JORC</b>	The Joint Ore Reserves Committee: The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (“the JORC Code”), as published by the Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia
<b>JV</b>	Joint venture
<b>kt</b>	Thousand tonnes
<b>kV</b>	Kilovolts

Term	Meaning
<b>Kwale Operations</b>	Base Resources’ mineral sands operations in Kwale county, Kenya
<b>kWhr</b>	Kilo watt hour
<b>LGIM</b>	Large Mining Investment Law
<b>LOM</b>	Life of mine
<b>LRIMP</b>	Labour, recruitment and influx management plan
<b>LSU</b>	Lower sand unit
<b>M&amp;I</b>	Measured and Indicated Resource
<b>Measured Mineral Resource</b>	A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade (or quality), densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit
<b>MG12 spirals</b>	A new high-performance spiral separator from Mineral Technologies
<b>MgO</b>	Magnesium oxide
<b>Mineral Resource</b>	Mineral Resources are a concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade (or quality), and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade (or quality), continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are subdivided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories
<b>MnO</b>	Manganese oxide
<b>MRNL</b>	Madagascar Resources NL

# Glossary

Term	Meaning
<b>MSP</b>	Mineral separation plant
<b>Mt</b>	Million tonnes
<b>Mtpa</b>	Million tonnes per annum
<b>MW</b>	Megawatt
<b>Nb<sub>2</sub>O<sub>5</sub></b>	Niobium pentoxide
<b>NGO</b>	Non-governmental organisation
<b>NPV</b>	Net present value
<b>ONE</b>	Office National Pour l'Environnement
<b>Opex</b>	Operating expenditure
<b>Ore Reserves</b>	Ore Reserves are the economically mineable part of Measured and/or Indicated Mineral Resources. Ore Reserves are sub-divided in order of increasing confidence into Probable and Proved categories.
<b>OS</b>	Oversize
<b>P<sub>2</sub>O<sub>5</sub></b>	Phosphorus pentoxide
<b>PFS</b>	Pre-feasibility study, the results of which were announced on 21 March 2019
<b>Probable Ore Reserves</b>	The economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Ore Reserve is lower than that applying to a Proved Ore Reserve.
<b>Proved Ore Reserves</b>	The economically mineable part of a Measured Mineral Resource. A Proved Ore Reserve implies a high degree of confidence in the Modifying Factors.

Term	Meaning
<b>RCF</b>	Revolving credit facility
<b>ROM</b>	Run of mine
<b>RWG</b>	Resettlement working groups
<b>SiO<sub>2</sub></b>	Silicon dioxide
<b>SL</b>	Slime or clay
<b>SMP</b>	Structural mechanical and pipework
<b>Solar PV</b>	Solar photovoltaic system
<b>t</b>	Metric tonne
<b>TiO<sub>2</sub></b>	Titanium dioxide
<b>Toliara Project</b>	The mineral sands development project, based on the Ranobe deposit, located in south west Madagascar, 45km north of the regional port town of Toliara
<b>TSF</b>	Tailings storage facility
<b>tph</b>	Tonnes per hour
<b>TZMI</b>	TZ Minerals International. An independent consulting group.
<b>WCP</b>	Wet concentration plant
<b>WTR</b>	World Titanium Resources Limited
<b>USU</b>	Upper sand unit
<b>U + Th</b>	Uranium and thorium
<b>V<sub>2</sub>O<sub>5</sub></b>	Vanadium pentoxide
<b>VAT</b>	Value added tax
<b>ZrO<sub>2</sub>+HfO<sub>2</sub></b>	Zirconium and hafnium